

## **ABSTRACT**

*This study is aimed at determining and comparing the cost incurred in treating HIV/AIDS and non-HIV/AIDS patients and the impact on health institutions. Three hospitals in Addis Ababa namely Tikur Anbessa, St. Paul's and Zewditu were included in this study. Essential data were extracted by assessing patient cards and Administrative records retrospectively and filled in a format developed for the purpose of this study. The extracted data were entered and analyzed in SPSS statistical package. The costs per inpatient day, per inpatient stay and outpatient visits were estimated by using the service and unit cost approaches.*

*The hospital costs of 453 patients (293 HIV positive, 160 HIV negative) were analyzed the mean length of stay of HIV/AIDS patients were 19 days and outpatient visits were 4 days. The HIV/AIDS patient service charges paid to the hospital (service cost) per admission were on average Birr 1,134 (US \$ 132)\* and per outpatient visits were Birr 585.41 (US \$ 68) moreover these inpatient and outpatient public services valued using private hospitals service prices the cost was Birr 4,614 (US \$ 539) and Birr 1072 (US \$ 125) respectively. Whereas the unit cost of HIV/AIDS patients per admission were Birr 2,727.51 (US \$ 318) and Birr 629.88 (US \$ 74) per outpatient visits.*

*There was no significance difference in cost of treatment, average length of stay and outpatient visits between HIV positive and negative patients. However at the outpatient level the unit cost of treating the HIV/AIDS patients is significantly greater than the non-HIV/AIDS patients.*

*The similar cost patterns of the two patient groups examined in this study may reflect the fact that few therapeutic options, limited and non-specific basic health services are being provided to both groups of patients. Therefore information on costs of the treatment and care of AIDS patients in health facilities is necessary in*

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\* 1US \$ = 8.56 Birr.

*order to have an idea of the likely costs of the increasing number of AIDS patients and to plan for their management and treatment effectively.*

## **Introduction**

All over the world around 42 million people are currently living with HIV/AIDS and more than 70% of them lives in sub-Saharan Africa (UNAIDS, 2002). Today it is estimated that about 2.2 million people in Ethiopia are infected with HIV/AIDS, including 2 million adults and 200,000 children (MOH, 2002). The increased demand for health care from people with HIV related illnesses is heavily taxing the over stretched public health services of many developing countries including Ethiopia.

**Statement of the problem-**The impact of HIV/AIDS epidemic on the health care sector is severe since it faces with steeply increasing demand for care. This challenge to the health institution is driven by at least three factors of care, namely, medical care for opportunistic infections and HIV related diseases, psychological care for counseling HIV-positive cases and HIV infection control in the institution through universal precaution measures. These all adding to the pressure on the public health services are diminishing resources allocated to health care. In this situation of dwindling resources and increasing demand, up to date information on costs of the treatment and care of HIV/AIDS patients in health facilities is necessary in order to have an idea of the increasing number of AIDS patients and to guide the allocation of the budget (resources) and design and implement alternative cost effective programs and services for HIV/AIDS patients.

### **Objectives of the study**

#### **General Objective**

- To determine the costs of hospital care for HIV/AIDS and non-HIV/AIDS patients.
- To estimate the costs of HIV/ AIDS to hospitals

#### **Specific Objectives**

- To compare the treatment costs of HIV/AIDS and non-HIV/AIDS patients groups with respect to:

- The cost per inpatient day.
- The average length of stay and out patient visits.
- The total average costs of the inpatient stay and outpatient visits in the three public hospitals.

**Study Area**-three public referral hospitals in Addis Ababa, namely, Zewditu , St. Paul’s and Tikur Anbessa were purposively selected for the costing analysis and only medical wards and medical outpatient departments were included for the study since HIV/AIDS patients would mainly be treated in these departments.

### **Hypothesis**

- The cost of treating HIV/AIDS patients is more expensive than the cost of treating non-HIV/AIDS patients.

### **Research Methodology**

**Study Design** This is an institution based retrospective cross sectional study to determine the costs of treating HIV/AIDS and non-HIV/AIDS patients in the three public referral hospitals.

**Study population** HIV tested patients (HIV positive and negative) from July 2002 to June 2003.

**Sample size:** - to determined the required sample size for the study the formula used was

$$n = \frac{2 (s)^2 (z_{\alpha} + z_{\beta})^2}{(MDC)^2}$$

The value of n was determined to be 453 and this sample was found to be 20 % of the total population considered (2,265) so proportional allocation to each stratum was applied. 20% from HIV positive and 20% from HIV negative patients’ records was considered in this survey.

### **Method of Data collection**

The data on cost of HIV/AIDS and non HIV/AIDS patients were collected through

**1. Patient Record Review**:-instruments were developed to collect data on the type and amount of drugs, medication and supplies used, investigations (x-ray and laboratory tests), treatment procedures performed and length of stays and outpatient visits of the patients.

**2. Administrative Record Review**:-data on a full year's hospital capital and recurrent cost for July 2002- June 2003 were gathered from administrative section of the hospitals, from the Federal Ministry of Health and Addis Ababa city Administration Health Bureau.

### ***Approaches of Total Cost Determination***

**1. Service based**:- is the price that the patient pays for investigations, drugs, consultation and treatment.

#### ***A. Inpatient***

Total cost inpatient episode (TC) = (B) - average bed days + total drug used (D<sub>i</sub>) + treatment + consultation received (T<sub>i</sub>) + investigation received (I<sub>i</sub>)

$$TC = BP_1 + \sum_{i=1} D_i P_{2i} + T_i P_{3i} + I_i P_{4i}$$

#### ***B. Outpatient***

Total cost outpatient visits (TC) = total drug used (D<sub>i</sub>) + treatment +consultation received (T<sub>i</sub>) + investigation received (I<sub>i</sub>)

$$TC = \sum_{i=1} D_i P_1 + T_i P_{2i} + I_i P_{3i}$$

Price of public low and high, private low and high prices sets were applied for both inpatients and outpatients.

### ***2. Unit cost based***

The cost information was available only on an aggregate basis for the hospital as a whole and not by department. The aim of the unit cost analysis is to allocate the hospital costs (direct and indirect) to patient care centers such as medical wards and medical outpatient departments. Therefore to estimate the average costs per in-patient day and out patient visit a combination of two different methodologies were used.

**2.1 Step-down Costing Methodology:** To allocate all overhead costs of running a hospital to departments. The equivalent annual costs were calculated assuming a useful life span of 20 years for buildings, 10 years for equipment and vehicles and 5 years for furniture (Creese and Parker, 1994). The cost of each outpatient visit and each inpatient day were calculated by dividing the cost share of medical outpatient departments by the number of medical OPD new equivalent visits and the cost share of medical ward by the number of medical total inpatient days respectively (Shapard *et.al*, 2000).

**Bottom-up Costing:** The aim of the bottom-up costing methodology is to capture the direct treatment and investigation costs such as drugs and disposable medical supplies, medication, x-ray and laboratory tests. The unit cost approach used the total average overhead cost at the inpatient level ( $B_i$ ) and the total average overhead cost at the outpatient level ( $O_i$ ) and applied to cost of service received directly for drugs consumed and investigation used ( $I_p$ ) at the inpatient and outpatient respectively. Therefore,

A. Inpatient total cost =  $B_i + D_i P_{2i} + I_p$

B. Out patient total cost =  $O_i + D_i P_{2i} + I_p$

The treatment cost of accidental exposure of health workers to HIV/AIDS was not included in this study because all of the three hospitals had no such system to provide ARV drug as a post exposure prophylaxis.

### **Data Analysis**

Data were entered, cleaned and analyzed using SPSS. **Non - parametric WILCOXON—Mann—Whitney test (Stat xact-4)** was used to compare the mean rank costs, inpatient stays and outpatient visits of HIV/AIDS positive and negative patients.

## **Result and Discussion**

### **A. Characteristics of the study patients**

The hospital costs of **453** patients (**293** HIV positive, **160** HIV negative) were analyzed. Of the 293 HIV positive patients, 55 % were males and the rest 45 % were females.

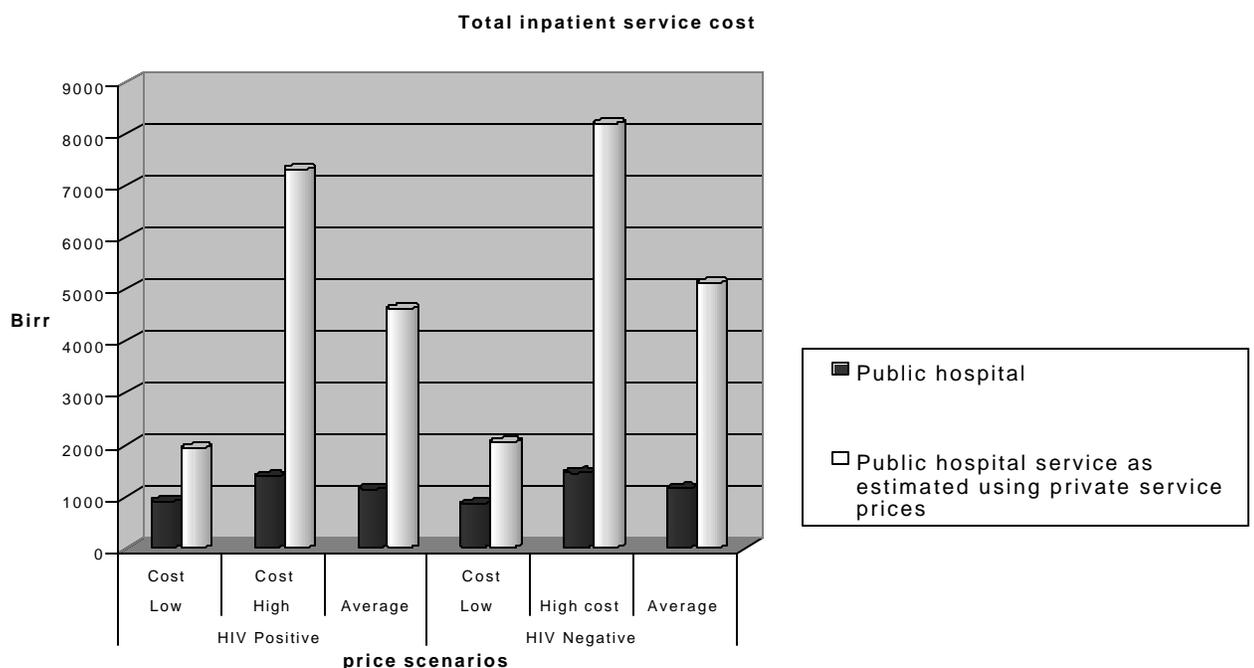
The Common diseases diagnosed in HIV Positive patients were Tuberculosis, Toxoplasmosis and *Pneumocytis carinii* pneumonia (Pcp) and these diseases were found to be more prevalent in HIV positives than HIV negatives. However, peptic ulcer diseases (4.6 %), acute febrile illness (3.9 %) and stroke sepsis (3.3 %) were more common in the HIV negative than in the HIV positive group.

The mean lengths of stay of HIV/AIDS and non-HIV/AIDS patients were 19 and 20 days respectively. The average outpatient visits of HIV/AIDS patients were 4 days and for HIV/AIDS negative patients were 3 days. However, the difference was not statistically significant ( $P > 0.05$ ).

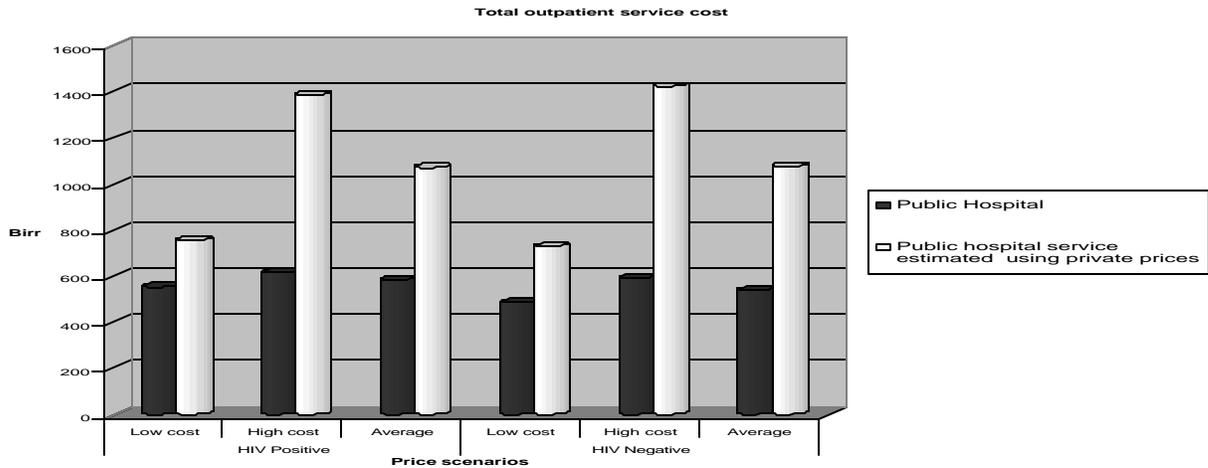
**Bed Occupancy:**-the percentage of beds occupied on average by HIV/AIDS patients in Tikur Anbessa and st Paul's hospitals were each 12 % and in Zewditu hospital 53 %, leaving only 47% of the beds for all other afflictions in the hospital.

**B. Cost Estimations**

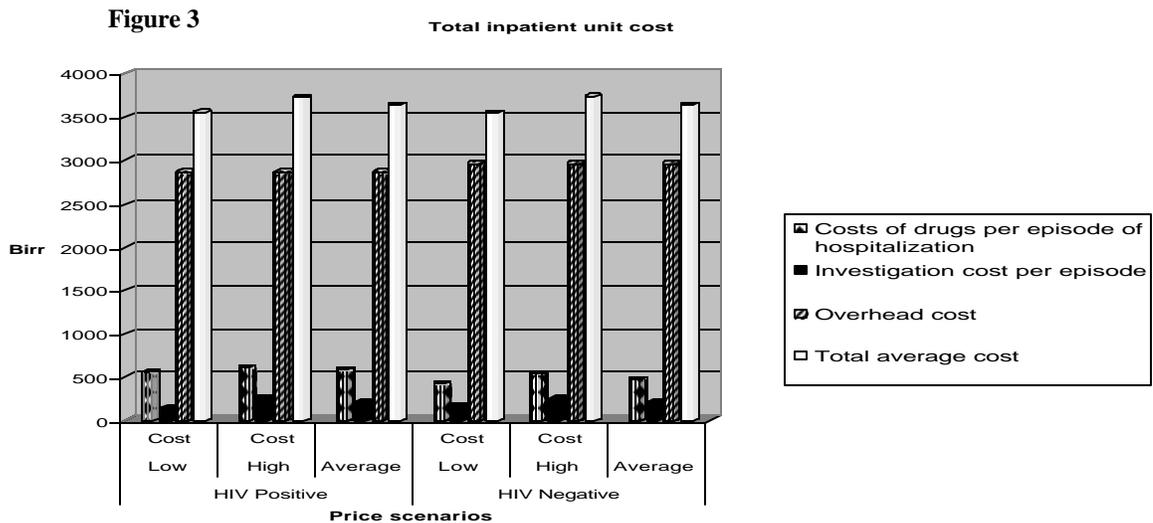
**1. Total inpatient service cost:**-the HIV/AIDS and non-HIV/AIDS patient service charges paid to the hospital per admission were on average Birr 1,134 and Birr 1,145 respectively. However, the difference was not statistically significant ( $P > 0.05$ ). The service cost of HIV/AIDS patients in public hospitals as estimated using private hospitals prices was Birr 4,614.



**2. Total outpatient service cost:-**the mean service cost of HIV positive and negative patients was Birr 585.41 and Birr 539.10 respectively and using private hospitals service prices, the average cost of an HIV positive patient was Birr 1,072.



**3. Total inpatient unit cost:-**the total unit cost of HIV positive and negative patients per admission was Birr 3,643 and Birr 3,648 respectively. However the cost difference was not statistically significant ( $P > 0.05$ ).

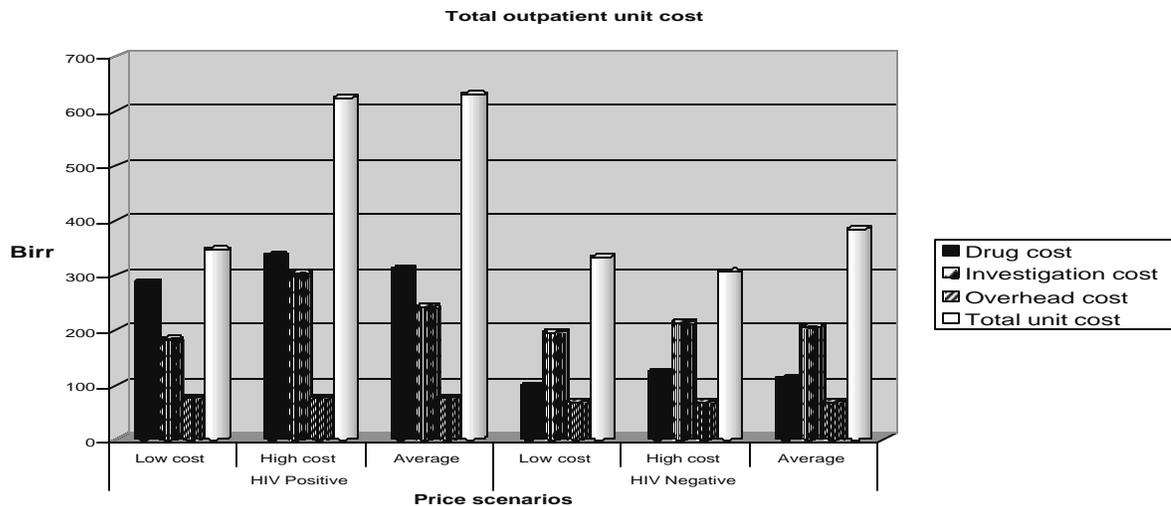


These findings are similar to the result of earlier studies done in Kenya and Zaire, which also found no significant difference in costs between HIV positive and HIV negative groups (Guinness, *et.al*, 2002; Hassing, *et.al*, 1990). However, it is different from a study

conducted in Zimbabwe in which the direct cost of treatment was found to be greater for the HIV Positive category (Hansen *et.al*, 2000). The similar cost patterns of the two patient groups examined in this study may reflect the fact that few therapeutic options, limited and non-specific basic services are being provided to both groups of patients. In some case patients are referred back to the health centers for appropriate follow-up in their near-by facilities. For instance, the follow-up of TB patients are usually handled at health center level. Hence, the cost associated with this service should have been included in the total costs of health care provided to people with HIV/AIDS.

**4. Total outpatient unit cost:-**the unit treatment cost of HIV positive and negative patients were Birr 629 and 383 respectively and the unit treatment cost of HIV positive patients was greater than the HIV negative groups and the difference was found to be statistically significant ( $p < 0.05$ ).

**Figure 4**



**Proportion of hospital budget needed to cover cost of HIV positive**

**patients:** The unit cost of HIV/AIDS patients shared from the total budget of Tikur Anbessa hospital was 16 %, Zewditu hospital 35 % and in St. Paul’s hospital, 7 %.

## **Conclusion**

From the results of this study it can be concluded that there is no significant difference in the cost of treating HIV/AIDS and non HIV/AIDS patients. However, it is an additional cost in the public hospitals which shares the meager resources available for health care. Therefore, information on costs of the treatment and care of HIV/AIDS patients in health facilities is necessary in order to have an idea of the likely costs of the increasing number of AIDS patients and to plan effectively for HIV/AIDS patients' treatment and management.

## **Recommendations**

Promote proper institutional, home and community based health care and psychological support for HIV/AIDS patients.

Provide health care to people living with HIV/AIDS on a scheme of payment according to ability, with special assistance for those who can not afford to pay.

Promote and encourage research activities targeted towards preventive, curative and rehabilitative aspects of HIV/AIDS, this will decrease the burden of HIV/AIDS patients on health institutions.

Anti retroviral post exposure prophylaxis services should be given for health workers who are accidentally exposed to blood and needle stick injury.

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