

The costs of HIV/AIDS care and treatment in Adigrat
General Hospital, eastern zone of Tigray National
Regional State, North Ethiopia

BY

ZEMENFESKIDUS HADGU (BSc in public Health)

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Principal investigator

ZEMENFESKIDUS HADGU (BSc in public Health)

Advisors

Kifle Woldemichael (MD, MPH)

Jeph Herrin (PhD)

Date: April, 2011

SUMMARY

Background: As the number of HIV /AIDS cases increases relentlessly throughout the country, hospitals are making a major commitment of resources to the treatment of HIV/AIDS and related diseases. The hospitals were significantly affected by the highest HIV/AIDS prevalence in the urban secondary and tertiary hospitals and increase the demand for care and resources; therefore, this study aims to assess the hospital HIV AIDS expenditure.

Objective: The objective of this study is to assess the costs of HIV/AIDS care and treatment in Adigrat General Hospital, eastern zone of Tigray, North Ethiopia.

Methodology: A cross-sectional survey with retrospective data collection approach was conducted on patients utilizing HIV/AIDS care at outpatient level and admissions to inpatient wards in Adigrat general hospital from January 2009 to December 2010 G.C. A sample of 373 patient charts and registers was reviewed using a systematic random sampling method. The data were collected using a pretested checklist that contains information about HIV/AIDS stage, frequency of visit and admission, pattern of disease, investigations, drugs, and length of stay. The bottom up and step down costing method was used for direct and indirect costs respectively. The data was collected by trained diploma and above level health professionals from review of medical records and registers of patients. Moreover, two year financial record review in the hospital was conducted by the financial expert data collectors to strengthen the information. The data were entered, edited; cleaned and analyzed using IT spreadsheet (Excel) and the statistical package SPSS version 16.0 for further analysis. Percentages, averages, and regression model were used and data were presented using tables, graphs and figures.

Results: Of the total 373 reviewed patient charts, The majority 59.2% , 81% and 69.2%, were females, 15-44 age group, and urban respectively. The finding revealed that Average Length of stay was 11.04 days; and the bed occupancy rate was 6.7% (17.3% of hospital admission days). The estimated hospital HIV/ AIDS cost per year was found that \$5,778,972.80 Eth birr, from this the highest 80.3 % and 72.4% hospital HIV AIDS expenditure found in outpatient department and direct cost respectively.

Conclusion: The study shows that Health care for HIV AIDS patients utilized large hospital resource that was provided free and financed by the hospital increased the burden and pressure on hospitals. Tigray Regional health bureau design programs to expand and cascade the outpatient HIV AIDS care and treatment to other alternative care facilities, and allow hospitals to receive supplemental reimbursement for a comprehensive HIV/ AIDS care and treatment.

KEYWORDS: HIV/AIDS, care and treatment, cost, hospital, Tigray.

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List of abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ALOS	Average length of stay
ART	Anti Retroviral therapy
ARV	Anti Retroviral
CDC	Centers for Disease Control and Prevention
ETB	Ethiopian Birr
EFDR	Federal Democratic Republic of Ethiopia
HCF	Health care financing
HCWs	Health care Workers
HIV	Human Immuno deficiency Virus
IP	Infection prevention
IPD	Inpatient department
MOH	Ministry of Health
OI	Opportunistic infection
OPD	Outpatient department
PFSA	Pharmaceutical factory supply agency
PLWHA	Peoples living with HIV/AIDS
PPE	Personal protective equipment
PPS	Population proportional to size
SSA	Sub Saharan Africa
TB	Tuberculosis
TRHB	Tigray Regional Health Bureau
US	united States
USD	united states dollar
VCT	Voluntary Counseling & Testing
WHO	World Health Organization

1. Introduction

1.1 Background

The rate of spread of HIV/AIDS and the damages accompanying it have reached a level which shock economists, health workers, politicians etc that it has now become a worldwide issue in general and developing countries in particular. The disease being one without any cure is still accountable for economic, social and health crises especially in developing countries.¹

HIV/AIDS has not only become a global epidemic, but it is also regarded as a major impediment to development and a substantial threat to human security. Most persons living with HIV/AIDS are in the prime of their working lives. If left unattended HIV/AIDS will weaken macroeconomic and microeconomic activity by squeezing productivity, adding costs, diverting productive resources and depleting skills in the country's most affected.² Global estimate of HIV/ AIDS at the end of 2008, indicate that 33.4 million people are living with HIV/AIDS, 2.7 million new infections in 2008, approximately 4 million people were receiving anti retroviral therapy and 2 million deaths due to HIV/AIDS in 2008.³ Sub-Saharan Africa remains the region's most heavily affected by HIV worldwide, accounting for over two thirds (67%) of all people living with HIV and for nearly three quarters (72%) of AIDS-related deaths in 2008. An estimated 1.9 million [1.6 million–2.2 million] people were newly infected with HIV in sub-Saharan Africa in 2008, bringing to 22.4 million [20.8 million–24.1 million] the number of people living with HIV.⁴

Health care systems on the front line in coping with the AIDS crisis are overburdened by the epidemic and the services that Africa can provide are sadly inadequate for not only is Africa the worst HIV/AIDS affected region, it is also the world's poorest region with lowest access to quality health care. Health care systems have to deal with increasing numbers of patients with AIDS-related illnesses such as tuberculosis and spending on HIV/AIDS is diverting scarce resources from other major health concerns.⁵

In some parts of the region, one in four hospital beds is occupied by a patient being treated for HIV-related symptoms, and in some cities, the majority of hospital beds are filled with HIV-related illnesses. HIV/AIDS will affect the health sector in two ways: by increasing demands of care and by reducing the supply of a given quality of care at a given price. The first and largest

effect is the increased cost of maintaining a given level of safety for medical procedures. The cost of HIV/AIDS is confined to the incremental costs of adding an HIV test to existing tests, ART and OI drugs, IP activities and using more PPE (personal protective equipment) like rubber gloves and facemasks in situations where they were previously not used.⁵ The nursing requirements for HIV/AIDS patients are 40 percent higher than for other patients, and that nursing accounts for 25 percent of hospital costs.⁶

As the number of HIV /AIDS cases increases relentlessly high throughout the country, hospitals are making a major commitment of resources to the treatment of HIV/AIDS related diseases. The hospitals to be significantly affected are in the areas of highest AIDS prevalence in the urban secondary and tertiary hospitals. As the epidemic spreads the demand for resources including beds, medical staff, nurses, and expertise will put increasing strains on acute care hospitals throughout the country. HIV/AIDS related diseases manifest in a bewildering variety of clinical presentations, many of which result in episodes of inpatient care. The person with HIV/AIDS is likely to require a wide range of health care services, including several hospitalizations. The most common reason HIV/AIDS patients enter the hospital is for treatment of an opportunistic infection. Since AIDS results in death within a short period of time, hospital mortality rates are high, as are the costs of hospitalization.⁶

One of Sub - Saharan Africa countries hit by HIV/AIDS epidemic, next to South Africa and Zambia, is Ethiopia. Based on the figures obtained from ministry of health (MOH), HIV prevalence is 2.3, Moreover people living with the virus, new HIV infections, new AIDS cases, annual HIV/AIDS deaths of all ages and Hospital AIDS deaths are 1,116,314, 131,145, 29,080, 44,750, and 37,508, respectively.⁷

AIDS accounted for an estimated 34% of all young adult deaths in rural Ethiopia and 66.3% of all young adult deaths in urban Ethiopia. The situation of HIV/AIDS epidemic in Tigray is one of the worst in Ethiopia. The HIV prevalence is 2.9, with 81,746 People living with HIV/AIDS (PLWHA), 10,051 new HIV infections, 2,708 annual HIV/AIDS deaths of all ages and 1,511 Hospital AIDS deaths.⁷

The cost of health care for HIV/AIDS patients is high while the expansion of the epidemic of newly infected with HIV and death due to AIDS seems to be relatively slow but increase demand of care for people infected with HIV/AIDS.⁸ Health care for AIDS patients is provided free and is financed by the hospital budget through the government budget, internal revenue retained and Donors support.

Studies on the costs of HIV/AIDS care and treatment are an important tool of advocacy-encouraging politicians, leaders and policymakers to engage in prevention. Excess in illness and death due to HIV/AIDS can also act as a signal to plan for increased demand. The study has a dual purpose: in that they provide rationale for both prevention and mitigation. If we are successful in our advocacy, prevention may be effective and reduce impact. In countries with more advanced epidemics there is no doubt that there will be an impact and the challenge is to predict and mitigate it.⁵

1.2 Statement of the problem

The total number and percentage of outpatient visit and hospitalized HIV AIDS patients were higher with longer hospital stay, higher bed occupancy and treated with several opportunistic infections. HIV/AIDS share large resources of the hospital expenditure and it affects to deliver the necessary quality of clinical standards.^{5,6,9} This challenge to the hospital service is determined by at least three factors of care, that is, medical care for opportunistic infections and HIV related diseases, psychological care for counseling HIV-positive people and HIV infection control in institutions by adopting universal precaution measures.¹⁰

The costs of drugs, medical supplies, investigation and medical person utilization was high in addition to minimize the risk of cross infection among Health care providers, patients, care givers, visitors and community had a frequent use of PPE, waste disposal system and train personnel's on preventing transmission had the greatest impact on incremental costs for hospitals.^{5,6}

All these add to the pressure on hospital services and diminish resource allocated to health care. In this situation of declining resources and increasing demand, up to date information on costs of the treatment of HIV/AIDS patients in health facilities is necessary in order to have an idea of the increasing number of the AIDS patients and to guide the allocation of the budget (resources), and design and implement alternative cost effective programs for HIV/AIDS patients.^{10, 11}

The Hospital Governing board and council of the Adigrat general hospital have a knowledge gape or problem in estimating the expenses and the effect of exempted services of HIV AIDS care and treatment that makes over burden and compromise the hospital quality services. This study could probably helps in designing appropriate strategy to reduce the burden of HIV/AIDS care.

The research inquisition that, what is the cost of HIV/AIDS in hospital service, which is measured by the direct, indirect and total cost of HIV/AIDS care and treatment in outpatient and inpatient of Adigrat General Hospital.

It is for the reason above mentioned that, across sectional study needs to be conducted to assess the cost of HIV /AIDS in Adigrat general hospital.

2. Literature Review

In sub-Saharan Africa, people with HIV-related diseases occupy more than half of all hospital beds. Research in South Africa has suggested that, on average, HIV-positive patients stay in hospital four times longer than other patients.¹²

From the total patients admitted to the medical ward 34.2%, 40%, and 55.6% were positive for HIV in Hospitals of India,¹³ Kenyatta National Hospital/Nairobi,¹⁴ and Kampala/Uganda¹⁵ respectively.

The inpatient deaths among known HIV-infected patients were 17.4%, 35%, 26.3% significantly higher than the 5.8%, and 23% rate observed in the HIV-negative patients in a Hospitals of Kampala/Uganda¹⁵, Nairobi¹⁶ and India¹⁷ respectively. The overall mortality rate was significantly associated with HIV infection. These data suggest that increasing selection for admission is taking place as demand for care increases because of HIV/AIDS. This process appears to favor HIV-positive patients at the expense of HIV-negative patients who seem to be crowded out and, once admitted, experience higher mortality rates.¹⁶

The median lengths of stay (LOS) for HIV-infected individuals admitted to medical ward during the study period were 11, and 10 days (range: 2– 48 days) in Irish teaching hospital/Ireland,¹⁸ and Pune/India¹² respectively. The mean LOS was found to be 9.5 days in Kenyatta National Hospital/Nairobi.¹⁴ The average LOS of HIV/AIDS patients admitted to different medical wards was 6.4-9.3 days in Zimbabwe Governmental hospitals in 1994/95.¹¹ Percent of medical/ surgical beds used for AIDS patients was 8.1%, 12.4%, and 1.6% in New York, Sanfransisco and other U.S hospitals respectively.⁶

The hospitalized patients had significantly lower CD4 T lymphocyte counts compared to those who were not.¹³ From the hospitalized adult HIV infected patients in Pune, India in which the median CD4+ T-lymphocyte counts were 66 cells/mm³ (range 4-446 cells/mm³).¹⁷ Patients with CD4 T lymphocyte counts <200 cells/mm³ at enrolment had a rate of hospitalization of 68%. The hospitalization rates were much lower for those with higher CD4 T lymphocyte counts. There was a decreasing trend in the hospitalization rates as the baseline CD4 T lymphocyte counts increased.¹³

TB was the leading diagnosis 55.8% (31.2% cases were extra-pulmonary and 24.6% were pulmonary), 30%, and 27.4 %, among HIV-infected adults admitted in medical wards in Pune/India, ¹⁷ Kenyatta National Hospital/Nairobi, ¹⁴ and Soweto/South Africa¹⁹ respectively. Other common reasons for admission were Pneumonia (14.7%), acute gastroenteritis (9.1%), Bacteraemic enteric illness (7.6%) and Meningitis (6.6%), alcoholic liver disease (3.7%) cerebro-vascular accident (3.1%) and cardiac disease (2.3%).^{14, 17}

Out of the admitted patients 65.4% have one of the five leading clinical problems and the case-mix was narrow. In HIV-negative patients the case-mix was broader. Although TB, acute pneumonia and acute gastro-enteritis predominated, the leading five diagnoses comprised only 39.8% of cases seen on Kenyatta National Hospital, Nairobi in 1997.¹⁴

The study conducted in Pune /India shows that out of the total patients hospitalized for HIV-related complications, 37 participants (70%) were hospitalized once, 12 were (23%) hospitalized twice, 3 were (6%) hospitalized three times and 1 was (2%) hospitalized 5 times, resulting in a total of 75 hospitalizations.¹³

Among HIV/AIDS patients TB accounted for 91 (52.9%) of inpatient deaths (33.7% were extra-pulmonary and 19.2% were pulmonary). Other common causes of death were cryptococcal meningitis (7.6%), aspiration pneumonia (7.0%), and non-alcoholic liver disease in Pune, India.¹⁷

In Ethiopia, the study at Dil chora Hospital in Dire Dawa Administrative Council in 2002/03, reports the admission diagnosis of patients treated as inpatients indicated that majority 48 (60%) RVI followed by 23 (28.8%) tuberculosis plus RVI and the average length of Hospital days was 6.37 for all causes of admission; but that for confirmed AIDS cases was 13.27 days (range: 1-120 days). Majority 44 (57.9%) of HIV/AIDS patients treated as inpatient improved at discharge followed by 31 (40.8%) died. ⁵

Cost of HIV/AIDS care

The costs of the medical care needs for HIV/AIDS patients are well above the average per capital expenditure on health care in many sub-Saharan African countries. These costs may become completely unaffordable as specific anti-viral drugs come onto the market, and the burden will fall on health networks, whose present strained budgets show no real signs of increase. As the total number and percentage of hospitalized patients with AIDS increases, the hospital services as a whole will not be able to deliver the necessary minimum quality of clinical standards because of too many HIV/AIDS patients.⁹

HIV-uninfected adults cost the hospital significantly less than HIV-infected adults during their admission. Adults treated with ARV therapy had significantly higher total costs compared with HIV-infected adults not on ARVs. Although medication costs were significantly higher in HIV-infected adults compared with uninfected adults, most (77%) of the total inpatient hospital costs were related to LOS.¹⁹

Unit costs of HIV care in Arba-Minch hospital was US\$2.98 per outpatient visits and US\$3.64 per inpatient day were higher than those reported by WHO for secondary-level hospitals in Ethiopia for year 2000,²⁰ WHO aggregates values for all services, were US\$0.43 per outpatient visit and US\$1.77 per inpatient day.²¹

Study in South Africa reported unit costs of US\$18.92 and US\$19.33 for an outpatient clinic visit under non-ART and ART conditions, respectively.²² But the mean daily inpatient cost per patient was 30.84 USD in Shiraz, Iran.²³

In Ethiopia, other study by Kello AB found that the per capita patient cost per visit under the low cost scenario is estimated to be 12.03 and 22.64 US dollars for outpatient and inpatient costs respectively. Under high cost scenario the costs are estimated at 41.30 and 197.00 US dollars respectively for the corresponding services.²⁴

The average costs of treating HIV-positive patients were significantly higher than those for non HIV patients at hospitals,²⁵ The average cost per in-patient day and cost per discharge of HIV/AIDS patients admitted to different medical wards was Z\$ 1040-1610 and Z\$ 6,708-13,745

respectively (US\$1=Z\$38.5, January 2000 Zimbabwe Dollar exchange rate) in Zimbabwe Governmental hospitals in 1994/95.¹¹

Study in Haiti (2003/04) reports that the Cost per day in care was significantly higher for patients who died; they had a higher rate of hospitalization (29% vs. 6%) and their cost per day in care was approximately twice as high (\$7.47 per day) as those who remained in care for one year (\$3.10 per day) or were lost to follow-up (\$3.90 per day).²⁶

The mean total cost of ART treatment per patient in Haiti was \$US 982, including \$US 846 in direct costs, \$US 114 for overhead, and \$US 22 for societal costs. For patients who remained in care for one year, the mean total cost of treatment per patient was \$US 1132. Total costs were significantly higher for patients who remained in care (\$US 1132) compared with those who died (\$US 508) or were lost to follow-up (\$US 382), due to additional days of treatment.²⁶

A study done in a low-income country for a single person starting on ART at outpatient for the first year costs would be US\$ 380 (US\$ 88 for first line drugs, US\$ 190 for laboratory tests and \$102 for service delivery) and if that person switches to second line therapy the annual costs will rise to US\$ 890 because of the higher cost of second line drugs. During the course of survival on first line and second line ART the total costs of the treatment per patient would be US\$ 9,200.²⁷

An estimated total cost of 136,815.02 (87% VCT and 13% OI) Ethiopian birr has been expended for both activities of HIV/AIDS in Dil Chora Hospital (1995 Ethiopian fiscal year). Only 3.6% from VCT and 7.9% from OI cost were recovered from user fee collected. The capital costs of activities were 24,566.79 birr (17.5%) and the recurrent costs were 112, 248.23 birr (82.5%).⁵

The average cost of care and treatment for admitted HIV/AIDS patients per stay was 335.8 birr, about 19 times higher than the average cost recovered from user fee. And 232 birr and 157.4 birr cost of admitted HIV/AIDS patients treatment for opportunistic infections and VCT service respectively, about 17.6 birr and 5.8 birr cost was recovered from user fee per client from the above activities respectively in Dil chora hospital 2002/03. The in-patient treatment cost of opportunistic infections of HIV/AIDS was costly.⁵

Infection prevention/Safety medical procedures

Among the first areas of concern is implementing infection control precautions as recommended by the IP guideline to minimize “the risk of exposure to blood and body fluids in order to prevent transmission of HIV infection in the workplace and during invasive procedures, Hospitals need to train personnel in preventing the transmission of blood borne infectious diseases and in other Standard infectious disease precautions. This training must be provided sensitively so that fear of AIDS does not hinder the provision of routine daily care to AIDS patients; routine Infection prevention precautions must be followed when there is a possibility of exposure to blood or other body fluids. Procedures involving more extensive contact with blood or potentially infective body fluids may require PPE (personal protective equipments) like gloves, gowns, masks, boots, plastic apron, eye coverings etc. The relatively frequent use of PPE is a significant incremental cost for the hospital. To prevent transmission of HIV infection to health care personnel, patients, caregivers, Community, etc should stick to the IP Guideline.⁶

Additional costs for treating AIDS patients also include the disposal of contaminated articles and infectious waste. Hospitals must dispose of waste in more expensive puncture-resistant containers to prevent contamination. Non disposable articles contaminated with blood and body fluids also need to be placed in decontamination, cleaned, high level disinfection or sterilize and used again. This includes double gloving, separate waste container with bin liner, additional waste pits, marking of linens and separate container for soiled linens, transport carts to prevent laundry employees from contacting contaminated material.⁶

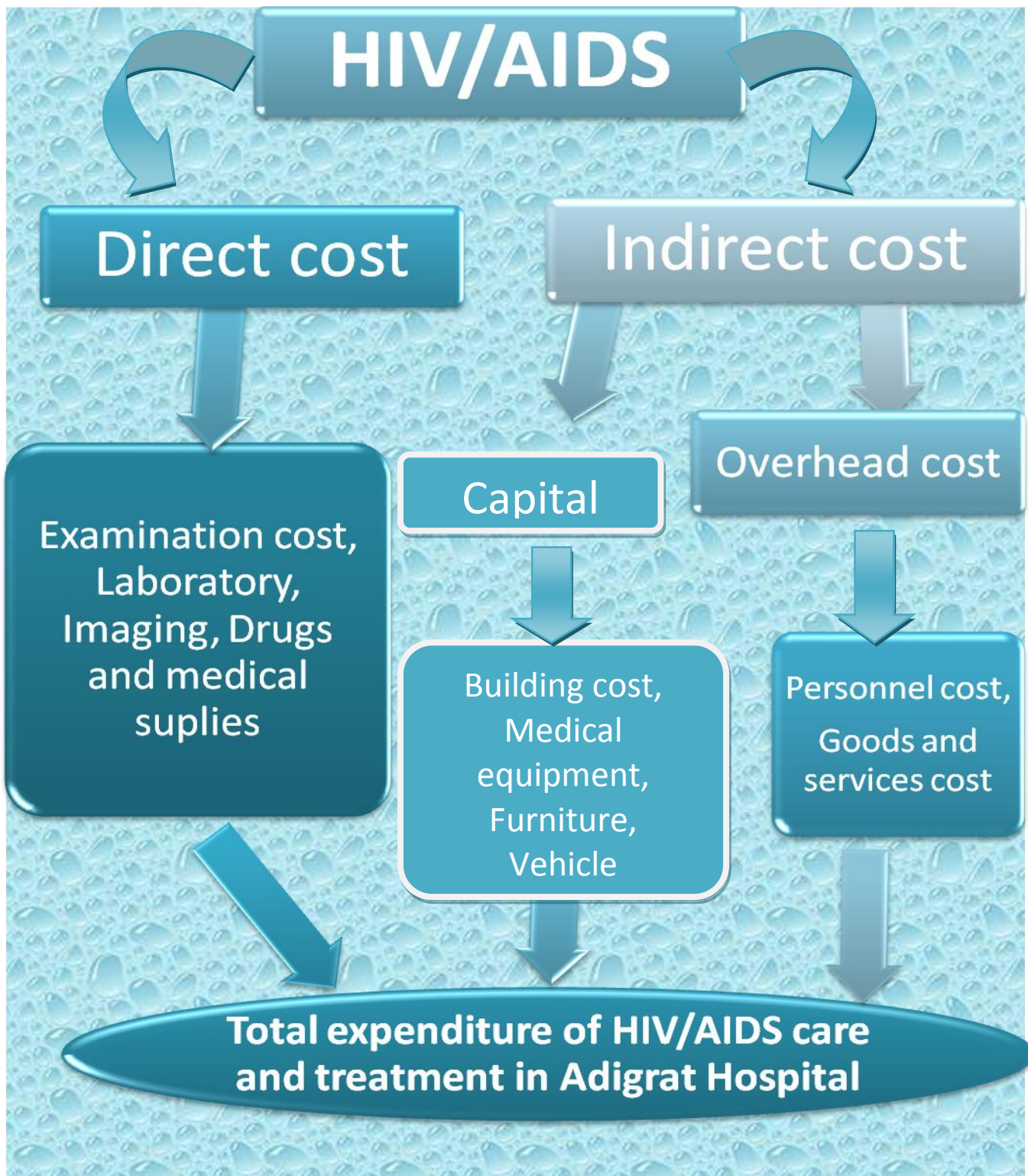


Fig 1 Conceptual framework of the costs of HIV/AIDS care and treatment in Adigrat General Hospital, 2009-2010 G.C

3. Significance of the study

Researches on cost of hospital due to HIV /AIDS care and treatment are rarely conducted in Tigray region. Since the service is totally exempted (free of charge); the hospitals are by now forced to supplement the expenditure from other sources. As a result Hospitals are in problem of estimating the cost for HIV/AIDS services and treatment so as to plan and forecast future expenditures.³⁸

Despite of the efforts of the Regional Health Bureau together with the development partners to help the poor get service for free, Hospitals remain over burdened by extra expenditure through direct and indirect costs and time & resource computation.

This study, therefore, aims to assess the expenditure of hospitals for HIV/AIDS care and the cost of care and treatment, therefore to recommend the way how hospitals overcome the expenses of HIV care and treatment for the future without compromising the quality of service for other patients.

The adoption and utilization of the findings will have an input to bring long term changes in designing way of refunding the hospital from other sources and designing appropriate strategy to reduce the burden of HIV/AIDS care.

4. Objectives

General objective: To assess the costs of HIV/AIDS care and treatment and associated factors in Adigrat General Hospital, eastern zone of Tigray, North Ethiopia.

Specific objectives

1. To identify the outpatient and inpatient costs of HIV/AIDS care and treatment in Adigrat General Hospital.
2. To estimate the direct and indirect costs of HIV/AIDS care and treatment in Adigrat General Hospital
3. To assess the factors associated to the costs of HIV/AIDS care and treatment in Adigrat General Hospital

5. Methodology

Study area: The present study was carried out in Adigrat Hospital found in the Eastern zone of Tigray, 120 km far north from Mekelle, the capital city of Tigray, and northern part of Ethiopia. This hospital, with a capacity of 148 beds, serves around 1 million population of the eastern zone, some districts of central zone of Tigray and nearby weredas of Afar region. The study was conducted from February to April 2011G.C.

The Ethiopian Government launched a nationwide program with free provision of ART in October 2005, and Adigrat hospital became part of this scheme. Patient selection and the ART regimen in Adigrat hospital followed national recommendations and those set by the World Health Organization (WHO). Adigrat hospital provides HIV/AIDS treatment and care on an outpatient basis and patients with severe clinical manifestations were admitted to inpatient wards (Medical, Pediatrics, Surgical, Gynecology and Obstetrics). The HIV Clinic has one physician, two ART nurses, one TB HIV nurse, one laboratory technologist, one druggist, one case manager, one data clerk and two outreach workers. The data clerk maintained the Clinic database; the outreach workers monitored patients and made regular home visits. Adigrat hospital maintained a database of HIV patients who received care and treatment. The inpatient wards had four senior specialists (an internist, a gynecologist, a surgeon, and a radiologist), three general practitioners, 67 nurses, 13 laboratory technologist/ technician and other staff; the senior physician (internist) visits the patients in ART clinic during consultation and referral.

Clinical Setting: The hospital inpatient wards have accepted admission patients over 24-hour periods. Patients are admitted from the outpatient examination rooms and from emergency department after evaluation by the duty physicians or medical officer. The senior medical staff/ physicians usually managed inpatient admissions, and junior clinical staff rotate among the different medical teams regularly. Patients with HIV/AIDS related illnesses are classified according to CDC Stage of disease.

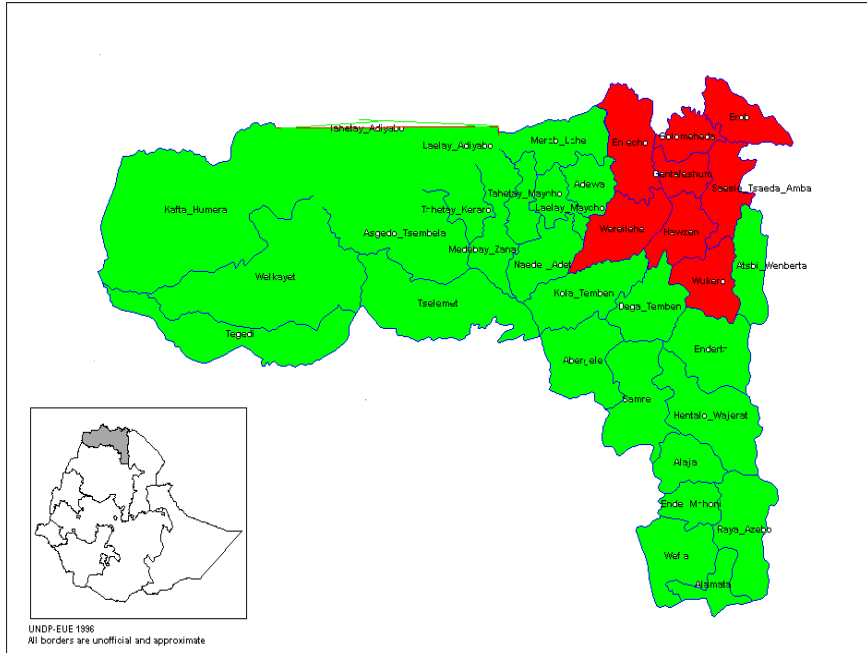


Fig 2 Map showing catchment's population /Area of Adigrat hospital, 2009-2010G.C.

Study Design: institutional based cross-sectional survey was conducted from February to April 2011G.C. with retrospective data collection approach and patient chart and document review method were used.

Source population: All PLWHA in the Eastern zone, some districts of central zone of Tigray and nearby wereda of Afar region who are in the catchment's population of Adigrat Hospital.

Study population: This study included all PLWHA who had received care and treatment in Adigrat Hospital and the patient medical record and registers have reviewed for two years period, from January 2009 to December 2010 G.C

Study unit: The study units were medical records of HIV AIDS patients sampled for review and two year financial documents of Adigrat hospital, from January 2009 to December 2010 G.C.

Sample size: The sample size is determined using a single mean formula for cross-sectional retrospective study design (the standard deviation is used from the previous pilot survey conducted for the study of cost of HIV/AIDS in three public hospitals in Addis Ababa; it was

birr 441.74 and a mean of birr 860, 95% CI and margin of error 5%). Hence, the calculated sample size was 405. Since the total number of HIV AIDS patients enrolled to ART department of Adigrat hospital are 2,294;

A correction factor was used to determine the final size of the sample which was 343 but adding a 10% for missing and incomplete medical records gave 377.

The sample size was calculated using the following formulae;

$$n = \frac{Z\alpha^2 s^2}{d^2}$$

$$\text{Then } n = \frac{n_0}{1 + \frac{(n_0-1)}{N}}$$

Where:

n = the sample size estimate

s = the sample standard deviation (Birr 441.74 obtained from the pilot survey)

Zα = the confidence level is 95%, 1.96

d = margin of error (5% of the mean of pilot survey birr 860 is 43)

The sample size calculated as follows:

$$n = \frac{1.96^2 \times 441.74^2}{43^2} = 405$$

$$\text{Then } n = \frac{405}{1 + \frac{(405-1)}{2294}} = 343$$

At last 10% of this added for missing and incomplete medical records and we got 343 + 34= 377

Sampling procedure: Systematic random sampling method was employed to select the study units. HIV/ AIDS patients chart review was conducted by sampling every 4th patient medical record after randomly selecting the first unit from the first 4 list of HIV patients in ART as the starting point. (nth element =population size/sample size)

Inclusion criteria: Medical record of HIV/AIDS Patients treated with HIV related illnesses and complications at outpatient and admitted to inpatient.

Exclusion criteria: Medical record of HIV/AIDS patients admitted to inpatient due to injury, labour and other not HIV related illnesses and complications in surgical, obstetrics and gynecology wards.

Variables of the study

Independent: Frequency of outpatient visit and inpatient admission, Stage of HIV/AIDS, CD4 count, length of hospital stay, patients on ART and pre ART, current status of patients on ART, patients condition at discharge, service departments, socio demographic (Age, sex, address, occupation, educational status)

Dependent: Total cost, Average cost

Data source and collection: The data was derived from HIV /AIDS patients medical record and registration book using checklist that contain information about socio demographic characteristics (sex & age), Frequency of previous outpatient visit and history of admission, investigations (laboratory and radiographic tests), HIV/AIDS stage, opportunistic infections/ clinical diagnosis, drugs used (ART & other medications), length of inpatient stay were compared. Medical officers were consulted if abbreviations, representing the diagnoses, could not be deciphered. The check list was pre tested in none study area and two days trained diploma and above health care workers data collectors was used to review the patient charts and registers.

Additionally, financial record review in the hospital was conducted by the financial expert data collectors to obtain the overhead and capital costs of the indirect costs and dividing to the service output to obtain the unit costs of indirect cost.

Cost data: Costs were estimated for direct and indirect costs for HIV-related services based on the bottom-up and the standard step-down costing method respectively; the direct treatment costs such as drugs, laboratory tests, X-rays and examination costs are estimated based on the amount consumed by each patient. Each patient charts was reviewed for information about consumption of drugs; number and type of laboratory tests, imaging, and examination cost of patients and costing were done on each component of health care that is utilized in outpatient and inpatient and a unit cost recovery was applied to each component. Drug and medical supply cost included all medications (ART, Antibiotics, other medications & medical supplies). We obtained the price of drugs and medical supplies from the list in Adigrat hospital, Tigray regional health bureau, and Pharmaceutical factory supply agency (PFSA). Hospital direct cost was calculated using the

mean diagnostic cost, ARV, OI drugs and other medications and medical supplies cost and multiplying by the total services output of HIV/AIDS patients receive care and treatment at outpatient and inpatient department of Adigrat hospital.

The indirect costs of overhead and capital inputs were obtained from the financial statement of the hospital. Major overhead costs were calculated based on the National Finance Coding System for all expenses of the hospital administration; maintenance, storage, kitchen, medical records, pharmacy, laboratory, transport service, domestic services (i.e., cleaning, security), laundry, clothing, food, utilities, printing, stationery, etc. would not directly involve in patient care but provide necessary services to the patient care department. The cost of running hospital departments are divided in to three categories. Overhead department, including for instance administration and kitchen, provide services which are not of direct medical benefit to patients but they are necessary to allow the hospital to function. The support departments placed at the second stage enable the medical care process to take place, by, for example, supplying drugs (pharmacy) and providing diagnostic services (laboratory. X-ray department). The third type, like Medical, pediatric ward, ART clinic final service departments, provide treatment services directly to patients. We calculated average unit costs of each of the services by dividing the cost of inputs incurred along each of the services during the year by the total number of output of the respective services during the same year.

For capital inputs (buildings, equipments furniture and vehicles), Information on the model and type of equipment and furniture by department was retrieved from the Master Assets Register and details of the size, structure and type of individual hospital departments were listed while the price of these items for the purpose of this study was used the original cost, faire market value estimated by experts and replacement value for new, old and Donated fixed Assets respectively. And the depreciation rate was used based on the Ethiopian law in the income tax proclamation number 286/2002. We identified the total costs of providing individual patient care was the sum of the direct cost and indirect cost. All costs are presented in Ethiopian birr and converted to the US dollar using the average exchange rate in Dec, 2010 (US\$ 1 = ETB 16.55).

Average Cost estimation and Data Analysis: Percentage of HIV/AIDS related illnesses, mean CD4 Laboratory values, and average unit costs were plotted on a prepared data sheet format.

Cost estimated per patient per day and per stay, average and median costs, and the total hospital cost, direct and indirect costs was calculated. Comparison of total costs among HIV/AIDS stage, CD4, ALOS, frequency of outpatient visit, rate of hospitalization, and socio Demographic characteristics was done. After all the cost data was collected and the basic calculations of cost data made, the results was double-checked to make sure that they are reasonable. Costs can be categorized as medications (OI and ARV drugs), diagnostic, goods and services personnel, and capital cost. These categories are based on National Finance Coding System Terminology for all expenses.

Data Processing technique

The data about the costs of the service was analyzed using IT spreadsheet (Excel) to categorize and summarize data of hospital costs, and the data was entered, edited, cleaned and analyzed using the statistical package SPSS version 16.0. Percentages, averages, and Regression model were used and data was presented using tables and figures.

Data Quality management: Standardized check list was used and pre tested on 5% of the sample size in none study area in Wukro and Mekelle hospitals and Checked for unclear, consistency and corrected before initiation of the study. The data was collected by two days trained data collectors from none study area; who were seven diploma and above level health professionals for Patient chart & registrations reviewed; Two finance experts (professionals) reviewed financial record and estimated the average unit cost, and the building estimated using the floor area method by an engineer. The completeness of check list and formats was regularly checked during data collection by the principal investigator and the data was double checked during the analysis.

Ethical issues: The study protocol was submitted and approved by the Ethical Review Board of the college of public health and Medical Sciences of the Jimma University. Prior to initiation of data collection, permission was obtained from Tigray regional health bureau, Adigrat hospital and all concerned bodies to access financial documents, patient records and registration book.

There was no collection of unnecessary information from the patient charts. Confidentiality was assured via anonymous records and code of Checklist and sited them in safe place after they have collected and have been utilized for the purpose of the study only.

Dissemination of findings: The results will be presented to Jimma university and get approval; then distributed to TRHB, Hospitals and other concerned bodies working on hospital administration and also the result will be presented in trainings, seminars and conference held by TRHB. The document will be put in libraries and published in journals.

Operational definitions

Inpatient: The department of the hospital in which patients stay for a period of days while receiving care and treatment.

Outpatient: The departments of the hospital in which patients take their treatment and care and continue to use at home.

Admission: A process of patients entering and allow hospital beds to receive medical care and treatment under the supervision of physicians.

Direct cost: these are those costs which are incurred for and may be conveniently identified with a cost unit or job or process (includes drugs, medical supplies, laboratory, X-ray and examination)

Indirect cost: The cost cannot be conveniently identified with a particular cost unit; process or department (includes Salaries, Goods and services, buildings, furniture's, medical equipment and vehicle).^{33, 34, 35, 36, 37}

Replacement value: The Replacement value is the cost of acquiring a new asset of equal utility and usefulness. It is normally useful in valuing tangible assets such as office equipment, furniture, and fixtures.

Stage of HIV/AIDS

HIV/AIDS stage 1

Asymptomatic

Persistent generalized lymphadenopathy (PGL)

HIV/AIDS stage 2

Moderate unexplained weight loss (<10% of presumed or measured body weight)

Recurrent respiratory tract infections (RTIs, sinusitis, bronchitis, otitis media, pharyngitis)

Herpes zoster, Angular cheilitis, recurrent oral ulcerations, Papular pruritic eruptions

Seborrhoeic dermatitis, Fungal nail infections of fingers

HIV/AIDS stage 3

Conditions where a presumptive diagnosis can be made on the basis of clinical

Signs or simple investigations

Severe weight loss (>10% of presumed or measured body weight), Unexplained chronic diarrhoea for longer than one month, Unexplained persistent fever (intermittent or constant for longer than one month), Oral candidiasis, Oral hairy leukoplakia, Pulmonary tuberculosis (TB) diagnosed in last two years, Severe presumed bacterial infections (e.g. pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteraemia), Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis.

Conditions where confirmatory diagnostic testing is necessary

CD4 count less than 350 Cells/ μ L, Unexplained anemia (< 8 g/dl), and or neutropenia (<500/mm³) and or thrombocytopenia (<50 000/ mm³) for more than one month

HIV/AIDS stage 4

Conditions where a presumptive diagnosis can be made on the basis of clinical

Signs or simple investigations

HIV wasting syndrome, Pneumocystis pneumonia, Recurrent severe or radiological bacterial pneumonia, Chronic herpes simplex infection (orolabial, genital or anorectal of more than one month's duration), Oesophageal candidiasis, extra pulmonary TB, Kaposi's sarcoma, Central nervous system (CNS) toxoplasmosis, HIV encephalopathy

Conditions where confirmatory diagnostic testing is necessary:

CD4 count less than 200 Cells/ μ L, Extra pulmonary cryptococcosis including meningitis, Disseminated non-tuberculous mycobacteria infection, Progressive multifocal leukoencephalopathy (PML), Candida of trachea, bronchi or lungs, Cryptosporidiosis, Isosporiasis, Visceral herpes simplex infection, Cytomegalovirus (CMV) infection (retinitis or of an organ other than liver, spleen or lymph nodes), any disseminated mycosis (e.g. histoplasmosis, coccidiomycosis, penicilliosis), Recurrent non-typhoidal salmonella septicemia, Lymphoma (cerebral or B cell non-Hodgkin) Invasive cervical carcinoma, visceral leishmaniasis. All HIV +ve patients fulfill at least one criteria from the above will be classified on each HIV/AIDS stage.

6. Results

A total of 373 (99%) Patients' medical record reviewed was found valid and included in the analysis. Among the reviewed patient charts 59.2%, 69.2%, 94.6%, 58.5% were females, urban, Orthodox Christians and jobless respectively. The age range of the study subjects was 1-63 years. The mean age (SD) of the patients was 32.9 (10.6) years (median 32,). The largest percentage, 302 (81%) belonged to the 15-44 age group (Table1).

Table1. Socio-demographic characteristics of HIV AIDS patients receive care and treatment, Adigrat Hospital, eastern zone of Tigray, North Ethiopia, 2009-2010.

VARIABLES N = 373	Frequency		Variables	Number	Percent
	Number	Percent			
SEX			Address		
Females	221	59.2	Urban	258	69.2
Males	152	40.8	Rural	115	30.8
Age group			Marital status		
1 -4 year	6	1.6	Single/ Never married	72	19.3
5-14 years	18	4.8	Married	169	45.3
15-44 years	302	81	Separated, Divorced, Widowed	132	35.4
45 - 64 years	47	12.6	Educational status		
Religion			Illiterate/ No education	126	33.8
Muslim	6	1.6	Primary education	143	38.3
Orthodox	353	94.6	secondary education	80	21.4
Protestant	2	0.5	Tertiary education	24	6.4
Catholic	9	2.4	Occupation N = 359		
Other	3	0.8	Jobless	210	58.5
			Governmental employee	36	10
			Private sector employee	113	31.5

Assessment of their stage of HIV/AIDS revealed that more than half (236 (63.3%)) were AIDS stage (stage three 51.2% and stage four 12.1%). CD4+ T-lymphocyte counts were available for 373 patients; the median was 272 cells/mm³ ranges, 9-1166 cells/mm³. One hundred twenty two (32.7%) of patients had less than 200 cells/mm³ (Table2). Of the 319 (85.5%) patients for whom a Hemoglobin value were available, the mean (SD) Hemoglobin was 13.11 gm/dl (1.98), ranging (3.9 to 17.63 gm/dl) and 74 (23.2%) did have Hemoglobin less than 12 gm/dl.

The Mean (SD) frequency of outpatient visit was 10.3(6.2), range from 1 to 31. One hundred seventy nine (50%) of the patients had less than 10 times OPD visit followed by 146 (40.6%) of the patients 11 to 20 visits and the remaining 34(9.5%) were 21 and above visits. There were a total of 303 (84.4%) patients under ART. The Current status of HIV patients who started anti

retroviral therapy during the study period was 263 (86.8%) currently on ART, 15(4%) transfer out. and 14(4.6%) drop out. Eleven (3.6%) were dead (Table 2).

Table2. Percentage of HIV AIDS patients by selected variables in Adigrat hospital, 2009-2010.

Variables	Frequency		ART/Pre ART	
	Number	Percent	Number	Percent
OPD visit N = 359			N = 359	
1 - 5 visit	88	22.3	Patients on ART	303 84.4
6 - 10 visit	99	27.6	Pre ART	56 15.6
11 - 15 visit	92	25.6	Currently status of HIV patients (Pt's under ART)	
15 - 20 visit	54	15	N = 303	
21 - 25 visit	25	7	On ART	263 86.8
≥ 26 visit	9	2.5	Death	11 3.6
			Drop out	14 4.6
			Transfer out	15 4
Stage of HIV AIDS patient			CD4 Count N = 359	
			< 200 cells/mm3	122 32.7
N = 373			200 - 499 cells/mm3	176 47.2
One	37	9.9	> 500 cells/mm3	75 20.1
Two	100	26.8		
Three	191	51.2		
Four	45	12.1		

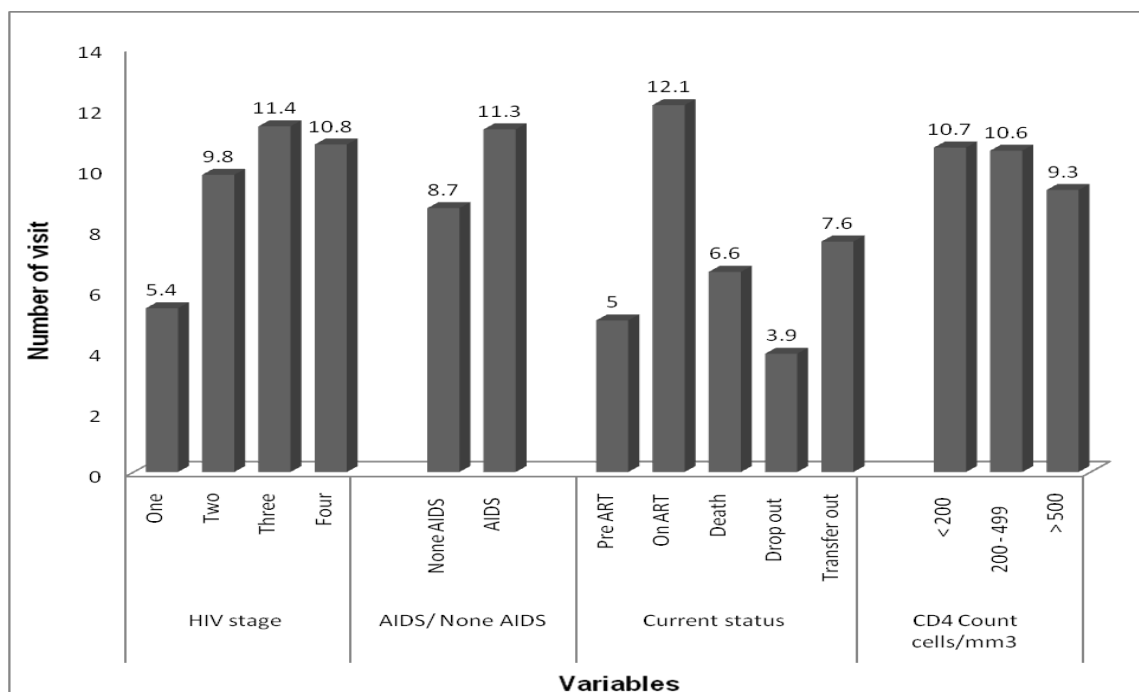


Fig3. The mean outpatient visit of HIV AIDS patients received care and treatment in Adigrat hospital by selected variables, 2009-2010

Pneumonia was the most common diagnosis 129 (34.6%) followed by diarrheal diseases 93 (24.9%) and Tuberculosis 60 (16.1%); of those with TB, 34(9.1%) cases were pulmonary and 26 (7%) were extra-pulmonary (Table 3).

Table 3. Diagnostic morbidity of HIV AIDS patients in Adigrat hospital, 2009-2010.

Type of disease	Number	Percentage
Pneumonia/ RTI	129	34.6
Chronic diarrhea & Gastroenteritis	93	24.9
Tuberculosis	60	16.1
Oro pharyngeal candidiasis	38	10.2
Gastritis/ PUD	27	7.2
Fungal infection	18	4.8
Herpes zoster/ Herpes simplex	11	2.9
Eye disease	10	2.7
UTI	9	2.4
PCP	9	2.4
CNS toxoplasmosis	6	1.6

Nearly six percent (633) of the hospital admissions at Adigrat hospital during the study period was HIV infected patients (20.3% of medical ward, 2.9% of pediatric ward and 3.4% of Obstetrics and gynecology ward admissions was HIV AIDS patients). Of the 93 (24.9%) HIV infected patients who were treated at inpatient, Majority 67(72%) admitted to medical ward, 76 (82%) clinical AIDS and 82 (88%) on Antiretroviral therapy. The frequencies of inpatient admissions were once 71(76.3%) and twice 17(18.3%). The outcome of hospital admitted patients was 11(11.8%) Dead and 79 (85%) improved at discharge from the hospital (Table4).

Table 4. Percent of HIV AIDS patients by selected variables at inpatient department in Adigrat hospital, 2009-2010.

Variables	Frequency		Frequency of Inpatient admission	Number	Percent
	Number	Percent			
Patient admission wards			Once	71	76.3
			Twice	17	18.3
Medical Ward	67	72	Three times	4	4.3
Pediatric Ward	9	9.7	Six times	1	1.1
			Length hospital of stay		
Surgical Ward	4	4.3	<= 5 days	32	34.4
Oby-Gyn Ward	13	13.9	>5 days	61	65.6
No Admission	280		Patient condition at discharge		
CD4 Count in IPD			Improved	79	85
< 200 cells/mm3	45	45.4	Dead	11	11.8
200 - 499 cells/mm3	41	44.1	No change	3	3.2
> 500 cells/mm3	7	1.9			

The mean (SD) length of stay for HIV-infected patients was 11.04 (12.86) days, (range 1 to 85 days, median 7 days) and 61 (65.6%) of the patients had greater than 5 days of hospital stay. The highest average length of stay 12.76 days (Median 8 days) was medical ward followed by 9.8days (Median 6 day's pediatric ward).

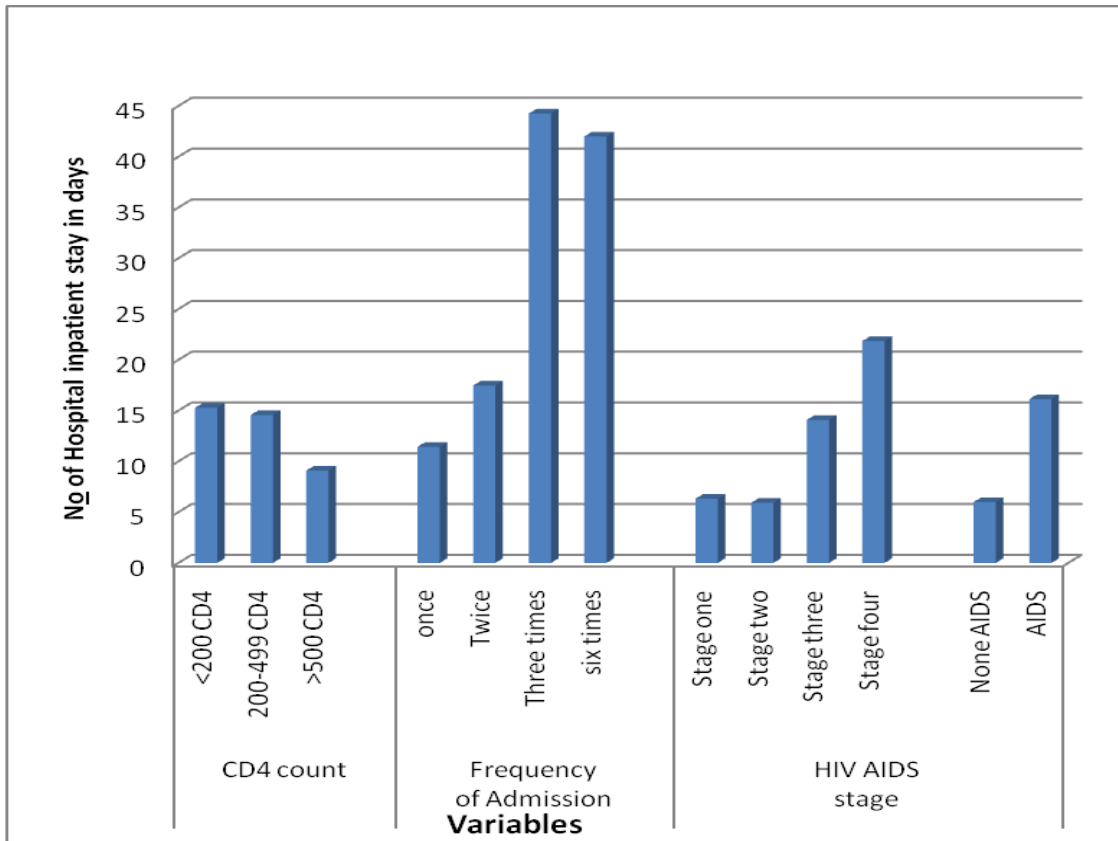


Fig.4 Average length of hospital stay for HIV AIDS patients by selected variables in Adigrat hospital, 2009-2010 G.C.

Bed occupancy rate of HIV AIDS patients who received care and treatment in Adigrat hospital was 6.7% (17.3% of hospital admission days) and the largest 89.8% of admission days was in medical ward followed by 5.4 % in pediatric ward and the remaining 3.3% and 1.4%, for obstetrics and gynecology ward, and surgical ward respectively.

Hospital cost of HIV/AIDS care and treatment

The average annual total cost of 5,778,972.80 Ethiopian birr (80.3% OPD and 19.7% IPD) has been expended for HIV AIDS care and treatment in Adigrat Hospital, in Jan 2009 - Dec 2010 G.C. This HIV AIDS care and treatment cost showed that 4,182,972 Eth birr (72.4%) of the expenditure had gone to direct cost. ART cost 1,665,567.20 Eth birr (28.8%) took greater share of the direct cost followed by 28.6% diagnostic cost and 9.9% OI drugs, other medication and supplies.

The remaining indirect cost was 1,596,001 Eth Birr (27.62%); of these, 10.7%, 6% and 10.9% were for personnel cost, Goods and service cost and capital cost respectively, (Table5). The indirect cost accounted for 21.7% of the hospital total indirect expense. The average annual hospital cost 241,848.32 Eth birr (5.8% of the annual direct cost) was expended for the supplies of infection prevention activities in Adigrat hospital.

Table5. Summary annual cost of HIV AIDS care in Adigrat hospital, 2009-2010 G.C.
(US\$1 = Eth birr \$16.55, December 2010 exchange rate)

Variables	Average annual outpatient cost		Average annual inpatient cost		Average annual hospital HIV AIDS cost	
	Eth birr	%	Eth birr	%	Eth birr	%
Direct cost	3809120.5	82.07	373851.3	32.86	4182972	72.4
Diagnostic cost	1521700.60	32.8	131257.68	11.5	1652942.55	28.6
Cost of ART Drugs	1665567.2	35.9	0		1665567.2	28.8
Cost of OI, other medication and supplies	347466.5	7.5	223473.1	19.6	570939.5	9.9
Indirect cost	832194.05	17.93	763806.95	67.14	1596001	27.62
Personnel cost	337341.36	7.3	280931.115	24.7	618272.5	10.7
Goods & Services cost	173610.06	3.7	171906.605	15.1	345516.665	6
Capital cost	321242.64	6.9	310969.21	27.3	632211.85	10.9
Total cost	4641314.55	80.3	1137658.25	19.7	5778972.8	100

Outpatient Hospital cost of HIV AIDS care and treatment

The average annual outpatient expenditure of HIV AIDS care and treatment was 4,641,314.55 Ethiopian birr, out of which the largest 3,052,264.60 Eth birr (65.8%) belongs to cost of patients on ART and the rest 1,589,050 Eth birr (34.2%) cost of Pre ART patients. Greater part of the outpatient cost was direct cost 3,809,120.50 Eth birr (82%); (32.8% Diagnostic cost, 35.9% Antiretroviral drugs cost and 7.5% other medication cost) and the rest 832,194 Eth birr (18%) indirect cost.

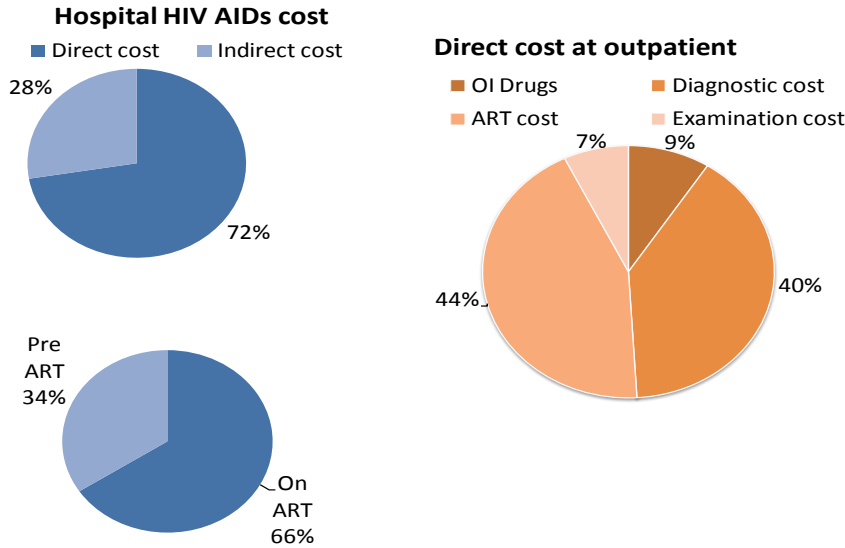


Fig5. Hospital HIV/AIDS cost by direct, indirect ART and pre ART cost in Adigrat hospital, 2009-2010

Outpatient mean cost of care and treatment of HIV

The mean cost per patient per year at outpatient department was 1,302.33 Ethiopian Birr and the average outpatient costs were 83.2% and 16.8% for direct cost and indirect cost respectively. Overall the direct cost of outpatient was higher and out of these, cost of ARV drugs was the major cost driver (69.2% of outpatient cost) followed by diagnostic cost (18.4% of outpatient cost) and the remaining 6.7% OI drugs, other medications and supplies and 5.8% examination cost. The average cost per person per visit of outpatient was 279.75 Eth birr; of this 83.2% was direct cost (62% ARV drugs cost, 24.7% diagnostic cost, and 7.6% OI drugs, other medication and supplies cost).

Table 6. Mean outpatient visit and person costs of HIV AIDS care by socio demographic characteristics in Adigrat hospital, 2009-2010.

Variables	No. of pts	Average person per year cost at outpatient (Eth birr)			Average person per visit cost at outpatient (Eth birr)		
		Mean Cost PPY	Beta-Value	P-value	Mean cost	Beta-Value	P-value
SEX							
Females	211	1328.36	0.039	>0.05	259.24	0.137	<0.001
Males	148	1265.21			308.98		
Age group							
1 -4 year	6	623.39	0.1005	< 0.001	219.88	0.05	>0.05
5-14 years	17	713.87			197.72		
15-44 years	291	1310.72			281.98		
45 - 64 years	45	1560.93			304.31		
Address							
Rural	108	1136.97	0.125	>0.05	288.55	-0.006	>0.05
Urban	251	1373.48			275.96		
Marital status							
Single	68	1089.28		>0.05	279.61	-0.145	>0.05
Married	164	1270.14			289.35		
Separated, Divorced, Widowed	127	1457.98			267.44		
Occupation							
Jobless	210	1269.64		>0.05	265.77	0.067	>0.05
Governmental employee	36	1363.16			290.83		
Private sector employee	113	1343.71			302.2		
Total	359	1302.33			279.75		

Among patients who receive HIV care and treatment at outpatient department males had significantly higher cost per patient per visit 308.98 Eth birr compared to females 259.24 Eth birr ($p < 0.01$).

The average person per year costs at outpatient department were 623.39, 713.87, 1,310.72, and 1,560.93 Eth birr for patients in the age group 1-4, 5-14, 15-44 and 45-64 years respectively. Patient's age was significantly associated with the outpatient cost ($p < 0.01$). In the outpatient department the mean cost per patient per year for urban patients was not significantly higher 1,373.48 Eth birr than rural 1,136.97 Eth birr ($p > 0.05$).

The annual mean costs of separated, divorced or widowed patients, single and married patients at the outpatient department were 1,457.98 birr, 1,089.28 birr and 1,270.14 Eth birr respectively. The mean cost per patient per visit for private sector employees, Governmental employees and jobless was 302.2 Eth birr, 290.83 Eth birr and 265.77 Eth birr respectively and the differences are not statistically significant ($p > 0.05$).

The average cost per person per year at outpatient department were 501.54 birr, 976.50 birr, 1,532.62 birr, 1,992.60 birr, 2,249.04 birr, and 2,879.15 Eth birr for patients in the outpatient visit grouped 1-5, 6-10, 11-15, 16-20, 21-25 and 26 and above visits respectively. Frequency of outpatient visit is strongly associated with the cost of HIV AIDS care and treatment ($P<0.001$).

The average cost per person per year and person per visit of patients under ART at outpatient were higher 1,460.27 and 295.19 Eth birr respectively; and 447.77 and 196.2 Eth birr for pre ART per person per year and person per visit cost respectively. The cost of ART patients was significantly higher than pre ART ($P<0.001$).

Assessment of the average person per year cost of HIV AIDS care and treatment received at outpatient based on their stage of HIV/AIDS revealed that higher expenditure 1,749.93 Eth birr were for stage four and 1,498.18 Eth birr for stage three. Stage two and stage one costs 1,030.39 and 459.31 Eth birr respectively. The mean cost difference between the different stages of HIV AIDS patients was statistically significant ($p<0.05$). The average person per year and person per visit cost of clinical AIDS patients at outpatient were 1,548.28 and 314.55 Eth birr respectively. And for none AIDS stage person per year and person per visit cost were 884.40 and 220.62 Eth birr respectively. The cost of AIDS stage patients was significantly higher than none AIDS stage HIV infected patients, ($P<0.05$).

The mean person per year cost for patients less than $200\text{cells}/\text{mm}^3$, $200\text{-}499\text{cells}/\text{mm}^3$ and $\geq 500\text{cells}/\text{mm}^3$ CD4 T-Lymphocytes count were 1,805.75 birr, 1174.74 birr, and 829.36 Eth birr respectively. There was a significant inverse relationship between CD4 cell count and the average person year cost at outpatient ($p<0.001$).

Table 7. Mean person and visit cost of HIV AIDS care by selected variables at outpatient in Adigrat hospital, 2009-2010

Variables	No. of pts.	Average person per year cost at outpatient (Eth birr)			Average person per visit cost at outpatient (Eth birr)		
		Mean cost	B-value	P-value	Mean cost	B-value	P-value
Frequency of outpatient visit							
1 - 5 visit	80	501.54	0.767	<0.001	295.65		>0.05
6 - 10 visit	99	976.50			274.6		
11 - 15 visit	92	1532.62			278.87		
15 - 20 visit	54	1992.60			280.78		
21 - 25 visit	25	2249.04			258.73		
≥ 26 visit	9	2879.15			256.38		
ART/Pre ART							
Patients under pre ART	56	447.77	0.507	<0.001	196.2		<0.001
Patients under ART	303	1460.27			295.19		
Stage of HIV AIDS patient							
One	34	459.31	0.145	<0.001	179.49	0188	<0.05
Two	99	1030.39			234.75		
Three	181	1498.15			302.33		
Four	45	1749.93			363.66		
AIDS/ None AIDS							
AIDS stage Pts	226	1548.28	0.091	<0.001	314.55		<0.01
None AIDS stage pts	133	884.40			220.62		
CD4 Count							
< 200 cells/mm ³	112	1805.75	-0.333	<0.001	383.15	-0.632	<0.001
200 - 499 cells/mm ³	175	1174.74			250.81		
> 500 cells/mm ³	72	829.36			189.24		
Total	359	1302.33			279.75		
Current status of under ART patients							
On ART	263	1551.75	-0.97	<0.05	292.61		>0.05
Death	11	1016.59			289.3		
Drop out	14	672.67			357.14		
Transfer out	15	916.87			286.65		
Total	303	1460.27			295.19		

Table 8: Regression results of the determinants of hospital person per year cost at outpatient in Adigrat hospital, 2009-2010

Variable Name	Un standardized Coefficients	Standardized Coefficients Beta	t	P-value	Confidence interval	
					Lower	Higher limit
Frequency of outpatient visit	99.27	0.738	21.11	5.60E-61	90.01	108.52
CD4 count	-477.75	-0.372	-11.27	9.40E-25	-561.18	-394.32
Age of the HIV AIDS patients	7.31	0.086	2.63	0.008	1.84	12.77
Current statuses of HIV patients	-78.76	-0.074	-2.15	0.03	-150.77	-6.74
Patients on ART and pre ART AIDS/ None AIDS patients at outpatient	733.76	0.32	5.7	2.40E-08	480.75	986.76
OPD Stage of HIV AIDS patient	328.73	0.19	3.37	0.0008	137.06	520.4
Sex of HIV AIDS patients		0.039	1.372	0.171		
Marital status		0.005	0.18	0.855		
Address of the patients		0.05	1.88	0.060		
Occupation		0.022	0.823	0.411		
Pneumonia and other RTI		-0.057	-2.04	0.041		
Diarrhea and Gastroenteritis		0.028	1.03	0.303		
Tuberculosis All forms		-0.006	-0.23	0.814		
Oro-pharyngeal candidacies		-0.02	-0.94	0.347		

Table 9. Regression results of the determinants of hospital cost per person per visit at outpatient in Adigrat hospital, 2009-2010

Average cost per person per visit at outpatient	Un standardized Coefficients	Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B	
					Lower Bound	Upper Bound
CD4 count	-101.94	-0.699	-13.77	1.00E-33	-116.502	-87.374
Sex of HIV AIDS patients	25.71	0.137	3.46	0.0006	11.0919	40.3283
AIDS/ None AIDS patients	-43.95	-0.21	-2.89	0.004	-73.8904	-14.002
Stage of HIV patients	20.85	0.142	1.98	0.049	0.12171	41.575
Age the HIV AIDS patients		0.05	1.23	0.22		
Address of the patients		-0.006	-0.16	0.87		
Marital status		-0.006	-0.145	0.88		
Occupation		0.067	1.544	0.12362		
Currently statuses of HIV patients		-0.0688	-1.71	0.08805		
Frequency of outpatient visit		-0.0141	-0.155	0.87642		

Inpatient Hospital cost of HIV AIDS care and treatment

The annual cost of HIV AIDS care and treatment at inpatient department was 1,137,658.25; of these, the largest expenditure, 88.7% belongs to Medical ward and followed by 5.9 % in pediatric ward. The remaining 1.6% and 3.8% were for surgical ward, Obstetrics and gynecology ward respectively.

The mean cost per person per stay of inpatient department was 2,609.83 Eth birr; of these, nearly three-fourth 1,905.62 Eth birr was indirect cost (27% personnel cost, 16.4% goods and service cost and 29.5% capital cost). And the remaining 704.21 Eth birr (27%) was direct cost. Cost of medication was higher (71.6% of inpatient direct cost) followed by diagnostic cost (26.2% of direct cost). The average person per day cost of inpatient care was 289.9 Eth birr (64.6% indirect cost which is the largest contributor of inpatient care, 35.4% direct costs, 21% OI drugs cost and 12.4 % diagnostic costs)

Inpatients mean cost of care and treatment of HIV

Assessment of the mean person per stay cost of HIV AIDS care and treatment received at inpatient were 2,901.70 Eth birr in medical ward and 2,392.62 Eth birr in pediatric ward. The remaining 1,603.56 and, 1,480.03 Eth birr were mean cost of Obstetrics and gynecology and surgical ward respectively. The mean cost difference between the inpatient departments was not statistically significant ($p>0.05$).

The average cost per person for patients with once, twice, three and six times inpatient admissions were 2,728.52 Eth birr 4,128.57, 9,192.02 Eth birr and 9,840.86 Eth birr respectively (p -value 0.01). However the frequency of inpatient admissions was not significantly associated with the average cost of person per inpatient day ($p>0.05$) (Table 8)

The median person per stay cost of HIV AIDS care and treatment at inpatient were 982.04 and 2,511.80 Eth birr for patient with 1-5 days and greater than 5 days hospital stay respectively. Hospital inpatient stay was significantly associated with the cost of HIV care and treatment ($P<0.001$).

Among patients who receive HIV care and treatment at inpatient, clinical AIDS patients had significantly higher mean cost per person per stay 2,835.51 Eth birr and person per inpatient day cost of 274.33 Eth birr compared to none clinical AIDS stage patients that were 1,600.90 and 220.62 Eth birr for person per stay and person per admission day respectively, ($p < 0.05$, $p < 0.001$).

The mean person per stay cost at inpatient department were 1891.56 birr, 1,538.62 birr, 2,609.71 birr, and 3,467.74 Eth birr for patients with stage one, stage two, stage three and stage four respectively. The average cost per person at inpatient department was statistically significantly associated with the stage of HIV AIDS ($p < 0.05$).

Both the outpatient and inpatient costs are higher for patients with AIDS, higher HIV stage, increased frequency of visit and length of stay.

Table 10. Mean person per stay and visit cost of HIV AIDS care by variables at inpatient in Adigrat hospital, 2009-2010

	N	ALOS/ median	P- value	Mean/ Median cost per person/ inpatient stay Median(Eth birr)	B- valu e	P- value	Mean Cost/pt/admiss ion day (Eth birr)	B- value	P- value
Patient admission wards									
Medical Ward	67	12.76/ 8	>0.05	2105.2		>0.05	268.44	0.187	<0.05
Pediatric Ward	9	9.78/ 6		1721.57			262.29		
Surgical Ward	4	4.75/ 4		1336.98			325.3		
Obstetrics and Gynecology Ward	13	4.9/ 2		724.25			408.73		
Total	93	11/ 7		1866.47			289.9		
IPD AIDS/ None AIDS pts				Median person per stay					
AIDS pts	76	12.28/ 8	<0.05	2087.24		<0.05	274.33		<0.001
None AIDS pts	17	5.5/ 3.5		1065.96			359.52		
Stage of HIV pts in IPD				Median person per stay cost					
Stage one	3	6.3/ 7	>0.05	1694.56		<0.05	301.18	-0.278	<0.05
Stage two	14	5.3/ 3		976.24			372.02		
Stage three	56	10.99/ 7.1		2032.39			278.18		
Stage four	20	15.88/ 9		2422.21			263.54		
Frequency of Inpatient admission		LOS		Average cost per person per total stay					
Once	71	11.43	<0.001	2728.52	0.058	<0.00 1	303.15		>0.05
Twice	17	17.47		4128.57			253.74		
Three times	4	44.25		9192.02			222.26		
Six Times	1	42		9840.86			234.3		
Total	93	14.28		3338.92			289.9		
Length of inpatient stay				Average person per stay cost					
1 - 5 days hospital stay	32	2.92/ 2	<0.001	977.85	0.594	<0.00 1	394.72	-0.621	<0.001
5+ days	61	15.3/ 9		3465.95			247.02		
Total	93	11.04/ 7		2609.83			289.9		

Table 11: Regression results of the determinants of hospital cost per person per inpatient stay in Adigrat hospital, 2009-2010

Variable Name	Coefficients	B	t	P-value	Confidence interval	
					Lower	Higher limit
Frequency of inpatient admission/ rate of hospitalization	71.55981	0.058	3.47	0.0008	105.96	391.02
Length of inpatient hospital stay	155.1795	1.024	21.87	<0.0001	141.05	169.31
Tuberculosis All forms	806.99	0.134	2.14	0.036	54.64	1559.33
Patient condition at discharge/ Outcome of admitted patient	-1610.92	-0.192	-2.913	0.004	-2712	-509.8
Patients on ART/ Pre ART		0.031	0.489	0.626		
CD4 count		-0.047	-0.726	0.47		
Patient admission wards		0.029	0.443	0.69		
AIDS/ None AIDS stage HIV positive patients		0.12	0.178	0.59		
Stage of HIV patients		0.023	0.342	0.733		

7. DISCUSSION

. This study revealed that 81% and 69.2% of the HIV AIDS related service users were from the urban area and the age of 15-44 years respectively. This could be attributed to the accessibility of health service and HIV highly affects the prime age. The majority of HIV infected patients received care and treatment at outpatient level and the largest proportion was on ARV therapy (84.4%).

The first five leading causes for hospital visit and inpatient admissions were pneumonia, Tuberculosis (pulmonary and extra pulmonary), diarrhea and gastroenteritis. This finding is similar to reports tuberculosis, Pneumonia and acute gastroenteritis the leading diagnosis among HIV-infected adults admitted in medical wards in Pune/India,¹⁷ Kenyatta National Hospital/Nairobi,¹⁴ and Soweto/South Africa.¹⁹ This could be result because of poor advice, monitoring for early identification and appropriate treatment of this diseases in HIV-infected patients and minimize the frequency of outpatient visit and inpatient admissions.

The mean duration of admission to hospital was 11.04 days. This duration was higher to that reported from other countries (9.5 days in Kenyatta National Hospital/Nairobi.¹⁴ and 10 days in Pune/India¹²). 6.4-9.3 days in different medical wards of Zimbabwe Governmental hospitals in1994/95¹¹ but lower with19days, in study done in three public hospitals in Addis Ababa.¹⁰ This difference could be probably due to the capacity of hospitals and the preference of patients to stay at hospital or home.

Percent of hospital beds used for HIV AIDS patients was 6.7% (17.3% of hospital admission days). This higher length of hospital stay and bed occupancy affected the hospital and this bed occupancy rate was lower than studies reported12% in Tikur Anbessa hospital, 12% St. Paul's hospital and 53% in Zewditu hospital.¹⁰ This difference could be probably because of higher patient load of HIV/AIDS patients and lower number of hospital beds.

Among the HIV AIDS patients who received care and treatment in Adigrat hospital, the frequency of outpatient visit, HIV stage, AIDS cases and patients on ART were direct relationship to each other and inversely related with CD4 count. In the case of inpatient situation, the rate of hospitalization, length of hospital stay, and HIV stage was a direct relationship.

The average outpatient visit per year was 5.17(2.5 none AIDS stage patients under pre ART, 5.7 and 5.65 for none AIDS and AIDS patients under ART conditions respectively). The average OPD visit per year was 6.1, 3.2 and 1.9 for patients currently on ART, death and dropout respectively. This shows that patients with the advanced disease and ARV therapy had higher outpatient visit and patients with less advanced disease conditions, death and dropouts had lower OPD visits. The estimates of outpatient visits for non-AIDS under none ART condition in our

study were less than 4.5 reported from Arbaminich hospital, 4.35 from South-Africa and 4.6 from Mexico. The estimate of outpatient visit for AIDS patients under ART conditions were 7.62 and 11.31 in South Africa and Arbaminich respectively.¹⁹

The frequency of outpatient visits was higher in patients with advanced disease condition, like AIDS cases, Higher HIV stage, lower CD4 count and patients on ARV therapy and this could probably causes higher hospital cost of HIV care.

Cost of HIV/ AIDS care

In this study, the estimated hospital HIV/ AIDS cost per year was found to be 5,778,972.8 Eth birr, from this the highest 4,641,315(80.3 %) was outpatient department whereas 4,182,972 (72.4%) was a direct cost. The major hospital HIV/ AIDS expense was the direct cost 66% under outpatient level. This indicates that large resources shift to HIV AIDS related services. Health care for HIV/ AIDS patients was provided free and financed by the hospital budget through the government budget, internal revenue and donors support. It could probably have a negative impact on the implementation of health care financing and hospital reform. And this would result to affect the quality of services. Even though no similar studies were obtained to compare hospital HIV AIDS costs, it was higher than the VCT and OI cost (136,815.02 Eth birr) reported from Dil chora hospital (1995 E.C.)⁵

It is difficult to compare results from one country to another since epidemiology, supply, availability, consumption of health care and rapid market price changes differ. Although difference in method must be taken into account, it should be easier to compare studies conducted in similar situations.

The average person per year and person per visit cost at outpatient derived in our study (i.e., 1,302.33Eth birr (USD 78.69) and 279.75 Eth birr (USD16.90) (USD1= 16.55Eth birr exchange rate) were higher than those studied in Arbaminch hospital (USD 2.98 per visit) in 2004/5¹⁹ and studies done by kello AB in selected five hospitals in Ethiopia, in low cost scenario (USD12.03) and lower than under the high cost scenario (USD 41.30) in 1998.²³ This difference could be probably because the studies did not capture all patterns of service use and the direct cost estimated based on the service tariff of the hospitals or payer's prospective and private sector price. The average person cost per outpatient visit was lower than studies reported 629.88 Eth birr in three public hospitals in Addis Ababa, 2004.¹⁰ This deference could be probably due to difference in costing methods, access and capacity of the facility and income difference of the patients.

The annual cost of HIV AIDS care and treatment at inpatient department was 1,137,658.25; of these, the largest expenditure, 88.7% belongs to Medical ward and followed by 5.9 % in pediatric ward. The remaining inpatient wards less frequently admitted patients with HIV related complications and the cost of care and treatment for HIV related complications are remain lower.

The mean cost per person per stay in inpatient department was high 2,609.83 Eth birr (USD 157.69), in Dil chora hospital it was 335.80 Eth birr and the study on five hospitals in Ethiopia done by kello AB reported 22.64 USD in low cost scenario; and lower than 197 USD study done in high cost scenarios.^{5,23} This could be the study doesn't cover all patterns of services use and different methods of costing. The average cost of HIV/AIDS patients per inpatient stay was slightly higher to studies reported 2486.68 Eth birr in Zewditu hospital and slightly lower than 2820.40 Eth birr in St. Paul's hospital and 2816.63 birr in in Tikur Anbessa hospital.¹⁰ This slightly deference could be probably due to difference in method, access and capacity of the facility and difference in study time can also affect the market price.

In this study, the estimated average hospital direct cost per year was 4,182,972 Eth birr (72.4% of hospital cost), of this the highest expenditure was on ARV drugs with cost 1,665,567.20 (28.8% of hospital cost) followed by diagnostic cost 1,652,942.55 (26.6% of hospital cost) and OI and other medication cost 570,939.50 (9.9% of hospital cost). This would result because of most of the HIV patients under ARV therapy and they are frequently visited at outpatient level.

The remaining hospital average indirect cost per year was 1,596,001 Ethiopian Birr (27.62%); of these, the largest expense 963,789.17 Eth birr (16.7%) were covered by recurrent cost and 10.9% were capital cost. The indirect cost was accounted for 21.7% of the hospital total indirect expense.

The mean indirect cost per person per stay of inpatient department was higher 1,905.62 Eth birr (73% of the average person per stay cost at inpatient), of these, a personnel cost was 27%, % goods and service cost 16.4and capital cost 29.5%. The remaining 704.21 Eth birr (27% of the average person per stay cost at inpatient) was direct cost, out of these medication took the higher share (71.6% of direct cost) followed by diagnostic cost (26.2% of direct cost).

The average cost per patient per visit at outpatient for males (308.98 Eth birr) was statistically significantly higher than for females (259.24 Eth birr) ($p < 0.01$). The mean cost of males was increased by 25.71 birr than females at a visit in outpatient, (CI: 95%, 11.10-40.33). And the mean person per year cost at outpatient was significantly associated with the age of patients, ($P < 0.01$). The average person per year cost at outpatient department was increased by 7.31 birr at an increase of age in one year, (CI: 95%, 1.84-12.77). This might be due to males and adults have higher risky behaviors, high health seeking behavior and better financial status than females and children.

The average person cost per year at outpatient department was statistically significantly associated with the frequency of outpatient visit ($p < 0.001$). The costs were increased by 99.27 Eth birr at a unit increase of outpatient visit (CI: 95%; 90.01 – 108.52)

Mean estimates of outpatient person per visit cost for patients on ARV therapy 295.19 Eth birr (USD17.84) and pre ART 196.20 Eth birr (USD11.85) were lower than reports from south Africa (USD 19.33 and 18.92).²¹ The annual average person cost of ART patients 1,460.27 Eth birr (USD 88.23) was lower than that reported in Haiti (USD 982).²⁵ This probably is because of medium income countries are at higher level of general cost than Ethiopia.

The average outpatient annual costs of treating HIV patients on ARV therapy (1,460.27 Eth birr) and AIDS stage patients (1548.28 Eth birr) were significantly higher than those for pre ART (447.77 Eth birr), and none AIDS stage HIV positive patients (884.40 Eth birr) ($p < 0.001$). The average person per year cost increased by 328.73 Eth birr for AIDS cases and 733.76 Eth birr for patient on ART than None AIDS stage HIV positive and pre ART patients respectively, (CI: 95%; 137.06 - 520.40, 480.75 – 986.76)

Assessment of the average person per year cost of HIV AIDS care and treatment received at outpatient based on their CD4 T Lymphocytes count revealed that higher expenditure 1,805.75 Eth birr was for < 200 cells/mm³ followed by 1,174.74 Eth birr for 200 - 499 cells/mm³ and the remaining 829.36 Eth birr for > 500 cells/mm³ T Lymphocytes count. The mean cost difference between the CD4 count of HIV AIDS patients was statistically significant ($p < 0.05$). The costs decreased by 477.75 Eth birr at an increase of CD4 count from the lowest category to the next (< 200 to 200-499 or > 500 cells/mm³), (CI: 95%; 394.32 – 561/18). This significant difference could be probably because the severity of the disease caused higher cost for management.

The mean person per year cost of patients who remained on ART care was 1,551.75 Eth birr (USD93.76), this finding is lower compared to a study done in Haiti USD 982.²⁵ The costs were significantly higher for patients who remained on ART compared with those who died 1016.56 Eth birr or were lost to follow up 672.67 Eth birr ($P < 0.01$); this could be due to additional days of treatment.

The average person per stay cost were 2,901.70 Eth birr (USD175.33) in medical ward similar with the lower cost USD 174.23-357.01 (Zimbabwe dollar 6,708-13,745) study in Zimbabwe Governmental hospitals.¹⁶ The average person per day cost of inpatient care was 279.75 Eth birr (USD16.90) and medical ward 268.44 Eth birr (USD16.22). This finding is lower than USD 27.01-41.82 in different medical ward in Zimbabwe Governmental hospitals¹⁶ and 30.84 USD for average person per inpatient day study done in shiraz, Iran,²². The average person per stay cost of HIV AIDS care and treatment at inpatient was increased by a cost of 155.18 Eth birr at increment of one day inpatient stay.(CI: 95%; 141.05-169.31)

There are large differences in costs between patients depending on their stage of HIV AIDS, CD4 count, ARV therapy, frequency of outpatient visit and age of the patient. The inpatient costs are significantly higher for patients with AIDS, higher HIV stage, higher rate of hospitalization and longer length of stay ($p < 0.05$).

The average costs of HIV AIDS patients who receive care and treatment at outpatient was higher with increased age, highest outpatient visits and the patient's condition under the advancement of disease like clinical AIDS, lower CD4 count and patients on ARV therapy appeared to be higher hospital expenditure, ($P < 0.001$).

8. Limitation

It is important to note that this type of study relies on patient chart recorded medical history and thus the accuracy and completeness of medical records is open to some questions and thus further work is required to address the gaps. The hospital cost of HIV/AIDS care and treatment was calculated under incomplete hospital service (the hospital has no full staff, equipment, supplies, investigations and drugs) which can under-estimate the cost. Intangible or opportunity costs, Patient and societal cost also are not included in this study.

9. CONCLUSIONS

In spite of its limitations, the study highlighted the profile of hospital HIV AIDS cost and results may have direct application for program planning. The following conclusions can be made from the study.

- Health care for HIV AIDS patients was provided free and financed by the hospital for an average 5,778,972.8 Eth birr annually. The highest hospital expenditure was outpatient services (80.3%) and direct cost (72.4%). The costs of HIV/AIDS Care and treatment increase the burden and pressure on hospitals.
- There is a shift in resource utilization from inpatient hospital admission towards outpatient services and ARV therapy.
- One of the most obvious consequences of HIV/AIDS patients are the increased occupancy of hospital beds (17.3% of hospital admission days) suggesting that only 82.7 % of the admission days are for all other diseases in the hospital. It appears that there is a lot of concern that patients with HIV are competing with the non-HIV infected patients in a resource limited areas
- Patients with more advanced diseases were more frequent outpatient visitors, with high rate of hospitalization and longer hospital stay. This indicated that the hospital costs of HIV/AIDS rise with the severity of the illness.
- Frequency of outpatient visit, rate of hospitalization, length of stay, HIV staging, CD4 count, ARV therapy and age of the patients were major predictors of hospital HIV AIDS cost.

- The findings of the study indicate that the difference among the predictors could be attributed to higher direct costs of outpatient (ARV Drugs, OI drugs and diagnostic cost) and also increased frequency of outpatient visit as well as high rate of hospitalization and longer lengths of inpatient hospital stay for HIV/AIDS patients. Therefore, the impact on hospital service could be affecting the quality of health service.

10. RECOMMENDATIONS

Based on the results the recommendations are as follows:

1. Adigrat hospital should improve the quality of medical care, Careful adherence counseling and monitoring for early identification and appropriate treatment of opportunistic infections and HIV related advanced diseases and minimize the frequency of outpatient visit, inpatient admissions and longer hospital stay.
2. Tigray National Regional Health Bureau expand outpatient clinics and cascade the outpatient HIV AIDS care and treatment to other facilities to minimize hospital burden.
3. Tigray National Regional State and TRHB design programs that allow hospitals to receive supplemental reimbursement for a comprehensive HIV/ AIDS care and treatment.
4. Further study covering wider area is vital to substantiate the findings of this study.

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Annexes

Checklist for data obtained from patient chart and registers

- 101** ID number of the chart _____
- 102** Age of patient/client _____ years
- 103** Sex of patient/client 0. Female 1. Male
- 104** Address of the patient/client 1. Urban 2. Rural 3. Other (specify) _____
- 105.** Marital statuses
1. Single/Never married 2. Married 3. Separated 4. divorced 5. widow/widower
- 106.** Educational status of patient/client
1. Illiterate/ No education 2. Reading and Writing 3. Primary educations.
4. Secondary education 5. Tertiary education
- 107.** Religion 1. Muslim 2. Orthodox 3. Protestant 4. Catholic 5. other
- 108.** Occupation of the patient/client
1. teacher 2. health worker 3. other gov. employee _____ 4. merchant
5. driver 6. house wife 7. commercial sex worker 8. bar owner
9. student 10. farmer 11. jobless 12. military 13. other (specify) _____
- 109** Frequency of **outpatient Visit** in the past one year _____ times
- 110.** Frequency of **inpatient admission** in the past one year _____ times
- 111.** Diagnose /Type of disease/ Opportunistic infections/:
- | | | | |
|------------------------------|------------|---------------------------------|----------------------|
| 1. Pulmonary tuberculosis | 1 yes 2 no | 2. Extra Pulmonary tuberculosis | 1 yes 2 no |
| 3. Chronic diarrhea | 1 yes 2 no | 4. CNS toxoplasmosis | 1 yes 2 no |
| 5. Oropharyngeal candidacies | 1 yes 2 no | 6. Pneumonia | 1 yes 2 no . |
| 7. PCP | 1 yes 2 no | 8. Meningitis | 1 yes 2 no |
| 9. Gastroenteritis | 1 yes 2 no | 10. Encephalitis | 1 yes 2 no |
| 11. Liver disease | 1 yes 2 no | Other (specify) | 12. _____ 1 yes 2 no |
| 13. _____ | 1 yes 2 no | 14. _____ | 1 yes 2 no |
| 15. _____ | 1 yes 2 no | 16. _____ | 1 yes 2 no |
- 112.** Stage of HIV AIDS patients:
1. Stage one 2. Stage two 3. Stage three 4. Stage four
- 113.** Current status of ART patients
1. Currently on ART 2. Death 3. Drop out/lost 4. Transfer out 5. Others
- 114.** Patient admission Wards 1. MW 2. PW 3. SW 4. Gyn ward 5. DR 6. No Admission
- 115.** Length of hospital stays in day's _____
Date of admission _____ Date of Discharge _____
- 116.** Outcome of inpatient admitted patient discharge from hospital
1. Improved 2. Dead 3. Not improved

200. Laboratory tests performed

	Laboratory tests	No of test done Tally		Total test		Unit cost	Total cost		Remark
		OPD	inpt	OPD	inpt		OPD	inpt	
201	HIV test - VCT								
202	HIV test - PITC								
203	WBC count & diff. count								
204	RBC								
205	Platelets								
206	CBC								
207	Blood chemistry								
208	ESR								
209	Hemoglobin								
210	Hematocrit								
211	Blood group & Cross match								
212	Blood sugar								
213	Blood film								

... 200. Laboratory tests performed

	Laboratory tests	No of test done Tally		Total test		Unit cost	Total cost		Remark
		OPD	inpt	OPD	inpt		OPD	inpt	
214	Blood Renal functional test								
215	Blood Liver functional test								
216	Hepatitis, or H - pylori								
217	Other serological tests								
218	CD4 count								
219	AST								
220	ALT								
221	Creatinen								
222	BUN								
223	Sputum-test								
224	Urine analysis								
225	Stool analysis/test								
226									
227									
228									
229									
230	X-ray								
231	Ultrasound								

250. CD4 count and Hemoglobin results

		Episode 1	Episode 2	Episode 3	Episode 4	
251	CD4 cells count/ mm ³					
261	Hemoglobin result					

300. Examination, Medication consumption and intervention cost

	Types of service cost/ medication	qty used		Unit cost	Total cost		Remark
		OPD	Inpt		OPD	Inpt	
I	Examination cost (____ No of OPD visit)						
II	Medication cost						
	A)ART drugs (strength, dosage, form)						
1							
2							
3							
4							
5							
	B) OI and other medications(Dosage, Strength &Qty)						
1							
2							
3							
4							
5							
6							
7							
8							

... 300. Examination and Medication consumption cost

	Types of service cost/ medication	qty used		Unit cost	Total cost		Remark
		OPD	Inpt		OPD	Inpt	
	C) Medical supplies						
1							
2							
3							
4							
5							
6							
7							
III	Medical procedures/ Interventions						
1							
2							
3							
4							
5							
6							
7							

400. Summary Costs for the patients

	Type of costs	Total cost		Cost per OPD visit	Cost per inpatient day	Remark
		Total OPD visit	Inpatient stay			
I.	Direct cost					
1	Examination cost (___ No of OPD visit)					
2	Diagnostic cost					
3	Medication cost					
3.1	1 st line ART drugs					
3.2	2 nd line ART drugs					
3.3	OI drugs					
3.4	Medical supply cost					
4	M/procedure or intervention					
II.	Indirect cost					
4	Total over head cost					
4.1	Personnel services cost					
4.2	Goods & services					
4.3	Construction & maintenances					
4.4	Other over head					
5	Capital cost					
	Total cost					

Reviewer's name & signature _____

Supervisor's name & signature _____

Date _____

Cost data collection formats

Indirect cost (overhead cost, Capital cost) (annual cost/annual output)

S. no	Budget code	Government source	Retained revenue	Non-Gov'tal source			Remark
				A	B	C	
1	Recurrent						
1.1	6100 Personnel services						
a	Salary of administrative, HRM, daily cash collectors, kitchen, laundry, guards, garden, metal work shop, medical record, pharmacy, laboratory, radiographer staff, Triage etc						Total cost/total output(patient days), For inpatient & OPD
b	Salary of each inpatient ward staff						Total cost of each ward/each ward output
c	Salary of Outpatient staff/ For all OPD Visit						Total cost/OPD output
d	Salary of ART staff/ For all HIV +ve Visit						Total cost/ART output
e	Salary of laboratory staff/ For all Lab. Tests done						Total cost/Lab. Output
1.2	6200 Goods & Services						
1.3	6300 Fixed Assets & Construction						
1.4	6400 Other Payments						
2	Capital cost						
2.1	buildings						
2.2	Furniture						
2.3	Equipment						
2.4	Vehicle						

Dummy table for Data obtained from Inpatient Ward and OPD Registration book

	Characteristics	Frequency	Remark
<i>I</i>	<i>Inpatient</i>		
1	Total Number of patients admitted to Inpatient		
2	Sex Male		
	Female		
3	Age < 15		
	15-24		
	25-34		
	35-44		
	45-54		
	55-64		
	65+		
4	Diagnose a)		
	b)		
	c)		
	d)		
	e)		
	f)		
	g)		
	h)		
5	Total number of HIV tested patients admitted to Inpatient		
6	Total number of patients which are not tested for HIV from patients admitted to Inpatient		
7	Number of HIV +ve/ infected patients admitted to Inpatient		
8	Outcome of patients admitted to Inpatient		
	Improved		
	Death		
	No change		
	Total no of Discharge patients		
9	Outcome of HIV infected patients admitted to Inpatient		
	Improved		
	Death		
	No change		
	Total no of Discharge patients		
10	Length of stay for patients admitted to Inpatient (MW, PW,SW, GynW, DR)		
	Length of hospital stay for HIV infected patients		
	Length of hospital stay for HIV uninfected patients		
<i>II</i>	<i>Outpatient Department</i>		
1	Total number of new patients seen in outpatient		
2	Total number of patients tested for HIV in outpatient		
3	Number of HIV +ve test result of patients in outpatient visit		

The Hospital HIV/AIDS cost was calculated using the following formula

7. Diagnostic cost = OPD diagnostic cost + IPD diagnostic cost

$$8. \text{ OPD diagnostic cost per year} = \frac{\text{Mean OPD diagnostic cost per patient per OPD visit} \times \text{Total number of OPD visits of HIV /AIDS patients in Adigrat hospital from 2009 to 2010 G.C.}}{2}$$

$$9. \text{ Mean diagnostic cost per patient per OPD visit} = \frac{\text{Summation of the costs of laboratory tests, Imaging and other diagnostic cost of all OPD visits of HIV/AIDS patients reviewed in Adigrat hospital from 2009 to 2010 G.C.}}{\text{Total number of OPD visits of HIV /AIDS patients in Adigrat hospital from 2009 to 2010 G.C.}}$$

$$10. \text{ Total ARV drug cost per year in Adigrat hospital} = \frac{\text{Mean ARV drug cost per patient per month} \times \text{Total number of OPD visits (months) of HIV/AIDS patients under ARV therapy in Adigrat hospital from 2009 to 2010 G.C.}}{2}$$

$$11. \text{ Mean ARV drug cost per patient per OPD visit (month)} = \frac{\text{Summation of the costs of ARV drugs of all OPD visits (months of treatment) of HIV AIDS patients reviewed in Adigrat hospital from 2009 to 2010 G.C.}}{\text{Total number of OPD visits (months of treatment) of HIV /AIDS patients in Adigrat hospital from 2009 to 2010 G.C.}}$$

$$12. \text{ Indirect cost of OPD} = \text{Personnel cost at OPD} + \text{Goods and service cost at OPD} + \text{Capital cost of OPD}$$

$$13. \text{ Personnel cost per year at outpatient department} = \frac{\text{Mean personnel cost per patients per OPD visit} \times \text{Total number of OPD visits of HIV/AIDS patients in Adigrat hospital from 2009 to 2010 G.C.}}{2}$$

$$14. \text{ Average personnel cost per patient per OPD visit} = \frac{\text{Total personnel costs (salary, Staff pension, Top up and duty allowances and other benefits) in the departments of Adigrat hospital from 2009 to 2010 G.C.}}{\text{Total number of service output (OPD visits or inpatient days) of the same department in Adigrat hospital from 2009 to 2010 G.C.}}$$

$$15. \text{ Capital cost per person per OPD visit} = \frac{\text{Cost of the building's of the hospital departments} \times 5\% \text{ depreciation} \times 2(\text{ years}) + \text{Cost of furniture, medical equipment, and vehicle of a department} \times 10\% \text{ depreciation} \times 2(\text{ years})}{\text{Total number of service out put (OPD visits or inpatient days) of the same department in Adigrat hospital from 2009 to 2010 G.C.}}$$

$$16. \text{ Indirect cost at OPD per year} = \frac{\text{Mean indirect cost of HIV infected patients per person per OPD visit} \times \text{Total number of OPD visits of HIV/AIDS patients in Adigrat hospital from 2009 to 2010 G.C.}}{2}$$

17. Inpatient cost per year = Direct Cost at IPD/year + Indirect cost at IPD/year

18. Inpatient HIV/AIDS cost per year = $\frac{\text{Average inpatient Cost per person per day} + \text{Total hospital length of stay in days of HIV/AIDS patients receive care and treatment at IPD in Adigrat hospital from 2009 to 2010}}{2}$

19. Average inpatient Cost per person per day = Summation of the mean direct cost per person per IPD day and the mean indirect cost per person per IPD day

19. Direct cost of inpatient per year = Summation of direct costs in all inpatient wards (Medical ward, pediatric ward, surgical ward, obstetrics and gynecological ward) in Adigrat hospital from 2009 to 2010 G.C.

20. Cost of inpatient Wards per year = $\frac{\text{Summation of Mean direct costs per person per IPD day (Diagnostic, OI and other medication and medical supplies cost) and mean indirect cost per person per IPD day at inpatient ward in Adigrat hospital from 2009 to 2010 G.C.} \times \text{Total length of stay in days of HIV/AIDS patients receive care and treatment at the same inpatient ward in Adigrat hospital from 2009 to 2010 G.C.}}{2}$

21. Diagnostic cost of inpatient per year = $\frac{\text{Mean Diagnostic cost of HIV infected patients per person per IPD day} \times \text{Total length of stay in days of HIV/AIDS patients receive care and treatment at IPD in Adigrat hospital from 2009 to 2010 G.C.}}{2}$

22. Mean diagnostic cost per patient per IPD days of HIV/AIDS patients = $\frac{\text{Summation of the costs of laboratory tests, Imaging and other diagnostic cost of all IPD days of HIV/AIDS patients reviewed during the study in Adigrat hospital from 2009 to 2010 G.C.}}{\text{Total number of IPD days of HIV/AIDS patients in Adigrat hospital from 2009 to 2010 G.C.}}$

24. Direct cost of inpatient per year = $\frac{\text{Direct cost per person per inpatient day} \times \text{Total length of stay in days of HIV/AIDS patients receive care and treatment at IPD in Adigrat hospital from 2009 to 2010 G.C.}}{2}$

23. Indirect cost per person per inpatient day = $\text{Personnel cost per person per inpatient day} + \text{Goods and service cost per person per inpatient day} + \text{Capital cost per person per inpatient day}$

24. Indirect cost of inpatient per year = $\frac{\text{Indirect cost per person per inpatient day} \times \text{Total length of stay in days of HIV/AIDS patients receive care and treatment at IPD in Adigrat hospital from 2009 to 2010 G.C.}}{2}$

Unit Costs of personnel expenses at outpatient and inpatient in Adigrat hospital, 2009-2010

S. no	Standard step down cost	2009G.c. Annual expense of personnel cost	2010G.C. Annual expense	Total cost 2009-2010	Two years service output of Adigrat hospital	Cost/ pt/ OPD visit	Cost Of OPD visit for inpatient admission	Cost/pt/ inpatient day during admission	Remark		
i	Total Admin	545435.28	668036.72	1213472	331393	3.661731	3.66173094	14.6469	Total Admin expenses/Total all OPD visit + (Total inpatient days * 4) (1 inpatient day=4 OPD visit based on FMOH Planning directorate)		
ii	OPD	636849.58	709830.59	1346680.17	110917	12.14133	12.1413324		OPD expense/ OPD service output		
	MR Triage X-Ray	270795.6	270795.6	541591.2	205276	2.638356	2.64				
iii	Laboratory	361113.4	209701.92	570815.32	205276	2.780721		2.78072	Expenses/(OPD+ inpatient days)		
iv	Pharmacy	183331.52	231464.4	414795.92	205276	2.020674		2.02067	Expenses/(OPD + inpatient days)		
v	ART	217305.71	283617.59	500923.3	40532	12.35871		0	ART Expense/ ART pts/ Visit		
vi	MW	362189.28	377809.44	739998.72	21380			34.6117	Expense/ MW inpatient days		
vii	PW	244160.4	264970.32	509130.72	7357			69.2036	Expense/ PW inpatient days		
viii	DR	235077.21	280547.05	515624.26	4819			106.998	Expense/ Obstetric Ward inpatient days		
ix	Gynecology ward	122847.04	142475.37	265322.41	1962			135.231	Expense/ Gynecology Ward inpatient days		
xi	SW	221887.28	299631.93	521519.21	6521			79.9753	Expense/ SW inpatient days		
xii	OR	190844.21	267379.1	458223.31	1436			319.097	expense/ major surgery + C/S		
xiii	Eye clinic	77719.2	77719.2	155438.4	5120	30.35906		30.3591	Eye clinic expense/ eye clinic service output		
xiv	physiotherapy	52050.24	52050.24	104100.48	6668	15.61195		15.612	expense/ physiotherapy service output		
	Total	3721605.95	4136029.47	7857635.42							
	Personnel cost	Admin	MR X-ray	Lab	Pharmacy	ART Dep't	Total				
	OPD ART Pt.	3.66	2.64	2.78	2.02	12.36	23.46				
		Admin	OPD	MR X-ray	Total	Admin	Lab	Pharmacy	Ward cost	Total	
	Medical Ward	3.66	12.14	2.64	18.44	14.65	2.78	2.02	34.61	54.06	
	PW	3.66	12.14	2.64	18.44	14.65	2.78	2.02	69.2	88.65	
	DR	3.66	12.14	2.64	18.44	14.65	2.78	2.02	107	126.45	
	Gynecology	3.66	12.14	2.64	18.44	14.65	2.78	2.02	135.23	154.68	
	SW	3.66	12.14	2.64	18.44	14.65	2.78	2.02	79.98	99.43	
	OR								319.1		
		Cost per inpatient day									
	Personnel cost	Cost/ OPD Visit	MW	PW	DR	Gynecology	SW	OR	Eye	P/therapy	
	Total cost/visit(day)	18.44	54.06	88.65	126.45	154.68	99.43	319.09	30.36	15.61	

Goods and service (utility) expenses by line Items in Adigrat hospital, 2009-2010

Budget by item of expenditure	2009 G.C.				2010 G.C.				2009-2010 G.C.			
	Treasury	Internal revenue	Aid (Donors & Carter)	Total	Treasury	Internal revenue	Aid (Donors & Carter)	Total	Treasury	Internal revenue	Aid (Donors & Carter)	Total
6211 Uniforms, clothing, Bedding	96501.59	27191.38	8855.38	132548.3	44999.99	4278.2	5165.64	54443.83	141501.58	31469.58	14021.02	186992.13
6212 Office supplies	22731.76	19395.51	58532.2	100659.5	17308.01	25316.98	44969.34	87594.32	40039.77	44712.49	103501.54	188253.82
6213 Printing	63054.82	28553.09	0	91607.92	50358.43	14796.13	0	65154.56	113413.25	43349.22	0	156762.48
6216 Food	344159.1	0	0	344159.1	292526.8	0	0	292526.8	636685.9	0	0	636685.9
6217 Fuel And lubricants	44069.95	47483.56	20784.76	112338.3	43947.45	72445.15	29941.76	146334.4	88017.4	119928.71	50726.52	258672.7
6218 Other materials & supplies	71114.5	576	10999.75	82690.26	61485.85	30000	3208.335	94694.19	132600.35	30576	14208.085	177384.45
6219 Miscellaneous equipment	5219.5	2230.24	0	7449.74	346	405.25	0	751.25	5565.5	2635.49	0	8200.99
6231 Peridium	12741.74	6872.775	5700	25314.52	13482.96	9761.625	5850	29094.59	26224.7	16634.4	11550	54409.11
6232 Transport Fees	13651.8	607.07	0	14258.87	1380.1	783.67	0	2163.77	15031.9	1390.74	0	16422.64
6233 Official Entertainment	1200	1900	10000	13100	600	1900	2916.665	5416.665	1800	3800	12916.665	18516.665
6241 Maintenance and repair of vehicles & other transport	38224.89	7080	821	46125.89	31246.89	51347	821	83414.89	69471.78	58427	1642	129540.78
6243 Maintenance and repair of plant, and machinery & equipment	3450	26610.3	0	30060.3	950	350	0	1300	4400	26960.3	0	31360.3
6244 Maintenance and repair of buildings Furnishing & fixtures	80096.68	150414.6	0	230511.3	48270.18	131900.8	0	180171	128366.86	282315.4	0	410682.3
6251 Contracted professional services	3301.25	7011	0	10312.25	1815	6948.5	0	8763.5	5116.25	13959.5	0	19075.75
6253 Advertising	3171	737.825	0	3908.825	1538	10	0	1548	4709	747.825	0	5456.825
6255 Freight	4786.25	10738.85	0	15525.1	2986.25	9848.75	0	12835	7772.5	20587.6	0	28360.1
6256 fees and charges	1928.8	1509.28	91.45	3529.53	1533.47	3387.105	182.9	5103.475	3462.27	4896.385	274.35	8633.005
6257 Electricity charges	83567.91	66.445	0	83634.35	74535.91	0	0	74535.91	158103.82	66.445	0	158170.26
6258 Telecommunication charges	11209.14	816.71	0	12025.85	10070.06	0	0	10070.06	21279.2	816.71	0	22095.91
6259 Water and other utilities	16783.18	1179	0	17962.18	4999.93	0	0	4999.93	21783.11	1179	0	22962.11
6214 and/or other IP materials	0	53161.25	89544.87	142706.1	0	53161.25	89544.87	142706.1	0	106322.5	179089.74	285412.2
6400 Other Payments (6417 Grant and gratitude to individuals)	0	7100	0	7100	0	7100	0	7100	0	14200	0	14200
Materials provide/ support freely	0	0	153156.1	153156.1	0	0	153156.1	153156.1	0	0	306312.2	306312.2
6200 Goods & Services Total	920963.9	401234.9	358485.5	1680684	704381.3	423740.4	335756.6	1463878	1625345.2	824975.3	694242.1	3144562

Goods and service (utility) expenses of Adigrat hospital, 2009-2010

Goods and service expense of Adigrat hospital, 2009 – 2010 G.C.					
	Treasury	Internal revenue	Aid (Donors & Carter)	Total	
2009 G.C.	920963.84	401234.89	358485.5	1680684.23	
2010G.C.	704381.3	423740.4	335756.6	1463878.3	
Total	1625345.14	824975.29	694242.1	3144562.53	

Unit Costs of Goods and services (utility) at outpatient and inpatient in Adigrat hospital, 2009-2010

	Goods and services expense of Adigrat hospital					Expense/service output
	Total expense	Total service output	Cost/ pt/ OPD visit	Cost Of OPD visit for inpatient admission	Cost/pt/ inpatient day during hospital inpatient stay	
6200 Goods & Services Total	3144563	331393	9.488924027	9.488924027	37.95569611	Total Utility expenses/Total OPD visit + (Total inpatient days * 4)
Goods & service						
Cost of OPD patients (Per patient per visit)			9.49			
Cost of Inpatient Admitted patients (Per patient per Day)			37.96			

Unit Costs of Furniture, Medical equipment and vehicle expenses at outpatient and inpatient in Adigrat hospital, 2009-2010

		Furniture's	Medical equipment	Total	Depreciation 10% *2 Year (20%)	Service Output (2009, 2010)	Cost/ pt/ OPD visit	Cost Of OPD visit for Inpatient admission	Cost/pt/ Inpatient day during admission
1	Administration including vehicle	3244013	0	3244013	648802.6	331393	1.957804	1.96	7.84
2	Central Lab & pharmacy	146997	1026828	1173825	234765	205276	1.143655		1.14
3	OPD	124787.1	1663925	1788712	357742.5	110917	3.225317	3.23	
4	ART	127134	9478.4	136612.4	27322.48	40532	0.674097		
5	physiotherapy	18450	43188	61638	12327.6	6668	1.84877		
6	Eye clinic	24775	193953.9	218728.9	43745.78	5120	8.544098		
7	Medical Ward	104963	296776	401739	80347.8	21380			3.758082
8	Pediatric Ward	52322.1	51712	104034.1	20806.82	7357			2.828166
9	Surgical Ward	101213	9187.2	110400.2	22080.04	6521			3.38599
10	Gynecology Ward	39945		39945	7989	1962			4.071865
11	Obstetric Ward DR	56074.25	415115	471189.3	94237.85	4819			19.55548
12	OR	37760	658413	696173	139234.6	1436			96.96003
	Total	4078433	4368577	8447010	1689402				
	Furniture and M. equipment	Admin	OPD	Lab & ph	ART Dep't	Total			
	OPD ART Pt.	1.96	3.23	1.14	0.67	7			
		Admin	OPD	Lab & ph	Total	Admin	Lab & pharmacy	Ward cost	Total
	Medical Admitted Pt's	1.96	3.23	1.14	6.33	7.84	1.14	3.76	12.74
	PW	1.96	3.23	1.14	6.33	7.84	1.14	2.83	11.81
	DR	1.96	3.23	1.14	6.33	7.84	1.14	19.56	28.54
	Gynecology Ward	1.96	3.23	1.14	6.33	7.84	1.14	4.07	13.05
	SW	1.96	3.23	1.14	6.33	7.84	1.14	3.39	12.37
					Cost of Admission/pt/day				
	Capital Cost	Cost of OPD/pt/Visit	Cost of ART/pt/Visit	MW	PW	DR	Gynecology	SW	OR
	Furniture, Medical equipment and vehicle	7	7	12.74	11.81	28.54	13.05	12.37	96.96

Unit Costs of Building expenses at outpatient and inpatient in Adigrat hospital, 2009-2010

Buildings	Admin	OPD	Lab & pharmacy	ART Dep't	Total					
OPD ART Pt.	3.18	3.23	0.86	3.29	10.56					
Inpatient cost per person per day										
Inpatient cost/pt/day	Admin	Lab & pharmacy	Ward cost	Total						
Medical Ward (MW)	12.72	0.86	41.87	55.45						
Pediatric Ward (PW)	12.72	0.86	38.74	52.32						
Delivery service (DR)	12.72	0.86	25.2	38.78						
Gynecology Ward(Gyn W)	12.72	0.86	61.91	75.49						
Surgical Ward (SW)	12.72	0.86	56.04	69.62						
Cost of Admission/pt/day										
Capital Cost	Cost of OPD/pt/Visit	Cost of ART/pt/Visit	MW	PW	DR	GynW	SW	OR	Eye	Physiot herapy
Building Cost of OPD/ Pt/ Visit or Cost of Admission/pt/day	10.56	10.56	55.45	52.32	38.78	75.49	69.62	195.96	20.9	7.45

Unit Costs of capital cost at outpatient and inpatient in Adigrat hospital, 2009-2010

	Cost of Admission/pt/day									
Capital Cost	Cost of OPD/pt/Visit	Cost of ART/pt/Visit	MW	PW	DR	GynW	SW	OR	Eye	Physiotherapy
Building Cost of OPD/ Pt/ Visit or Cost of Admission/pt/day	10.56	10.56	55.45	52.32	38.78	75.49	69.62	195.96	20.9	7.45
Furniture, Medical equipment and vehicle	7	7	12.74	11.81	28.54	13.05	12.37	96.96	8.54	1.85
Total	17.56	17.56	68.19	64.13	67.32	88.54	81.99	292.92	29.4	9.3

Unit costs of hospital indirect cost at outpatient and inpatient department in Adigrat hospital from 2009 to 2010 G.C.									
Type of cost	Cost of OPD/pt/ visit	Cost per inpatient day							
		MW	PW	DR	Gynecology	SW	OR	Eye	Physiotherapy
Personnel cost	18.44	54.06	88.65	126.45	154.68	99.43	319.09	30.36	15.61
Goods & service	9.49	37.96	37.96	37.96	37.96	37.96	37.96	37.96	37.96
Building Cost	10.56	55.45	52.32	38.78	75.49	69.62	195.96	20.9	7.45
Furniture, Medical equipment and vehicle cost	7	12.74	11.81	28.54	13.05	12.37	96.96	8.54	1.85
Capital Cost	17.56	68.19	64.13	67.32	88.54	81.99	292.92	29.4	9.3
Indirect cost	45.49	160.21	190.74	231.73	281.18	219.38	649.97	97.76	62.87

Direct and indirect unit Cost of HIV/AIDS care and treatment at outpatient and inpatient department in Adigrat hospital, 2009-2010

Unit costs of direct cost for patients on ART and pre ART at outpatient and inpatient wards in Adigrat hospital, 2009-2010			
	Pre ART	ART	Total
OPD Diagnostic cost/pt/visit	121.66	53.57	63.63
OPD ART Cost/pt/visit	0	161.08	161.08
OPD OI Drug cost/ pt/visit	17.62	20.05	19.67
OPD Medication cost/pt/visit	17.62	180.53	155.62
OPD Direct cost/pt/visit	154.28	249.7	234.26
Total OPD Indirect cost/pt/visit	45.49	45.49	45.49
Total OPD cost/pt/visit	199.78	295.19	
Inpatient Diagnostic cost/pt /day	103.19	32.11	36.04
Inpatient OI Cost/pt/day	75.87	59.35	61.36
Inpatient Direct cost/pt/day	186.26	95.46	102.65
Total Inpatient Indirect cost/pt/visit	209.72	209.72	209.72
Total Inpatient direct and Indirect cost/pt/visit			312.37

Table. Direct and indirect cost of ART and Pre ART HIV/AIDS patients receive care and treatment at Outpatient department in Adigrat hospital, 2009-2010 (Total OPD cost = Average cost per person per visit * Total OPD visits of HIV/AIDS patients in Adigrat hospital from 2009 to 2010G.C.)																	
Service output				OPD Indirect cost		OPD Direct cost										Total	
ART/Pre ART	2009 G.C.	2010 G.C.	Total Service output (NO of visits)	OPD indirect Cost /pt/visit	Total OPD indirect cost	OPD Diagnostic cost/pt/visit	Total OPD Diagnostic cost	OPD ART Cost/pt/visit	Total ART cost	OPD Drug cost/pt/visit	Total OPD OI cost	OPD Medication cost/pt/visit	Total OPD Medication cost	OPD Direct cost/pt/visit	Total OPD Direct cost	OPD Direct & Indirect cost/pt/visit	Total OPD Direct & Indirect cost
Pre ART	7600	8308	15908	45.49	723654.9	121.66	1935367	0	0	17.6	280299	17.62	280299	154.29	2454445	199.78	3178100
On ART	9227	11453	20680	45.49	940733.2	53.58	1108034	161.08	3331134	20.1	414634	180.53	3733360	249.7	5163796	295.19	6104529
Total	16827	19761	36588	45.49	1664388		3043402		3331134		694933		4013659		7618241		9282629

Inpatient direct and indirect Cost																
Total inpatient hospital cost = (Average patient per day cost * Total length of stay for HIV AIDS pts from 2009-2010 G.C.)																
Total length of stay for HIV AIDS patients				Indirect cost (Average cost/person/day* Total hospital length of stay)					Direct cost (Average cost/person/day* Total hospital length of stay)						Total inpatient direct & indirect inpatient	
	Inpatient days in 2009 G.C	Inpatient days in 2010 G.C	Total inpatient days	OPD indirect Cost 45.49/pt/visit	Indirect Cost/pt/inpatient days	Inpatient indirect cost	Total inpatient indirect cost	Average indirect cost/inpatient day	Inpatient Diagnostic cost/pt/day	Inpatient Diagnostic Direct cost	Inpatient OI Cost/pt/day	Inpatient OI Direct Cost	Inpatient Direct cost/pt/day	Inpatient Total Direct cost	Total inpatient direct & indirect cost/pt/day	Total inpatient direct & indirect cost
MW	3506	3038	6544	297686.6	160.21	1048414	1346101	205.7	36.04	235845.8	61.36	401539.8	102.65	671741.6	308.35	2017842.4
PW	177	218	395	17968.55	190.74	75342.3	93310.85	236.23	36.04	14235.8	61.36	24237.2	102.65	40546.75	338.88	133857.6
SW	53	50	103	4685.47	219.38	22596.14	27281.61	264.87	36.04	3712.12	61.36	6320.08	102.65	10572.95	367.52	37854.56
GW	27	24	51	2319.99	281.18	14340.18	16660.17	326.67	36.04	1838.04	61.36	3129.36	102.65	5235.15	429.32	21895.32
DR	91	100	191	0	231.73	44260.43	44260.43	231.73	36.04	6883.64	61.36	11719.76	102.65	19606.15	334.38	63866.58
Total	3854	3430	7284	322660.6		1204953	1527614	209.7218	36.04	262515.4	61.36	446946.2	102.65	747702.6	312.37184	2275316.5

Table. Indirect cost of HIV/AIDS patients receive care and treatment at Outpatient department and inpatient wards in Adigrat hospital, 2009-2010													
Summary Costs	OPD Cost			Medical Ward					Pediatric Ward				
	Cost per OPD visit	Total OPD visit	Total OPD Visit Cost	Cost/ IPD/day MW	TLD in MW	Cost of OPD visit	Cost in MW	Total cost of MW	Cost per inpatient day PW	PW TLD	Cost of OPD visit	Cost in PW	Total cost of PW
Personnel services cost	18.44	36588	674682.72	54.06	6544	120671.36	353768.64	474440	88.65	395	7283.8	35016.75	42300.55
Goods & services	9.49	36588	347220.12	37.96	6544	62102.56	248410.24	310512.8	37.96	395	3748.55	14994.2	18742.75
Over head cost/pt	27.93	36588	1021902.84	92.02	6544	182773.92	602178.88	784952.8	126.61	395	11032.35	50010.95	61043.3
Capital cost	17.56	36588	642485.28	68.19	6544	114912.64	446235.36	561148	64.13	395	6936.2	25331.35	32267.55
Total Indirect cost /pt	45.49	36588	1664388.12	160.2	6544	297686.56	1048414.24	1346100.8	190.74	395	17968.55	75342.3	93310.85

Table. Indirect cost of HIV/AIDS patients receive care and treatment at Outpatient department and inpatient wards in Adigrat hospital, 2009-2010																
Summary Costs	Surgical Ward						Gynecology Ward						Delivery Room			
	Cost per OPD visit	Cost per inpatient day SW	SW TLD	Cost of OPD visit	Cost in SW	Total cost of SW	Cost per inpatient day Gyn	Gyn TLD	Cost of OPD visit	Cost in Gyn	Total cost of Gyn	Cost per inpatient day DR	TLD in DR	Cost of OPD visit	Cost in DR	Total cost of DR
Personnel services cost	18.44	99.43	103	1899	10241.29	12140.61	154.68	51	940.44	7888.7	8829.12	126.45	191	0	24151.95	24151.95
Goods & services	9.49	37.96	103	977.5	3909.88	4887.35	37.96	51	483.99	1936	2419.95	37.96	191	0	7250.36	7250.36
Total over head cost	27.93	137.39	103	2877	14151.17	17027.96	192.64	51	1424.43	9824.6	11249.07	164.41	191	0	31402.31	31402.31
Capital cost	17.56	81.99	103	1809	8444.97	10253.65	88.54	51	895.56	4515.5	5411.1	67.32	191	0	12858.12	12858.12
Indirect cost	45.49	219.38	103	4685	22596.14	27281.61	281.18	51	2319.99	14340	16660.17	231.73	191	0	44260.43	44260.43

Table. Overhead cost of HIV/AIDS patients receive care and treatment at Outpatient and inpatient department in Adigrat hospital, 2009-2010																
Summary Costs	OPD Cost							Inpatient Cost						Total COST		
	Total Visit or TLD	Personnel cost per OPD visit	Total Personnel cost	Goods & services cost per OPD visit	Total Goods & services cost	Over head cost per OPD visit	Total OPD Over head cost	Personnel cost per IPD day	Total Personnel cost at IPD	Goods & services cost per inpatient day	Total Goods & services cost at IPD	Over head cost per inpatient day	Total inpatient Over head cost	Total OPD & IPD Personnel COST	Total OPD & IPD Goods & services COST	Total OPD & IPD Over head COST
OPD Visit	36588	18.44	674682.72	9.49	347220.12	27.93	1021902.84	0	0	0	0	0	0	674682.72	347220.12	1021902.84
MW	6544	18.44	120671.36	9.49	62102.56	27.93	182773.92	54.06	353768.64	37.96	248410.24	92.02	602178.88	474440	310512.8	784952.8
PW	395	18.44	7283.8	9.49	3748.55	27.93	11032.35	88.65	35016.75	37.96	14994.2	126.61	50010.95	42300.55	18742.75	61043.3
SW	103	18.44	1899.32	9.49	977.47	27.93	2876.79	99.43	10241.29	37.96	3909.88	137.39	14151.17	12140.61	4887.35	17027.96
GW	51	18.44	940.44	9.49	483.99	27.93	1424.43	154.68	7888.68	37.96	1935.96	192.64	9824.64	8829.12	2419.95	11249.07
DR	191	0	0	0	0	0	0	126.45	24151.95	37.96	7250.36	164.41	31402.31	24151.95	7250.36	31402.31
Total cost			805477.64		414532.69		1220010.33		431067.31		276500.64		707567.95	1236544.95	691033.33	1927578.28

Table. Indirect cost of HIV/AIDS patients receive care and treatment at Outpatient and inpatient department in Adigrat hospital, 2009-2010																
	OPD Cost							Inpatient Cost						Total COST		
	Total Visit or TLD	Over head cost per OPD visit	Total Over head cost	Capital cost per OPD visit	Total Capital cost	Indirect cost per OPD visit	Total Indirect cost of OPD	Over head cost per inpatient day	Total Over head cost of inpatient	Capital cost per inpatient day	Total Capital cost of inpatient	Indirect cost per inpatient day	Total Indirect cost of inpatient	Total OPD & IPD Over head COST	Total OPD & IPD Capital COST	Total OPD & IPD indirect COST
OPD Visit	36588	27.93	1021902.84	17.56	642485.28	45.49	1664388.12	0	0	0	0	0	0	1021902.84	642485.28	1664388.12
MW	6544	27.93	182773.92	17.56	114912.64	45.49	297686.56	92.02	602178.88	68.19	446235.36	160.21	1048414.24	784952.8	561148	1346100.8
PW	395	27.93	11032.35	17.56	6936.2	45.49	17968.55	126.61	50010.95	64.13	25331.35	190.74	75342.3	61043.3	32267.55	93310.85
SW	103	27.93	2876.79	17.56	1808.68	45.49	4685.47	137.39	14151.17	81.99	8444.97	219.38	22596.14	17027.96	10253.65	27281.61
GW	51	27.93	1424.43	17.56	895.56	45.49	2319.99	192.64	9824.64	88.54	4515.54	281.18	14340.18	11249.07	5411.1	16660.17
DR	191	0	0	0	0	0	0	164.41	31402.31	67.32	12858.12	231.73	44260.43	31402.31	12858.12	44260.43
Total cost			1220010.33		767038.36		1987048.69		707567.95		497385.34		1204953.29	1927578.28	1264423.7	3192001.98

	Total length of stay for HIV AIDS pts			Remark
	2009 G.C	2010 G.C	Total	
MW	3506	3038	6544	
PW	177	218	395	
SW	53	50	103	
GW	27	24	51	
DR	91	100	191	
Total	3854	3430	7284	

Mean cost of variables at inpatient	Direct and indirect cost of HIV/AIDS patients receive care and treatment per inpatient day and per two years duration at inpatient department in Adigrat hospital, 2009-2010					
Frequency of Inpatient admission	N	Direct cost per person at inpatient/ two years	Indirect cost per person at inpatient/ two years	Total cost per person at inpatient/ two years	Direct cost/pt/day at inpatient	Total cost/pt/day at inpatient
Once	71	730.54	1997.98	2728.52	109.64	303.15
Twice	17	1238.63	2889.94	4128.57	86	253.74
Three times	4	1966.26	7225.76	9192.02	57.84	222.26
Six Times	1	2839.1	7001.76	9840.86	67.6	234.3
Total	93	899.23	2439.68	3338.92	102.64	289.9
patient admission wards						
Medical Ward	67	1081.25	2832.47	3913.72	100.7	268.44
Pediatric Ward	9	482.11	1910.5	2392.62	63.11	262.29
Surgical Ward	4	392.48	1087.55	1480.03	92.9	325.3
Obstetrics Gynecology Ward	2	405.84	1197.73	1603.56	143..05	408.73
Length of inpatient stay						
1 - 5 days hospital stay	27	426.25	570.3	996.55	171.82	394.72
5+ days	66	1092.73	3204.43	4297.16	74.34	247.02
Stage of HIV pts in IPD						
Stage one	3	565.92	1325.65	1891.56	90.05	301.18
Stage two	14	487.2	1218.35	1705.56	150.09	372.02
Stage three	56	956.65	2379.82	3336.47	98.44	278.18
Stage four	20	1076.92	3629.32	4706.23	83.09	263.54
IPD AIDS/ None AIDS pts						
None AIDS	17	501.1	1237.29	1738.38	139.49	359.52
AIDS	76	988.3	2708.64	3696.94	94.4	274.33

Mean cost of HIV AIDS patients receive care and treatment in Adigrat hospital, 2009-2010					
Variables	Direct cost per person/ two years at OPD	Indirect cost per person/ two years at OPD	TOTAL COST per person/ two years at OPD	Total cost/pt/visit at OPD	Direct cost/pt/visit at OPD
SEX					
Females	2190.61	468.48	2656.72	259.24	213.75
Males	2139.46	390.96	2530.43	308.98	263.49
Total	2169.52	436.52	2604.66	279.75	234.26
Age group					
1 -4 year	973.83		1246.77	219.88	174.4
5-14 years	1079.87		1427.73	197.72	152.24
15-44 years	2184.82		2621.43	281.98	236.49
45 - 64 years	2641.68		3121.85	304.31	258.82
Address					
Urban	2286.08	462.87	2746.97	275.96	230.47
Rural	1898.64	375.29	2273.93	288.55	243.06
Marital status					
Single/ Never married	1811.97	366.60	2178.56	279.61	234.12
Married	2121.71	418.56	2540.28	289.35	243.86
Separated, Divorced, Widowed	2422.72	497.17	2915.95	267.44	221.95
Occupation					
Jobless	2100.18	439.08	2539.27	265.77	220.28
Governmental employee	2290.37	435.95	2726.32	290.83	245.34
Private sector employee	2259.89	431.95	2687.43	302.2	256.70
Frequency of outpatient visit					
1 - 5 visit	849.54	159.78	1003.08	295.65	250.15
6 - 10 visit	1627.21	325.78	1952.99	274.6	229.1
11 - 15 visit	2559.41	505.83	3065.24	278.87	233.38
15 - 20 visit	3327.29	657.92	3985.21	280.78	235.29
21 - 25 visit	3686.54	811.54	4498.08	258.73	213.24
≥ 26 visit	4722.14	1036.16	5758.3	256.38	210.88
Stage of HIV AIDS patient					
One	687.12	246.18	918.62	179.49	134
Two	1642.18	418.6	2060.78	234.75	189.25
Three	2520.78	475.5	2996.29	302.33	256.85
Four	3036.87	462.98	3499.86	363.66	318.17
ART/Pre ART					
Patients under ART	670.5	233.94	895.53	196.2	150.71
Patients under Pre ART	2446.57	473.96	2920.54	295.19	249.7
Current status of patients on ART					
On ART	2594.22	502.11	3096.34	292.61	247.12
Death	1755.58	359.37	2114.95	289.3	243.8
Drop out	1150.38	194.95	1345.34	357.14	311.65
Transfer out	1518.34	315.4	1833.74	286.65	241.16
OPD CD4 Count					
< 200 cells/mm ³	3151.62	454.1	3605.73	381.3	335.81
200 - 499 cells/mm ³	1898.24	440.44	2338.68	250.5	205.01
> 500 cells/mm ³	1266.36	399.3	1658.72	189.23	143.75

Total hospital and HIV AIDS bed occupancy rate in Adigrat hospital from 2009-2010 G.C.

Department	No of beds	Bed days/year	2009 G.C.					2010 G.C.					2009 - 2010 G.C.				
			1st year	%	HIV admission days	% from total beds	% from Admitted pts	2nd year	%	HIV admission days	% from total beds	% from Admitted pts	Total	%	HIV admission days	% from total beds	% from Admitted pts
MW	58	21170	10901	51.49	3506	16.56	32.16	10479	49.499	3038	14.35	29	24986	59	6544	15.45	26.2
PW	31	11315	4436	39.20	177	1.56	3.99	2921	25.815	218	1.9266	7.5	7579	33.5	395	1.745	5.2
SW	31	11315	3670	32.43	53	0.47	1.444	2851	25.197	50	0.4419	1.8	6608	29.2	103	0.45	1.5
OGW	18	6570	928	14.12	27	0.41	2.909	1034	15.738	24	0.3653	2.3	2006	15.3	51	0.38	2.5
DR	10	3650	2212	60.60	91	2.49	4.114	2607	71.425	100	2.7397	3.8	4977	68.2	191	2.6	3.8
Total	148	54020	22147	41	3854	7.13	17.4	19892	36.823	3430	6.3495	17.2	45959	42.5	7284	6.74	15.8

Total indirect costs of HIV care and hospital expense in Adigrat hospital from 2009-2010 G.C.

Total Indirect cost of 2009-2010 G.C.			
	Two years hospital expense	HIV AIDS Cost	%
Personnel cost	7857635.4	1236545	15.736858
Goods & service	3144563	691033.3	21.975496
Total over head cost	11002198	1927578	17.519937
Total Capital cost	3724067	1264424	33.952765
Total indirect cost	14726265	3192002	21.67557

Total direct and indirect costs of HIV care at outpatient and inpatient department, Adigrat hospital from 2009-2010 G.C.

	Indirect cost 2009-2010 G.C.	Direct cost 2009- 2010 G.C.										Total cost
		%	Diagnostic Direct cost	%	ART Direct cost	%	OI Direct Cost	%	Total Medication cost	Total Direct cost	%	
OPD	1664388.1	17.93	3043369.74	39.95	3331134.4	43.73	694933	9.12	4013659	7618241	82.07	9282629.1
IPD	1527613.9	67.14	262515.36	35.11	0	0	446946.2	59.78		747702.6	32.86	2275316.5
Total	3192002	27.62	3305885.1	39.52	3331134.4	39.82	1141879	13.65		8365944	72.38	11557946

Total cost of HIV care and treatment for patients on pre ART and ART at outpatient in Adigrat hospital from 2009-2010 G.C.

	Total OPD indirect cost 2009 - 2010			OPD Direct cost 2009 - 2010					Total OPD Direct & Indirect cost 2009 - 2010
	Overhead cost 2009 -2010	Capital cost 2009 - 2010	Total OPD indirect cost 2009 - 2010	OPD Diagnostic cost 2009 - 2010	Total ART cost	Total OPD OI cost	Total OPD Medication cost	Total OPD Direct cost	
Pre ART OPD visit	444310.44	279344.48	723654.92	1935367.3	0	280298.96	280298.96	2454445.3	3178100.2
Currently on ART OPD visit	577592.4	363140.8	940733.2	1108034.4	3331134.4	414634	3733360.4	5163796	6104529.2
Total service given to HIV AIDS pts	1021902.8	642485.28	1664388.1	3043401.7	3331134.4	694932.96	4013659.4	7618241.3	9282629.4

Average cost per person per hospital stay at inpatient in Adigrat hospital						
	Personnel cost/stay	Goods & service cost/stay	Overhead cost/Stay	Capital cost/Stay	Indirect cost	Total hospital cost per person per stay
N	93	93	93	93	93	93
Mean	707.8613978	428.4786	1136.34	769.279731	1905.62	2609.830179
Median	450.92	275.21	714.88	494.89	1189.93	1866.47
Minimum	72.5	47.45	119.95	84.88	205.7	336.92
Maximum	4613.54	3236.09	7849.63	5813.71	13663.34	16169.59
Std. Deviation	781.0001108	488.33803	1250.1257	873.716251	2110.21	2471.57426
	Diagnostic cost/stay	OI cost/stay	Medication cost/Stay	Examination cost/stay	Direct cost/stay	Total hospital cost per person per stay
N	93	93	93	93	93	93
Mean	184.3978495	53.840903	504.40937	15.4032258	704.210448	2609.830179
Median	166	40.562222	420.45	15	609.75	1866.47
Minimum	15	6.3235931	8.4	15	59.7	336.92
Maximum	566	255.4	2071.25	30	2506.25	16169.59
Std. Deviation	105.5508699	45.712213	388.28323	2.31048892	453.0754425	2471.57426

Average person cost of HIV care and treatment at outpatient in Adigrat hospital from 2009-2010 G.C.

Outpatient cost per person (2009-2010)	N	Mean	Median	Minimum	Maximum	Std. Deviation
Total Diagnostic cost OPD	359	455.4	423	30	1202	226.6
Cost of ART Drugs at OPD	303	1716	1380	84	8838	1262
Cost of OI, other medication and supplies at OPD	359	165.9	135	0	2788	212.8
Total Medication cost at OPD	359	1607.4	1371.3	4	8910	1361.8
Total Direct cost of out patient	359	2167.8	1927	47	8982	1476.85
Total Indirect cost at OPD	359	436.53	409.41	45.49	1091.76	257.18
TOTAL COST AT OPD	359	2604.3	2359.4	99.49	98.46.31	1687.36
Personnel cost at OPD	359	176.95	165.96	18.44	442.56	104.25
Goods & Services cost at OPD	359	91.07	85.41	9.49	227.76	53.65
Total overhead cost at OPD	359	268.02	251.37	27.93	670.32	157.9
Total Capital cost at OPD	359	168.5	158.04	17.56	421.44	99.27
Total Indirect cost at OPD	359	436.53	409.41	45.49	1091.76	257.18
OPD Diagnostic cost per pt per visit	359	64.2	47.58	2.5	335.33	50.56
OPD ART Cost per pt per visit	303	161.08	138	37.5	558.75	79.58
OPD OI Drug cost/ pt/visit	359	19.67	12.32	0	278.8	23.94
OPD Medication cost/pt/visit	359	155.62	146.92	1.38	575.11	96.63
OPD Direct cost/pt/visit	359	234.82	208.3	69	655.57	95.28
Total OPD cost/pt/visit	359	280.3	253.79	114.49	701.06	95.28

Average person cost of HIV care and treatment at inpatient in Adigrat hospital from 2009-2010 G.C.

Inpatient cost per person(2009-2010)	N	Mean	Median	Minimum	Maximum	Std. Deviation
Diagnostic cost of inpatient	93	219.8	216	30	566	113.6
Cost of OI, other medication and supplies at inpatient	93	644.8	510.8	8.4	2555.3	557.23
Total Medication cost at inpatient	93	658.95	510.8	8.4	2555.3	554.26
Direct cost of inpatient	93	899.24	769.35	59.7	2839.1	626.13
Indirect cost at inpatient	93	2439.7	1380.67	205.7	13663.3	2610.83
TOTAL COST AT INPATIENT	93	3338.9	2354.7	336.92	16169.59	3113.77
Personnel cost at inpatient	93	889.07	550.34	72.5	4613.54	926.29
Goods & Services cost at inpatient	93	554.6	313.17	47.45	3236.09	613.39
Total overhead cost at inpatient	93	1443.7	856.11	119.95	7849.63	1522.9
Capital cost at inpatient	93	996.01	563.08	84.88	5813.71	1099.43
Indirect cost at inpatient	93	2439.7	1380.67	205.7	13663.3	2610.83
IPD diagnostic cost/pt /day	93	36.04	21.53	4.94	294	49.25
IPD OI Cost/pt/day	93	61.36	49.46	8.4	255.4	45.3
IPD Direct cost/pt/day	93	102.64	77.88	25.01	402.9	78.75
Total IPD cost/pt/visit	93	289.9	260.96	186.99	687.97	98.25
ART cost per person per day	303	5.37	4.6	1.25	18.62	2.65
OPD ART Cost per pt per visit or Month	303	161.08	138	37.5	558.75	79.58
ART cost per person per year	303	1933	1656	450	6705	955

Table. Summary cost of HIV AIDS care in Adigrat hospital, 2009-2010.
(US\$1 = Eth birr \$16.55, December 2010 exchange rate)

Variables	Outpatient cost Eth birr (%)	Inpatient cost Eth birr (%)	Total cost Eth birr (%)
Direct cost	7618241(82.07)	747702.6 (32.86)	8365944(72.4)
Diagnostic cost	3043401.70(32.8)	262515.36(11.5)	3305885.1(28.6)
Cost of ART Drugs	3331134.4(35.9)		3331134.4(28.8)
Cost of OI, other medication and supplies	694933(7.5)	446946.2 (19.6)	1141879(9.9)
Indirect cost	1664388.1(17.93)	1527613.9(67.14)	3192002(27.62)
Personnel cost	674682.72(7.3)	561862.23(24.7)	1236545(10.7)
Goods & Services cost	347220.12(3.7)	343813.21(15.1)	691033.33(6)
Capital cost	642485.28(6.9)	621938.42(27.3)	1264423.7(10.9)
Total cost	9,282,629.1(80.3)	2275316.5 (19.7)	11557945.6(100)

Average cost per person per hospital stay at inpatient in Adigrat hospital						
	Personnel cost/stay	Goods & service cost /stay	Overhead cost/Stay	Capital cost/Stay	Indirect cost	Total hospital cost per person per stay
N	93	93	93	93	93	93
Mean	707.8613978	428.4786	1136.34	769.279731	1905.62	2609.830179
Median	450.92	275.21	714.88	494.89	1189.93	1866.47
Minimum	72.5	47.45	119.95	84.88	205.7	336.92
Maximum	4613.54	3236.09	7849.63	5813.71	13663.34	16169.59
Std. Deviation	781.0001108	488.33803	1250.1257	873.716251	2110.21	2471.57426
	Diagnostic cost/stay	OI cost/stay	Medication cost/Stay	Examination cost/stay	Direct cost/stay	Total hospital cost per person per stay
N	93	93	93	93	93	93
Mean	184.3978495	53.840903	504.40937	15.4032258	704.210448	2609.830179
Median	166	40.562222	420.45	15	609.75	1866.47
Minimum	15	6.3235931	8.4	15	59.7	336.92
Maximum	566	255.4	2071.25	30	2506.25	16169.59
Std. Deviation	105.5508699	45.712213	388.28323	2.31048892	453.0754425	2471.57426

Average annual direct cost per person per year at outpatient department
in Adigrat hospital, 2009-2010

	OPD Diagnostic cost per person per year"	OPD examination cost of per person per year	OPD Cost of ART Drugs per person per year	OPD Cost of OI, other medication and supplies per person per year	OPD Medication cost per person per year	OPD Direct cost per person per year
N	359	359	303	359	359	359
Mean	227.42	71.97	857.98	82.962	803.685	1084.76
Median	211.5	67.5	690	67.5	685.65	963.5
Std. Deviation	113.57	42.4	631.04	106.4	680.902	737.303
Minimum	15	7.5	42	0	2	52.5
Maximum	601	180	4419	1394	4455	4491

Average annual indirect and total cost per person per year at outpatient department
in Adigrat hospital, 2009-2010

	OPD Personnel cost per person per year	OPD Goods & Services cost per person per year	OPD overhead cost per person per year	OPD Capital cost per person per year	OPD Indirect cost per person per year	Average cost per person per year (APY) at outpatient in Adigrat hospital	Outpatient cost per person per two years duration
N	359	359	359	359	359	359	359
Mean	88.476	45.53	134.01	84.254	218.263	1302.33	2604.662
Median	82.98	42.71	125.69	79.02	204.705	1179.7	2359.4
Std. Deviation	52.125	26.83	78.951	49.638	128.589	843.431	1686.863
Minimum	9.22	4.745	13.965	8.78	22.745	87.245	174.49
Maximum	221.28	113.9	335.16	210.72	545.88	4923.16	9846.31

Average mean and median cost at outpatient				
Costs	Mean	%	Median	%
OPD Diagnostic cost per person per year	227.41685	20.96465	211.5	21.95122
OPD examination cost of per person per year	71.970752	6.634696	67.5	7.005708
OPD Cost of ART Drugs per person per year	857.97896	79.09366	690	71.61391
OPD Cost of OI, other medication and supplies per person per year	82.96163	7.647902	67.5	7.005708
OPD Medication cost per person per year	803.68482	74.0885	685.65	71.16243
OPD Direct cost per person per year	1084.7633	83.29398	963.5	81.67331
OPD Personnel cost per person per year	88.476045	40.53638	82.98	40.53638
OPD Goods & Services cost per person per year	45.533496	20.86173	42.705	20.86173
OPD overhead cost per person per year	134.00954	61.39811	125.685	61.39811
OPD Capital cost per person per year	84.25376	38.60189	79.02	38.60189
OPD Indirect cost per person per year	218.2633	16.75943	204.705	17.35229
Average cost per person per year (APY) at outpatient in Adigrat hospital	1302.3309		1179.7	
Outpatient cost per person per two years duration	2604.6618		2359.4	

Inpatient Cost per person		Average cost per person per hospital stay (APS) at inpatient in Adigrat hospital * Average length of stay			
Frequency of Inpatient admission	Mean	Median	IPD AIDS/ None AIDS for admitted pts		Average cost per person per hospital stay
Once admitted	2728.523	1866.58	None AIDS stage HIV +ve Patients	Mean	1600.9068
Twice	4128.573	3423.69		Median	1065.955
Three times	9192.025	8815.165	AIDS stage patients	Mean	2835.5104
six times	9840.86	9840.86		Median	2087.2425
Total	3338.923	2354.7	Total	Mean	2609.8302
				Median	1866.47

Average cost per person per hospital stay (APS) at inpatient in Adigrat hospital * Inpatient admission ward			Average cost per person per hospital stay (APS) at inpatient in Adigrat hospital * Average length of stay		
Inpatient admission ward		Average cost per person per hospital stay	Average length of stay		Average cost per person per hospital stay
	Mean	Median	Less than 5 days	Mean	977.8511
Medical Ward	2901.704	2105.21	greater than 5 days	Median	982.04
Pediatric Ward	2392.62	1721.57		Mean	3465.95
Surgical Ward	1480.033	1336.985	Total	Median	2511.8
Obstetrics Gynecology Ward	1603.565	724.25		Mean	2609.83
Total	2609.83	1866.47		Median	1866.47

Frequency of outpatient visit			Frequency of outpatient visit * Patients on ART and pre ART at outpatient			
N	Valid	359	Frequency of outpatient visit			
	Missing	14	Patients on ART and pre ART at outpatient	Mean	N	Std. Deviation
Mean		10.33	Pre ART	5.02	56	3.57
Median		10	Under ART	11.32	303	6.1
Std. Deviation		6.211	Total	10.33	359	6.211
Minimum		1				
Maximum		31				

Frequency of outpatient visit * Currently statuses of HIV patients (Pt's under ART)				Frequency of outpatient visit * On ART AIDS pt's, on ART none AIDS, pre ART AIDS, pre ART none AIDS pt's			
Frequency of outpatient visit				Frequency of outpatient visit			
Current statuses of HIV patients	Mean	N	Std. Deviation	Statues of HIV patients	Mean	N	Std. Deviation
Currently on ART	12.13	263	5.902	Pre ART- None AIDS stage HIV positive patients	5.02	56	3.57
Death	6.55	11	4.413	On ART-None AIDS stage HIV positive patients	11.39	77	4.804
Drop out	3.86	14	3.439	On ART-AIDS stage patients	11.29	226	6.491
Transfer out	7.6	15	5.011	Total	10.33	359	6.211
Total	11.32	303	6.1				

Frequency of outpatient visit			Frequency of outpatient visit * Patients on ART and pre ART at outpatient			
N	Valid	359	Frequency of outpatient visit			Std. Deviation
	Missing	14	Patients on ART and pre ART at outpatient	Mean	N	
Mean		10.33	Pre ART	5.02	56	3.57
Median		10	Under ART	11.32	303	6.1
Std. Deviation		6.211	Total	10.33	359	6.211
Minimum		1				
Maximum		31				

Frequency of outpatient visit * Current statuses of HIV patients (Pt's under ART)				Frequency of outpatient visit * On ART AIDS pt's, on ART none AIDS, pre ART AIDS, pre ART none AIDS pt's			
Frequency of outpatient visit				Frequency of outpatient visit			
Currently statuses of HIV patients	Mean	N	Std. Deviation		Mean	N	Std. Deviation
Currently on ART	12.13	263	5.902	Pre ART- None AIDS stage HIV positive patients	5.02	56	3.57
Death	6.55	11	4.413	On ART-None AIDS stage HIV positive patients	11.39	77	4.804
Drop out	3.86	14	3.439	On ART-AIDS stage patients	11.29	226	6.491
Transfer out	7.6	15	5.011	Total	10.33	359	6.211
Total	11.32	303	6.1				