DRUG COST IMPLICATIONS OF TREATING HIV/ AIDS PATIENTS WITH MENTAL ILLNESS AT MUHIMBILI NATIONAL HOSPITAL, TANZANIA

By

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A Dissertation Submitted in partial fulfilment of the requirements for the Degree of Master of Science in Pharmaceutical Management of the

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CERTIFICATION

The undersigned certify that she has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled '**Drug Cost Implications of Treating HIV/ AIDS Patients with Mental Illness at Muhimbili National Hospital, Tanzania'** in partial fulfilment of the requirements for the MSc Programme (Pharmaceutical Management) of Muhimbili University of Health and Allied Sciences

. ……

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DEDICATION

This work is dedicated to my lovely and very supportive family, Israel Mwasha my husband and my children Shilekirwamuu and Eliashishi who have endured my absence during the study period.

ABSTRACT

Background

Tanzanian patients suffering with HIV/AIDS or mental illness are treated free of charge as per the Ministry of Health and Social welfare (MOHSW) cost sharing policy of 1993. The exemption of cost sharing for HIV/AIDS patients put a severe financial burden on the government to provide free treatment and care to an estimated 1.8 million patients. Although there are many checks and balances to quantify the national drug use and expenditure of antiretroviral (ARV) and TB drugs; there is no parallel system of quantifying the expenditure associated with the other drugs used to manage HIV related co morbidities such as mental illness which is also exempted.

Objective

The study was conducted to determine drug cost implications associated with the treatment of HIV patients with mental illness as compared to those with HIV alone.

Methodology

Prescription data was retrieved from the MNH JEEVA electronic data base for all the attendees of MHN HIV Clinic from January 2008 to December 2010.The drug cost prices were obtained from the Medical Store Department (MSD) and the July 2010 government subsidised price list was used. One United States dollar (US$) was set to be equivalent to 1,600 Tsh. Retrieved Data was exported into Excel and data analysed using SPSS and R- Statistical Computing Software.

Results

A total of 1913 out of 1987 (96.7%) patient's data were analyzed. The majority of the clinic attendees were from Kinondoni district Dar es Salaam (51.2%). The mean age for the patient was 43.2 (range 18-85 years). The majority of patients were female and married, 69.7% and 51.3%, respectively. First visit to emergency medicine and psychiatry departments contributed 41% and 25% respectively of previously undiagnosed HIV infected persons. The total drug cost for the study period was US$ 906,450.5 (Tsh1, 450,320,800). The average drug expenditure cost per person per year

(PPY) was US$ 204. 1 (Tsh 326,540.7). The majority of patients were on first line ARV regimens (98.4%) and the total cost for antiretrovirals (ARVs) was US$ 804,449.5 (Tsh 1,287,119,205). The cost for PPY for patients on ARV alone was US$ 197.0 (Tsh 315,261.9). The total cost for mental illness drugs for the study period was US$ 6,943.5 (Tsh 11,109,629) with Amitriptyline being the most commonly prescribed mental illness drug at 55.9%. The proportion of attendees that were prescribed drugs for the management of mental illness in the study period was 16.5%, with 8.5% of these being for the management of severe mental illness. Patients with HIV and mental illness had a significantly higher mean drug expenditure cost per person years of US$ 278. 6 (Tsh 445,717.5), compared with patients with HIV alone whose mean cost was US$ 226. 7 (Tsh 362,664.6/=) [p-value <0.0001]. There was no significant difference in the number of HIV patients with mental illness on first line ARV regimens compared to second line regimens. Switching HIV/ mental illness patients onto second line ARV regimens significantly increased the drug cost per person years from US$ 198.5 to US$ 1,108.0 (Tsh 317,657.8 to 1,772,801.6 [p-value <0.0001].

Conclusions and Recommendation

Mental illness develops in a significant proportion of HIV patients at MNH. Drugs used to manage co- morbid HIV/mentally ill patients have a significant impact on the cost of treating these patients, making this group of HIV patients a more expensive group with respect to drug costs. The high contribution of first case psychiatry presentation in identifying HIV infected persons strongly advocates that psychiatric care should be part and parcel of routine HIV care and treatment programs at Muhimbili National Hospital (MNH).

TABLE OF CONTENTS

DECLARATION..... ……..iii
ABSTRACT ……..….vi
TABLE OF CONTENTS ……...……..viii
LIST OF TABLES.....x
LIST OF FIGURES xi
ABBREVIATIONS xii
CHAPTER ONE 1
1.0 BACKGROUND …….……..1
1.1 Introduction ……..1
1.2. Literature review ……..3
1.3. Statement of the Problem ……6
1.4. Rationale ……...8
1.5. Objectives ……..…10
CHAPTER TWO ……11
2.0. Methodology……11
2.1. Study Site ……11
2.2. Study design ……11
2.3. Study Population and Sample Size Calculation ……11
2.4. Data collection ……12
2.5. Inclusion Criteria ……12
2.6. Exclusion Criteria ……...13
2.7. Data analysis ……...13
2.8. Ethical considerations ……13
CHAPTER THREE.....14
3.0Results…….....…….14

3.1 Patient Follow up Records ……14
3.2 Demographic Characteristics ……16

3.3 Distribution of HIV patients by Region and District ……17
3.4 Medical problem at first visit ……19
3.5 Medical problems other than known HIV case. ……...20
3.6 Drugs prescribed for mental illness. ……....20
3.7 HIV/Mentally ill prescriptions…….27
3.8 Antiretroviral drug usage and cost……...27
3.9. Drug Cost per Visit ……..32
3.10 Drug Prescriptions for Co-morbidities ……..33
CHAPTER FOUR.....41
Discussion…….....41
Conclusions…….45
Limitations of the study……..……45
Recommendations……..46
REFERENCES 47
APPENDIXES.....52
Social – Demographic Information ……52
Treatment Details, Types of Drugs, Out Patient HIV Drugs ……53
Drugs for Opportunistic Diseases ……54
Drugs for Mental Illness ……54
Drugs for Diabetes ……55
Drugs for Other Diseases ……..55

LIST OF TABLES

Table 3.1	Duration of Patient Follow up	14
Table 3.2	Social demographic characteristic of the study population	16
Table 3.3	Distribution HIV Patients by Region	17
Table 3.4	Medical Problems at First visit	19
Table 3.5	Medical Problem at first visit other than known HIV	20
Table 3.6	Prescription and cost for mental illness drugs	26
Table3.7	Categorization of mentally ill patients by prescriptions	27
Table 3.8	Mentally ill patients by ART treatment regimes	28
Table 3.9	Cost of commonly prescribed ART regimens per dose	30
Table 3.10	HIV/mental illness prescription cost per visit	32
Table 3.10.1	Cost of antibiotics per dose	34
Table 3.10.2	Cost of antifungal per dose	36
Table 3.10.3	Cost of antihypertensive per dose	38
Table 3.10.4	Cost of antidiabetics per dose	40

LIST OF FIGURES

Figure 3.1	Number of patients at specific follow up days	15
Figure 3.2	Distribution of HIV patients by district	18
Figure 3.6	Prescriptions for drugs for Mental illness among HIV	25
Figure 3.8.2	Prescribed first line ARVs	28
Figure 3.8.3	Prescribed Second line ARVs	29
Figure 3.9	Cost per visit by Mental illness and ARV regimen	31
Figure.3.10.1	Prescribed Antibiotics	35
Figure 3.10.2	Prescribed Antifungals	37
Figure 3.10.3	Prescribed antihypertensives	39
Figure 3.10.4	Prescribed antidiabetic	40

ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
CI	Confidence Interval
CTC	Counselling and Testing Centre
HIV	Human Immunodeficiency Virus
ICD – 10	International Classification of Diseases (Common mental health diagnoses)
IDU	Intra Venus Drug Uses
MOHSW	Ministry of Health and Social Welfare
MSD	Medical store department
MUHAS	Muhimbili University of Health and Allied Sciences
NACP	National AIDS Control Programme
PEPFAR	President's Emergency Plan for AIDS Relief (USA)
PLWHA	People living with HIV and AIDS
PPY	Per Person Years
TRIPS	Trade Related Aspects of Intellectual Property Rights (TRIPS)
Tsh	Tanzanian Shillings
UNAIDS	Joint United Nations Programme on HIV and AIDS
USD	United States dollars
WHO	World Health Organization

CHAPTER ONE

1.0 BACKGROUND

1.1 Introduction

Human Immunodeficiency Virus/AIDS (HIV/AIDS) is a major global public health problem. By the end of 2010, an estimated 33.3 million people worldwide were living with HIV/AIDS and over 5 million people needing treatment. Sub-Saharan Africa the most severely affected region is home to two-thirds of the global number of people living with HIV and AIDS, although it harbours only 10% of the world's population (UNAIDS Global Report 2010).

In Tanzania around 1.8 million people aged 15 and above are living with the HIV (UNAIDS Global Report 2010). Currently the national HIV prevalence is estimated to be at around 5.7%, with an estimated 275 new infections occurring daily in Tanzania as of 2009 (UNAIDS Tanzania Country Report March 2012). However the epidemic's severity differs widely from region to region with, for example, Zanzibar reporting a prevalence of as low as 0.6% while Iringa reports prevalence levels of 14.7 % (UNAIDS Tanzania Country Report March 2012).

The current HIV epidemic in Tanzania mainland is described as generalized, meaning it affects all sectors of the population. Heterosexual transmission accounts for the majority of infections (80%) on the mainland, whereas, on the island of Zanzibar the epidemic primarily affects female sex workers, men who have sex with men and injecting drug users (IDUs) (UNAIDS Tanzania Country Report March 2012).

The rollout of free antiretroviral therapy (ART) in 1996 in Tanzania resulted in dramatic improvement in survival of patients infected with HIV. Nonetheless, the Tanzanian government's commitment to provide free HIV/AIDS treatment and care services for its people has imposed a significant cost burden on the government. To date the major portion of the cost associated with the procurement and supply of antiretroviral (ARVs) is financed by generous donations from external funders such as the Global Fund to

Fight AIDS, Tuberculosis and Malaria; the United States President's Emergency Plan for AIDS Relief (PEPFAR) and others to the Government of Tanzania (GOT).

External funding at its current rate may not continue especially, in face of the current global economic recession, and that HIV/AIDS is no longer considered an emergency, but more of a chronic problem (Medicines Sans Frontiers, Untangling the Web of Antiretroviral Price Reductions, 14th Edition 2011). Hence in future the GOT, will have to assume the role as the sole financier of its current and future HIV treatment and care programs. It is therefore imperative that Tanzania and other developing nations, who are heavily dependent on donors for their supply of Antiretrovirals (ARVs), immediately, perform comprehensive cost estimates analysis of the true cost for treating and caring for HIV patients.

Determining the true cost for treating and caring for HIV/AIDS patients in Tanzania will enable Tanzania to put in place policies and strategies that ensure the cost-effectiveness and sustainability of HIV/AIDS interventions programs. These cost estimate studies will offer insights as to the true costs the government will have to incur to continue to provide free HIV treatment and care. In addition to this it will provide a basis for economic evaluations, through the identification of inputs and their valuation. Hence providing an overview of the cost profile of different components of interventions, and the total amount of resources needed to sustain or expand such programs. This will hopefully, result in the formulation and review of current health policies so as to ensure the future improvement and sustainability of national HIV treatment and care programs.

1.2. Literature review

HIV /AIDS, has had a devastating effects on the health, economy, and social structure of Tanzania. The health impact of HIV can be observed in the increase of underlying public health problems, including mental illness. People living with HIV/AIDS (PLWHA) experience a high level of stigma and discrimination (S&D), because of the perceived link between HIV/ AIDS and immoral behaviours, marginalized groups such as sex workers and homosexuals. As a result mental disorders are more common in HIV infected persons than in non-infected (WHO, Mental Health Report 2011). In some instances, this is due to mental conditions existing prior to the HIV infection, while in other instances mental problems are a direct or indirect consequence of the disease itself. It has been found that as many as 30%-40% of hospitalized AIDS patients develop delirium, and that HIV positive patients demonstrate a twofold risk of developing depression (Sammond et al 2007, Breitbart et al 2005). A study in the UK that found that 20% HIV patients had major depressive disorders associated with unemployment, poverty and lack of support, that depression in HIV patients was associated with poorer adherence to treatment and that depressed persons with HIV were less likely to have an undetectable viral loads (HIV&AIDS Information HIV weekly report April 25th 2012). The situation is no different in Tanzania. In 2010, a cross-sectional study to assess socio-demographics, clinical variables and prevalence of ICD-10 common mental health diagnoses conducted by Marwick and Kaaya; found that 15.5% of HIV patients were suffering from depression or mixed anxiety and depression, and that 4.5% were suffering from other anxiety disorders. The above findings lend weight to the World Health Organization (WHO) assertion that the mental health consequences of AIDS are substantial. In addition to general emotional responses of anger, guilt, fear, denial, and despair, the WHO estimates that 38 to 73 % of HIV /AIDS patients will have at least one psychiatric disorder in their lifetime, with up to 20 percent of PLWHA exhibiting psychiatric symptoms as their earliest medical symptoms fof AIDS (Baingana et al 2005; Gallego 2000; Stern et al 2000).

Mental disorders associated with HIV/ AIDS can result from the psychological impact of having a fatal disease, or stem from the effects of psychosocial stressors associated with the illness like stigma and discrimination. They can also result from actual neurological changes in the physical and chemical structures of the central nervous system that occur as a result of the HIV virus, opportunistic infections, or related treatments (Stern et al 2000). Studies have claimed that most HIV positive psychiatric patients actually suffer from multiple disorders. These disorders are classified into four categories, according to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, 4th Edition into ; Problems that Emerge from Life Circumstances , Brain Diseases, Personality and Temperament Disorders and Disorders of Motivated Behaviour (Baingana et al 2005).

Disorders resulting from life circumstances may take the form of adjustment disorder or demoralization. Demoralization has many of the same symptoms as depression, including sadness, feelings of helplessness, and sleep disturbances, but is treated through psychotherapy, not medication. Apart from demoralization HIV/AIDS-related stressors can also elicit high levels of anxiety among PLWHA. Anxiety may manifest itself through motor symptoms like shakiness and jumpiness, autonomic responses such as palpitations, excessive sweating, hyperventilation, rapid heartbeat, and diarrhoea, or vigilance symptoms including hyper vigilance, decreased sleep, irritability and distractibility (Warren 1995). Anxiety can also be a symptom of other AIDS-related mental disorders like depression (Stern et al 2000). . Neuropsychiatry disorders in HIV/AIDS patients on the other hand are often overlooked since psychiatric conditions are frequently misconstrued as psychological in nature (Koutsilieri et al 2002). Neurological impairment in these patients can occur as a direct effect of HIV/ AIDS on the central nervous system (CNS) or result from opportunistic infections. Brain diseases typically manifest themselves in syndrome forms and are caused by "structural or functional brain lesions." Examples of common, HIV and AIDS-related brain disorders include AIDS Dementia Complex (ADC), tumours, and opportunistic infections such as TB and streptococcal meningitis.

In addition to the traditional causes of mental disorders associated with HIV/ AIDS, research indicates that 20 to 73 % of HIV/AIDS infected individuals suffer from substance abuse disorders (Gallego 2000). Although HIV transmission through injected drug use currently accounts for only 5 % of HIV infections worldwide, the role of substance abuse has great part to play in the transmission of HIV (UNAIDS Fact sheet 2001). Substance use disorders, be it injection, smoking or alcohol impairs judgment. Impaired judgment is traditionally linked with impulsiveness, hence the association of alcohol use and increased risk for HIV infection. Alcohol abuse increases the probability of a variety of risky sexual behaviours, including sex with multiple partners, failure to use condoms, and sex with intravenous drug users. A national survey in the Central African Republic showed that the likelihood of having multiple sexual partners in a period of one-year increased for both men and women when sex was combined with alcohol (Baingana et al 2005). As many HIV patients indulge in substance and alcohol abuse as a mechanism for dealing with an HIV positive diagnosis, they pose the risk further transmitting the diseases and not properly adhering to their medication regimens (Meade et al 2008; Parry et al 2008). Concurrently, on the individual level, people with existing mental illnesses may be at a higher risk for HIV/AIDS infection as a result of impaired judgment (Pearson et al 2008; Angelino 2001; Gallego 1999). Consequently substance abuse of any kind and pre-existing mental illness act as risk factors for the acquisition and transmission of HIV as well as fostering the selection of drug resistant strains in HIV patients due to non-adherence.

Whatever the cause of the mental illness in HIV patients, it has impact on the national HIV treatment and care programs. The most obvious fact is that HIV patients exhibiting signs and symptoms of mental illness will have to be treated to ensure they remain lucid enough to comply with their ARV regimens and not engage in irrational sexual behaviour. Treating mental illness in HIV patients may have cost implications to the national HIV treatment and care programs; mainly from the fact that the drugs have to be identified and budgeted for. Inevitably, this may cause the HIV treatment and care

program budgets to inflate; to the determinant of programs of countries with limited resources. Particularly if one takes into consideration that drugs for treatment of severe mental illness are generally expensive. As was revealed in a Taiwanese study that found treatment of Schizophrenia consumed around 1.2% of Taiwan's total health care expenses (Lang et al 2004).

So far, the cost impact of treating mental illness in HIV patients has minimally been explored. There has only been one large study examining 23729 HIV infected adults at the University of Pennsylvania, Philadelphia that found that Medicaid Recipient with HIV and Serious Mental illness inflated the budget by 80% (Rothbard et al 2003, 2009a, 2009b). However, data from resource limited countries is scarce. Thus to ensure the sustainability and enhancement of future HIV treatment and care programs in resource limited countries, more data is required to be collected.

1.3. Statement of the Problem

Drugs used in the treatment of mental illness and HIV/AIDS are issued free of charge to patients in Tanzania, as in accordance to the 1993, Government of Tanzania cost sharing policy. This policy was enacted to uphold equity, universal access and affordability of drugs to the general population. Thru this policy, the government provides exemptions and waivers to specific categories of patients and disease including; all maternity health services, services to children under five, and the elderly (>60 years of age), patients suffering from tuberculosis, leprosy, hypertension, diabetes, mental illness, cancer and HIV/ AIDS, and treatment and care of epidemic outbreaks of diseases such as cholera, meningitis, plague etc, (Mubyazi, 2004)

However, according to the Poverty and Human Development Report of 2007, since the introduction of health user charges under the cost-sharing policy, numerous surveys have highlighted public concern about the cost of treatment and drug availability. A common occurrence particularly in many African government health facilities is the

frequent drug stock outs. (Pasquet et al 2010; Burgha et al 2010; Muhamadi et al 2010). As a result many patients including HIV and mental illness patients find themselves in situation where they are forced to buy their medication although by law they should be provided these free of charge at government health centres. The most probable reasons for frequent drug stock outs at government health facilities is probably, inappropriate budgeting and limited funds to purchase sufficient amounts of the drugs required. Subsequently, patients pay for their medication by private means. Regrettably not only are the drugs for mental illness not readily available in Tanzanian private pharmacies, but they are considered slow moving as they a have limited number of cliental that purchase them on a private basis. As a result the few private pharmacies that stock them sell them at prohibitive prices that induce patient compliance to be poor. Consequently, if the mental state of these patients is not adequately controlled; these patients tend not to adhere to their ARV drug regimens. This in turn fosters the development of ARV drug resistance and increased transmission of HIV. An increase in the number of HIV patients' infected HIV drug resistant strains has a negative implication on the Tanzanian Government's budget for HIV treatment and care services; as it heralds increased expenditure for purchase of newer and more expensive drugs. Moreover, not only does mental illness in HIV patient increase treatment cost, it also impairs judgment and reduces fear of consequences. As a result, HIV patients with untreated mental disorders are at increased risk of getting infected and are more likely to transmit the disease (Yuri et al, 2003; Blank et al, 2002).

Moreover, there is limited data in Africa, that has attempted to estimate the average per person year (PPY) drug cost for HIV patients, or the HIV drug cost analysis that have factored in the costs of drug for co-morbidities associated with HIV/ AIDS even though HIV patients are often afflicted with co-morbidities such as cancer, hypertension, diabetes, chronic obstructive pulmonary disease and mental illness (Bikilla et al 2009). As a result the true drug cost implications of treating HIV patients with its co morbidities such as mental illness has not been accurately determined in the sub Saharan setting even though that there are studies that have been conducted in the United States

of America (Rothbard et al 2009; Himelohch et al 2007; Hoover et al 2004: Bozzette S. et al 2001)

Thus determining the actual cost implications of treating HIV patients with co morbidities such as mental illness as compared to those with HIV alone could be probably instrumental in improving HIV treatment and care programs in Tanzania. To continue with the erroneous practice of budgeting for HIV treatment and care services without factoring in the drug costs for the treatment of HIV associated co-morbidities, may in the future undermine the sustainability and enhancement of current HIV programs. By exacerbating continued drug stock outs that promote the development and evolution of HIV drug resistant strains that need to be controlled with more expensive second line and third line ARVs.

It is in this context that we have embarked on study to determine the drug cost implications, of treating HIV patients with mental illness at MNH so as to set a baseline for future comprehensive and comparative studies.

1.4. Rationale

In Tanzania patients afflicted with HIV and mental illness are treated free of charge as is decreed in the 1993 cost sharing policy of the Ministry of Health and Social welfare (MOHSW) (Mubyazi, 2004). This policy puts a great financial burden on the government to ensure availability and accessibility of the drugs for these two conditions on a national scale. The governmental financial burden may become overwhelming; when one takes into account that the treatment of HIV and mental patients is often long-term, lifelong in most cases and uses drugs that can generally be considered expensive. Furthermore, an increase in the number of patients on treatment due to conformance to the new WHO criteria for initiation of ART, (CD4 count of 350 and below from the previous CD4 count of 200) will put an additional strain on the health care budget. It is therefore imperative, that Tanzania develop strategies to minimize the rate of new

infections, while at same time resource new financial avenues to continue to finance and sustain its treatment and care programs.

The Tanzanian government has made some inroads in implementing a number of strategies to reduce and prevent transmission of HIV; including promoting safe sex practices, providing free voluntary testing and counselling (VCT) service, establishment of Prevention of Mother to Child Programs (PMTCT), supply of free ARVs just to mention just a few (NACP report 2009). Even though ARVs have been shown to be effective in slowing disease progression and reducing HIV transmission their long-term benefit is only sustainable if drug resistant HIV strains do not emerge (Chesney et al 1999). It is therefore crucial that once HIV treatment commences in patients, factors that promote development of secondary HIV drug resistance such as poor adherence, due to drug stock outs or non-compliance be minimized.. Ensuring that there are adequate drugs for mental illness for both HIV and mentally ill patients, will promote the reduction of HIV transmission and minimize the development of HIV drug resistance. Basically because mentally stable patients tend to adhere to their ARVs regimens and refrain in risky sexual behaviour that promotes spread of HIV (Kemppainen et al 2004).

However, to ensure that there are adequate stocks of ARVs as well as the drugs to mental conditions in HIV patients within health facilities in Tanzania one requires to perform a proper needs assessment estimations of the amount of ARVs, drugs for mental illness required as well asthe associated cost implications (Rothbard et al 2009). Knowledge of the true cost implications of treating HIV patients with mental illness as compared to those with HIV alone will not only assist the government in the future to budget and plan effectively to improve HIV treatment and care in Tanzania, but also assist in the control and possible reduction of HIV transmission and drug resistance development rates.

1.5. Objectives

Broad objective:

To determine the cost implications of treating HIV/ AIDS patients with mental illness at Muhimbili National Hospital (MNH)

Specific objectives:

1. To determine the number of HIV patients prescribed drugs for mental illness.
2. To determine the most commonly prescribed drugs for mental illness.
3. To estimate the drug cost for treatment of patients with HIV/AIDS alone per person years.
4. To estimate the drug cost for treatment of HIV/AIDS patients with mental illness per person years.
5. To estimate the total cost for antibiotics, antifungals, antidiabetic and antihypertensive prescribed to HIV patients for the study period.

CHAPTER TWO

2.0. Methodology

2.1. Study Site

The study was conducted at MNH in Dar-es-salaam Region, Tanzania. The hospital is located in Ilala district. MNH is a National Referral Hospital and University Teaching Hospital with 1,500 bed facility, attending 1,000 to 1,200 outpatients per day, and admitting 1,000 to 1,200 inpatients per day. This is the largest and only tertiary referral hospital in Tanzania with patients being referred from both public and private health facilities as well as from neighbouring countries.

2.2. Study design

The study was a retrospective cross sectional documentary review of patient's electronic prescription, retrieved from MNH HIV clinic attendees from 1st of January 2008 to 31st December 2010.

2.3. Study Population and Sample Size Calculation

The study included all patients above 18 years who attended HIV Clinic at MNH. On average MNH hospital attends approximately 150-220 HIV patients in the outpatient clinic daily, which are approximately 1000 HIV patients per week. In one month, a total of 4000 patients attend clinic for prescription refills and routine clinic visits. In addition to these there are additional new patients initiated to the clinic every month and thus there are approximately 5000 patients every year.

For the period of the study, we expect to have 10,000 HIV patients. It is estimated that the prevalence of mental illness among HIV patients is 7 %(unpublished data from the department of Psychiatric unit of MNH – Head Department of Psychiatric Kaaya SF), therefore 7% of 10000 is equivalent to 700. Thus the sample size can be: approximately 720 patients. This study included all patients who attended HIV-AIDS clinic from 1st January 2008 to 31st December 2010 as calculated below:

$N^2 = (1.96/d)^{2\pi} (1-\pi)$

Where π=proportion 7% = 0.07

d=precision 2% = 0.02

$N^2 = (1.96/0.02)^2 0.07(1-0.07)$

$= 625$

Adjusting for dropouts and non-respondents or death

Adding 15% of the calculated sample:

$N = 625 + (15 \times 625)/100$

$N = 625 + 94 = 719$

$N = 720$

Simple computer based random sampling was used to select case reports. The study found 1978 HIV registered patients and decided to use all of them for the study.

2.4. Data collection

The information collected from electronic database and in some cases paper record files, was recorded on a Microsoft excel 2007 data collection form (see appendix). For each patient, personal particulars (age, weight, sex, residence), education level, marital status, diagnosis and treatment details was recorded on excel sheet. Incomplete data or inaccuracies was reviewed at the site and corrected through verification of patient's paper records. The pharmaceutical cost prices used, were obtained from the Public distributor of drugs the Medical Store Department (MSD). The price used was for July 2011. If MSD didn't have a price the Hospital buying consortium price was used.

2.5. Inclusion Criteria

All patients aged 18 years and above who attended HIV clinic from January 2008 – December 2010.

2.6. Exclusion Criteria

All patients with other HIV co-morbidities such as Hepatitis and Tuberculosis

2.7. Data analysis

The collected data was entered into excel work sheet (Microsoft excel 2007®) followed by data coding, checking and cleaning. Double entry was done to ensure appropriate data consistency and quality. Then data was exported to SPSS version 16 for further data management. Finally data was imported into R- Statistical Computing Software Version 2.13.0 where more study variables were generated. Patient characteristics were analysed to generate range and mean (±SD) for continuous and frequencies for categorical variables. Drug utilization data was analysed to generate frequencies of prescription for drugs for various HIV co-morbidities. Duration and drug cost for the study period were calculated for individual patients and also for groups (HIV alone or HIV/mental). Values generated from individual patients were used to calculate mean cost of treatment per patient per year. Comparisons of mean drug cost between groups were performed by independent T-test and differences were considered significant if p value was less than 0.05.

2.8. Ethical considerations

Ethical approval to conduct the study was sought from the Muhimbili University of Health and Allied Sciences (MUHAS) ethical review board. Permission to use data from, Pharmacy and Pyschiartry department, at Muhimbili National Hospital was sought from the hospital authorities. All the information from computer database and record files were kept under strict confidentiality.

CHAPTER THREE

3.0 Results

A total of 1978 adult HIV patients were registered on the MNH pharmacy data from January 2008 to December 2010. Out of 1978 patients data only 1913 (96.7%) could be analysed. Non analysable data were due to missing information i.e. not filled properly at first visit, or the consequence/refill visit.

3.1 Patient Follow up Records

The median duration of patient follow up for the study period was 1056 days (2.89 years) with most patients having duration of follow up period of beyond 2.5 years as shown in Table 3.1 and figure 3.1

Table-3.1: Duration of Patient Follow up

Parameter	*(days)*
Minimum duration of follow up recorded	*0*
1st quartile	*987*
Median	*1056*
Mean	*989*
3rd quartile	*1069*
Maximum	*1293*

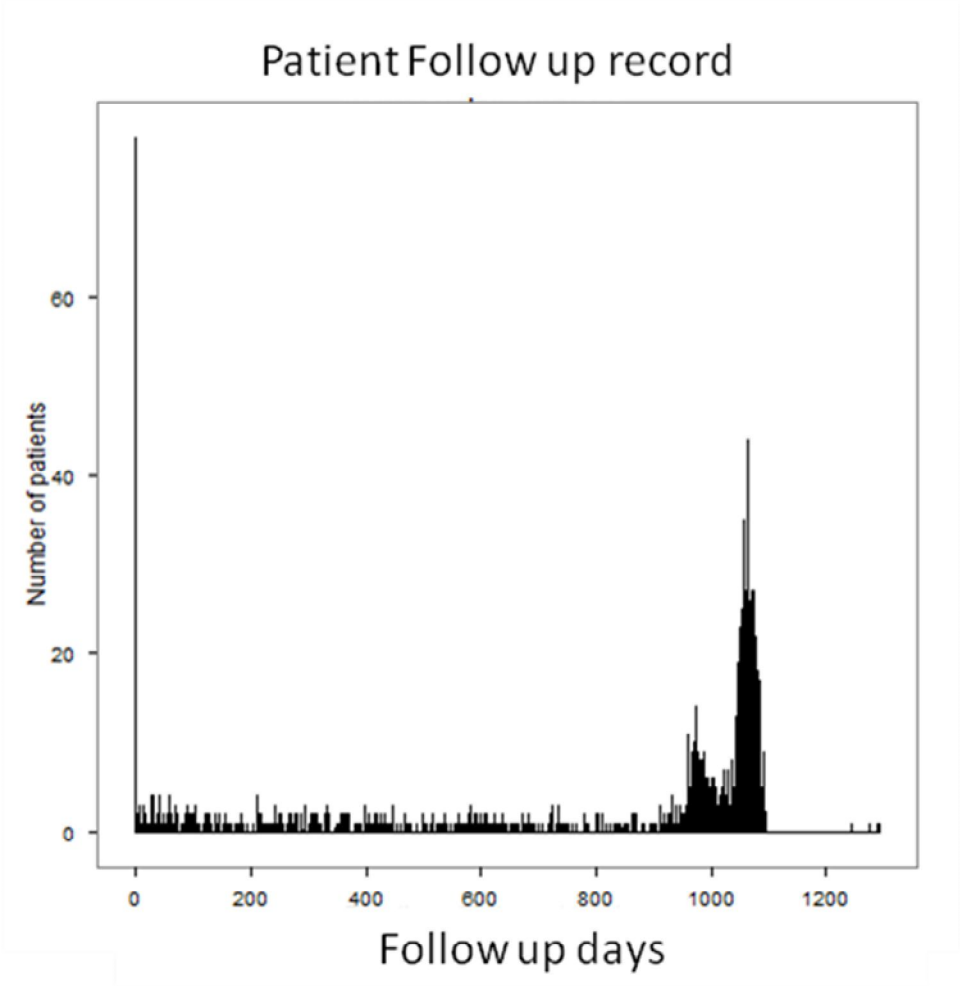


Figure 3.1: Number of patients at specific follow up days

3.2 Demographic Characteristics

Table-3.2: Summary of Social demographic characteristics of study population (n=1913)

Parameters	Number	Percentage (%)
Sex		
Male	579	30.3
Female	1334	69.7
Total	**1913**	100
Age		
Below 25 years	59	3.1
25 years to 45 years	1099	58.0
More than 45 years	738	38.9
Mean age	43.2 (SD10).	
Total	**1901**	100
Marital status		
Single		39.7%
Married		51.3%
Widowed		7.48%
Divorced		1.42%
Total	1471	

The majority (69.68%) of patients were females and married (51.3%) respectively. Their mean age was 43.2 (SD10).

3.3 Distribution of HIV patients by Region and District

Table-3.3. Distribution of HIV patients attending MNH clinic by Region

Region	Number	Frequency (%)
Dar es Salaam	1789	93.6
Coast Region	52	2.70
Morogoro	16	0.90
Tanga	12	0.63
Iringa	9	0.45
Tabora	3	0.16
Shinyanga	3	0.16
Lindi	3	0.16
Dodoma	2	0.10
Arusha	2	0.10
Mtwara	2	0.10
Mwanza	2	0.10
Musoma	2	0.10
Sumbawanga	2	0.10
Kigoma	2	0.10
Mbeya	2	0.10
Kilimanjaro	1	0.05
Njombe	1	0.05
Singida	1	0.05
Ngara	1	0.05
	1913	**100**

The majority of the clinic attendees were from Dar-es –salaam (93.6%) and Coast region (2.7%)

3.3.2 Distribution of Dar es Salaam clinic attendees by District

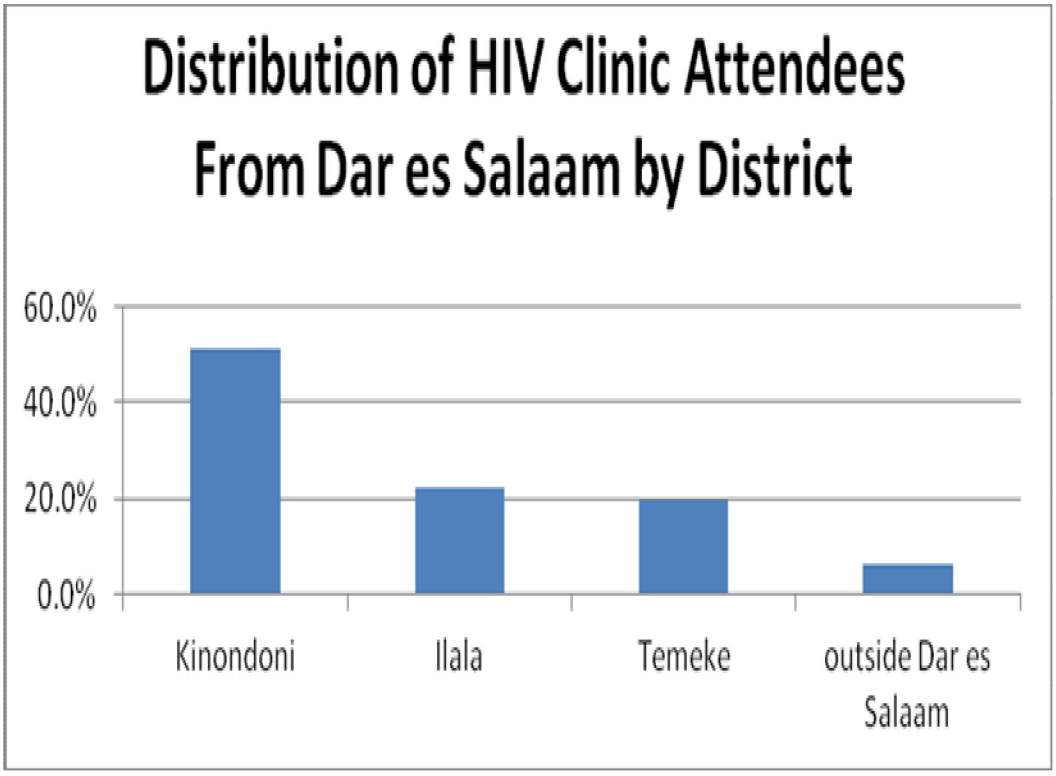


Figure-3.2: Distribution of HIV patients from Dar es Salaam by district

The clinic aattendees from Dar es Salaam were mainly residents of Kinondoni (51.2%) and Ilala (22.69%) districts.

3.4 Medical problem at first visit

Table-3.4: Medical Problems at First Visit as criteria for recruitment to HIV Clinic.

Case Type	N	%
Known HIV case	1735	90.70
Emergency	73	3.82
Psychiatry	44	2.30
General Medicine	20	1.05
Dental	9	0.47
Ophthalmology	7	0.37
General surgery	6	0.31
Gynaecology	6	0.31
Obstetrics	5	0.26
Physiotherapy	2	0.10
Dermatology	1	0.05
Ear. Nose. Throat	1	0.05
Haematology	1	0.05
Neurology	1	0.05
Urology	1	0.05
Post natal	1	0.05
	1913	**100**

The majority of patients (90.70%) were known HIV cases at first visit as can be seen in Table 3.4 above.

3.5 Medical problems other than known HIV case.

Table-3.5: Medical problem at first visit other than known HIV case

CASE TYPE	N	(%)
Emergency	73	41
Psychiatry	44	24.7
General Medicine	20	11.2
Dental	9	5.1
Ophthalmology	7	3.9
General surgery	6	3.4
Gynaecology	6	3.4
Obstetrics	5	2.8
Physiotherapy	2	1.1
Dermatology	1	0.6
Ear .Nose .Throat	1	0.6
Haematology	1	0.6
Neurology	1	0.6
Urology	1	0.6
Post natal	1	0.6
	178	**100**

First visit to emergency medicine (41.0%), psychiatry (24.7%), general medicine (11.2%) and dental (5.1%) clinics were major clinical sites for identifying undiagnosed HIV infected individuals.

3.6 Drugs prescribed for mental illness.

The total cost for mental illness drugs prescribed for the study period was US$ 6,943.5 (11,109,629 Tsh). The three most expensive drugs per dose were Olanzapine at US$31.5 (50,831 Tsh), Risperidone at US$29.3 (46800Tsh) and Sodium valporate tabs at US$18.2 (29,100 Tsh) . The least expensive drugs per dose were Phenobarbitone at US$0.19(305Tsh), Amitriptyline at US$0.3 (510Tsh) and Promethazine at US$0.49 (780 Tsh) respectively as can be seen in Table 3.6 and figure 3.6.

The most commonly prescribed mental illness drugs were Amitriptyline tabs (55.9%), Haloperidol tabs (10.8%), Carbamazepine tabs (8.5%) and Benzohexol tabs (7.5%) as shown in figure 3.6. Although amitriptyline was the most commonly prescribed drug to HIV patients (55%); it was not possible from the prescriptions, to make inference as to whether this drug was being used for the management of HIV neurosis, depressive psychosis or HIV neuropathy as the same dose was used for all three conditions according to the National standard treatment guidelines of 2007.

Prescription of Drugs for Management of Mental Illness, Muhimbili National Hospital, 2008-2010

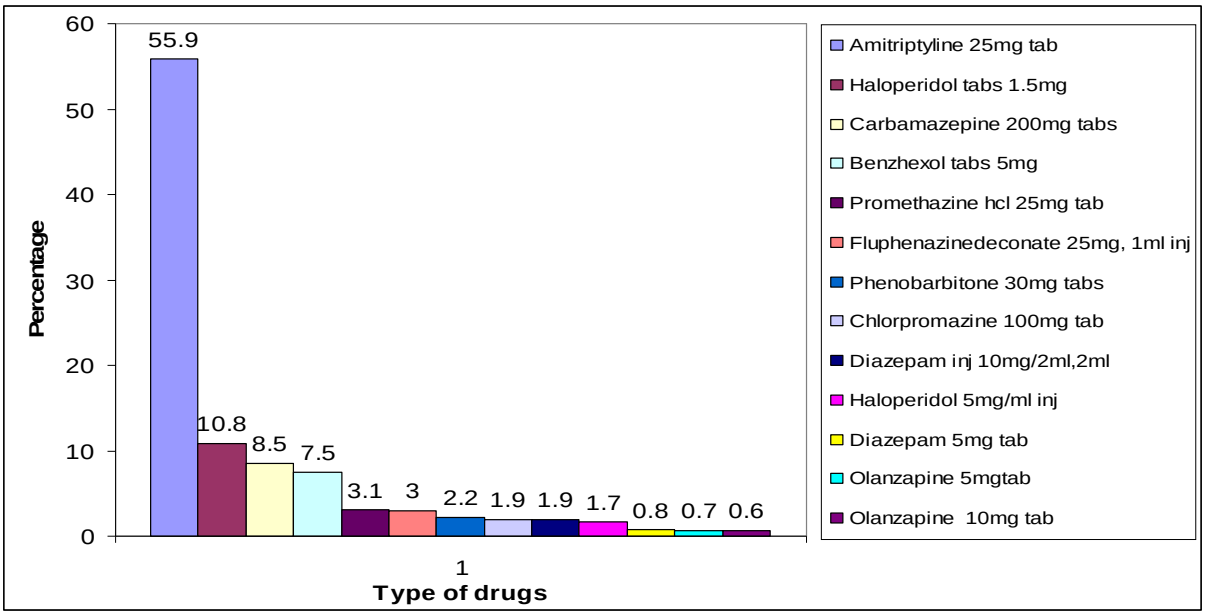


Figure-3.6: prescriptions for drugs for management mental illness

Table-3.6: Prescription frequency and cost for mental illness drugs

Drug	Number of prescriptions	(%)	Price/Dose (Tsh)	Price/Dose (USD)
Amitriptyline 25mg tab	3312	55.9	510	$0.3
Haloperidol tabs 1.5mg	642	10.8	2500	$ 1.5
Carbamazepine 200mg tabs	505	8.5	1014	$0.6
Benzhexol tabs 5mg	444	7.5	6708	$4.2
Promethazine hcl 25mg tab	182	3.1	780	$0.5
Fluphenazinedeconate 25mg, 1ml inj	180	3.0	2760	$ 1.7
Phenobarbitone 30mg tabs	129	2.2	305	$ 0.2
Chlorpromazine 100mg tab	113	1.9	1436	$ 0.9
Diazepam inj 10mg/2ml,2ml	110	1.9	470	$0.3
Haloperidol 5mg/ml inj	100	1.7	2080	$1.3
Diazepam 5mg tab	50	0.8	120	$ 0.08
Olanzapine 5mgtab	44	0.7	50831	$ 31.
Olanzapine 10mg tab	38	0.6	39800	$ 24.9
Phenytoin 100mg tab	16	0.3	780	$ 0.5
Sodium valprate 500 mg tabs	15	0.3	29100	$ 18.2
Risperidone 1mg tab	12	0.2	46800	$29.3
Sodium valproate tabs 200mg	10	0.2	9000	$ 5.6
Bromazepam (pascalium)1.5 mg	7	0.1	3760	$.2.4
Risperidone 4mg	6	0.1	46800	$ 29.3
Risperidone 2mg tab	5	0.1	46800	$ 29.3
Promethazine hcl 25mg/ml inj	2	0.0	500	$0.3
Risperidone 8 mg	2	0.0	46800	$ 29.3
Amitriptyline hcl 10 mg tab	1	0.0	250	$ 0.1
Fluoxetine 20mg cap	1	0.0	6300	$ 3.9
Total number of prescription during study period	5926		100	

3.7 HIV/Mentally ill prescriptions.

Table-3.7: Categorization of mentally ill patients by drugs prescribed.

Category	Number	%
Prescribed drugs for Mental illness (e.g. carbamazepine, phenobarbitone, sodium valproate etc)	316	16.5
Prescribed drugs for serious mental illness (e.g , Chlorpromazine, Haloperidol, Benzhexol ,Risperidone, Olanzapine Modecate etc)	162	8.5
Prescribed only an anticonvulsant	154	8.0
Prescribed only amitriptyline	941	49.2
Prescribed amitriptyline with other drugs for mental illness	732	38.3

The proportion HIV patients prescribed drugs for mental illness at least once during the study period was 16.5%. The proportion of HIV patients who were prescribed drugs for serious mental illness at least once during the study period was 8.5%.

3.8 Antiretroviral drug usage and cost

3.8.1 Distribution of Mentally ill patients on ARV regimens.

A total of 1882 (98.4%) ppatients were on first line and 31 (1.62%) on second line ARV regimens respectively. Among these patients 308 first line and 8 second line ARV patients could be considered mentally ill as can be seen in table 3.8 below. This difference is however not significant p-value = 0.246 (Pearson's Chi-squared test with Yates' continuity correction, X-squared = 1.346, df = 1,)

Table-3.8.1. HIV/Mentally ill patients on ARV treatment regimens

	Mentally ill	Non Mentally ill	Total
First line	308(16.3%)	1574(83.6%)	1882 (100%)
Second line	8(25.8%)	23(74.1%)	31 (100%)
Total	316(16.5%)	1597(83.4%)	1913 (100%)

3.8.2 Antiretroviral Prescription Pattern

The most commonly prescribed first line ARV was Duovir150mg/300mg [ZDV/3TC] (31.6%), Efavirenz tabs 600mg (22.8%) and Triomune 30 [D4T/3TC/NVP (18.9%) as shown in figure 3.8.1 Whereas the most commonly prescribed second line ARV were Kaletra and Abacavir see figure 3.8.2

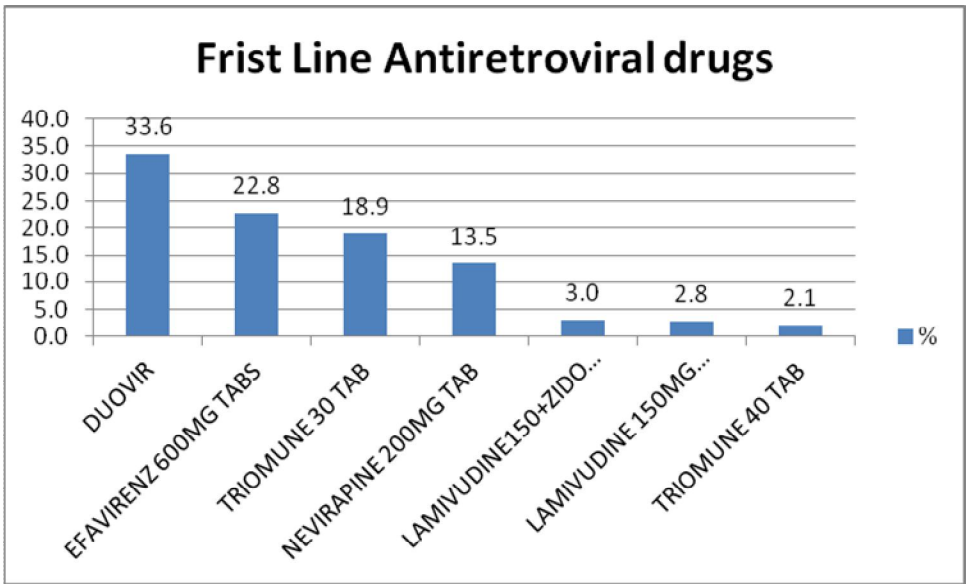


Figure 3.8.1 Prescribed First line ARVs

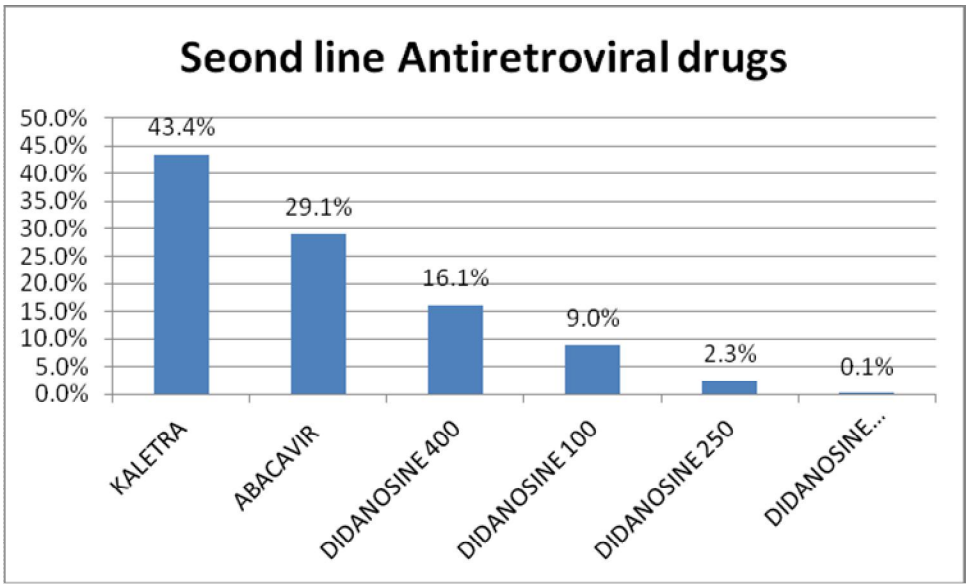


Figure 3.8.2 Prescribed Second line ARVs

3.8.3 Cost of Antiretroviral

3.8.3.1. ARV cost per dose

Total cost for ARVs for the entire study period was US$ 804,449.5 (1,287,119,205 Tsh). The total cost for first line drugs was US$ 657,369.9 (1,051,791,807 Tsh) while the total cost of second line drugs was US$ 147,079.6 (235,327,398Tsh). The most expensive first line regimen was D4T/3TC/EFV at US$ 34.1 per dose while the cheapest was D4T/ 3TC /NVP (TRIOMUNE 30) at US$ 10 per dose see table 3.8.2 below

Table-3.8.2 Cost of Commonly Prescribed ARV Regimens per Dose

Cost of ARV Regimens	Name	Cost per dose in US$
First line		
	D4T/ 3TC /NVP (TRIOMUNE 30) D4T/ 3TC /NVP (TRIOMUNE 40) AZT/3TC/NVP D4T/3TC/EFV AZT/3TC/EFV	10 10.5 5.3 34.4 24.1
Second line	ABC/Lopinavir-Ritonavir/ddI	106.8

The mean drug cost per patient per year for patients on second line ARVs regimens @ US$ 1,108.0 (1,772,801.6 Tsh) was significantly different from the drug cost per patient per year for patients on first line ARVs regimens was US$ 198.5 (317,657.8 Tsh) p - value < 0.0001 (T = -265.0733, df = 6487.699), as illustrated in figure 3.8.3 below.

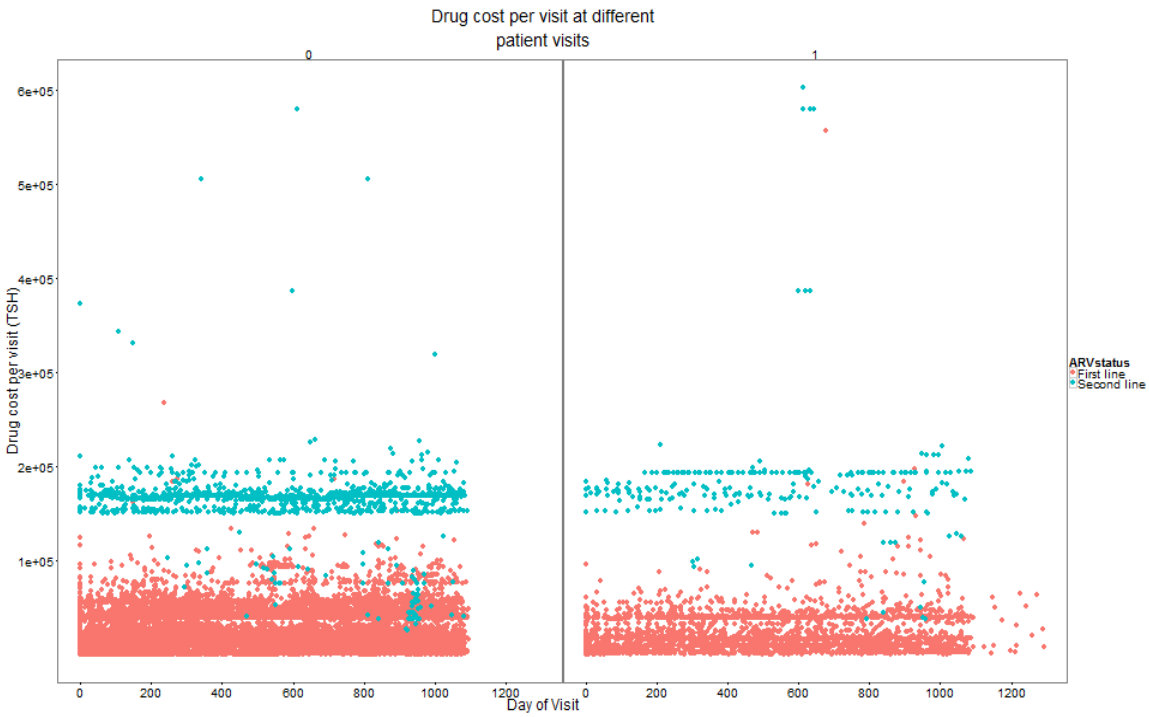


Figure-3.8.3. Cost per visit stratified by mental illness and ARV regimen

0 – Patients with HIV/AIDS only

1 – Patients with HIV/AIDS and Mental illness

3.9. Drug Cost per Visit

The drug cost per patient in person years for the various groups of HIV patients was calculated using a cost analysis formula adopted from the 3rd Edition of Methods for economic evaluation of Health care programmes by Drummond M. et al 2010:

$$Drug\ cost\ per\ person\ years\ =\ \frac{\Sigma_{visit=1}^{last\ visit}(Total\ price\ for\ every\ drug\ at\ every\ visit\ for\ every\ study\ patient\ visits}{(\Sigma_{patient1}^{1913} duration\ since\ first\ visit\ to\ date\ of\ data\ collection\ (days))\ /\ 365}$$

This was done to factor in the variation in the number of visits per patient.

Table 3.9 HIV/Mental illness Prescription cost per person years

Patient category	Total duration of follow up person years) (PPY)	Total cost of treatment in US$(Tsh)	cost per patient per person years in US$ (Tsh)
HIV Patients prescribed only antiretrovirals	3607.764	710,869.0 (1,137,390,411)	197.0 (315,261.9)
Patients Prescribe ARVs plus drugs for mental illness excluding anticonvulsants	313.36	848,15.7 (135,705,056)	270.7 (433,078.2)
Patients prescribed ARVs plus drugs for mental illness including anticonvulsants	724.663	169, 960.2 (271,936,273)	226.7 (362,664.6)
Patients prescribed ARVs plus amitriptyline only	1870.72	370,108.9 (592,174,252)	197.8 (316,548.8)
Prescription cost for all drugs prescribed to HIV patients for the entire study period (ARVs, antifungals, mental illness drugs , antidiabetic etc)	4332.4	884,190.7 (1,414,705,087)	204.1 (326,540.7)

The cost difference per person years between HIV/Mentally ill patients and patients suffering from HIV alone was US$ 270.7 and US$ 197.0 respectively. This indicates a drug cost increase of US$ 73.9 or 37.5% per person.

3.9.2 Mean Drug Cost per patient per year

The mean drug cost per patient per year was calculated using a cost analysis formula adopted from the 3rd Edition of Methods for economic evaluation of Health care programmes by Drummond M. et al 2010 :-.

$$Drug\ cost\ per\ patient\ per\ year = \frac{(\sum_{visit1}^{last\ visit} prescription\ cost\ per\ visit\ for\ an\ individual)}{Duration\ since\ first\ visit\ to\ date\ of\ data\ collection(days)\ for\ the\ individual\ /\ 365}$$

This formula was only used to calculate drug cost per patient per year only for those patients whose duration of follow up was more than 365 days.

The mean drug cost per patient per year for HIV/mentally ill patient was determined to be US$ 278.6 (445,717.5Tsh), 95% CI [275.0 (440,064.4) – 282.1 (451,370.6)]). This is significantly higher (p-value <0.0001) then the mean cost of drugs for HIV patients without mental illness US$ 226.6 (362,664.6 Tsh), 95% CI [225.5 (360,775.8)- 227.8 (364,553.4]).

3.10 Drug Prescriptions for Co-morbidities

3.10.1 Cost for antibiotics

The total cost for antibiotics for the entire study period was US$80,556.96 (128,891,182Tsh). The most commonly prescribed antibiotic was cotrimoxazole (69.2%) followed by amoxyicillin (13.17%), Cloxacillin (3.94%), and ciprofloxacin(3.7%), The most expensive antibiotics per dose were Cefuroxime (Zinnat) , costing US$23.6 (37,700Tsh), followed by Amoxycillin + Clavulanic acid 625mg tab at US$ 21.6.(34,600Tsh). as shown in table 3.10.1 and figure 3.10.1

Table 3.10.1 Cost of antibiotics per dose

Drug	No of prescriptions	Frequency (%)	Price/Dose Tsh	Price/Dose / US$
Cotrimoxazole 480mg Tabs	8052	69.2	63	0.03
Amoxycillin 250mg cap	1532	13.2	1600	1.0
Cloxacillin 250mg caps	459	3.9	1700	1.06
Ciprofloxacin 500 mg Tabs	434	3.7	760	0.5
Ampiclox 500mg CAP.	380	3.3	1250	0.8
Azithromycin 250mg cap.	122	1.0	2330	1.5
Cefuroxime (zinnat) 500mg tabs	111	1.0	37700	23.6
Ampicillin 440mg+Sulbactam 294mg	107	0.9	9100	5.7
Erythromycin 250mg tab	96	0.8	2301	1.4
Flucloxacillin+amoxycilline [flucamox] 500mg cap	53	0.5	8580	5.4
Doxycycline 100mg cap	44	0.4	300	0.2
Amoxycillin + Clavulanic acid (clavulin)625mg tab	39	0.3	34600	21.6
Chloramphenicol 0.5%w/v eye drops (10ml)	31	0.2	300	0.2
Gentamycin eye/ ear drops 0.3%w/v	24	0.2	450	0.3
Chloramphenicol eye ointment 1% 3.5gm	18	0.2	325	0.2
Cephalexin 250mg caps	11	0.09	6000	3.8
Cotrimoxazole (septrin) syrup 240mg/5ml 100ml	11	0.09	560	0.4
Gentamycin+dexamethasone (pyricort) 5ml	11	0.09	890	0.6
Amoxycillin + clavulanic acid(clavulin) 375mg tab	10	0.08	34000	21.3
Chloramphenicol 250mg tabs	10	0.08	1092	0.7
Clarithromycin 250 mg	9	0.07	13000	8.1
Gentamycin eye drops 10ml	8	0.07	550	0.3
Benzyl penicillin 5mu inj.	7	0.060	2064.1	1.3
Chloramphenicol 1gm inj	7	0.60	2784	1.7
Phenoxymethyl penicillin - pen v 250 mg tab	5	0.04	1445	0.9
Chloramphenicol ear drops 10ml	4	0.03	520	0.3
Amoxicillin +clavulanic acid (clavulin)156mg/5ml	3	0.02	7200.1	4.5

Amoxycillin + clavulanic acid(clavulin) 228mg/5mil	3	0.02	8287.6	5.2
Amoxycillin +clavulanic acid(augmentin) tabs 1 gm	3	0.02	24236	15.1
Amoxycillin susp. 125mg/5ml 100ml	3	0.02	950	0.6
Ampicillin 500mg inj.	3	0.02	412	0.3
Gentamycin 40mg/ml 2ml inj	3	0.02	3500	2.2
Geftriaxone (powercef) 1gm inj.	2	0.017	19500	12.2
Ciprofloxacin eye/ear drops 0.3%w/v 5ml	2	0.017	1196	0.7
Cloxacillin 500mg inj	2	0.017	5400	3.4
Doxycycline 100mg caps	2	0.017	600	0.4
Erythromycin granules 125mg/5ml 100ml	2	0.017	1600	1.0
Flucloxacillin caps 250mg	2	0.017	8680	5.4
Cotrimoxazole inj 480mg/5ml	1	0.008	27300	17
Gatifloxacin 400 mg tab	1	0.008	2200	1.4
Gatifloxacin eye drops 0.3%	1	0.008	4000	2.5

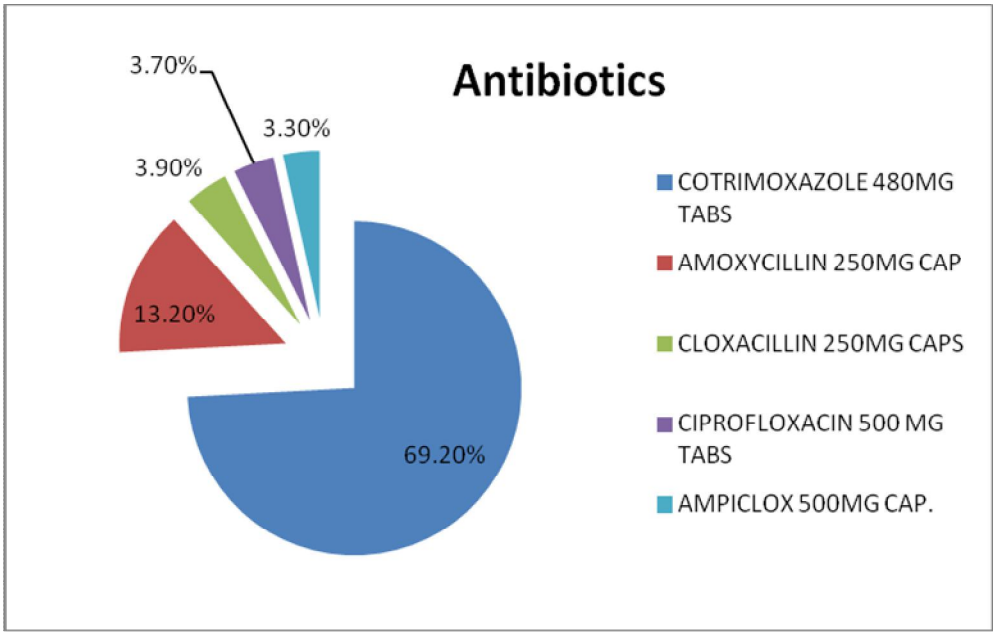


Figure 3.10.1 Prescribed Antibiotics.

3.10.2 Cost for Antifungals

The total cost for antifungals for the entire study period was US$13,817.3 (22,107,735Tsh). Fluconazole was the commonly prescribed antifungal (38.3%) at a cost of US$ 4.7 (7605Tsh). The most expensive antifungals were fluconazole at a cost price of US $10.7 (17160Tsh) and diprosalicylic ointment at US$ 7.3 (1163Tsh) as shown in table 3.10.2 and figure 3.10.2 below.

Table 3.10.2 Antifungal drug cost per dose

Drug	No of prescriptions	Frequency (%)	Price per dose (Tsh)	Price per dose (US$)
Fluconazole 150mg tabs	1114	38.3	7605	4.7
Clotrimazole cream 1%	724	24.9	800	0.5
Gentalene-c-cream 10gm	350	12.0	2548	1.6
Gentrisone cream 10gm	225	7.7	2405	1.5
Clotrimazole pessary with applicator	148	5.1	5850	3.6
Griseofulvin 500mg tab	70	2.4	3900	2.4
Nystatin oral susp100,000iu/ml 30 ml	62	2.1	1300	0.8
Ketoconazole (nizoral)200mg tab	37	1.2	3640	2.3
Sonaderm cream 10g	37	1.2	3770	2.3
Nystatin vaginal tabs 100,000 iu	25	0.8	1200	0.75
Terbinafine 250mg tabs	25	0.8	10800	6.75
Whitfield ointment	25	0.8	730	0.4
Diprosalic ointment 10g	23	0.7	11635	7.3
Terbinafine cream	13	0.4	4250	2.6
Ketoconazole cream 2% 15gm	9	0.3	2041	1.3
Clotrimazole vag cream 2%	8	0.3	2500	1.6
Fluconazole2mg/ml,100mls inj	7	0.2	17160	10.7
3 % Salicylic acid ointment	2	0.07	3120	1.95

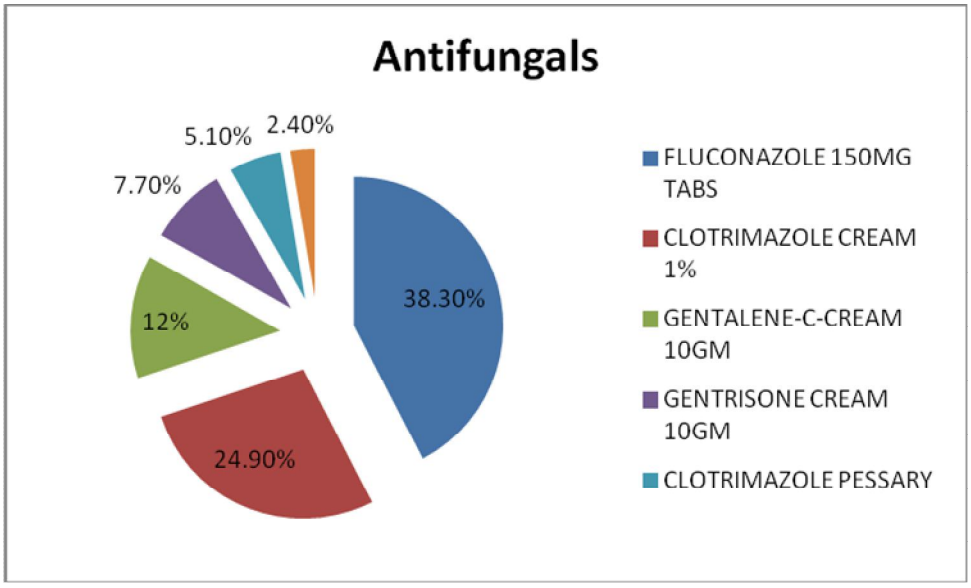


Figure 3.10.2 Prescribed Antifungals

3.10.3 Cost for Antihypertensive

The total cost for antihypertensive for the entire study period was US$ 578.4 (919,626Tsh). The most expensive antihypertensive prescribed was Metoprol US$12.2 (19500Tsh) followed by Losartan+hydrochlorothiazide US$8.4(1350Tsh) and Lisinopril US$6.4 (10296.02Tsh). The cheapest is Bendrofluazide US$0.2 (370.1Tsh), Frusemide US$0.24 (390.2Tsh) and Atenolol US$0.7 (1170Tsh) which is also the most used anthypetensive

Table 3.10.3 Antihypertensive Cost per dose.

Drug	No of Prescriptions	Frequency%	**Price per dose** (Tsh)	**Price per dose** (US$)
Atenolol 50mg tab	209	26.6	1170	0.7
Captopril 25mg tab	153	19.5	7254	4.5
Frusemide(furosemide) 40mg tab	144	18.3	390.02	0.2
Bendroflumethazide 5mg tabs	127	16.1	370.11	0.2
Propranolol 40mg tab **	47	6.0	3600.5	2.3
Losartan (repace) 50mg tabs	23	2.9	8390.02	5.2
Losartan+hydrochlorothiazide (repace-h) tabs	20	2.5	13500	8.4
Spironolactone 25mg tabs(aldactone)	12	1.5	2600	1.6
Lisinopril 10mg (cipril) tabs	10	1.3	10296.02	6.4
Carvedilol 12.5mg tabs	7	0.9	7470.06	4.7
Lisinopril 5mg (cipril) tabs	7	0.9	4000	2.5
Enalapril 5mg tabs	4	0.5	2340	1.4
Hydralazine 25mg tabs	4	0.5	5967	3.7
Soluble asprin 75mg tab	4	0.5	2060.04	1.3
Metoprol 50 mg tabs	3	0.4	19500	12.2
Verapamil hcl 40mg tab	3	0.4	2340	1.4
Amlodipine 5mg tab	2	0.3	2790.1	1.7
Frusemide 10mg/ml 2ml inj	2	0.3	11700.02	7.3
Amlodipine 10 mg	1	0.1	7600	4.8
Amlodipine 10mg**	1	0.1	6000	3.8
Carvedilol 12.5mg tab	1	0.1	6500	4.0
Enalapril 10mg tabs	1	0.1	7644.03	4.7
Junior asprin 75mg tab (acetyl salicylic acid)	1	0.1	2070.6	1.3

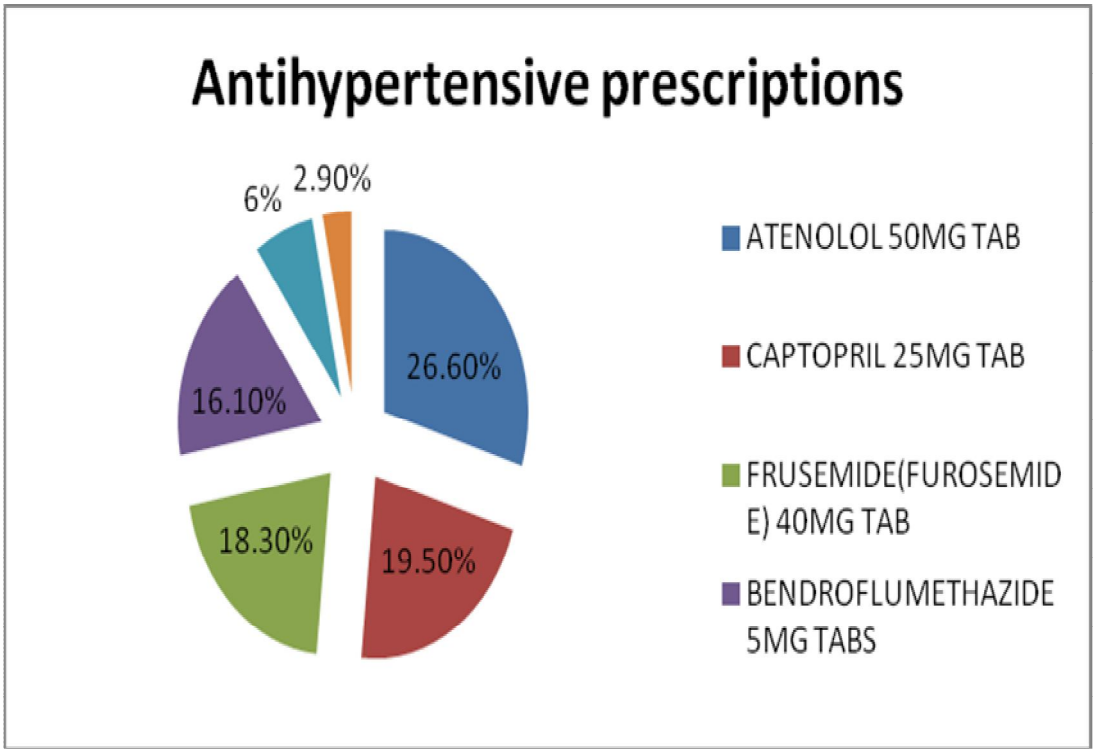


Figure 3.10.3 Prescribed Antihypertensives

3.10.4 Cost for Diabetes

The total cost for antidiabetics for the entire stud period was US$ 108.5 (173,628Tsh). The most widely prescribed antidiabetic was Glibenclamide 51.6% at price of US$ 0.68 (1092 Tsh) per dose. The most expensive antidiabetic drug was, Insulin human (isophane) at a cost price per dose of US$ 10.5(16900.02Tsh) as can be seen in Table 3.10.4 and figure 3.10.4 below

Table 3.10.4 Cost per dose Antidiabetics

Drug	**No of prescriptions**	**Frequency (%)**	**Price per** dose **(Tsh)**	**Price per dose (US$)**
Glibenclamide 5mg tabs	82	51.6	1092	0.7
Metformin 500mg tabs	54	33.9	2808.02	1.8
Chlorpropamide 250mg tabs	18	11.3	5850	3.6
Insulin human (isophane)100iu/ ml	3	1.9	16900.02	10.5
Glipizide 5mg tabs	2	1.3	7500.02	4.7
	159	100		

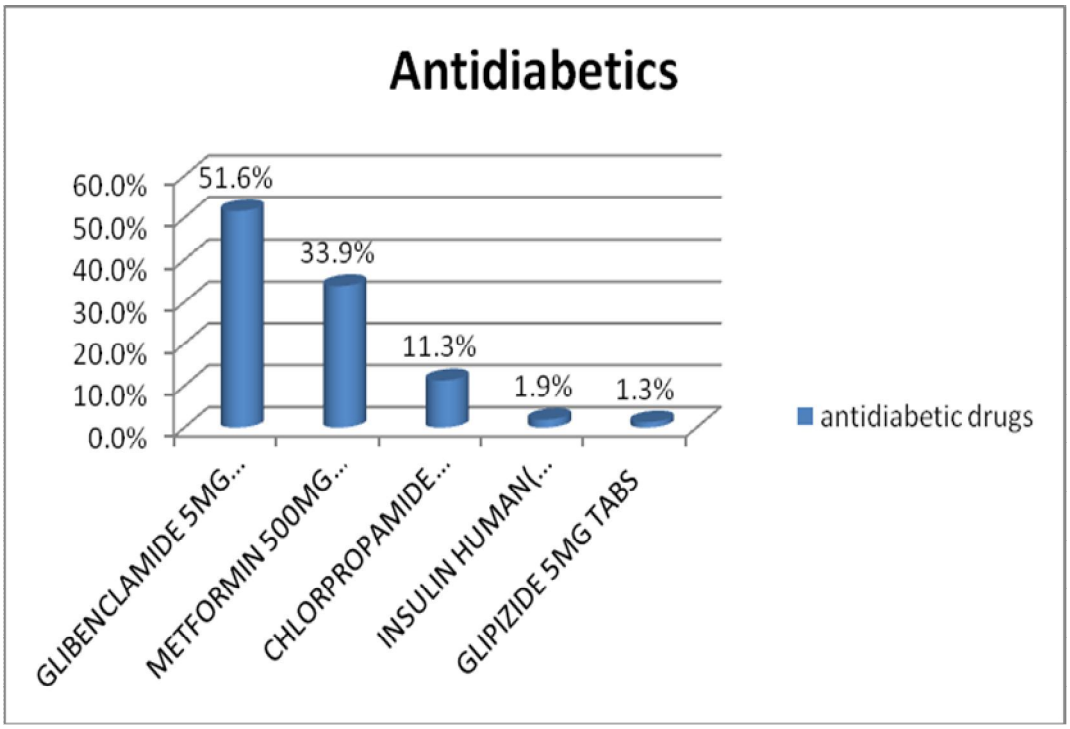


Figure 3.10.4 Prescribed Antidiabetics

CHAPTER FOUR

Discussion

The study set out to determine the cost implications of treating HIV/ AIDS patients with mental illness at Muhimbili National Hospital (MNH).

The fact that the majority of patients of this cohort were female (69.7%), confirms the findings of the National HIV prevalence indicators that females between the ages of 15-49 have higher prevalence rates than their male counter parts at 3.39% and 1.39% respectively (UNAIDS Tanzania Country Report March 2012). Furthermore these findings support Nyamuhanga T. PhD thesis of 2011; On Equity in HIV&AIDS Care, Treatment and Support: An Examination of the influence of gender in accessing and adhering to antiretroviral Therapy in Dar-es-salaam. Tanzania, that women have a higher health seeking behaviour than men at 63.7%.

The mean age of this cohort was relatively high at 43.2 years, when one considers that most of the national HIV prevalence and incidence data are obtained from a population aged 15-45 years. Such an advanced mean age could mean several things. The simplest explanation would be that HIV patients are now living longer due to the availability of drugs for treatment, alternatively it could be that with 51.3% of this cohort married: that married individuals particularly females with family responsibilities are more prone to attend HIV clinic to ensure they stay healthy as long as possible. However it could also be true that this high mean age is a silent indicator of the change in pattern with regard to HIV prevalence in individuals older than 45years. This is of course is an area that needs more research; especially if one considers that the majority of HIV prevention campaigns are geared to addressing the younger generations.

Mental Illness as marker of HIV infection

First visit psychiatry cases contributed 25% in identifying undiagnosed HIV infected persons. These findings clearly suggest that comprehensive psychiatric care should be part and parcel of routine HIV/AIDS treatment and care programs. This fact cannot be over emphasized particularly in view of the findings of studies conducted in Brazil, Denmark and Uganda, which found that HIV infected females were more vulnerable to developing anxiety and depression 35.8% and 21.8% respectively: and that depression was frequently under diagnosed among HIV positive patients (Nogueira et al 2006; Kiyanda et al 2011 and Rodkejar et al 2010). What these findings call for is the expansion of HIV treatment initiatives in resource-poor settings to integrate mental health care into these programs, so as to improve the quality of HIV treatment and care programs.

HIV patients with mental illness

Based on sampled prescriptions it was found that 16.5% of HIV patients suffered from some form of mental illness. This confirms the WHO estimates of 20% and Tanzanian findings of Marwick et al 2010 and Ramadhani et al 2007 that mental illness affects 15.5% to 21.1% of HIV patients. In addition to this, the study was able to ascertain that 8.5% of the mental patients were suffering from serious mental illness based on the types of drugs they were being prescribed which indicated conditions such as schizophrenia, mania and dipolar disorder.

The most prescribed drugs for management of mental illness at MNH HIV clinic was Amitriptyline at 55.5%. Although it was extensively prescribed, its use had no impact on increasing the drug cost for mentally ill (US$197.8) versus none mentally ill (US$ 197.0) HIV patients; most probably due to the fact that the cost per dose for Amitripyriline, was a mere US$ 0.3. Nevertheless despite its affordability, budgeting specifically for Amitriptyline requirements for mental illness and not for the management for HIV neuropathy is difficult. The Tanzanian HIV treatment Care

Standard Treatment Guidelines of 2007 omits to indicate the appropriate dose of Amitripyriline for managing HIV neuropathy. It only provides the Amitriptyline dose indications for psychological stress set at 10-50mg nocte, and that for depressive psychosis set at 50mg-75mg nocte (Tanzania Standard Treatment Guidelines 2007). These doses are however not in line with doses quoted in text books of pharmacology that advocate higher doses of Amitripyriline for depressive psychosis [150 -300 mg nocte] (Bertarn et al 2009.). The fact that amitryptyline at similar doses is used for all three conditions at MNH, makes it impossible to accurately make direct inference from the prescription as to what exactly the Amitryptyline was being used for. However if you exclude amitryptline for the analysis, the study results clearly indicate that the drug cost per person year increases by 37.5% for HIV/mentally ill patients. Furthermore, the mean drug cost per patient of treating HIV patients with mental illness is a significantly higher at US$ 278.6 (445,717.5Tsh), than that of HIV patients without mental illness at US$ 226.6 (362,664.6 Tsh) [p value = 0.0001]. This cost increase is however, most probably attributed to HIV patients prescribed powerful and expensive antipsychotics such as Benzhexol, Risperidone and Olanzapine. The findings of our study are comparable although not as dramatic to a study conducted in U.S.A in which the cost implications of treating seriously mentally ill HIV patients was shown to increase by 80% from US $23,842 to13,183 per person per year (Rothbard et al 2009) . These results affirm that HIV patients with co-occurring mental illness are a more costly population than patient populations with HIV alone.

Cost Implications of Treating HIV patients with Mental illness.

The total cost for drugs for the whole study period was US$ 906,450.5, with largest portion being spent on ARVs, which used US$ 804,449.5, equivalent to 88.8% of the total amount. The remaining 22.2% equivalent to US$ 102,001 was spent on antibiotics (US$ 80,556.96) antifungal (US$ 13,817.3) and mental illness drugs (US$ 6,943.5) respectively. The mean cost for ARVs per person year of US$ 197.0, is still high, when compared to the current prices of available WHO approved standard generic regimens. For example the cost for the generic regimen of TDF/3TC/EFV is US$ 143.0

(Medicines sans Frontiers, Campaign for Accesses to Essential Medicines report 2011). These price reductions for generic ARV formulations are in part thanks to the Trade Related Aspects of Intellectual Property Rights (TRIPS) agreements. TRIPS has facilitated and promoted the manufacture of generic formulations of ARVs by pharmaceutical industries in developing countries. As a result in price wars have ensued among manufactures, and have forced the price of ARVs such as TDF to fall from US$ 195 in 2007 to US$ 76 by 2011 (Medicines sans Frontiers, Campaign for Accesses to Essential Medicines Report 2011).

Unfortunately, the Tanzanian pharmaceutical industries are not fully taking advantage of the TRIP agreements to promote the local manufacture ARVs and mental illness drugs. Currently there is only one local manufacture namely, Tanzania Pharmaceutical Industries that is producing oral ARVs (Mwilongo S 2011). This deficiency, especially in the face of the current global economic recessions is a drawback to effective HIV treatment and care in Tanzania. Many international donors of ARV such as PEPFAR have already started to reduce the amount of funding to developing nations; mainly because of economic issues; but more so, they no longer consider the HIV epidemic, an emergency but a chronic condition. Reduced funding from donors in the long run means, that the Government of Tanzania (GOT) in future will have to bear the brunt of the cost for supplying drugs to its HIV treatment care programmes. The Tanzanian National ARV quantification report of April 2011, estimate that there are 278,892 patients adults and children as of April 2012, that require ARVs costing at a total of US $ 63,354,343.36 for the period 2012-2013 (in line with the new WHO HIV treatment criteria of using TDF and initiation treatment in patients with CD 4 counts of 350 and below, (Tanzania National ARV quantification Report 2011). If one was to estimate the cost implications of adding the cost of drugs for mental illness based on the results of our study (16.5% of all HIV patients will develop some form of mental illness and that the cost per patient will increase by 37.5%); the above figure would swell to a staggering US $ 77,294, 481.06. The question thus then arises, will the GOT be able find

the resources to cater this bill in order to sustain its HIV care and treatment programs as well as to maintain its 1993 cost sharing policy?

What is clearly evident from this study is that drugs for mental illness for HIV patients must be properly budgeted for so as to improve current HIV treatment and care programs. As appropriate budgeting, will avoid stock outs that may indirectly lead to increased HIV transmission and HIV drug resistance development as a result of mental and HIV patients not being adequately stabilized.

Conclusions

Mental illness develops in significant proportion of HIV patients at MNH and that this group of HIV patients are a more expensive group with respect to drug costs. The high contribution of first case psychiatry presentation in identifying HIV infected persons strongly advocates that psychiatric care should be part and parcel of routine HIV care and treatment programs at MNH.

Limitations of the study

A major limitation of this study was that data collected was routine in nature, not purposely designed for research. Thus the quality of data may have been compromised by data recording errors and missing values. In addition this, being a retrospective study there was limited opportunity to find missing data from patients who were transferred from MNH to other Counselling and Testing Centres (CTC).

Moreover the MNH electronic pharmacy data base only records issued drugs and not drugs that were out of stock; hence it was not possible to ascertain the extent of drug stocks out at MNH for the study period. In addition to this, the data base does no record patients diagnosis. This would have been useful in determining what the drugs were being used to manage what conditions.

Recommendations

1. HIV treatment and care programs in Tanzania to integrate psychiatric care as part and parcel of routine HIV care and treatment programs so as to improve the quality of care.

2. The Government of Tanzania utilize the TRIPS agreement by supporting more local pharmaceutical manufactures to produce generic ARVs.

3. The Standard Treatment Guideline of 2007 Tanzania be reviewed to include the appropriate drugs for mental and HIV.

4. Future studies to be conducted to determine the true frequency of ARV and mental illness drug stocks outs.

5. The Commission of Science and Technology (COSTECH) of Tanzania to fund Academic Institutions to develop local generic ARV Formulation

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APPENDIXES

Data Abstraction for Muhimbili National Hospital HIV Clinic

Social – Demographic Information

1. File Number
2. Region
3. District
4. Workplace
5. Occupation
6. Age (use numbers)
7. Sex (Male/Female)
8. Marital Status
    a. Single
    b. Married / cohabiting
    c. Divorced
    d. Widow
9. Education
    a. None
    b. Primary
    c. Secondary
    d. Post-secondary
10. Head of Household (Yes/No)_____
11. Patient's Diagnosis_____
    a. HIV Alone
    b. HIV and Diabetes
    c. HIV and Asthma____
    d. HIV and TB
    e. HIV and Mental Illness

Treatment Details, Types of Drugs, Out Patient HIV Drugs

1st Line		2008/ 2009/ 2010												
Name of Drug		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													

2nd Line		2008/ 2009/ 2010												
Name of Drug		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													

Drugs for Opportunistic Diseases

		2008/ 2009/ 2010												
Name of Drug		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													

Drugs for Mental Illness

		2008/ 2009/ 2010												
Name of Drug		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													

Drugs for Diabetes

		2008/ 2009/ 2010												
Name of Drug		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													

Drugs for Other Diseases

		2008/ 2009/ 2010												
Name of Drug		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													
	Count													
	Cost													