

**ACCESS TO ESSENTIAL MEDICINES FOR MANAGING  
OPPORTUNISTIC INFECTIONS AMONG HIV/AIDS PATIENTS IN  
DAR-ES-SALAAM REGIONAL HOSPITALS,  
TANZANIA**

By

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Master of Public Health of**

**Muhimbili University of Health and Allied Sciences**

**Muhimbili University of Health and Allied Sciences**

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## **CERTIFICATION**

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences, a dissertation entitled access to essential medicines for managing opportunistic infections among HIV/AIDS patients in Dar-es-salaam regional hospitals, Tanzania in fulfillment of the requirements for the degree of Master of public health of Muhimbili University of Health and Allied Sciences.

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**DECLARATION**

AND

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I, **Zawadi Phares Secha**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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## ACRONYMS

HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
TACAIDS	Tanzania Commission for AIDS
OIs	Opportunistic Infections
ARVs	Anti Retroviral drugs
RMO	Regional Medical Officer
DMO	District Medical Officer
ART	Antiretroviral Therapies
DED	District Executive Director
PLHIV	People Living With HIV
CTX	Co-trimoxazole
MPR	Median Price Ratio
TRIPS	Trade Related Intellectual Property Rights
CTC	Care And Treatment Center
MDGs	Millennium Development Goals
IRP	International Reference Price
MSH	Management Sciences for Health
TZS	Tanzanian Shillings
MPR	Median Price Ratio

## DEFINITION OF KEY TERMS

**Direct cost** is any financial cost incurred by patients in purchasing unavailable prescribed medicine for managing opportunistic infections.

**Essential medicines list** is a list of those medicines that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness.

**Opportunistic infections** are infections that occur because of a weakened immune system

**Availability** refers to the percentage of medicines found in the clinics on the day of data collection.

**Affordability** refers to the number of days' wages would the lowest paid unskilled government worker need to spend to pay for treatment medicines

**Price** refers to the ratio of median local prices expressed to International reference price

**Access** is defined as having medicines continuously available and affordable at public or private health facilities or pharmacies that are within one hours' walk from the clinic and /or home.

**Minimum dose** refers to the minimum recommended dose of a particular opportunistic infection.

## ABSTRACT

**Background:** Insufficient access to essential medicines for managing opportunistic infections in CTC clinics and high medicines prices in the private pharmacies are still the leading problems in the management of opportunistic infections among HIV patients. In Tanzania and other East African countries, little is documented regarding the access of essential medicines for treatment of opportunistic infections at the patient level. Findings from this study are important for decision makers in developing effective policies and provide equitable access to essential medicine for managing opportunistic infections.

**Objective:** The main objective of this study was to assess the access of essential medicines for managing opportunistic infections among HIV/AIDS patients in Dar-es-salaam regional hospitals.

**Methods:** A cross-sectional study was conducted among selected HIV/AIDS patients, pharmaceutical personnel at three CTC clinics (Amana, Mwananyamala and Temeke) and 6 private pharmacies. Data was collected by using adopted WHO/HAI methodology. Median price of these medicines were compared with International Reference Price. The salary of the lowest-paid un-skilled government worker and National Poverty Line income was used to assess affordability of essential medicines for managing OIs. Data was analyzed by using EPI Info version 3.5.4. Chi-square test was used to test for statistical significance of the observed results.

**Results:** This study enrolled 305 participants with a mean age of 41 years, of which more than 59% earn below TZS 5,500 per day. The selected common OIs found were respiratory tract infection (**RTI**), skin fungal infection (**SFI**), urinary tract infection (**UTI**) and oral candidiasis (**OC**), and common prescribed medicines were Amoxicillin 250mg capsules, Ciprofloxacin 500mg tablets, co-trimoxazole 480mg tablets, fluconazole 150mg tablets and Clotrimazole 1% cream. The availability of medicines for managing opportunistic infections in the CTC clinics were found to be very low about 15%, 17% and 24% for Mwananyamala, Temeke and Amana CTC respectively. Most of the patients have inadequate ability to purchase medicines due to high price in the private pharmacies, (MPR=2.605), of which patients need to utilize up to more than 5 working days of lowest unskilled government employee to purchase a minimum dose, while

for those patients who are living below poverty line (TZS 2000) need to work for about 12 days' wages in order to pay for a one-treatment dose of an essential medicines.

**Conclusion and recommendations:** The study reveals poor accessibility of essential medicines for managing opportunistic infections in the CTC clinics. The prices of medicines are very high for majority of HIV/AIDS patients to have ability to pay for medicines. Therefore the availability, pricing and affordability of essential medicines should be improved in order to ensure equity in access to medicines among HIV/AIDS patients in CTC clinics among referral hospitals in Dar-es-salaam. Through adopting health financing system and universal health coverage approach at the CTC clinics, consideration of other alternative strategies for controlling measures of essential medicines availability, prices and drug subsidation in the private pharmacies will make these medicines readily available and affordable by the majority of the HIV patients.

## INTRODUCTION

### 1.1 Background information

Globally, the number of people receiving antiretroviral treatment has tripled over the last five years. Since 2005, sharp increases in the number of people receiving antiretroviral treatment have occurred in all regions of the world(1). However, opportunistic infections continue to cause high morbidity and mortality in patient with human immunodeficiency virus (HIV) infections throughout the world. Notwithstanding, certain HIV patients in the developed and developing world do not have access to care(2). Recent data indicate that one third of the global population lacks reliable access to essential medicines. This situation is even worse in African countries including Tanzania. In Tanzania it has been reported that, 5.1 percent of adults aged 15-49 are infected with HIV(1)(3)(4) . The virus weakens the immune system, making the body susceptible to opportunistic infections; this could be treated if HIV patients in these countries had reliable access to existing essential medicines.

It has been shown that the major leading opportunistic infections that continue to cause significant morbidity and mortality in HIV infected individuals globally are tuberculosis, cryptococcosis, hepatitis B, hepatitis C and Malaria(5).

HIV infection has been one of the most serious public health and development challenge in sub-Saharan Africa. It accounts for about 75 percent of all HIV infections worldwide and more than 75 percent of AIDS-related deaths estimated for 2003 occurred in Sub-Saharan Africa(6). Also it is estimated that 23.5 million individuals, live with HIV infections and 1.8 million with new infections and 1.2 million are HIV related deaths.

In Tanzania and all around the world HIV/AIDS patients have been suffering from opportunistic infections, however; availability of medicines for managing these OIs is still questionable. These medicines are sometimes not available in health care facilities in Tanzania. Today, more than one-third of the world's population and more than one-half of the poorest people in African countries, including Tanzania still lack access to essential medicines that are used in managing opportunistic infections. According to the WHO, such access should cover therapeutic, physical

and financial aspects of priority health problems, and should be within easy physical and affordable reach to all(7).

The cost of newer medicines with proven advantages over older medicines, such as antiretroviral drugs and medicines for opportunistic infections, limit the access to medicines in low income countries like Tanzania. Moreover, up to 90% of the population in low and middle-income countries must pay for medicines out of pockets due to lack of medicines in the public health facilities and inadequate publicly subsidized services which give rise to financial hardship and finally medicines become unaffordable(8) The private sectors now are increasingly taking over the medicine supply in many African countries, including Tanzania, driving the cost of medicines out of range of affordability for the vast majority of the poor(9) (10)

Common HIV associated opportunistic infections include but not limited to, fungal infections such as candidiasis and cryptococcosis, viral infections such as herpes simplex and some bacterial infections. Other opportunistic infections include toxoplasmosis, cytomegalovirus, and malignancies such as Kaposi sarcoma and non-Hodgkin's lymphomas(11). Management of opportunistic infections requires appropriate diagnostic services and availability of necessary medicines; therefore people living with HIV with opportunistic infections are often managed at more complex health facilities.

This study focused on access of individual essential medicines in the management of different opportunistic infections among HIV/AIDS patients and affordability of those essential medicines which are not available in the clinics i.e. cost of medications in relation to HIV/AIDS patient's income

## **1.2 Statement of the problem**

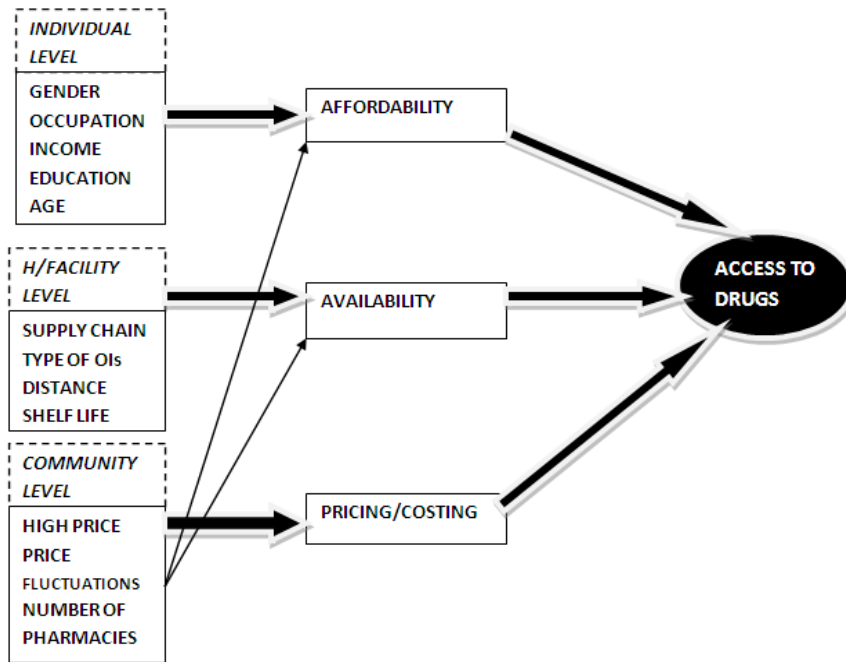
Insufficient access to essential medicines for managing opportunistic infections among HIV patients in CTC clinics is still the leading problem in the management of opportunistic infections, and probably leading to increased morbidity and mortality among HIV patients in low income countries including Tanzania. According to National HIV Policy of Tanzania, antiretroviral and other medicines used in managing HIV related conditions are supposed to be available for free. However, it is still not known to what extent are these medicines accessible in the respective clinics.

Today, more than one-third of the world's population and more than one-half of the poorest people in African countries, lack access to essential medicines that are used in managing opportunistic infections(7). Among many causes, irrational use of medicines, increased morbidity, drug resistance and side effects have been reported to contribute to the problem (12). Moreover, long distance to the facilities, high health care cost, persistent lack of coordination of international aids, poor supply chain management, insufficient resource allocation and Trade Related Intellectual Property Rights (TRIPS) agreement has contributed to non-availability of medicines for managing OIs in CTC clinics and inability to pay for the same from private pharmacies(13)(14). People with low income and without health insurance are more likely to suffer from this problem.

Several studies have been done with focus on drug-drug interactions, access to free ARVs, access to general essential medicines, supply of free ARVs etc (15)(10). The present study is a contribution to the body of literature by specifically focusing on accessibility to medicines for managing OIs with main focus on availability, affordability and cost incurred by patients for purchasing medicines for opportunistic infections. Opportunistic infections have been the central focus of the study in this group of patients because; it is the major cause of death. Ensuring good accessibility to OIs medicines will result into improved well-being of HIV patients and reduce the financial hardships encountered by this group in Tanzania.



### 1.3 Conceptual framework



The conceptual framework above tries to show probable links between the dependent variable (Access to drugs) and other independent variables. Poor access to essential medicines for managing opportunistic infections may be linked to several factors or causes.

This framework is divided into three parts; namely dependent/ measured variable which is access to drugs, intermediate measured variables which are affordability, availability and pricing/costing and also independent variables which are grouped into three levels.

**Level one** is individual level (gender, occupation, income, level of education, and age) all these can affect the ability to pay for medicines. **Level two** is health facility level (supply chain, types of IOs, and medicine shelf life) all these may affect the availability of medicines. **Level three** is community level (high price, number of pharmacies and fluctuation of medicine price) all these may affect the pricing of medicines and also cost to medicines.

Finally all these may determine access to essential medicines for managing opportunistic infections among HIV patients.

## **1.4 Rationale of the study**

The focus of this study was to assess the access of essential medicines for managing OIs and cost on medicine purchasing to HIV patients. Access to healthcare is one of the fundamental human rights. However, without equitable access to essential medicines for treatment of opportunistic infections, the fundamental right to healthcare cannot be fulfilled. Access to essential medicines is one of the United Nations' Millennium Development Goals (MDGs)(16)(8). This study covers the number of OIs medicines present in CTC clinics which patients can access, number of HIV patients with OIs and ability to buy from private pharmacies. Findings from this study are important in adopting new knowledge on WHO/HAI Methodology on assessing availability and affordability of essential medicines, reviewing current national HIV policy and the programs to increase budget for purchasing varieties of OIs medicines to insure their availability in all CTC clinics, which will result into well-being of HIV/AIDS patients and finally reduce the financial hardships encountered by HIV patients in Tanzania.

## **1.5 Research questions**

### **1.5.1 Main question**

To what extent do HIV patients have access to essential medicines used for managing opportunistic infections in Care and Treatment Centers in Dar-es-salaam regional referral hospitals?

### **1.5.2 Sub questions**

1. What are the common types of opportunistic infections do they encounter?
2. What are the common medicines prescribed for treatment of those opportunistic infections?
3. To what extent are the medicines for treatment of opportunistic infections available in CTC clinics?
4. What is the direct cost incurred by patients to purchase medicines from private pharmacies that are not available in the CTC clinics?
5. What is the range of prices of medicines used for treating opportunistic infections in private pharmacies?
6. To what extent are HIV patients able to pay for drugs in the private pharmacies that are not available in the clinics?

## **1.6 Study objectives**

### **1.6.1 Broad Objectives**

To assess the access to essential medicines for managing opportunistic infections among HIV/AIDS patients in Dar-es-salaam regional hospitals

### **1.6.2 Specific Objectives**

1. To explore types of opportunistic infections encountered by CTC clinic attendees
2. To explore the common medicines prescribed for treatment of opportunistic infections
3. To assess availability of selected medicines for managing opportunistic infections at CTC clinics.
4. To determine the direct cost incurred by patients to purchase medicines that are not available in the CTC clinics
5. To determine the ranges of price of medicines used in the treatment of opportunistic infections
6. To assess financial capability of HIV/AIDS patients to purchase medicines for managing opportunistic infections from private pharmacies

## **2. LITERATURE REVIEW**

### **2.1 Access to medicines**

Access is defined as having medicines continuously available and affordable at the public or private health facilities or medicines outlets that are within one hours' walk from the homes of population(8). Access to medicines is a broad concept and includes availability (physical access), affordability (economic access), geographical accessibility and acceptability (social-cultural access) cross linked with safe, efficacious, quality and cost-effectiveness. Also in recognizing that better access to medicines is requirement for improving health outcome in HIV patients

#### **2.1.1 HIV and related opportunistic infections.**

People with advance HIV infections are vulnerable to infections that are called opportunistic infections because they take advantage of the opportunity offered by the weakened immune system. Even though there are currently no medicines for the cure of HIV infections, there is treatment for opportunistic infections resulting from HIV induced immune deterioration.

In most cases patients do not die from HIV infections but yield to complications that the HIV induced immune deterioration cannot handle. Opportunistic infections depend on the level and kind of infections that are common in a given area and so these diseases may also be common disease that are found among non-HIV population e.g. tuberculosis, pneumonia, etc.(17)

However, because of high frequency of certain disease in HIV infected people, special attention may be provided to AIDS patients or HIV patients in term of prevention and treatment. E.g. the use of cotrimoxazole and fluconazole (The Diflucan Initiative)(18) in the prevention and treatment of bacterial and fungal infections respectively, Isoniazid for prevention of tuberculosis.

In resource constrained countries the main challenges is the choice between interventions that will lessen the morbidity and suffering of those in need while not exceeding the financial capability of the health system. The effective intervention against opportunistic infections requires the following strategies:-

- Prevention of active disease using medicines with aim of eradicating existing infection prior to development of active disease or preventing new infections.

- Prevention of exposure of infection where possible
- Early treatment of active disease aimed at source of infection.

### **2.1.2. The natural history of HIV and related opportunistic infections**

Understanding the natural history of HIV and related opportunistic infections is necessary to optimize strategies for the prophylaxis and treatment of OIs. Once infected with HIV the progression to AIDS and premature death is the reality for people in most low income countries. OIs have spread to more than 20% of the population in seven sub-Saharan countries including Tanzania. These disease burden resulted in more than 2 million HIV –related death in 2001 and has reduced the average life expectancy in sub-Saharan Africa from an anticipated 62 years to 47 years(19). It has been studied that across sub-Saharan Africa most infections to which HIV infected individual are susceptible in this region are fungal infections (more often pneumocystis carinii pneumonia), bacterial infections (more often tuberculosis) and malaria. Due to low turn-up of people to test for HIV, most of them start developing opportunistic infections and then use it as an indicator for going for HIV testing. This lead to them attend clinics at a too late stage after developing major symptoms which are direct indication of AIDS patient, using WHO criteria of major and minor signs(19).

### **2.1.3 Spectrum of opportunistic infections**

According to a study done in Gabon, most of the opportunistic infections encountered were treatable but the mortality rate was high (11.7%) due to late diagnosis, the lack of availability of medicines for managing opportunistic infections and poor economic conditions of the population(20). In Tanzania, Iringa region is among the region with highest rates of HIV infection in the country at 9.1% prevalence in the general population(17). According to strategic assessment report done in Iringa many participants working in NGOs complained that many facilities such as the regional hospital are often understaffed or lack reagents, ART, or medicines for managing opportunistic infections. Therefore when patients are referred to these centers, they either have to wait for unacceptably long periods of time to receive services or sometimes they are turned away due to lack of these supplies and/or medicines(21).

### **2.1.3b Opportunistic Infection's medicines and HIV/AIDS**

Opportunistic infections will continue to cause substantial morbidity and mortality in patients with HIV infection. As it has been documented that most opportunistic infections encountered were in therapy but the mortality rate is still high due to late diagnosis and non-availability of medicines for managing opportunistic infections(13). Medicines for preventing and treating opportunistic infections are being prescribed by physicians. However, they have encountered problem of non-adherence. And the most cited reason for non-adherence were unavailability of CTX at the hospitals (35%) and CTX induced side effect (27%). (22)(23). Many PLHIV reported being prescribed septrin (the locally used brand name for co-trimoxazole), a medicine used for prophylaxis and treatment of wide range of opportunistic infections associated with HIV, but reported difficulties in obtaining it from clinics while it was supposed to be available free of charge to HIV patients. In addition PLHIV were instructed to purchase the medications using out-of-pocket money at the nearby pharmacies(21). Some of these medications are not available in the CTC clinics; they are mostly available in private facilities and community pharmacies where they can be accessed through paying a substantial amount of money.

### **2.1.4 Treatment and support services**

ARVs and other clinical services for management of opportunistic infections are provided in health centers. The government of Tanzania strategically aims to strengthen and scale up the implementation of comprehensive care and treatment services in both public and private health facilities. Up to December 2012, a total of 1,135,390 people living with HIV and AIDS were cumulatively enrolled in care and treatment services. In Dar-es-salaam alone, the cumulative number of people enrolled on HIV care are 178,150 of which 117,986 are on ART (17) By December 2010 the regional population of Dar-es-salaam was 4,364,541 with HIV prevalence of 6.9 % for age group 15-49 years, with 100 CTC centers.(3)

#### **2.1.4b Cotrimoxazole prophylaxis (CTX)**

Cotrimoxazole is the generic name of a medicine which is a combination of trimethoprim and sulfamethoxazole. Cotrimoxazole is the most important medicine for prevention of certain opportunistic infections in both industrialized and resource-limited countries. Cotrimoxazole has

been shown to reduce morbidity and mortality in Sub-Saharan Africa and has been shown to be cost-effective and even cost saving in some settings. It is generally recommended for all people with CD4 less than 350 or clinical stage 2, 3, or 4 but in some countries it is recommended for all HIV infected persons. CTX prophylaxis should be considered an essential service which all programs should provided(24)

#### **2.1.4c Management of acute OIs in the setting of ART**

Opportunistic infections that develop after patients have started using potent ART can be categorized into three groups.

The first group, includes OIs that occurs shortly after initiating ART (within 12 weeks). These are thought to be subclinical infections that have been unmasked by early immune reconstitution and are not considered as early ART failure.

The second group includes report of OIs occurring more than 12 weeks after initiation of ART among patients with greater than 200cell/ $\mu$ L CD4 counts. The presence of organism by stain and culture suggest that, in either situation, specific therapy is indicated.

The third group includes OIs that develop among patients who are experiencing virologic and immunologic failure while on potent ART. These represent clinical failure of ART(2) Opportunistic infections usually begin five to seven years after infections and occur progressively as uncontrolled HIV replication destroys the immune system (6)

#### **2.1.5 Availability**

Access to healthcare is one of the fundamental human rights. However, without equitable access to essential medicines for treatment of opportunistic infections, the fundamental right to healthcare cannot be fulfilled. Access to essential medicines is one of the United Nations' Millennium Development Goals (MDGs).(16) The right medicines in the right formulation should be made available for every patient. This requires activities under rational use, quality, equitably and safety.

Lack of essential medicines is the main concern in many health facilities. A survey done by “The Sauti za Wananchi” in the health facilities (face to face interviews) asked heads of health

facilities to describe three main problems affecting the quality of health care in their communities. In order of priority, lack of medicines at the health facility was mentioned as the main problem by 26% and as one of the three main problems by 69% of the heads of health facilities.(12)

### **2.1.5b Medicines stock-outs**

The 2010 Service Delivery Indicators (SDI) Survey Tanzania involved visits to 175 public primary health facilities across Tanzania and assessed, among other issues, the availability of medicines from a list of essential medicines through direct observation. The list of medicines included Oral Rehydration Salt, Paracetamol, ALu and Metronidazole as well as other antibiotics and medicines. On average, 24% of the items on the list were not available. Note that stock-out measures are very sensitive to the number of different medicines checked. In this respect, the fact that Tanzania does not have an officially accepted and regularly monitored list of essential medicines is problematic(12)

### **2.1.6 Affordability**

Affordability is calculated in terms of the number of days the lowest paid unskilled government worker would have to work to pay for one treatment course for an acute condition or one month's treatment for a chronic condition. A survey made by WHO in Tanzania about medicines price shows that, the lowest paid unskilled government worker earned TZSs 1667 (US\$1.558) per day. According to the World development Report of 2005, 72.5% of the Tanzanian population lives on less than US\$2 per day and 48.5% on less than US\$1 per day. More than half of the population lives on less than the salary of the lowest paid government worker and hence the affordability for many Tanzanians was lower than for this worker. Overall, purchasing treatments for chronic conditions was found to require many more days' work than purchasing treatments for acute conditions. The burden is especially great for a family needing treatment for several conditions at the same time, e.g. using the lowest priced generic medicines, it would take just under 5 days' wages for the lowest paid unskilled government worker to purchase a salbutamol inhaler for a child with asthma, a course of cotrimoxazole suspension for a child with a respiratory tract infection, glibenclamide tablets for an adult with diabetes and ranitidine tablets for an adult with a peptic ulcer.



The survey also found significant differences in affordability between medicines within a therapeutic category. While there may be clinical advantages of one treatment option over the other, for patients paying out-of-pocket and in particular when a medicine is not available in the public sector, patients may be unable to afford the preferred treatment.(25)

### **2.1.6b Economic burden to HIV patients**

People with HIV frequently experience severe economic barriers to health care, including out-of-pocket expenses related to diagnosis and treatment (direct medical costs), as well as indirect costs due to loss of income. These barriers can both aggravate economic hardships and prevent or delay diagnosis and treatment and successful outcome. Leading to increase rate of HIV transmission and finally to increased HIV morbidity and mortality. In a study of assessing the needs of PLWHA in New Delhi, India, major support received by the respondents from the government was free ART and medicines for OIs while the major support required was regular availability of medicine for various opportunistic infections and associated diseases at CTC clinics. Finding from the study shows that 62.62% of the respondents show concern of regular un-availability of medicine for opportunistic infections and associated diseases at the CTC clinics(26). Moreover, high direct and indirect cost of care constitute salient determinants of poor treatment adherence, contributing to low cure rates and high risk of death among poor and vulnerable groups. These cost have been shown to affect the uptake of medicines (ARVs and OIs medicines) from treatment in Malawi and to negatively impact ART adherence in Botswana and Brazil (27).

### **2.1.7 Pricing**

The situation of price components of medicines varies between countries, studying these components is particularly important. Although this may be challenging, medicine retailers within the pharmacies know exactly where the additional charges are occurring. Individual patients are very unlikely to have access to such price, availability and affordability and such information the government has a responsibility for obtaining this information and sharing it widely. Often policy actions was required to address specific areas of abuse(28). The WHO through Management Sciences for Health (MSH) medicine price indicator has developed the International Reference Unit Price list, which will help the price regulators or policy makers to

control the price of medicines in their countries. Because the pricing formula is not completely implemented, currently, the prices of individual medicines could be decided by the importers, manufacturers and individual pharmacy owners.

### **3. METHODOLOGY**

#### **3.1 Study area**

This study was conducted in three regional hospitals (Temeke, Amana, and Mwananyamala) of Dar es Salaam region. These three hospitals are public hospitals with large number of HIV infected individual attending Care and Treatment Clinics. Amana CTC has a total of 5479 patients, Mwananyamala CTC has a total of 5577 patients and Temeke CTC has a total of 4989 patients(29). Selection of the mentioned hospitals was based on their capacity to provide services to large number of clinic attendees which made it easy to reach the required sample size. Additionally, they have ability to provide HIV services to clients of all social economic groups as compared to private hospitals.

#### **3.2 Study type/design**

This was a cross sectional study design, using quantitative data collection approach. It included the population of HIV patients attending CTC clinics in the study area. The second part of the study focused on the pharmacies in these CTC clinics and private pharmacies in the catchment area.

#### **3.3 Study population**

This study involved HIV/AIDS patients attending CTC clinics, pharmaceutical personnel from pharmacies in each CTC clinic and pharmaceutical personnel working in private pharmacies in the catchment area. The pharmacies in CTC clinics and around catchment area were not a part of the calculated sample size.

### 3.4 Sample size calculation.

(A). patients in the CTC clinics

The following formula was used for calculating sample size(30)

$$n = \frac{z^2 p (100-p)}{\epsilon^2}$$

Assumptions:  $z = z$ -score, at 95% confidence interval is 1.96=2

$p =$  expected proportion of opportunistic infections among HIV/AIDS is=23 % (31)

$\epsilon =$  margin of error that I will allow = 5%

$$n = \frac{2^2 \times 23 (100-23)}{5^2} = 285$$

Using the above assumptions a total sample size of 285 patients was obtained. An addition of 7% of the calculated sample size was made to account for non response, giving a total sample size of 305 patients.

The required number of patients obtained in each hospital has been described below

Total number of HIV patients seen in Amana, Mwananyamala and Temeke are **5479**, **5577** and **4989** respectively. Total numbers of HIV patients in all hospitals are **16045**

**Proportion of patients** for each hospital as compared to total number of patients

$$\text{Amana: } 5479/16045 = 0.34 \times 100 = 34\%$$

$$\text{Temeke: } 4989/16045 = 0.31 \times 100 = 31\%$$

$$\text{Mwananyamala: } 5577/16045 = 0.35 \times 100 = 35\%$$

Required number of sample size in each hospital

$$\text{Amana: } 0.34 \times 305 = \mathbf{104 \text{ patients}}$$

Temeke:  $0.31 \times 305 = 95$  patients

Mwananyamala:  $0.35 \times 305 = 106$  patients

### (B). Private pharmacies

Private pharmacies near to the CTC clinic (catchment area) were conveniently selected. The researcher enrolled two private pharmacies in the catchment area of each hospital giving the total of 6 pharmacies. This sample size has been adopted from WHO and HAI methodology as a minimum sample size for medicine outlets in measuring medicine prices, availability and price component(8) .

### 3.5 Sampling method:

#### (A). Patients in the CTC clinics

Systematic sampling method was used to obtain study participants in each CTC clinic. Based on the timing of the study, the required number of patients per day was obtained as follows

	Amana	Mwananyamala	Temeke
<b>Total required sample size</b>	104	106	95
<b>Data collection days</b>	15	15	15
<b>Sample size per day</b>	$104/15 = 7$	$106/15 = 7$	$95/15 = 6$
<b>Total patients seen per day (Will serve as sampling frame for the day)</b>	$5479/20^a$ 274	$5577/20^a$ 279	$4989/20^a$ 249
<b>Systematic sampling method was used. Calculation of K</b>	$274/7 = 39$ K= 39	$279/7 = 40$ K=40	$249/6 = 42$ K=42

<sup>a</sup> means number of working days per month to complete follow-up circle

‘K’ means sampling fraction

The first patient included was picked randomly from number one to the K value. The following patients were picked after every K<sup>th</sup> value of the respective hospital.

Sampling frame for the respective day was obtained on the preceding day from register of patients on call for the next day. This was obtained from the in charge Nurse of the respective CTC clinic

## **(B). Private pharmacies**

They were conveniently selected

### **Inclusion criteria:**

**Patients in the CTC clinics:** Any HIV patient aged 18years and above who had attended on the day of visit.

**Private pharmacies:** Any registered pharmacy in the catchment area

Exclusion criteria:

**Patients in the CTC clinics:** All HIV patients with opportunistic infections that were managed in special clinics.

### **3.6 Data collection methods and tools**

Data were collected using standardized questionnaire and check lists/references. Check list used to collect data on access of OIs essential medicine was adopted from WHO/HAI methodology.

**Patient information:** Questionnaires with both closed and open ended questions were used in exploring information on medicine availability to clinics and private pharmacies and their ability to purchase missed medicines to the private pharmacies.

**CTC pharmaceutical personnel:** A check list was used to explore information on medicine availability to both originator brands and lowest priced generics, type and number of medicine stocked (branded and generics)

**Private pharmacy personnel:** A check list was used to explore information on medicine availability to originator brands and lowest priced generics, type and number of medicine stocked (branded and generics), and selling price. Pricing of medicines was compared to international reference price list.

References used for comparison included; Tanzania National Essential medicine list for managing opportunistic infections, and International Reference Unit Price list.

### **3.7 Pre-testing of data collection tools**

Pre-testing of the study instrument was conducted in the preceding week of the planned data collection. This was done at Muhimbili National Hospital, of which the results were not included in the main study. The pre-testing was done in the chosen facility because the CTC clinics in Dar-es-salaam hospitals offer the same service with the chosen facility. This was important because, the picture that was revealed from this exercise was the picture that was expected in the real study and also helps in understanding study validity and reliability.

Both pharmaceutical personnel working in this clinic and HIV patients were interviewed and information obtained were recorded in the questionnaires. The aim of the pre-testing was to test to what extent the target audience would understand the tool and if the information required would be obtained. Therefore the results obtained from this pre-testing were used to find if the participants and research assistants understood the tool and if the tool could be used to give answers to the research questions.

### **3.8 Data collection procedure**

Data was collected between June and July 2014 using questionnaires and checklists. Research assistants were recruited and trained to understand the study aims and how to use of the questionnaire and checklists for data collection. This was done by the principal investigator for one day

Data collection was done by principal investigator and trained research assistants. Detailed explanation about the study was given to the study participants and any question regarding the study was addressed. They were asked for their consent to participate in the research. After consenting, they were interviewed by the Principal Investigator or Research Assistants.

The first part of the study involved interviewing patients with the questionnaires. This tool was used to obtain information like personal demographics, medical information like **current** and **previous** history of opportunistic infections (status) on types of OIs encountered, medicines prescribed and their availability at the clinic pharmacy, their ability to pay for the missed

medicines to the private pharmacies and cost of OIs medicines for one course of treatment. The participants were also asked about their daily income.

The second part of the study was interviewing the clinic pharmacy personnel, who were asked about the availability of medicines for managing opportunistic infections.

The third part of the study was nearby (about one hour walking distance from the clinic and/or home) private pharmacy dispensers, who were asked about the availability and price of those essential medicines for managing OIs prescribed from these study hospitals.

### **3.9 Variables**

#### **3.9.1 Dependent variables**

Access to medicines for managing opportunistic infections (measured by availability and affordability)

#### **3.9.2 Independent variables**

Demographics: gender, age, marital status, religion, education level, occupation and district of residence

Medicine availability at CTC clinics

Direct cost encountered by patients in purchasing medicines

Outcome measures

**Availability** was expressed as the percentage, calculated by dividing the number of essential medicines for managing OIs in stock on that **day of visit** and also **on previous visit** by the number of the key essential medicines that should be available multiplied by 100.

**Price** was expressed as a price per unit (e.g. tablet/capsule, dose) and Dose Median Price. Price per unit was converted to a median price ratio (MPR) by dividing the median local unit price by an international reference unit price (IRP) obtained from MSH international drug price indicator

guide. Dose Median Price was calculated by multiplying median local unit price by minimum dose required. A MPR of one or less was considered complying with international price guide while for MPR greater than one was considered expensive.

**Affordability** was calculated by comparing the median medicines price information and the daily wages of the lowest-paid unskilled government worker.(8) But in contrast with WHO/HAI method, we selected two levels of assessment. One was by using unskilled workers minimum wages (TZSs 5500/day)(4) and second was by using people living below the poverty line (TZSs 2000/day). A course of treatment that cost one days' wage or less was considered affordable and more than that was considered unaffordable

### **3.10 Data management**

#### **3.10.1 Review of data collected and coding**

Monitoring of data collected was done by the principal investigator each day after return from the field. This was done by cross checking of each questionnaire to ensure they are properly filled. During data entry, a consecutive record of each identification number was made to avoid mixing up of data. The investigator insured that every item was coded correctly.

#### **3.10.2 Data cleaning**

This was done through running the frequencies of all variables. This helped to identify miscoded variables, duplicates and omissions. Listing of selected variables was done using statistical Software to identify missing/incorrect information that needs to be updated. Cross checking of the appropriate questionnaire to update missing/incorrect information was done.

#### **3.10.3 Data analysis**

Preliminary data analysis involved tabulation of descriptive statistics for all variables. This involve initial running of frequencies of all variables, followed by examination of frequency distribution of respondent's characteristics. Second level involves cross tabulations of variable to examine the relation between dependent and independent variables. All reported values from the



sample populations were analyzed by using Epi info. Statistical tests used to test for statistical significance of the observed results was chi-square ( $\chi^2$ ) test

The average availability of medicines for managing opportunistic infections at the study population and their ability to pay for medicine was assessed and the median price for commonly used medicines in the selected private pharmacies was calculated, the frequency of the patients who will report missing the medicines because of unavailability was also calculated. The commonly prescribed medicines for OIs and common types of OIs was obtained by preparing frequency table

### **3.11 Ethical considerations**

Ethical clearance was sought from Muhimbili University of Health and Allied Sciences (MUHAS) Institutional Review Board. Permission to conduct the study to these municipal hospitals was sought from the relevant municipal and hospital authorities. Respondents were informed about the purpose of the study, data to be collected and their voluntary participation. Those who agreed to participate signed an informed consent form prior to inclusion in the study. Confidentiality of information and freedom to withdraw from the study anytime was stipulated.

## 4.0 RESULTS

### 4.1 Socio-demographic characteristics of the study population and their proportion of opportunistic infections.

This study enrolled 305 study participants by using questionnaires, of which most of those interviewed were females 270 (75%). Mwananyamala and Amana CTC contributed 106(35%) and 104(34%) of the required sample size respectively. Majority of the participants were aged between 31 to 50 years with a mean age of 41years (SD=9.2) and 189(62%) of all participants have only primary education, 200(66%) were self employed and the overall proportion of opportunistic infections being 39% as shown in table 1

**Table 1:** Socio-demographic characteristics of the selected participants in CTC clinics in Dar-es-salaam referral hospitals, N=305

Variables	Variable categories	Frequency	Percentage	OIs/Yes	Percentage
<b>District of residence</b>	Kinondoni	119	39	47	39
	Ilala	83	27	32	39
	Temeke	103	34	40	39
<b>CTC clinic</b>	Mwananyamala hosp	106	35	39	40
	Amana hosp	104	34	42	39
	Temeke hosp	95	31	38	39
<b>Sex</b>	Female	270	75	88	38
	Male	75	25	31	41
<b>Age</b>	Mean (SD)	41years (9.2)			
	19-30years	34	11	12	35
	31-40years	121	40	45	37
	41-50years	107	35	49	46
	50+years	43	14	13	30
<b>Marital status</b>	Never married	52	17	17	33
	Married	154	50	70	45
	Divorced/widowed	99	33	32	32
<b>Education</b>	None	73	24	31	42
	Completed primary education	189	62	78	41
	Completed secondary education	38	12	9	24
	Tertiary education	5	2	1	20

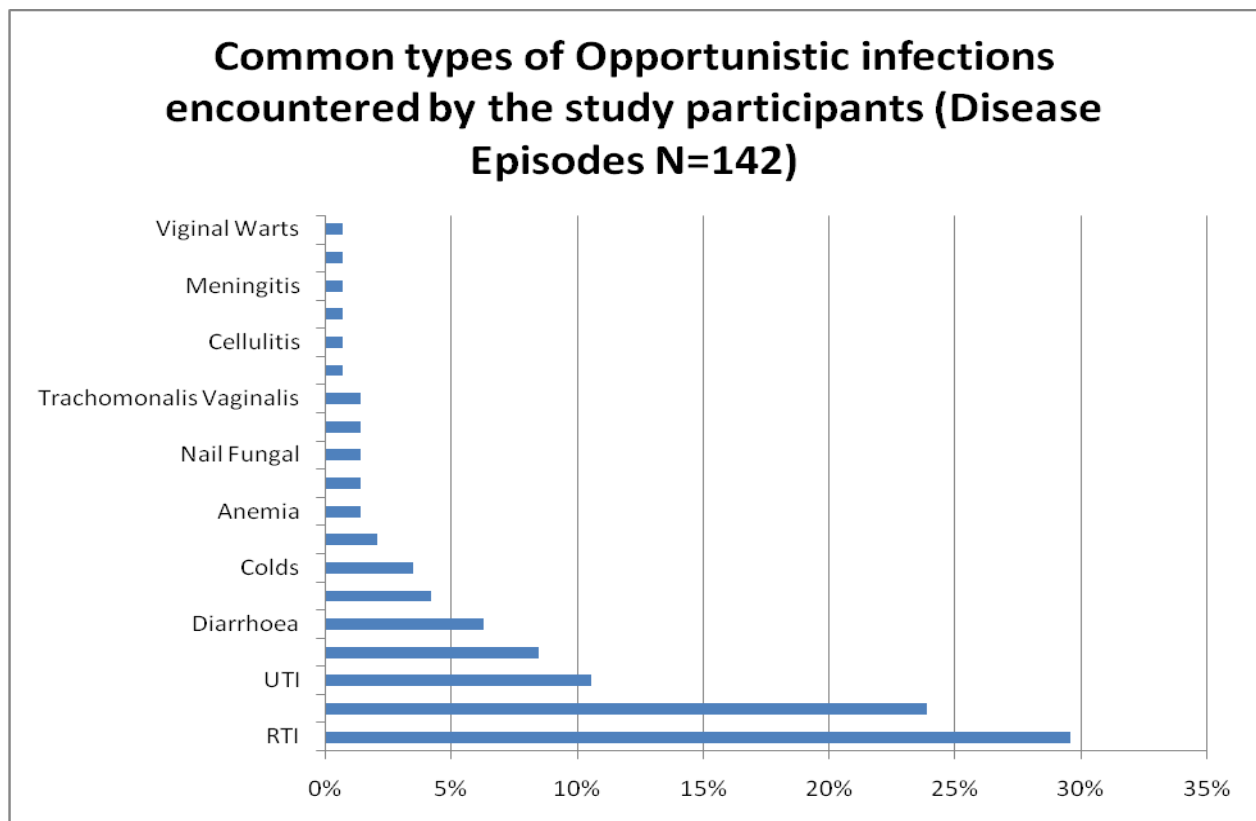
<b>Occupation</b>	Employed	38	12	17	45
	Self employed	200	66	76	38
	Casual laborer	6	2	2	33
	None	61	20	24	39

## 4.2 Common types of Opportunistic Infections among study participants

### 4.2.1 Episodes of Common Opportunistic infections

Figure 1 below show that, among 142 episodes of opportunistic infections, respiratory tract infections (**RTI**) (29.6%), skin fungal infection (**SFI**) (23.9%), urinary tract infection(**UTI**) (10.6%) and oral candidiasis(**OC**) (8.5%) were the most(>70%) common occurring types of opportunistic infections among respondents compared to other types of infections (see **Appendix 8.2**)

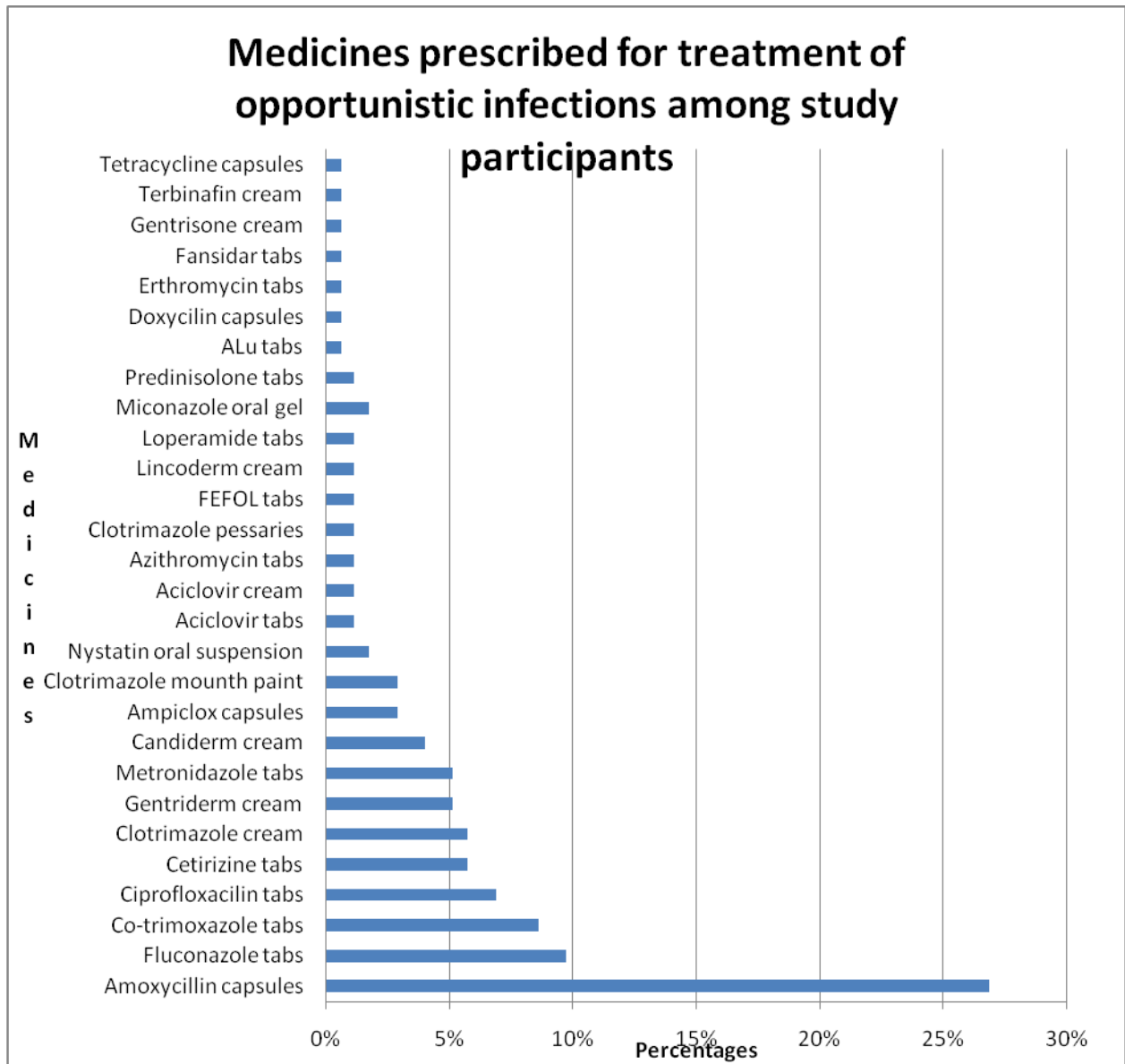
**Figure 1: Number of episodes of Common Opportunistic infections among respondents (Disease Episodes N=142)**



**4.3 Common medicines prescribed for treating opportunistic infections**

**Figure 2** shows that, mostly prescribed medicines for treatment of opportunistic infections are Amoxicillin 250mg capsules (27%), Fluconazole 150mg tabs (10%), Co-trimoxazole 480mg tabs (9%), Ciprofloxacin 500mg tabs (7%), Clotrimazole cream (6%) and cetirizine tabs (6%) (see appendix 8.1 )

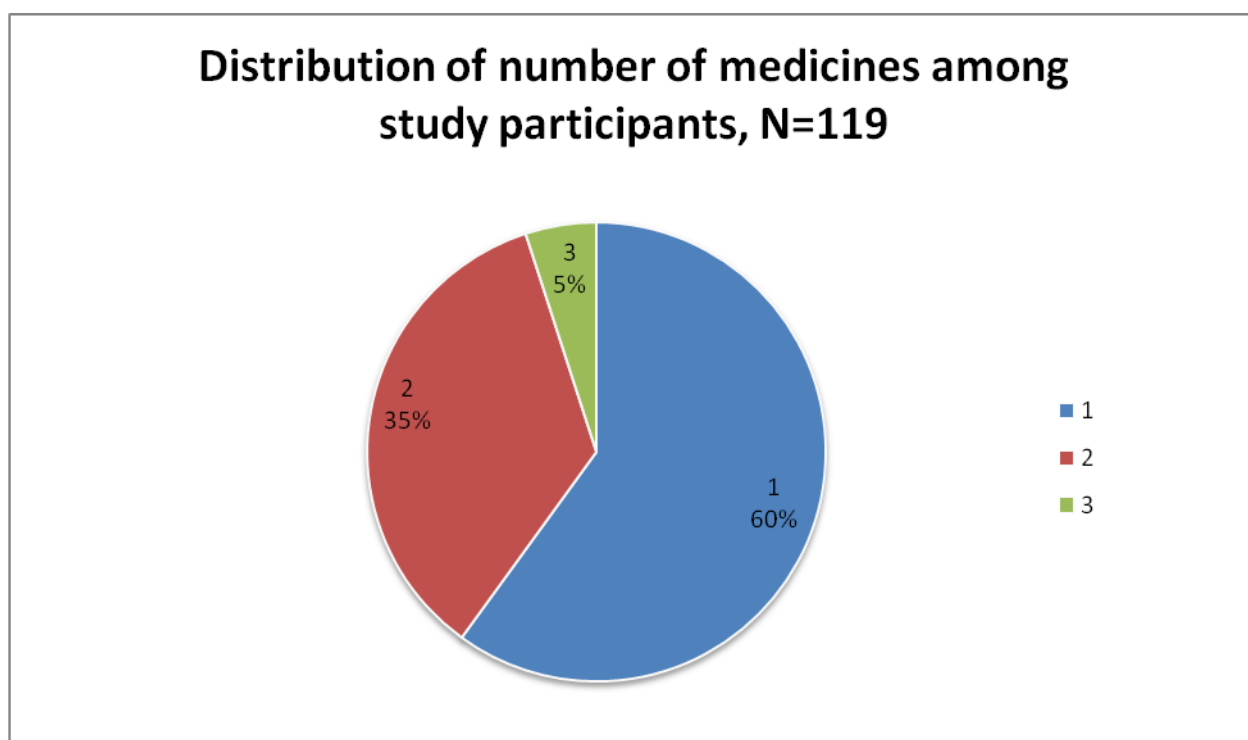
**Figure 2: Medicines prescribed for treatment of opportunistic infections among study participants**



### 4.3.1: Distribution of number of medicines among study participants

As shown in figure 3 , most (60%) of the study participants were prescribed with a single medicine, where by the rest had been prescribed two or more medicines for treating opportunistic infections per visit.

**Figure 3:** Distribution of number of medicines for treating Opportunistic infections (OIs) among study participants



*Key: 1=one OIs medicines prescribed, 2= two OIs medicines prescribed and 3= three OIs medicines prescribed*

### 4.4 Availability Medicine for managing Opportunistic Infections.

4.4.1: Proportion of patients who obtained prescribed medicines on the day of visit and on previous visit

**Table 2** show that, more than half (58% and 60%) of the respondents reported to have obtained medicines prescribed for treatment of opportunistic infections both on the previous visit and the date of interview respectively.

**Table 2: Availability of medicines at the CTC clinics on the previous visit and on the day of interview as reported by study respondents who had been prescribed medicines for Opportunistic Infections (N=80 and 119 respectively)**

	PREVIOUS VISIT		DAY OF INTERVIEW	
	frequency	percentage	frequency	percentage
<b>YES</b>	46	58	71	60
<b>NO</b>	34	42	48	40
<b>TOTAL</b>	80	100	119	100

#### 4.4.2: Availability of essential medicines at the CTC clinic pharmacies

Table 3 shows that, availability of essential medicines for treating opportunistic infections is 15% (Mwananyamala), 17% (Temeke) and 24% (Amana)

**Table 3: Availability of essential medicines for managing Opportunistic Infections at CTC clinic pharmacies on the day of visit (Number of essential medicines=46)**

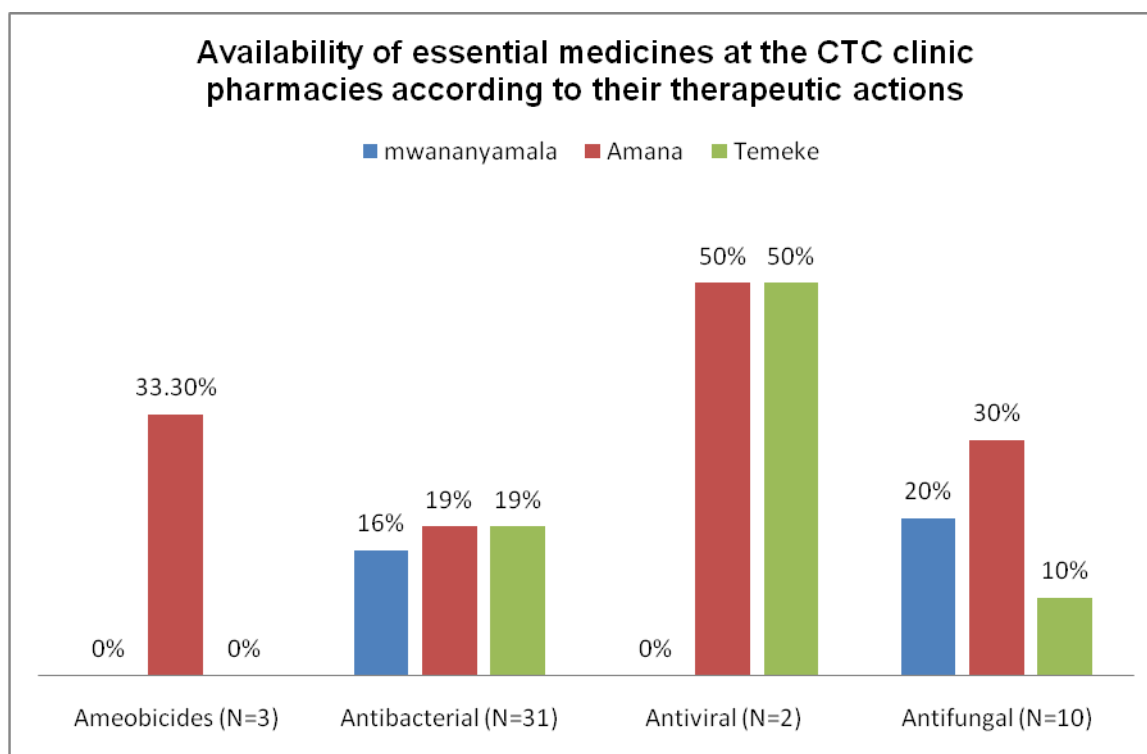
		LPG	OB	Frequency	percentage
<b>Mwananyamala CTC</b>	YES	6	1	7	15
	NO	39	N/A	39	85
	<b>TOTAL</b>	45	1	46	100
<b>Amana CTC</b>	YES	9	2	11	24
	NO	35	N/A	35	76
	<b>TOTAL</b>	44	2	46	100
<b>Temeke CTC</b>	YES	7	1	8	17
	NO	38	N/A	38	83
	<b>TOTAL</b>	45	1	46	100

Note: CTC=care and treatment center, LPG=lowest priced generics, OB=originator brands.

#### 4.4.3: Availability of essential medicines at the CTC clinic pharmacies according to their therapeutic actions as per National Essential Medicine List of Tanzania (NEMLT)

Results shown in figure 4 indicate that, medicines that were mostly available at CTC clinics were antibacterial (16%) and antifungal (20%) for Mwananyamala, ameobicides (33.3%), antibacterial (19%), antiviral (50%) and antifungal (30%) for Amana and antibacterial (19%), antiviral (50%) and antifungal (10%) for Temeke

**Figure 4: Availability of essential medicines at the CTC clinic pharmacies according to their therapeutic actions**



0% indicates that the medicine was not available on the day of visit.

#### 4.4.4: Availability of essential medicines at the private pharmacies as per National Essential Medicine List of Tanzania (NEMLT)

**Tables 4** shows that, majority (72%) of essential medicines were available at the private pharmacies, (Appendix 8.3)

**Table 4: Availability of essential medicines for treatment of opportunistic infections at the private pharmacies (number of essential medicines=46)**

	frequency	percentage
<b>YES(at least in one pharmacy)</b>	33	72%
<b>NO</b>	13	28%
<b>TOTAL</b>	46	100%

#### **4.5 Prices of medicines for Opportunistic infections and Affordability of study participants to purchase those medicines**

##### **4.5.1 Proportion of patients as per their daily income groups**

Table 5 depicts that, about 148(60%) out of 246 study respondents have their daily incomes below TZS.5, 500, of which is the minimum daily income of un-skilled government employee.

**Table 5: Proportion of patients as per their daily income groups (N=246)**

Daily income (TZS)	Frequency	Percentages
<b>≤ 2,000</b>	45	18%
<b>2,001-5,500</b>	103	42%
<b>&gt;5,500</b>	98	40%
<b>Total</b>	246	100%
<b>Mean=7840/= (SD=8150), median=5000/=</b>		

##### **4.5.3 Comparison of sex with monthly income among study participants and their proportions**

As shown in table 6, majority (59%) of the study participants have income below the minimum monthly wage of un-skilled government employee there is significant difference in income between male and female



**Table 6: Comparing sex with monthly income and their income proportions, N=246**

Variables	Variable categories	≤50,000	50,001-70,000	170,001-500,000	>500,000	Total	P-VALUE
Sex	Female	18 (78) (10)	101 (83) (56)	46(64) (26)	15 (52) (8)	180 (73) (100)	0.0011
	Male	5 (22) ( 8)	21 (17) (32)	26 (36) ( 39)	14 (48) (21)	66 (27) (100)	
	Total	23(100) ( 9)	122 (100) (50)	72 (100) (29)	29 (100) (12)	246(100) (100)	

Mean=237,500/= (SD=244,500), median=TZS150, 000, Chi square test was used to test for statistical significance

#### 4.5.4: Median Price Ratio for selected essential medicine in the private pharmacies

Results in table 7 indicate that, the MPRs for the selected common prescribed medicines for treating opportunistic infections were Amoxicillin 250mg caps=2.97, fluconazole 150mg tabs=4.17 , co-trimoxazole 480mg=1.23 , Ciprofloxacin 500mg tabs=7.11 , and Clotrimazole cream=0.59. (See also **appendix 8.4**, for **price range** of these medicines as found in 6 visited pharmacies)

**Table 7: The Median Price Ratio for the selected common prescribed medicines for treating opportunistic infections, (MPR, adjusted with IRP MSH 2013)**

No	Medicines for Opportunistic Infections	MPR(LPG) TMPR=2.605	MPR (OB)
1	PEN-V 250 mg	18.56	
2	Clotrimazole pessaries	14.58	
3	loperamide 2mg	9.07	
4	ciprofloxacin 500mg	7.11	
5	gentamycine 40mg/ampoule	6.78	
6	clindamycin 150mg		6.09
7	acyclovir 200/400 mg		5.7
8	doxycillin 100mg	5.68	
9	Ampicillin 500mg/vial	5.24	
10	fluconazole 150mg tabs	4.17	
11	Metronidazole 200mg	3.9	
12	Amoxicillin + clavulanic 625mg	3.85	
13	Ketoconazole 200mg	3.74	
14	Griseofulvin 500mg	3.33	
15	Amoxicillin 250mg	2.97	
16	Ampicillin 250mg	2.82	

17	Clarythromycin 250/500mg	2.77	
18	levofloxacillin 250mg		2.71
19	cloxacilin 250mg	2.44	
20	Ceftriaxone 500/1000mg/vial	2.22	
21	erythromycin 250mg	1.85	
22	Metronidazole5mg/ml	1.69	
23	Nalidixic acid 500mg	1.68	
24	Chloramphenicol 250mg	1.59	
25	Tinidazole500mg	1.44	
26	co-trimoxazole 480mg	1.23	
27	levofloxacillin 250mg	1.1	
28	Miconazole 2%	1.01	
29	Nitrofurantoin 100mg	0.98	
30	Terbinafine 1%	0.79	
31	Clotrimazole cream	0.59	
32	Miconazole 2%		0.46
33	Nystatin 500000IU	0.45	
34	Cefixime 200mg/400mg		0.41
35	fluconazole 2mg/ml	0.23	
36	fluconazole 2mg/ml		0.13

**MPR** means Median Price Ratio, **LPG**=lowest priced generics, **OB**=originator brand

**Note:** Only 36 out of 46 essential medicines for treating opportunistic infection were available with its selling price necessary for MPR calculations.

#### 4.5.5: Number of days' wages needed to purchase a minimum dose of medicine for treating opportunistic infections

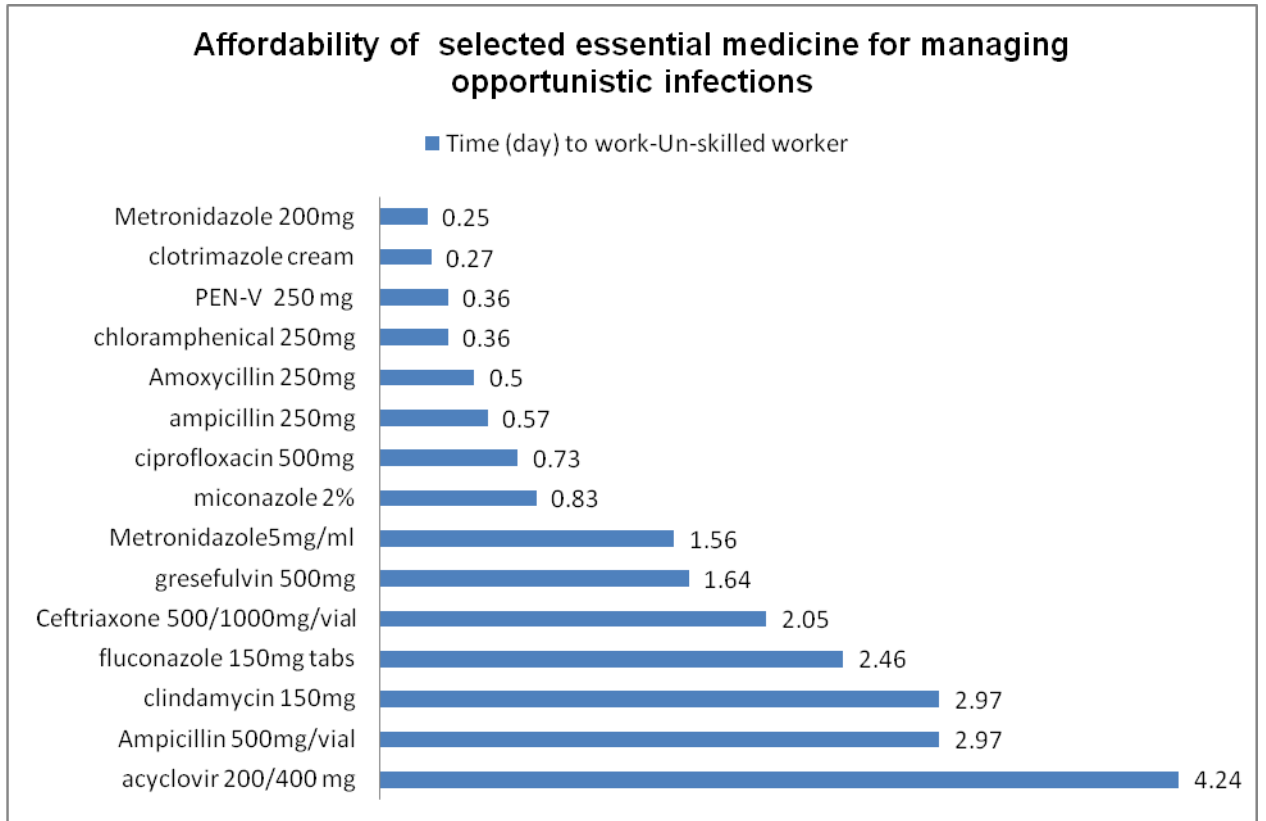
Table 8 depicts that, about 16 (44%) out of 36 essential medicines, need one's to work for more than one day in order to purchase them (see appendix 8.5)

**Table 8: Number of days' wages needed to purchase a minimum dose of medicine for treating opportunistic infections prescribed to study participants, N=36**

Number of days wages	Frequency	percentage
>1 working days	16	44%
≤1 working day	20	56%
<b>Total</b>	36	100%

Figure 5 below shows that, some of the essential medicines like Acyclovir, one's need to work for more than 4 days in order to be able to purchase the medicine. This has been compared to the lowest unskilled government employee.

**Figure 5: Selected essential medicines with the number of days one's need to work in order to purchase the medicine**



## 5.0 DISCUSSION

This study assessed the access to essential medicines for managing opportunistic infections among HIV patients in Dar-es-salaam referral hospitals. It is one of the few studies conducted in Tanzania that report the accessibility of medicines for managing opportunistic infections and specifically focusing on HIV patients. The study population comprised of 305 HIV positive patients of which 75% were female, which is in line with the current data in Tanzania that female are more affected than male(17) as well as with a study by Njelekela et al (32)

This study has revealed that the selected common types of opportunistic infections among study participants who reported episodes of opportunistic infections; those which have been reported frequently were respiratory tract infection (**RTI**), skin fungal infection (**SFI**), urinary tract infection (**UTI**) and oral candidiasis (**OC**). These opportunistic infections and others as shown in table 4, were comparable with a study done by UNAIDS 2011(11) and the one done at Nigeria looking for the prevalence of opportunistic infections, have reported the same type of infections (31)

Finding from this study highlight common essential medicines which are mostly prescribed at the CTC clinics. These are three antibiotics namely Amoxicillin 250mg capsules, Ciprofloxacin 500mg tablets and co-trimoxazole 480mg tablets, and two antifungal which were fluconazole 150mg tablets and Clotrimazole 1% cream for topical application. These findings reflect that more were having bacterial and fungal infections as seen in the list of common opportunistic infection being respiratory tract infection, urinary tract infection, oral candidiasis and Skin fungal infections. For co-trimoxazole 480mg tablets and fluconazole, they are mostly used as prophylaxis for opportunistic infections among HIV patients(18)(33). The above identified common medicines for opportunistic infections from this study are more or less similar to those identified in other studies e.g. by Mtenzi et al.(34).

Availability of essential medicines for managing opportunistic infections as per National Essential Medicine List of Tanzania (NEMLT) was low in the CTC clinics pharmacies. Moreover, Mwananyamala CTC (15%) clinic had the lowest availability, followed by Temeke CTC (17%) and lastly Amana CTC (24%). However in the community pharmacies findings shows that, the medicines for managing opportunistic infections are more available but less

affordable. But these outcomes are contradicting with the availability percentage of medicines (60% on the date of visit and 58% on the previous visit) for managing opportunistic infections in the same centers as reported by study participants. These differences in finding were due to the fact that prescribers were prescribing only those medicines which were in stock. That is to say diseases were being matched with available medicines on that day (prescribing habit).

This percentage availability as reported by study participants, despite the fact of prescribing only the medicines which are available at the CTC pharmacies, fail to count to 100% availability because some of the medicines in a therapeutic group like amebocides and antiviral are missing completely from the pharmacy. Finding shows that Mwananyamala CTC has run out of stock of these groups (0%) as seen in table 9, 10 and 11.

Most of study participants reported that their monthly income were very low, less than TZS 170,000 (Table 14) which is below lowest paid un-skilled government employee. Low income is attributed to low level of education, of which majority have only primary education as also reported by other studies(9)(35)

Cost for purchasing minimum dose for one course of treatment of opportunistic infection in private pharmacies requires one to five working days for a lowest paid of un-skilled government employee(4). This is worse for those who were living under poverty line as they need one to twelve working days in order to pay for one course of treatment (9).

The price of medicines for managing opportunistic infections, their availability and affordability are the major determinants of access to treatments(8). These prices have been shown to be high for study participants to afford. This has resulted into low ability to pay for treatment of opportunistic infections.

The burden is especially great for patients needing treatment for more than one opportunistic infection at the same time, which covers about 19% of our respondents. Example using the lowest priced generics medicines; it would take just 3 to 4 days' wages for the lowest paid unskilled government employee to purchase acyclovir tablets, fluconazole 150mg tablets, and Amoxicillin+ clavulanic acid 625mg tablets for viral, fungal and bacterial infections

respectively. This finding concur with the report by WHO (2010) on medicine prices in Tanzania(25)

At private pharmacies, median medicine prices for the lowest priced generics were found to be 2.61 times higher as compared to international reference prices(36). This Median Price Ratio were the same as report from WHO,2010 on medicine price in Tanzania(25). The price charged to study participants for the lowest priced generic medicines ranged from 0.23 times the international reference price for fluconazole 2mg/ml in 100ml intra venous injection to 18.56 times the international reference price for penicillin V 250mg tablets. A difference of five times or more between the international reference price and the price charged to patients make these medicines particularly costly than what could be available or achieved(37).

There was marked price deviation for some medicines within private pharmacies. Different in strength and pharmacological dosage, fluctuation of medicine selling price overtime, that is to say no special organ for price controlling in the private outlets, as a result patients are un-able to pay due to high price and low income among them. This high price of medicines may be one of the contributing factors for financial hardships among HIV patients, resulting into skipping of medications or inability to buy them. This in turn will contribute to the increased mortality and morbidity among HIV patients. According to Tanzania HIV policy of 2001, the government is mandated to provide service for HIV patients free of charge(34)

The use of WHO/HAI methodology of assessing the accessibility to essential medicines and by considering the oldest method first edited in 2003,(8) this seem to be the robust method in looking for medicine accessibility as it is able to give more information regarding availability, pricing and affordability of medicines at a time enough to give the correct picture from the study.

## **5.1 Limitations of the study**

The following were the major limitations in this study.

1. Dar es Salaam region and CTC clinics were chosen conveniently, affects generalizability of findings to all CTC clinics in Tanzania. However among the selected CTC clinics captures all diverse people living in Dar es Salaam.
2. Patients studied were those who attended the CTC clinic on the day of visit who may not be fully representative of all HIV positive patients. However, the researcher was able to extend the data collection time to three weeks so as to be able to capture all the patients who are on follow up.
3. Measuring availability of medicines on the day of interview was not adequate to come up with a concrete conclusion. This effect were minimized by looking also the availability of medicines on the previous visit (one month before interview day).

## **6.0 CONCLUSION AND RECOMMENDATION**

### **6.1 CONCLUSION**

The present study had revealed that, there was poor availability of essential medicines for managing opportunistic infections in CTC clinics in the referral hospitals in Dar-es-salaam, as well as inability of people to pay for missed medicines due to high price in purchasing medicines at the private pharmacies around these clinics.

The low availability of essential medicines for managing opportunistic infections at CTC clinics will contribute to worsen the health of the patients by imposing financial hardship. This is because medicines that are expensive are deliberately not kept in stock (private pharmacies) because of low demand and are purchased only on request, patients were often sent to those pharmacies directly to purchase those medicines(7). The second health problem is by creating a loop for emerging of drug resistance and tissue injury as medicine un-availability for HIV infection is difficult to monitor and can develop resistance quickly if medicines are not available and properly administered.

### **6.2 RECOMMENDATION**

From the findings and implications of the study, the following are recommended;

The essential medicines for treating opportunistic infections should be given priority during selection and ensure good supply chain. This will ensure medicines for opportunistic infections are consistently available and affordable at the CTC clinics.

The CTC clinics by the help of TACAIDS to review on the area of delivering free health services to all HIV patients in Tanzania.

The regulatory authorities to regulate the pricing of medicines in the private pharmacies, so as to reduce the price and its high range by identifying innovative strategies for influencing and managing the price and availability of these medicines to ensure equitable access.

Research is needed to identify factors that lead to low access to essential medicines for treating opportunistic infections, and also more research should be done in the area of prescribing habits among clinicians in CTC clinics



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## 8.0. APPENDICES

### 8.1: Medicines prescribed for treatment of opportunistic infections among study participants

Type of medicine	Frequency	Percentage	Availability	
			Yes	Percentage
<b>Amoxicillin capsules</b>	47	26.9%	33	78.6%
<b>Fluconazole tabs</b>	17	9.7%	10	58.8
<b>Co-trimoxazole tabs</b>	15	8.6%	11	73.3%
<b>Ciprofloxacin tabs</b>	12	6.9%	5	41.7%
<b>Cetirizine tabs</b>	10	5.7%	9	90%
<b>Clotrimazole cream</b>	10	5.7%	8	80%
<b>Gentri-derm cream</b>	9	5.1%	5	55.6%
<b>Metronidazole tabs</b>	9	5.1%	4	44.4%
<b>Candiderm cream</b>	7	4.0%	3	42.9%
<b>Ampiclox capsules</b>	5	2.9%	0	0%
<b>Clotrimazole mouth paint</b>	5	2.9%	3	60%
<b>Nystatin oral suspension</b>	3	1.7%	1	33.3%
<b>Acyclovir tabs</b>	2	1.1%	0	0%
<b>Acyclovir cream</b>	2	1.1%	0	0%
<b>Azithromycin tabs</b>	2	1.1%	0	0%
<b>Clotrimazole pessaries</b>	2	1.1%	1	50%
<b>FEFOL tabs</b>	2	1.1%	2	100%
<b>Lincoderm cream</b>	2	1.1%	0	0%
<b>Loperamide tabs</b>	2	1.1%	0	0%
<b>Miconazole oral gel</b>	3	1.7%	1	33.3%
<b>Prednisolone tabs</b>	2	1.1%	0	0%
<b>ALu tabs</b>	1	0.6%	1	100%
<b>Doxycycline capsules</b>	1	0.6%	0	0%
<b>Erythromycin tabs</b>	1	0.6%	0	0%

<b>Fansidar tabs</b>	1	0.6%	0	0%
<b>Gentrisone cream</b>	1	0.6%	1	100%
<b>Terbinafine cream</b>	1	0.6%	1	100%
<b>Tetracycline capsules</b>	1	0.6%	0	0%
<b>TOTAL</b>	175	100%	99	58.3%

**8.2: Number of episodes of Common Opportunistic infections among respondents (Disease Episodes N=142)**

<b>Common types of opportunistic infections</b>	<b>Frequency</b>	<b>Percent</b>
<b>RTI</b>	42	29.60%
<b>Skin Fungal</b>	34	23.90%
<b>UTI</b>	15	10.60%
<b>Oral Candidiasis</b>	12	8.50%
<b>Diarrhoea</b>	9	6.30%
<b>PCP</b>	6	4.20%
<b>Colds</b>	5	3.50%
<b>Virginal Fungal</b>	3	2.10%
<b>Anemia</b>	2	1.40%
<b>Malaria</b>	2	1.40%
<b>Nail Fungal</b>	2	1.40%
<b>PV Discharge</b>	2	1.40%
<b>Trachomonalis Vaginalis</b>	2	1.40%
<b>Amoebiasis</b>	1	0.70%
<b>Cellulitis</b>	1	0.70%
<b>Herpes Zoster</b>	1	0.70%
<b>Meningitis</b>	1	0.70%
<b>Pneumonia</b>	1	0.70%
<b>Virginal Warts</b>	1	0.70%

<b>Total</b>	142	100.00%
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**8.3: Availability of essential medicines for Opportunistic Infections at the private pharmacies on the period of interview (number of pharmacies=6)**

Medicine name	Availability		Availability percent	Medicines types	
	YES	NO		LPG	OB
Metronidazole 200mg tabs	6	0	100%	YES	NO
Amoxicillin 250mg caps	6	0	100%	YES	YES
Amoxicillin + Clavulanic acid 625mg tab	6	0	100%	YES	YES
Cloxacilin 250mg caps	6	0	100%	YES	NO
Co-trimoxazole 480mg tabs	6	0	100%	YES	YES
Erythromycin 250mg tabs	6	0	100%	YES	NO
Loperamide 2mg tabs	6	0	100%	YES	YES
Ciprofloxacin 5mg tabs	5	1	83%	YES	YES
Penicillin, benzathine benzyl/pen V 250	5	1	83%	YES	NO
Clotrimazole cream	5	1	83%	YES	YES
Tinidazole 1000mg tabs	4	2	67%	YES	NO
Doxycycline 100mg caps	4	2	67%	YES	NO
Nalidixic acid 200mg tabs	4	2	67%	YES	NO
Miconazole oral gel	4	2	67%	YES	YES
Metronidazole Inj	3	3	50%	YES	NO
Ampicillin 250mg caps	3	3	50%	YES	NO
Ceftriaxone 1000mg inj	3	3	50%	YES	YES
Levofloxacin 500mg tabs	3	3	50%	YES	YES
Acyclovir 200/400mg tabs	3	3	50%	NO	YES
Clotrimazole pess	3	3	50%	YES	YES
Fluconazole 150mg caps	3	3	50%	YES	YES
Griseofulvin 500mg tabs	3	3	50%	YES	NO
Azithromycin 250/500mg tabs	2	4	33%	YES	NO

<b>Clindamycin 150mg tabs</b>	2	4	33%	NO	YES
<b>Gentamycine inj</b>	2	4	33%	YES	NO
<b>Penicillin, benzyl inj</b>	2	4	33%	YES	NO
<b>Acyclovir cream</b>	2	4	33%	NO	YES
<b>Terbinafine cream</b>	2	4	33%	yes	YES
<b>Fluconazole inj</b>	2	4	33%	YES	YES
<b>Ketoconazole200mg tab</b>	2	4	33%	YES	YES
<b>Ampicillin inj</b>	1	5	17%	YES	NO
<b>Clarythromycin 250/500mg tabs</b>	1	5	17%	YES	YES
<b>Amikacin inj</b>	0	6	0%	N/A	N/A
<b>Ceftazidime inj</b>	0	6	0%	N/A	N/A
<b>Cefixime 200mg tabs</b>	0	6	0%	N/A	N/A
<b>Chloramphenicol inj</b>	0	6	0%	N/A	N/A
<b>Chloramphenicol 250mg caps</b>	0	6	0%	N/A	N/A
<b>Ciprofloxacin inj</b>	0	6	0%	N/A	N/A
<b>Clindamycin inj</b>	0	6	0%	N/A	N/A
<b>Cloxacilin inj</b>	0	6	0%	N/A	N/A
<b>Flucloxacillin 500mg tabs</b>	0	6	0%	N/A	N/A
<b>Kanamycin inj</b>	0	6	0%	N/A	N/A
<b>Nitrofurantoin 100mg tabs</b>	0	6	0%	N/A	N/A
<b>Vancomycin inj</b>	0	6	0%	N/A	N/A
<b>Amphotericin B inj</b>	0	6	0%	N/A	N/A





**8.4: Median price and price range for a minimum dose of essential medicines for managing Opportunistic Infections at the private pharmacies**

No	Medicine names	Pharm1	Pharm2	Pharm3	Pharm4	Pharm5	Pharm6	Dose Median Price	Price Range (TZS)	
1	acyclovir 200/400 mg	24,000	24,000	32,000	20,000	20,000	20,000	23,333.20	20,000 32,000	-
2	clindamycin 150mg	17,600	24,000	22,400	16,000	16,000	16,000	18,666.72	16,000 24,000	-
3	Metronidazole5mg/ml	15,000	15,000	18,000	15,000	20,000	20,000	17,166.70	15,000 20,000	-
4	Cefixime 200mg/400mg	20,000	15,000	15,000	25,000	15,000	10,000	16,666.70	10,000 25,000	-
5	Clarythromycin 250/500mg	18,200	14,000	16,800	21,000	14,000	14,000	16,333.38	14,000 21,000	-
6	Ampicillin 500mg/vial	15,000	10,000	15,000	25,000	15,000	18,000	16,333.30	10,000 25,000	-
7	Amoxicillin + clavulanic 625mg	12,600	14,000	14,000	13,300	14,000	16,800	14,116.62	12,600 16,800	-

<b>8</b>	fluconazole 2mg/ml	7,000	10,500	10,500	14,000	14,000	17,500	12,250.00	7,000	–
									17,500	
<b>9</b>	Ceftriaxone 500/1000mg/vial	10,000	12,500	9,000	11,000	15,000	10,000	11,250.00	9,000	–
									15,000	
<b>10</b>	Griseofulvin 500mg	7,500	6,000	6,000	12,000	15,000	7,500	9,000.00	6,000	–
									15,000	
<b>11</b>	Clotrimazole pessaries	7,500	6,000	9,000	9,000	9,000	9,000	8,250.00	6,000	–
									9,000	
<b>12</b>	levofloxacin 250mg	7,000	7,500	10,000	7,500	9,000	7,500	8,083.35	7,000	–
									10,000	
<b>13</b>	Ketoconazole 200mg	7,000	8,400	8,400	7,000	5,600	8,400	7,466.76	5,600	–
									8,400	
<b>14</b>	Terbinafine 1%	7,500	5,000	8,000	8,500	7,000	7,000	7,166.67	5,000	–
									8,500	
<b>15</b>	fluconazole 150mg tabs	4,200	7,000	7,000	7,000	8,400	7,000	6,766.69	4,200	–
									8,400	
<b>16</b>	Nitrofurantoin 100mg	2,000	4,000	10,000	10,000	4,000	10,000	6,666.60	2,000	–
									10,000	
<b>17</b>	Miconazole 2%	4,000	5,000	5,000	5,000	4,500	4,000	4,583.33	4,000	–
									5,000	

<b>18</b>	ciprofloxacin 500mg	5,000	5,000	3,000	2,000	3,500	5,500	4,000.00	2,000	–
									5,500	
<b>19</b>	Nalidixic acid 500mg	3,000	5,250	3,000	3,000	3,750	4,500	3,750.00	3,000	–
									5,250	
<b>20</b>	erythromycin 250mg	4,500	3,000	3,600	4,500	3,000	3,000	3,600.00	3,000	–
									4,500	
<b>21</b>	Azithromycin 250/500mg	3,000	4,500	3,000	3,600	3,000	3,600	3,450.00	3,000	–
									4,500	
<b>22</b>	gentamycine 40mg/ampoule	2,500	2,500	5,000	2,500	2,500	5,000	3,333.35	2,500	–
									5,000	
<b>23</b>	levofloxacillin 250mg	3,500	2,500	4,000	3,500	2,500	3,750	3,291.65	2,500	–
									4,000	
<b>24</b>	Ampicillin 250mg	1,500	3,750	3,000	3,000	4,500	3,000	3,125.10	1,500	–
									4,500	
<b>25</b>	Amoxicillin 250mg	1,500	3,000	3,000	3,000	1,500	4,500	2,750.10	1,500	–
									4,500	
<b>26</b>	cloxacilin 250mg	1,500	3,000	2,250	3,000	3,000	3,000	2,625.00	1,500	–
									3,000	
<b>28</b>	Chloramphenicol 250mg	1,500	3,000	1,500	1,500	1,500	3,000	2,000.10	1,500	–
									3,000	

<b>29</b>	PEN-V 250 mg	1,500	1,500	2,250	1,500	2,250	3,000	2,000.10	1,500 3,000	–
<b>30</b>	Nystatin 500000IU	2,000	1,500	2,000	2,000	2,500	1,800	1,966.67	1,500 2,500	–
<b>31</b>	doxycillin 100mg	1,000	1,000	1,000	4,000	1,000	1,500	1,583.30	1,000 4,000	–
<b>32</b>	Clotrimazole cream	1,500	1,500	1,500	1,500	1,800	1,200	1,500.00	1,200 1,800	–
<b>33</b>	Metronidazole 200mg	600	1,500	1,800	1,500	1,500	1,500	1,400.10	600 – 1,800	
<b>34</b>	loperamide 2mg	1,000	1,500	1,500	1,000	1,000	1,500	1,250.00	1,000 1,500	–
<b>35</b>	Tinidazole500mg	800	1000	1,000	500	500	1,000	800	500 – 1,000	
<b>36</b>	co-trimoxazole 480mg	400	600	600	1,000	600	700	650	400 – 1,000	

**8.5: comparison of mean price of medicines for opportunistic infections with number of days' wages needed to purchase a minimum dose prescribed to a study participants**

S/N	Medicine name	Mean price(TZS) per min/dose	Time(day) to work-Un-skilled worker(TZS.5,500)	Time(day) to work-(under poverty line)(TZS.2000)
1	acyclovir 200/400 mg	23,333.33	4.24	11.67
2	Cefixime 200mg/400mg	16,666.67	3.03	8.33
3	clindamycin 150mg	16,333.33	2.97	8.17
4	Ampicillin 500mg/vial	16,333.33	2.97	8.17
5	Clarythromycin 250/500mg	16,333.33	2.97	8.17
6	Amoxycillin + clavulanic 625mg	14,116.67	2.57	7.06
7	fluconazole 150mg tabs	13,533.33	2.46	6.77
8	fluconazole 2mg/ml	12,250.00	2.23	6.13
9	Ceftriaxone 500/1000mg/vial	11,250.00	2.05	5.63
10	Nitrofurantoin 100mg	10,000.00	1.82	5.00
11	Griseofulvin 500mg	9,000.00	1.64	4.50

12	Metronidazole 5mg/ml	8,583.35	1.56	4.29
13	levofloxacin 250mg	8,083.33	1.47	4.04
14	Ketoconazole 200mg	7,466.67	1.36	3.73
15	Terbinafine 1%	7,166.67	1.30	3.58
16	fluconazole 2mg/ml	7,000.00	1.27	3.50
17	gentamycin 40mg/ampoule	4,666.67	0.85	2.33
18	Miconazole 2%	4,583.33	0.83	2.29
19	ciprofloxacin 500mg	4,000.00	0.73	2.00
20	Nalidixic acid 500mg	3,750.00	0.68	1.88
21	erythromycin 250mg	3,600.00	0.65	1.80
22	levofloxacin 250mg	3,291.67	0.60	1.65
23	Ampicillin 250mg	3,125.00	0.57	1.56
24	Amoxicillin 250mg	2,750.00	0.50	1.38
25	cloxacillin 250mg	2,625.00	0.48	1.31
26	Miconazole 2%	2,083.33	0.38	1.04

<b>27</b>	PEN-V 250 mg	2,000.00	0.36	1.00
<b>28</b>	Chloramphenicol 250mg	2,000.00	0.36	1.00
<b>29</b>	Nystatin 500000IU	1,966.67	0.36	0.98
<b>30</b>	doxycillin 100mg	1,583.33	0.29	0.79
<b>31</b>	Clotrimazole cream	1,500.00	0.27	0.75
<b>32</b>	Metronidazole 200mg	1,400.00	0.25	0.70
<b>33</b>	Clotrimazole pessaries	1,375.00	0.25	0.69
<b>34</b>	loperamide 2mg	1,250.00	0.23	0.63
<b>35</b>	Tinidazole500mg	800.00	0.15	0.40
<b>36</b>	co-trimoxazole 480mg	650.00	0.12	0.33

**8.6: CHECKLISTS**

## AVAILABILITY OF ESSENTIAL MEDICINES FOR OPPORTUNISTIC INFECTIONS IN THE CTC CLINIC/PRIVATE PHARMACY

ID CODE \_\_\_\_\_ CLINIC/PHARMACY \_\_\_\_\_ INVESTIGATOR \_\_\_\_\_  
 CLINIC/PHARMACY STAFF \_\_\_\_\_ PHONE NUMBER \_\_\_\_\_

**AVAILABILITY OF ESSENTIAL MEDICINES FOR OPPORTUNISTIC INFECTIONS IN THE CTC CLINIC/PHARMACY**

S/N	GENERIC	FORM	MED TYPE	BRAND NAME	AVAILABLE ALTERNATIVE FOUND	PACK FOUND	PRICE /PACK	UNIT PRICE	COMMENTS
1	Metronidazole 200mg	tabs	Originator brand						
			lowest priced generic						
2	Tinidazole500mg	tabs	Originator brand						
			lowest priced generic						
3	Metronidazole5mg/ml	inj	Originator brand						
			lowest priced generic						
4	Amikacin 500mg	inj	Originator brand						
			lowest priced generic						



5	Amoxicillin 250mg	caps	Originator brand
			lowest priced generic
6	Amoxicillin + clavulanic 625mg	tabs	Originator brand
			lowest priced generic
7	Ampicillin 500mg/vial	inj	Originator brand
			lowest priced generic
8	Ampicillin 250mg	caps	Originator brand
			lowest priced generic
9	Azithromycin 250/500mg	tabs	Originator brand
			Originator brand
10	Ceftazidime 250mg/vial	inj	lowest priced generic
			Originator brand
11	Cefixime 200mg/400mg	tabs	lowest priced generic
			Originator brand
12	Ceftriaxone 500/1000mg/vial	inj	lowest priced generic
			Originator brand
13	Clarythromycin 250/500mg	tabs	lowest priced generic
			Originator brand
14	Chloramphenicol 250mg	caps	lowest priced generic
			Originator brand

<b>15</b>	Chloramphenicol 500mg/vial	inj	lowest priced generic
			Originator brand
<b>16</b>	ciprofloxacin 500mg	tabs	lowest priced generic
			Originator brand
<b>17</b>	ciprofloxacin 2mg/ml in 100ml	inj	lowest priced generic
			Originator brand
<b>18</b>	clindamycin 150mg	tabs	Originator brand
			lowest priced generic
<b>19</b>	clindamycin 150mg/ml	inj	Originator brand
			lowest priced generic
<b>20</b>	cloxacilin 250mg	caps	Originator brand
			lowest priced generic
<b>21</b>	cloxacilin 500mg/vial	inj	Originator brand
			lowest priced generic
<b>22</b>	co-trimoxazole 480mg	tabs	Originator brand
			lowest priced generic
<b>23</b>	doxycillin 100mg	caps	Originator brand
			lowest priced generic
<b>24</b>	erythromycin 250mg	tabs	Originator brand
			lowest priced generic

25	Flucloxacillin 250mg	caps	Originator brand
			lowest priced generic
26	gentamycine 40mg/ampoule	inj	Originator brand
			lowest priced generic
27	levofloxacin 250mg	tabs	Originator brand
			lowest priced generic
28	Kanamycin 1000mg	inj	Originator brand
			lowest priced generic
29	Nalidixic acid 500mg	tabs	Originator brand
			lowest priced generic
30	Nitrofurantoin 100mg	tabs	Originator brand
			lowest priced generic
31	penicillin, benzyl 5000000IU	inj	Originator brand
			lowest priced generic
32	PEN-V 250 mg	tabs	Originator brand
			lowest priced generic
33	Vancomycin 250/500mg	inj	Originator brand
			lowest priced generic
34	acyclovir 200/400 mg	tabs	Originator brand
			lowest priced generic

	acyclovir 5%	cream	Originator brand
			lowest priced generic
<b>35</b>	amphotericin B 50 mg	inj	Originator brand
			lowest priced generic
<b>36</b>	Terbinafine 1%	cream	Originator brand
			lowest priced generic
<b>37</b>	Clotrimazole	cream	Originator brand
			lowest priced generic
<b>38</b>	Clotrimazole	pessaries	Originator brand
			lowest priced generic
<b>39</b>	fluconazole 150/200mg	tabs/caps	Originator brand
			lowest priced generic
<b>40</b>	fluconazole 2mg/ml	inj	Originator brand
			lowest priced generic
<b>41</b>	Griseofulvin 500mg	tabs	Originator brand
			lowest priced generic
<b>42</b>	Ketoconazole 200mg	tabs	Originator brand
			lowest priced generic
<b>43</b>	Miconazole 2%	gel	Originator brand
			lowest priced generic

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<b>44</b>	Nystatin 500000IU	tabs	Originator brand
			lowest priced generic
<b>45</b>	loperamide 2mg	tabs	Originator brand
			lowest priced generic

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**8.7: OPPORTUNISTIC INFECTION ESSENTIAL MEDICINE LIST**

<b>S/N.</b>	<b>MEDICINES</b>	<b>STRENGTH</b>	<b>FORMULATION</b>
<b>1.0 Ameobicides (N=3)</b>			
1	Metronidazole	200mg	tabs
2	Tinidazole	500mg	tabs
3	Metronidazole	5mg/ml in 100ml	i.v inj
<b>1.1 Antibacterial (N=31)</b>			
4	Amikacin	500mg	inj
5	Amoxicillin	250mg	caps
6	Amoxicillin + Clavulanic acid	500mg+125mg	tabs
7	Ampicillin	500mg/vial	inj
8	Ampicillin	250mg	caps
9	Azithromycin	250mg/500mg	caps/tabs
10	Ceftazidime	250mg/vial	inj
11	Cefixime	200mg/400mg	caps
12	Ceftriaxone	500mg/1000mg/vial	inj
13	Clarithromycin	250mg/500mg	tabs
14	Chloramphenicol	250mg	caps
15	Chloramphenicol	1000mg/vial	inj
16	Ciprofloxacin	500mg	tabs
17	Ciprofloxacin	2mg/ml in 100ml	i.v inj
18	Clindamycin	150mg	tabs
19	Clindamycin	150mg/ml 2mlampule	in inj
20	Cloxacilin	250mg	caps
21	Cloxacilin	500mg in vial	inj
22	Co-trimoxazole	480mg	tabs
23	Doxycycline	100mg	caps
24	Erythromycin	250mg	tabs
25	Flucloxacillin	250mg	caps
26	Gentamycine	40mg/ml ampule	in 2ml inj
27	Levofloxacin	250mg	tabs
28	Kanamycin	1000mg	inj
29	Nalidixic acid	500mg	tabs
30	Nitrofurantoin	100mg	tabs
31	Penicillin, benzyl	5,000,000 IU/vial	inj

32	Penicillin, benzathine benzyl/pen V	250mg	tabs
33	Vancomycin	250mg/500mg	inj
<b>1.3 Antiviral(N=2)</b>			
34	Acyclovir	200mg/400mg	tabs
35	Acyclovir	5%	cream
<b>1.4 Antifungal =(N=10)</b>			
36	Amphotericin B	50mg in vial	inj
37	Terbinafine	15g/30g-1%	cream
38	Clotrimazole	15g/30g-2%	cream
39	Clotrimazole	100mg	pessaries
40	Fluconazole	150mg/200mg	caps/tabs
41	Fluconazole	2mg/ml in 100ml	i.v inj
42	Griseofulvin	500mg	tabs
43	Ketoconazole	200mg	tabs
44	Miconazole	2% oral gel	gel
45	Nystatin	500,000 IU	tabs
<b>Miscellaneous</b>			
46	loperamide	2mg	caps/tabs

**8.8: QUESTIONNAIRE – ENGLISH VERSION****QUESTIONNAIRE FOR ASSESSING THE ACCESSIBILITY TO ESSENTIAL MEDICINES FOR MANAGING OPPORTUNISTIC INFECTIONS AMONG HIV/AIDS PATIENTS IN DAR-ES-SALAAM REGIONAL REFERRAL HOSPITALS, TANZANIA****ID code:** \_\_\_\_\_

General information:

CTC clinic name \_\_\_\_\_ interview date \_\_\_\_\_

Investigator/assistant \_\_\_\_\_

Name and contact details of the participant

Name \_\_\_\_\_ Address \_\_\_\_\_ phone number \_\_\_\_\_

**A. Demographic information (tick the appropriate response)**

1 Gender:

- a. Female
- b. Male

2 Date of

DAY		MONS		YEARS			

birth

Age: \_\_\_\_ years (complete)

3 Marital status:

- a. Never married
- b. Married
- c. Cohabiting
- d. Divorced/  
widowed.

4 District of Residence: 1.Kinondoni      2. Ilala      3.Temeke

5 Religion:

- 8.1 Muslim
- 8.2 Christian
- 8.3 Hindu
- 8.4 Others (Please mention) \_\_\_\_\_

6. Level of education:

- 1. No formal education
- 2. Primary education complete
- 3. Completed secondary education
- 4. Tertiary education



## 7. Occupation:

1. Permanently employed
2. Temporarily employed
3. Self employed (business/ agriculture)
4. Casual laborer
5. Student
6. None

**B. Diagnosis and treatment status (review patient card/file):-**

## 8. Do you have any opportunistic infections?

1. Yes
2. No ( **if NO go to section D question 20**)

9. If **yes**, mention those opportunistic infections found

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

## 10. Number of OIs

--	--

## 11. If yes, What medicines have been prescribed (names)

1 \_\_\_\_\_, 2 \_\_\_\_\_, 3 \_\_\_\_\_

**C. Patient interview:-**12. Have you obtained **all** the prescribed medicine for OIs at the **clinic today**?

1. Yes (**go to section D question 20**)
2. No

## 13. If no, what is the reason for missing the medicine?

- Drugs are not available
- The dispenser is not available
- Others, Specify \_\_\_\_\_

14. Do you intend to buy **all** the missed medicine for **OIs** at the community pharmacy?

1. Yes
2. No

## 15. If no, why \_\_\_\_\_

## 16. Do you have any other disease condition that requires long-term treatment?

1. Yes

2. No

17. If yes, mention \_\_\_\_\_

18. Have you ever skipped medication during your course of treatment? (For OIs)

1. Yes

2. No

19. If yes, what was the reason for skipping the medication? (Check where apply)

- Long travel distance to the clinic
- Drug unavailability at the community pharmacies
- High cost of purchasing medicines at community pharmacies
- High cost of seeking health care
- Drug side effects
- No reason
- Others, specify \_\_\_\_\_

#### **D. ACCESS TO MEDICINE INFORMATIONS**

20. Were you prescribed medicines for OIs the last time you come to this clinic?

1. Yes

2. No

21. If yes, did you get **all** medicines at the clinic?

1. Yes

2. No

22. If no, what was the reason (check where applicable)?

- Drugs were not available
- The dispenser was not available
- Others, Specify \_\_\_\_\_

23. Did you manage to get all the medicines missed at the clinic **today** or on the **previous** visit?

1. Yes (**go to question 24**)

2. No (**go to question 25**)

24. If yes, where did you get them?

- Bought it at the community pharmacy (**go to question 26**)  
 Obtained them from a neighbor/friend/relative e.t c  
 Had a remained stock at home  
 I changed to traditional medicines  
 Others, specify \_\_\_\_\_
25. If no, what was the reason?
- Was not able to buy it due to price  
 Drug was not available at the visited community pharmacy  
 I stopped the treatment  
 Others, specify \_\_\_\_\_
26. What quantity of the drug did you buy?
1. Full dose (**go to question 29**)
  2. Half dose (**go to question 27**)
27. If half a dose was bought, what was the reason?
- Was able to afford only a half dose  
 Was the only stock available at the visited pharmacy?  
 Others, specify \_\_\_\_\_
28. Did you manage to buy the **remaining** half dose to complete the treatment?
1. Yes (**go to question 29**)
  2. No ( **go to question 30 & 31**)
29. If yes, how much did it cost?
- Full dose (TZSs) \_\_\_\_\_  
 Half dose (TZSs) \_\_\_\_\_
30. Who finances the costs of your medicines for OIs?
1. myself
  2. From insurance company
  3. Family member
  4. Employer
  5. Borrowed money
  6. Other sources, mention \_\_\_\_\_
31. What is your approximate income from employment and all other sources?

a. Monthly income TZSs \_\_\_\_\_

b. Daily income TZSs \_\_\_\_\_

32. What were the reasons of not buying the remaining dose?

I was already cured by that first half dose

Was not able to afford to buy the remaining half dose

The medicines were not available at pharmacy?

Pharmacies are too far from home

Others, specify \_\_\_\_\_

## 8.9: QUESTIONNAIRE – SWAHILI VERSION

DODOSO KUHUSU KUTATHIMINI UPATIKANAJI WA DAWA MUHIMU KWA AJILI YA MATIBABU YA MAGONJWA NYEMELEZI KWA WAGONJWA WA UKIMWI KATIKA HOSPITALI ZA RUFAA ZA WILAYA ZA DAR-ES-SALAAM, TANZANIA

Dodoso number \_\_\_\_\_

Mimi \_\_\_\_\_ nimekubali kuwa sehemu ya huu utafiti. Nitaulizwa maswali kuhusu taarifa za upatikanaji wa dawa muhimu kwa ajili ya matibabu ya magonjwa nyemelezi kwa wagonjwa wa ukimwi katika kituo hiki cha huduma na matibabu kwa wagonjwa wa UKIMWI. ninaruhusu majibu yangu kutumika kwa namna ambayo jina langu halitajulikana. Tathmini hii inaheshimu mapendekezo ya ufanyaji wa tafiti zimhusuzo binadamu (Shirika la afya duniani, tamko la Helsinki)

Taarifa za jumla:

Jina la kituo cha huduma na matibabu \_\_\_\_\_

Tarehe ya usahili \_\_\_\_\_

Jina la mtafiti/msaidizi \_\_\_\_\_

Jina na anwani ya mshiriki

Jina \_\_\_\_\_ anwani \_\_\_\_\_ simu \_\_\_\_\_

### A. Taarifa za demografia (weka alama ya vema pale panapohusika)

1. Jinsia;
  1. Mwanaume
  2. mwanamke
2. tarehe ya kuzaliwa: \_\_\_\_\_ umri: (miaka) \_\_\_\_\_
3. Hali ya ndoa:
  1. sijaoa/ sijaolewa
  2. nimeoa/ nimeolewa
  3. tumeachana

4. ni mjane/ mgane
4. Wilaya unayoishi 1. Kinondoni 2. Ilala 3. Temeke
5. Dini:
1. Muislamu
  2. Mkristo
  3. Mhindu
  4. Nyingine (taja) \_\_\_\_\_
6. Elimu:
1. Sijasoma
  2. sijamaliza elimu ya msingi
  3. nimemaliza elimu ya msingi
  4. sijamaliza elimu ya sekondari
  5. nimemaliza elimu sekondari ya kidato cha nne
  6. nimemaliza elimu ya sekondari kidato cha sita
  7. Elimu ya juu
7. Kazi:
1. Mwajiriwa wa kudumu
  2. Mwajiriwa wa muda/ mkataba
  3. Nimejajiri (biashara au kilimo au mfugaji)
  4. Kibarua
  5. Mwanafunzi
  6. Sijaajiriwa

**B. Taarifa za utambuzi na matibabu ( angalia jalada au kadi ya mgonjwa):-**

8. Ana ugonjwa wowote nyemelezi?
1. Ndiyo
  2. Hapana (**nenda swali la 20**)
9. Kama ndiyo, nimagonjwa gani? 1. \_\_\_\_\_
2. \_\_\_\_\_ 3. \_\_\_\_\_
10. Idadi yake \_\_\_\_\_
11. Kama ndiyo ni dawa gani alizoandikiwa kwenye cheti cha dawa?

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

**C. Maswali yakumuuliza mgonjwa:-**

12. Je, umepata dawa zote ulizoandikiwa na daktari **LEO** kwa ajili ya magonjwa nyemelezi?

1. Ndiyo ( nenda swali la 20 )
2. Hapana

13. Kama hapana, Sababu za kukosa dawa ni ipi?

- dawa hazikuwepo kwenye famasi ya kliniki
- mtoa dawa hakuwepo
- sababu nyingine, elezea \_\_\_\_\_

14. Je, unampango wa kununua dawa ulizokosa hapa kwenye maduka ya dawa ya watu binafsi?

1. Ndiyo
2. Hapana

15. Kama \_\_\_\_\_ hapana, \_\_\_\_\_ kwanini?

16. Je, una ugonjwa mwingine unaohitaji matibabu ya muda mrefu?

1. Ndiyo
2. Hapana

17. Kama ndiyo, taja \_\_\_\_\_

18. Umewahi kuacha au kutokumaliza kunywa dawa ulizoandikiwa na Daktari?

1. Ndiyo
2. Hapana

19. Kama ndiyo, sababu za kuacha ni nini? (weka alama ya vema panapohusika)

- Umbali mrefu toka nyumbani/kliniki kwenda duka la dawa
- Dawa hazikuwepo kwenye maduka ya dawa
- Gharama kubwa za ununuzi wa dawa
- Madhara yatokanayo na dawa
- Hakuna sababu
- Nyingine, \_\_\_\_\_ taja

### D.TARIFA ZA UPATIKANAJI WA DAWA

20. Ziara ya mwisho kabla ya hii kumwona daktari, uliandikiwa dawa yoyote?
1. Ndiyo
  2. Hapana
21. Kama ndiyo, ulipata dawa zote kwenye famasi ya kliniki?
1. Ndiyo
  2. Hapana
22. Kama hapana, sababu ni ipi?
- Dawa hazikuwepo
- Mtoa dawa hakuwepo
- Sababu \_\_\_\_\_ nyingine, \_\_\_\_\_ taja/elezea
- 
23. Ulifanikiwa kupata dawa zote ulizokuwa umekosa kliniki LEO au KLINIKI ILIYOPITA?
1. Ndiyo (**nenda swali la 24**)
  2. Hapana (**nenda swali la 25**)
- 24. Kama ndiyo, ulizipata wapi?**
- nilinunua kwenye famasi binafsi (Nenda swali la 26)
- nilipata kwa jirani/rafiki/ndugu
- nilikuwa na akiba iliyobaki nyumbani ziku za nyuma
- nilibadili na kutumia miti shamba
- sababu nyingine, elezea** \_\_\_\_\_
- 25. Kama hapana, sababu ilikuwa nini?**
- sikuweza kununua kwa sababu ya bei**
- dawa hazikuwepo kwenye daka la dawa nilipokwenda
- sababu \_\_\_\_\_ nyingine, \_\_\_\_\_ elezea
- 
26. Je, ulinunua kiasi gani cha dawa?
1. dozi nzima
  2. nusu dozi (**nenda swali la 25**)
27. kama ulinunua nusu dozi sababu ni nini?



- Zikuweza kununua dozi kamili kwa sababu ya bei juu
- Dawa zilizokuwepo kwenye daka la dawa nilipokwenda
- Sababu \_\_\_\_\_ nyingine, \_\_\_\_\_ elezea
- 

28. uliweza kununua nusu nyingine iliyobaki?

1. Ndiyo (**nenda swali la 26**)
2. Hapana (**nenda swali la 30 na 31**)

29. Kama ndiyo, ziligharimu kiasi gani?

Dozi nzima (TZSs) \_\_\_\_\_

Nusu dozi (TZSs) \_\_\_\_\_

30. Je, ni nani anayekulipia gharama za manunuzi ya dawa hizo?

1. Mimi mwaneyewe
2. Bima
3. Ndugu
4. Mwajiri
5. Ninakopa hela
6. Vyanzo vingine, taja \_\_\_\_\_

31. Je, ni kiasi gani kwa wastani kipato chako toka kwenye ajira pamoja na vyanzo vingine vya mapato

- a. Kwa mwezi TZSs \_\_\_\_\_
- b. Kwa siku TZSs \_\_\_\_\_

32. Sababu ni nini ya kutokununua dawa zilizobaki ili kukamilisha dozi?

- Nilikuwa nimeshapona kwa ile nusu ya mwanzo
- Sikuwa na uwezo wa kununua dawa zilizobaki
- Dawa hazikuwepo kwenye duka la dawa nililo enda
- Famasi/ duka la dawa liko mbali sana na nyumbani
- Sababu nyingine, Elezea \_\_\_\_\_

### 8.10: INFORMED CONSENT FORM – ENGLISH VERSION

INFORMED CONCENT FORM TO PARTICIPATE IN THE STUDY TITLED “ACCESS TO ESSENTIAL MEDICINES FOR MANAGING OPPORTUNISTIC INFECTIONS AMONG HIV PATIENTS IN DAR ES SALAAM REGIONAL HOSPITALS”

ID-NO

Consent to participate in a study

Greetings! My name is .....I am a MPH resident at Muhimbili School of Public Health and Social Sciences, working on this research project with the objective of assess the accessibility of essential medicines for managing opportunistic infections among HIV/AIDS patients in Dar-es-salaam regional referral hospitals

Purpose of the study

This research is aiming at collecting information for assessing the access to essential medicines for managing opportunistic infections among HIV/AIDS patients in Dar-es-salaam regional referral hospitals. You’re being asked to participate in this study because you have particular information that may be important to the study.

If you agree to join the study, you will required to respond to the questionnaire for the purpose of the research.

Confidentiality

I assure you all information we collect on forms was entered into computers with only the study identification number. Only people working on this research study will have access to the information.

Risks

We do not expect any harm to happen to you because of joining to this study.

### Right to Withdraw and Alternatives

Taking part in this study is completely voluntary. You can also stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdraw from the study will not involve penalty or loss of any benefits to which you are otherwise entitled, although your participation is highly valued.

### Benefits

If you agree to take part in this study, you will assist in obtaining the information that was used in evaluating the current national HIV policy of providing free services to HIV patients. This in turn, will help you or our fellow Tanzanians who have **no** access to the essential medicines for managing opportunistic infections.

### Who to Contact

If you ever have questions about this study, you should contact the

**Principal investigator: Zawadi Phares Secha**

Muhimbili University of Health and Allied Sciences

P.O.Box 65001, Dar es salaam. (Tel. +255714 516 713)

If you ever have questions about your rights as a participant, you may call

Prof.M.Moshi

Chairman of the university Research and Publications committee,

P.O.Box 65001, Dar es Salaam.

Tel:2150302-6

Signature:

Do you agree?

Participant agrees [\_\_\_]

Participant does NOT agree [\_\_\_\_]

I \_\_\_\_\_ have read the contents in this form. My questions have been answered. I agree to participate in this study.

**Signature of participant**

\_\_\_\_\_

Signature of research assistant

\_\_\_\_\_

Date of signed consent

\_\_\_\_\_

### 8.11: INFORMED CONSENT FORM – SWAHILI VERSION

FOMU YA RIDHAA YA USHIRIKI KWENYE UTAFITI WENYE KICHWA KINACHOSEMA ‘KUTATHIMINI UPATIKANAJI WA DAWA MUHIMU KWA AJILI YA MATIBABU YA MAGONJWA NYEMELEZI KWA WAGONJWA WA UKIMWI KATIKA HOSPITALI ZA RUFEE ZA MKOA WA DAR-ES-SALAAM’

Namba ya utambulisho

Ridhaa ya kushiriki Utafiti

Hujambo!

Ninaitwa ....., mwanafunzi wa digrii ya uzamili katika afya ya jamii Chuo Kikuu cha Afya na sayansi shirikishi cha Muhimbili. Ninafanya utafiti wenye lengo la kuangalia upatikanaji wa dawa muhimu kwa ajili ya matibabu ya magonjwa nyemelezi kwa wagonjwa wa ukimwi katika hospitali za rufaa za mkoa wa Dar-es-salaam.

Madhumuni Ya Utafiti

Utafiti huu unalenga kuainisha upatikanaji wa dawa muhimu kwa ajili ya matibabu ya magonjwa nyemelezi kwa wagonjwa wa UKIMWI katika hospitali za rufaa za mkoa wa Dar-es-salaam. **Unaombwa kushiriki katika utafiti huu kwa sababu wewe una taarifa muhimu sana kwa ajili ya utafiti huu.**

Nini Kinahitajika ili Kushiriki

Ili kushiriki katika utafiti huu inabidi kukubali na kujiunga kwa kujibu maswali yaliyotungwa kwa ajili ya utafiti huu.

Usiri

Taarifa zitakazokusanywa na dodoso hili zitaingizwa kwenye ngamizi kwa kutumia namba za utambulisho.

wahusika wanaofanya kazi kwenye utafiti huu ndio watakao kuwa na uwezo wa kuona taarifa hizi tu.

Hatari

Hakuna hatari yoyote itakayojitokeza

Haki Ya Kujittoa au Vinginevyo

Ushiriki katika utafiti huu ni wa hiyari.kutoshiriki au kujittoa kutoka kwenye utafiti hakutakuwa na adhabu yeyote na hutapoteza stahili zako. Ila kushiriki kwako ni muhimu sana kwangu

Faida

Kama utakakubali kushiriki kwenye utafiti huu itakuwa ni faraja kwa kuwa utasaidia katika upatikanaji wa taarifa muhimu ambazo zitatumika kupitia sera ya taifa ya UKIMWI ya utoaji wa huduma bure kwa wagonjwa wa UKIMWI. Kwa hilo itakusaidia wewe au watanzania wenzetu ambao wanapata shida ya upatikanaji wa dawa muhimu ya magonjwa nyemelezi.

Nani wa Kuwasiliana Naye

Kama una maswali kuhusiana na utafiti huu itakubidi kuwasiliana na msimamizi mkuu wa utafiti.

Mtafiti mkuu:Zawadi Phares Secha

Muhimbili University of Health and Allied Sciences

P.O box 65015

Dar-es-salaam

Simu: +255714 516 713

Kama una maswali yoyote kuhusu haki yako kama mshiriki, unaweza kuwasiliana na

Prof. M.Moshi

Mwenyekiti wa kamati ya chuo ya utafiti na uchapishaji

P.O. Box 65015,

Dar-es-salaam

Simu 2150302-6

Je umekubali?

Mshiriki amekubali [\_\_\_\_] Mshiriki hajakubali [\_\_\_\_]

Mimi..... nimesoma maelezo ya fomu hii, maswali yangu yamejibiwa.Nakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki .....

Sahihi ya mtafiti msaidizi .....

Tarehe ya kutia sahihi ya kushiriki.....