**ADDIS ABABA UNIVERSITY**

**COLLEGE OF HEALTH SCIENCES**

**SCHOOL OF MEDICINE**

**DEPARTMENT OF EMERGENCY MEDICINE**

# CLINICAL PROFILE AND OUTCOMES OF ADULT HIV-POSITIVE PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT OF TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA: A CROSS-SECTIONAL STUDY.

Principal investigator: Dr.Ayenew Genet

A thesis submitted to the Department of Emergency and Critical Care Medicine, College of Health Sciences, Addis Ababa University in partial fulfillment for the requirement of specialty certificate in Emergency and Critical Care Medicine.

December 2025

Addis Ababa, Ethiopia

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# ACRONYMS AND ABBREVIATIONS

**3TC** – Lamivudine
**AAU** – Addis Ababa University
**ABC** – Abacavir
**ACS** – Acute Coronary Syndrome
**AGE** – Acute Gastroenteritis
**AIDS** – Acquired Immune Deficiency Syndrome
**AKI** – Acute Kidney Injury
**AOR** – Adjusted Odds Ratio
**ART** – Antiretroviral Therapy
**AZT** – Zidovudine
**BMI** – Body Mass Index
**BPH** – Benign Prostatic Hypertrophy
**CD4** – Cluster of Differentiation 4
**CHS** – College of Health Sciences
**CHS-IRB** – College of Health Sciences Institutional Review Board
**CI** – Confidence Interval
**CKD** – chronic kidney disease
**CNS** – Central Nervous System
**CVD** – cardiovascular disease
**DILI** – Drug-Induced Liver Injury
**DKA** – Diabetic Ketoacidosis
**DTG** – Dolutegravir
**DVT** – Deep Venous Thrombosis
**ECCM** – Emergency and Critical Care Medicine
**ED** – Emergency Department
**EMR** – Electronic Medical Record
**FET** – Fisher's Exact Test
**GUS** – Genitourinary System
**HAART** – Highly Active Antiretroviral Therapy
**HIV** – Human Immunodeficiency Virus
**ICU** – Intensive Care Unit
**INR** – International Normalized Ratio

**IQR** – Interquartile Range
**IRB** – Institutional Review Board
**LGI** – Lower Gastrointestinal
**NCD** – Non-Communicable Diseases
**OI** – Opportunistic Infection
**OPD** – Outpatient Department
**PAD** – Peripheral Arterial Disease
**PCP** – Pneumocystis Pneumonia
**PE** – Pulmonary Embolism
**PLHIV** – People Living With HIV
**PUD** – Peptic Ulcer Disease
**RNA** – Ribonucleic Acid
**SD** – Standard Deviation
**SIVs** – Simian Immunodeficiency Viruses
**SNNPR** – Southern Nations, Nationalities, and Peoples Region
**SPSS** – Statistical Package for the Social Sciences
**TASH** – Tikur Anbessa Specialized Hospital
**TB** – Tuberculosis
**TDF** – Tenofovir Disoproxil Fumarate
**t-test** – Independent t-test
**TXA** – Tranexamic Acid
**UGI** – Upper Gastrointestinal
**U-test** – Mann–Whitney U Test
**UTI** – Urinary Tract Infection
**WHO** – World Health Organization
**$X^2$** – Chi-square Test

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## ABSTRACT

**Background**: HIV has been a global health problem since its identification. Despite a decline in new infections, many patients still present to emergency departments with advanced disease and critical systemic infections in Ethiopia.

**Objective**: The main aim of this study was to assess the clinical profile and outcomes of adult HIV-positive patients presenting to the emergency department of Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia**.**

**Methods:** This study involved a retrospective cross-sectional electronic medical records review from January 1 to June 30, 2025, taking place in Tikur Anbessa Specialized Hospital adult emergency department. Data was extracted using a structured Kobo tool and then analyzed with SPSS v27. Multivariable logistic regression was applied to identify the factors associated with mortality, with a p-value of <0.05 regarded as statistically significant.

**Results:** Out of a total of 104 HIV-positive patients included, the mean age was 45.78 ±14.25 years, and 64(61.5%) were females. The leading clinical presentations were vomiting (14.1%), diarrhea (10.5%), and fatigue (10.1%). Outcomes included ICU admission at 3.8%, and emergency department mortality at 14.2%. Advanced WHO clinical stage (AOR=6.068, 95%CI:1.273-28.880, P=0.024), high white blood cell count(AOR=1.205, 95%CI:1.015-1.429,P=0.033), and hemoglobin (AOR=0.704, 95% CI: 0.540-0.918,P=0.009) were significant independent predictors of mortality. The majority (76.4%) stayed in the ED for ≥24 hours, with a median stay of 2 days (IQR: 1–3).

**Conclusion:** Most HIV-positive adults presenting Tikur Anbessa Specialized Hospital emergency department had advanced diseases, high mortality, and prolonged ED stays. Advanced WHO clinical stage, high WBC, and low hemoglobin are independently associated with increased mortality. Findings underscore the need for early HIV diagnosis, proper monitoring, and optimized care.



**Key terms:** HIV, emergency department, clinical profile, outcomes, Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.

# 1. INTRODUCTION

## 1.1. Background

HIV has been a global health problem since its identification in the early 1980s [1,2]. An estimated 39.9 million people worldwide live with HIV[3], among them 38.6 million were adults aged 15 years and older, as of 2023[3]. Even though there is a reduction, an estimated 1.7 million new infections make Sub-Saharan Africa remain the highest HIV-burdened region as of 2021 [4].

The first HIV-1 infection in Ethiopia was confirmed in Addis Ababa in 1984[4]. Similarly, the first clinically diagnosed AIDS case was reported in 1986 in Addis Ababa [4]. The national prevalence of HIV was 0.91% among adults aged 15 years and older, with urban areas like Addis Ababa accounting for 3.1% [5]. There has been a significant decline in new infections over the past two decades [5].

Even though prevention programs, Antiretroviral Therapy (ART) expansion, and national health initiatives have been implemented to combat HIV/AIDS, significant challenges persist in emergency settings [6]. Many patients continue to present to Emergency Department (ED) with advanced diseases, complicated comorbidities, opportunistic infections, and systemic illnesses, which contribute to higher ED mortality rates [6].

Tikur Anbessa Specialized Hospital(TASH), the final tertiary referral hospital in Ethiopia, serves as the main treatment and referral center for severely ill HIV-positive patients. Understanding the clinical profile and outcomes of HIV-positive patients visiting TASH through further research is essential due to the diverse case presentations and high burden of severe cases. This knowledge is fundamental for improving emergency care and services and for reducing HIV related mortality.

## 1.2. Statement of the Problem

In the era of ART, knowledge about the clinical presentation, treatment, care, and outcomes of HIV-positive patients in Ethiopian EDs is limited, despite the high burden of HIV/AIDS in the country. Most available evidence and research have been conducted in non-emergency settings [7,8]. Because of this gap, targeted interventions, and treatments for HIV-positive patients in the emergency setting are hindered. Therefore, understanding the clinical profile and outcomes of patients at TASH ED is critical for enhancing emergency care and improving outcomes for HIV-positive patients.

## 1.3. Significance of Study

This study has paramount significance because it will fill a knowledge gap in sociodemographic profile, clinical presentation, HIV treatment history, immunologic data, laboratory investigations and diagnostic imaging, ED treatment, clinical outcomes, and length of ED stay in HIV-positive patients presenting to the ED. This study helps to identify the determinants of outcomes to enhance emergency care, promote early interventions, and improve the quality of care. It will highlight even more important shortcomings in patient management, the need for ED physician training and clinical standards, and the need to better integrate emergency HIV care into national treatment programs. At the time of Highly Active Antiretroviral Therapy (HAART), this study will analyze the impact of CD4 count and viral load monitoring, ART administration, and comorbidities in the evaluation of emergency presentations. Finally, the study will serve as an evidence-based baseline for policies and procedures to improve emergency care nationally.

# 2. LITERATURE REVIEW

## 2.1. Clinical Presentation of HIV

A South African ED prospective study involving 1,224 participants found that most patients presented with chest pathology (43.5%), followed by genitourinary (20.3%), gastrointestinal (18.2%), and central nervous system pathologies (11.8%)[9].Chronic cough (40%) and night sweats (25%) being among the most often reported symptoms [9].

In Ethiopia, the major clinical manifestations reported by the Ministry of Health among 18,049 AIDS patients included weight loss (87.5%), prolonged fever lasting (84.3%), chronic diarrhea (59.2%), and persistent cough (68.1%)[10].

## 2.2. Comorbidities of HIV

In England, 29% of people with HIV/AIDS had at least one comorbidity, with hepatitis being the most common, followed by mental health disorders and cardiovascular disease[11]. In Kenya, dyslipidemia and hypertension affected 21.2% and 20.0% of patients, respectively[12]. Locally, 14.1% had hypertension and 8.6% had diabetes[13], and nearly one in three individuals suffered from a common mental disorder, with depression being the most prevalent (25%) [14].

## 2.3. Opportunistic Infections in HIV Patients

A retrospective study conducted in West China among 954 HIV patients reported that the most common opportunistic infections(OIs) were bacterial pneumonia (25.8%), followed by Pneumocystis jiroveci pneumonia(PCP) (11.9%), tuberculosis(TB) (11.5%), and other less common OIs [15].

In South African study, the most frequent presenting diagnoses included bacterial pneumonia 22.5%, Pulmonary TB 14.0%), PCP3.8%, cryptococcal meningitis 3.1%, bacterial meningitis 2.5%, and chronic gastroenteritis 2.5%[9].

From 2012 to 2016, a cross-sectional study conducted at Zewditu Memorial Hospital revealed a prevalence of opportunistic infections of 33.6%, among which pulmonary tuberculosis was the most common OI seen [16].

Additionally, a retrospective observational cohort study conducted at St. Paul's Hospital Millennium Medical College found that 83.8% developed opportunistic infections. Among these patients, 43.5% had tuberculosis, 35.2% had oral candidiasis, and 19% had herpes zoster, which showed the highest prevalence [17].

## 2.4. ART and Chemoprophylaxis

Among the estimated 84% of people living with HIV (PLHIV) who know their status, 98% were on ART, and 98% of those on ART were virally suppressed [5].

In a prospective study involving 422 HIV patients presenting to the ED, 51.7% were on a first-line HAART regimen (TDF + 3TC + EFV/NVP), 19.4% were on a second-line regimen (ABC + ddI + LPV/r), 13% had not yet started HAART, and 2.8% had an unknown treatment status[**Error! Reference source not found.**].

## 2.5. Immunology and Laboratory Findings

In South Africa, 47.6% of patients had a CD4 cell count <100 cells/mm³, 59.0% had a viral load (VL) >1,000 copies/mL, and 56.3% had hemoglobin levels <11 g/dL [9].

In a study conducted in Addis Ababa, 42.9% had a CD4 count <200 cells/µL, and 8.8% were unknown during presentation[18].

## 2.6. Outcomes of HIV Treatment and Care

As of 2023, 630,000 deaths were reported globally[4], with Sub-Saharan Africa experiencing the greatest decline in HIV-related deaths in 2021[4]. Because of the introduction and scale-up of ART programs in Ethiopia, new AIDS-related deaths have declined[5], although adult women died more often[19], with varying death rates across the country, where 10.3% died at Shashemene and Assela hospitals [20], and 6.85% died at Dessie Comprehensive Hospital [22]. Survival was significantly associated with low clinical stage, high baseline hemoglobin levels, and the administration of cotrimoxazole prophylaxis therapy[20]. Conversely, comorbid conditions[21], advanced clinical condition, suboptimal medication adherence, lower CD4 counts, and higher viral loads were identified as factors associated with increased early mortality in the emergency setting [22]. A regional study showed that 16.7% of patients needed Intensive Care Unit (ICU) admission, 31.1% were hospitalized for ≥7 days, and 13.6% died [9].

# 3.OBJECTIVES

## 3.1. General objective

To assess the clinical and demographic profile, patterns of presentation, diagnostic modalities, and outcomes of HIV-positive adult patients presenting to the ED of TASH, Addis Ababa, Ethiopia.

## 3.2. Specific objectives

1. To describe the baseline characteristics of HIV-positive adult patients presenting to the ED of TASH.

2. To determine the clinical presentations of HIV-positive adult patients presenting to the ED of TASH.

3. To evaluate laboratory and diagnostic modalities of HIV-positive adult patients presenting to the ED of TASH.

4. To identify treatment outcomes and factors associated with mortality among HIV-positive adult patients presenting to the ED of TASH.

# 4. Methods

## 4.1. Study Setting and Period

This study took place from January 1 to June 30, 2025, in the ED of TASH, which is one of the largest and most comprehensive tertiary care centers in Ethiopia. With a national referral hospital, TASH is based in Addis Ababa with a diverse patient population. The Adult ED, which serves over 12,000 patients annually[23], is prepared to handle many medical emergencies, including those related to infectious diseases such as HIV. Depending upon a high volume of patients, there is treatment of critically ill cases and diagnosis in the department.

## 4.2. Study Design

This study utilized a hospital-based, cross-sectional, retrospective review using EMR of ED visiting patients over a six-month period. A review of electronic records was performed of all adult HIV-positive patients who presented to the TASH ED during this period, and data was extracted from August 1 through September 30, 2025.

## 4.3. Population

### 4.3.1. Source Population

All HIV-positive patients aged ≥15 years who presented to the adult ED of TASH during the study period and whose medical records were available for review.

### 4.3.2. Study Population

HIV-positive adults (aged ≥15 years) from the source population who meet eligibility criteria.

## 4.4. Eligibility criteria

### 4.4.1. Inclusion Criteria:

- ✓ Age ≥15
- ✓ Confirmed HIV status.
- ✓ Emergency visit during the study period.

### 4.4.2. Exclusion Criteria

- ✓ Inability to Retrieve Records.
- ✓ HIV patients with trauma.
- ✓ Patients with repeated visit during the study period.

## 4.5. Sample Size Determination

The required sample size was calculated using a single proportion formula:

$$n = \frac{Z_{\alpha/2}^2 \cdot P(1-P)}{d^2}$$

Where $Z_{\frac{\alpha}{2}}$ is the value from the standard normal table for the desired confidence interval (1.96 for 95% CI), $P$ is the estimated prevalence, $d$ is the margin of error (0.05), and $n$ is the minimum required sample size. Since there was no prior prevalence estimate in the local context, $P$ was assumed to be 0.5, and the first sample size was increased by 50%. Substituting the values:

$$n = \frac{(1.96)^2 \cdot 0.5(1-0.5)}{(0.05)^2} = 384$$

Because the total population was less than 10,000, a finite population correction was applied:

$$\text{Corrected sample size} = \frac{n \cdot N}{n+N}$$

Where $N$ is the estimated total population of HIV-positive patients expected in the Adult ED over six months, which was 120 based on earlier records [24]. Using this correction, the sample size was reduced to **92**. To account for incomplete or missing records, a 10% adjustment was

added, resulting in a final sample size of **103.** Based on the sampling approach, **all 104 eligible patients** were included finally.

## 4.6. Sampling Frame/unit and Method

A **census sampling approach** was used to review all clinically confirmed HIV-positive patient records of those who attended the ED during the study period.

## 4.7. Study Variables

### 4.7.1. Independent Variable:

- ✓ Socio demographic characteristics
- ✓ Referral source
- ✓ Triage category
- ✓ Duration of illness
- ✓ Clinical presentation
- ✓ ART and chemoprophylaxis information
- ✓ ART side effects
- ✓ CD4 count
- ✓ Co morbidities

### 4.7.2. Dependent Variable:

- ✓ Patient outcome

## 4.8. Operational Definitions

**ART Status:** This refers to whether a patient is currently receiving ART for the management of HIV. Patients can be categorized as "on ART," "ART naïve," or "unknown" [25], defined as follows:

- ✓ **ART-naive:** No recorded ART use prior to the ED presentation.
- ✓ **On ART:** The patient has been taking ART for at least one month prior to the ED visit.

**Immunologic status**

- ✓ **Viral suppression**: A viral load that is undetectable, equal to or less than 50 copies/ml[25].
- ✓ **Low level viremia**: Is one or more viral load results are 50-1000 copies/ml[26].

- ✓ **Virological failure:** Viral load above 1000 copies/ml based on two consecutive viral load measurements within 3 months apart with enhanced adherence support following the first viral load test[26].

**Comorbidity:** Any chronic pre-existing medical illness documented in the chart.

**Outcomes:** Refers to the outcomes of care provided to patients during their stay in the ED. These outcomes include admission to an inpatient ward or ICU, discharge to home, referral to another hospital, leaving against medical advice, ED mortality, length of stay in the ED, and instances of patients lost to follow-up.

## 4.9. Data Collection Tools, Methods, and Procedures

### 4.9.1. Data Collection Tools and Methods

A structured data collection form was developed by the principal investigator, with some components adapted from the literature and others added based on the study area's configuration, to extract information from patient medical records. The tool included sections on demographic information, HIV history and immunological data, laboratory and imaging results, clinical presentation, comorbidities, management in the ED, and patient outcomes.

### 4.9.2. Data Collection Procedure

Precautions were taken to ensure precise and consistent collection. Prior to formal data collection, the principal investigator provided training on standardized data extraction procedures for data collectors. The tool was pilot tested using 10 patient records to ensure clarity, completeness, and usefulness. The pilot showed how to update, recategorize and change variables. Each EMR of eligible patients was reviewed by each data collector in abstract form. The entries were confirmed by the principal investigator with the missing/incomplete entries corrected by ID numbers and coding, and data entries were made correctly. Data extraction was undertaken using KOBO Toolbox.

## 4.10. Data Quality Control

The integrity of the data was supported through various regular quality control steps. A random double check was made daily on a subset of charts by the principal investigator. There were weekly meetings with data collectors regarding questions raised or issues about data collection and protocol compliance. Data forms were prepared in English and reviewed for completeness before entering SPSS.

### 4.11. Data Processing and Analysis

Data obtained with KOBO Toolbox was coded in the beginning and exported to Microsoft Excel before being exported into SPSS version 27 to be statistically analyzed.

Data exported was subject to a consistency check during and post to minimize data entry errors. Data of patients and their outcomes were recorded with descriptive statistics on clinical profile and results. Tables reported results in terms of frequency and percentages. For continuous variables normality was calculated by the Shapiro-Wilk test. The normally distributed variables were represented by means and standard deviations, and the skewed variables were represented by medians with interquartile ranges (IQR) and represented in tables.

For categorical variables and binary outcomes chi-square and Fisher's exact tests were employed to examine associations of independent variables with clinical outcomes. For continuous variables, independent t-test was performed if the data were normally distributed, and the Mann–Whitney U test was used for non-normally distributed data. Variables with a p-value <0.25 in bivariate analysis were included in the multivariable logistic regression model. Model assumption tests including an independent observation in the dataset, no multicollinearity among predictors, no outliers, and linearity between continuous independent variables and the log-odds of the dependent variable were checked before running the analysis. Model fitness was also evaluated using the Hosmer-Lemeshow goodness-of-fit test. Binary logistic regression was then performed to find independent predictors of clinical outcomes such as death and ICU admission. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported, and a p-value <0.05 was considered statistically significant. Results were presented in clear summary tables to support right interpretation and effective communication of the study findings.

### 4.12.Missing Data Assessment

The completeness of all key study variables was evaluated, and the proportion of missing observations is reported in Annex 2. Analyses were performed on available cases. As CD4 count (62.5%) and viral load (95.2%) were often missing, while other variables were 100% complete, a complete-case analysis was considered proper.

## 5. ETHICAL CLEARANCE

Permission to conduct the study was obtained from the Institutional Review Board (IRB) of Addis Ababa University College of Health Science, School of Medicine, Department of Emergency and Critical Care Medicine (IRB approval no: Em/sm/443/17/)(Look Annex 3).

# 6. RESULT

## 6.1. Baseline patient characteristics

Out of a total of 7,346 patients presenting to the ED, 116 were HIV-positive. After excluding 3 trauma cases and 19 repeat visits, 104 patients were included finally. Of these, 64 (61.5%) were female and 40 (38.5%) were male, with a mean age of 45.78 ± 14.25 years. Most patients, 90 (86.5%), were from Addis Ababa, 43 (41.3%) were self-referred, and 103 (99%) had an earlier HIV diagnosis. Advanced disease was common, with 41 (39.4%) of patients classified as WHO clinical Stage IV. ART coverage was high, 102 (98.1%), on therapy, and the most common regimen was TDF + 3TC + DTG (34.6%). ART-related side effects were unknown. CD4 counts at presentation were available for 37 patients (35.6%), and viral load results were available for 5 patients (4.8%) (look Table 1).

***Table 1: Baseline characteristics of HIV-Positive Patients Presenting to the ED of TASH, 2025(N=104).***

| **Variables** | | **Frequency** | **percent** | **Median (IQR)/ Mean± SD** |
|---|---|---|---|---|
| **Age (years** | | --- | --- | 45.78±14.25 |
| **Sex** | Male | 40 | 38.5 | - |
| | Female | 64 | 61.5 | - |
| **Address** | Addis Ababa | 90 | 86.5 | - |
| | Regions | 14 | 13.5 | - |
| **Source of ED presentation** | Self | 43 | 41.3 | - |
| | Regular OPD | 33 | 31.7 | - |
| | Health center | 17 | 16.3 | - |
| | Government Hospitals | 8 | 7.7 | - |
| | Private Hospitals/Clinics | 3 | 2.9 | - |
| When was HIV diagnosed | Newly diagnosed | 1 | 1 | - |
| | Previously diagnosed | 103 | 99 | - |
| ART status | ART- naïve | 2 | 1.9 | - |
| | On -ART | 102 | 98.1 | - |
| ART regimens | Unknown | 50 | 48.1 | - |
| | TDF+3TC+DTG | 36 | 34.6 | - |

| | | | | |
|---|---|---|---|---|
| | ABC+3TC+DTG | 8 | 7.7 | - |
| | Others | 9 | 8.5 | - |
| WHO clinical stage | Stage 1 | 33 | 31.7 | - |
| | Stage 2 | 20 | 19.2 | - |
| | Stage 3 | 10 | 9.6 | - |
| | Stage 4 | 41 | 39.4 | - |
| Line of ART | 1st line | 42 | 40.2 | - |
| | 2nd line | 9 | 8.7 | - |
| | 3rd line | 4 | 3.8 | - |
| | Unknown | 49 | 47.1 | - |
| ART side effects | Unknown | 104 | 100 | - |
| Duration of ART (median years (IQR)) | | | | 12(5-17) |
| CD4 count at presentation(cells/µL) | Available | 37 | 35.6 | 184(130-418) |
| Viral load at presentation(copies/ml) | Available | 5 | 4.8 | 340(40-50545) |

***SD**: Standard Deviation. **IQR**: Interquartile Range. **ART**: Antiretroviral Therapy. **TDF**: Tenofovir Disoproxil Fumarate .**3TC**: Lamivudine. **DTG**: Dolutegravir .**ABC**: Abacavir. **ATV/r:a**tazanavir boosted Ritonavir. **DRV/r**: Darunavir boosted with Ritonavir: **Zidovudine**. **SWT:** Shapiro-Wilk Test **CD4: C**luster of Differentiation 4. OPD: Outpatient department*

## 6.2. Clinical Presentation of HIV positive patients

The most commonly presenting complaints were vomiting, 35 (14.1%), diarrhea 26 (10.5%), and easy fatigability 25 (10.1%). Most patients were triaged as orange, 40(38.5%), followed by green ,39 (37.5%), using the South African Triaging Score(SATS). Additionally, 58 (55.8%) of the 104 patients had comorbidities. Malignancies accounted for 36 (43.9%) of these, followed by hypertension at 14 (17.1%). Chief complaint and comorbidity were multi-response variables, where percentages reflect proportion of total responses, not total patients (look *Table 2).*

***Table 2: Chief Complaints, triage category, and comorbidities of HIV-Positive Patients presenting to ED of TASH,2025.***

| | **Variables** | **Frequency** | **Percent** |
|---|---|---|---|
| **Chief complaints** | Vomiting | 35 | 14.1 |
| | Diarrhea | 26 | 10.5 |
| | Easy fatigability | 25 | 10.1 |
| | Shortness of breath | 24 | 9.7 |
| | Fever | 23 | 9.3 |

| | | | |
|---|---|---|---|
| | Cough | 19 | 7.7 |
| | Loss of appetite | 19 | 7.7 |
| | Others | 77 | 30.9 |
| **Triage Category** | Orange | 40 | 38.5 |
| | Green | 39 | 37.5 |
| | Red | 12 | 11.5 |
| | Yellow | 13 | 11.5 |
| **Comorbidities** | Yes | 58 | 55.8 |
| | Malignancy | 36 | 43.9 |
| | Hypertension | 14 | 17.1 |
| | Diabetes Mellitus | 9 | 11 |
| | Chronic kidney disease | 8 | 9.8 |
| | Others | 15 | 18.3 |

*†Percentages exceed 100% as multiple responses were allowed.*

## 6.3. Laboratory and Imaging

Among the study population, the median white blood cell count, hemoglobin, and platelet count are 6.85 $\times 10^3/\mu L$ (IQR: 4.75–11.60),11.45(8.73-13.10) g/dL, and 240 $\times 10^3/\mu L$ (IQR: 142–329) respectively.

About imaging, 65 (62.5%) patients underwent investigations, with ultrasound being most frequent (48.1%), followed by X-ray (37.7%) and CT scan (14.3%). The most common X-ray findings were pneumonia 11 (10.6%) and pulmonary tuberculosis 7 (6.7%). Eight patients (8, 22.2%) revealed unremarkable ultrasound scans, while acute deep vein thrombosis and acute kidney injury (likely) 3 (8.3% each) were the common abnormalities found. The most common CT scan finding was unremarkable. Some patients had more than one imaging modality at the same time (look *table 3*).

***Table 3: Laboratory and Imaging of HIV-Positive Patients presenting to ED of TASH,2025(N=104)***

| **Laboratory** | | **Frequency** | **percent** | **Median(IQR)/ Mean ±SD** |
|---|---|---|---|---|
| Complete cell count | White cell count (×10³/µL) | - | - | 6.85(4.75-11.6) |
| | Hemoglobin (mg/dl) | - | - | 11.45(8.73-13.10) |
| | Platelet (×10³/µL) | - | - | 240(142-329) |
| Liver function test | AST (mg/dL) | - | - | 28.6(20.7-39) |
| | ALT (mg/dL) | - | - | 16(10-22) |
| | ALP (mg/dL) | - | - | 101(73-130) |
| Renal function test | Creatinine (mg/dL) | - | - | 1.1(0.7-1.8) |
| | Urea (mg/dL) | - | - | 30.5(22.7-72) |
| Electrolytes | Sodium (mmol/L) | - | - | 135.27±5.13 |
| | Potassium (mmol/L) | - | - | 3.85±0.54 |
| | Chloride (mmol/L) | - | - | 103.63±6.31 |
| Imaging | Yes | 65 | 62.5 | - |
| | X -ray | 29 | 37.7 | - |
| | Ultrasound | 37 | 48.1 | - |
| | CT scan | 11 | 14.3 | - |
| X-Ray Findings | Pneumonia | 11 | 10.6 | - |
| | Unremarkable | 8 | 7.7 | - |
| | Pulmonary tuberculosis | 7 | 6.7 | - |
| | Others | 2 | 2 | - |
| Ultrasound Findings | Unremarkable | 8 | 22.2 | - |
| | Acute Deep venous thrombosis | 3 | 8.3 | - |
| | Acute kidney injury(likely) | 3 | 8.3 | - |
| | Cervical ca | 2 | 5.6 | - |
| | Others | 20 | 50.4 | - |
| CT scan Findings | Unremarkable | 4 | 3.8 | - |
| | Pneumonia | 1 | 1 | - |
| | Others | 5 | 5 | - |

***AST:*** *Aspartate amino transferase,* ***ALT:*** *Alanine amino transferase,* ***ALP:*** *Alkaline phosphates,* ***SWT:*** *Shapiro-Wilk Test,* ***SD****: standard deviation,* ***IQR****: Interquartile range-*

## 6.4. **Diagnoses of HIV-Positive Patients at ED.**

Among the ED diagnoses, hematologic disorders were the most common, affecting 50 (48.1%) patients, followed by respiratory disorders in 46 (44.2%) and gastrointestinal(GI) disorders in 30 (28.8%) patients. The leading specific diagnoses were anemia 42 (56.8%), acute gastroenteritis 21 (53.3%), pneumonia 19 (41.3%), and pulmonary tuberculosis 15 (36.2%). Sepsis and septic shock accounted for 28.8% of cases, with GI and respiratory systems being the most common sources of infection. Surgical disorders accounted for 16 (15.4%) of all diagnoses, with nephrolithiasis being the most frequent, reported in 3 (18.8%) patients. Diagnosis categories

were multi-response variables, where percentages reflect proportion of total responses, not total patients (look *Table 4*).

***Table 4 : ED Diagnoses of HIV-Positive Patients Presenting to ED of TASH, 2025***.

| Affected System | | Frequency | Percent |
|---|---|---|---|
| Hematological disorders | Yes | 50 | 48.1 |
| | Anemia | 42 | 56.8 |
| | Thrombocytopenia | 11 | 14.9 |
| | Pancytopenia | 7 | 9.5 |
| | Others | 14 | 18.6 |
| Respiratory disorders | Yes | 37 | 35.6 |
| | Pneumonia | 19 | 41.3 |
| | Pulmonary Tuberculosis | 15 | 36.2 |
| | Others | 12 | 26.1 |
| Gastrointestinal disorders | Yes | 30 | 28.8 |
| | Acute gastroenteritis | 21 | 53.3 |
| | Peptic ulcer disease | 5 | 13.2 |
| | Esophageal candidiasis | 3 | 7.9 |
| | Others | 9 | 23.8 |
| Renal disorders | Yes | 30 | 28.8 |
| | Acute kidney injury | 15 | 44.1 |
| | Electrolyte disturbance | 9 | 26.5 |
| | Others | 10 | 29.4 |
| Sepsis ± septic shock | Yes | 30 | 28.3 |
| | Sepsis | 24 | 58.5 |
| | Septic shock | 17 | 41.5 |
| Focus of sepsis | Gastrointestinal system | 9 | 8.5 |
| | Chest | 7 | 6.6 |
| | Genitourinary system | 3 | 2.8 |
| | Others | 4 | 3.7 |
| Cardiovascular disorders | Yes | 15 | 14.4 |
| | Acute decompensated heart failure | 4 | 22.2 |

| | | | |
|---|---|---|---|
| | Arrhythmia | 3 | 16.7 |
| | Hypertensive crisis | 3 | 16.7 |
| | others | 6 | 44.6 |
| Genitourinary disorders | Yes | 13 | 12.5 |
| | Urinary tract infection | 7 | 46.7 |
| | Nephrolithiasis | 3 | 20.0 |
| | Others | 5 | 33.3 |
| Neurological disorders | Yes | 12 | 11.5 |
| | Bacterial meningitis | 3 | 25 |
| | Tuberculous meningitis | 3 | 25 |
| | Central nervous system toxoplasmosis | 3 | 25 |
| | Ischemic stroke | 3 | 25 |
| | Others | 7 | 58.4 |
| Endocrine disorders | Yes | 7 | 6.7 |
| | Diabetic ketoacidosis | 2 | 22.2 |
| | Hypothyroidism | 2 | 22.2 |
| | Hypoglycemia | 1 | 11.1 |
| | Others | 4 | 44.4 |
| Skin and soft tissue disorders | Yes | 6 | 5.8 |
| | Wound infection | 4 | 57.1 |
| | Others | 3 | 42.9 |
| Surgical disorders | Yes | 16 | 15.4 |
| | Nephrolithiasis | 3 | 18.8 |
| | Esophageal ca | 2 | 12.5 |
| | Cholecystitis | 2 | 12.5 |
| | Benign prostatic hypertrophy | 2 | 12.5 |
| | Other | 7 | 44.1 |

## 6.5. Treatments Administered in the ED

HIV-positive patients were provided with a wide range of treatments during ED visits, with antibiotics 61 (21.9%) being the most frequent therapy, followed by fluid resuscitation 47 (16.8%) and analgesics 38 (13.8%), with some had more than one treatment at the same time (see *Table 5*).

***Table 5: Treatments Provided for HIV-Positive Patients presenting to the ED of TASH,2025.***

| Types of treatment | Frequency | Percent |
|---|---|---|
| Antibiotics | 61 | 21.9 |
| Fluid resuscitation | 47 | 16.8 |
| Analgesia | 38 | 13.8 |
| Anticoagulants | 17 | 6.1 |
| Proton Pump Inhibitor | 16 | 5.7 |
| Antiemetics | 15 | 5.4 |
| Blood transfusion | 13 | 4.7 |
| Anti-Tuberculosis | 11 | 3.9 |
| Steroids | 9 | 3.2 |
| Antifungals | 9 | 3.2 |
| Others | 43 | 15.7 |

## 6.6. Outcomes of HIV-Positive Patients in the ED

The majority were discharged home, 51 (48.1%), followed by admission to the wards, 32 (30.2%), died at the ED, 15 (14.2%), and admitted to the ICU, 4 (3.8%). Most patients, 81 (76.4%), stayed in the ED for ≥24 hours, with a median length of ED stay of 2 days (IQR: 1–3). Refractory shock accounted for the majority ED death, 6 (5.8%), followed by multi-organ failure in 3 cases (2.9%), and Pulmonary embolism 2 (1.9%), highlighting the high vulnerability of HIV-positive patients to severe infectious and multi-organ complications in the emergency setting (look *Table 6*).

***Table 6: Outcome of HIV-positive patients presenting to ED of TASH,2025(N=104).***

| Outcomes | Variables | Frequency | percent | Median (IQR) |
|---|---|---|---|---|
| | Discharged home | 51 | 48.1 | --- |
| | Admitted to wards | 32 | 30.2 | --- |
| | Death at ED | 15 | 14.2 | --- |
| | Admitted to ICUs | 4 | 3.8 | --- |
| | LAMA | 2 | 1.9 | --- |
| | <24 hours Length of stay | 33 | 21.7 | 2(1-3) days |
| | ≥24hours Length of stay | 81 | 76.4 | |
| **Cause of Death** | Refractory septic shock | 6 | 5.8 | --- |
| | Multi-organ failure | 3 | 2.9 | --- |
| | Massive Pulmonary Embolism | 2 | 1.9 | --- |
| | Type 1 Respiratory failure | 2 | 1.9 | --- |
| | Refractory hypoxia | 1 | 0.9 | --- |
| | Refractory hemorrhagic shock | 1 | 0.9 | --- |

## 6.7. Factors affecting Mortality among HIV-Positive Patients in the ED

Although female sex (P =0.112), Regional residence (P =0.116), advanced WHO clinical stage (P < 0.001), critical triage category (P =0.102), having comorbidities (p=0.009) hemoglobin (P =0.005), and white blood cell count (WBC) (P = 0.169) showed a relationship with mortality (look *Annex 4* and Table 7 for more details), in the multivariable analysis, only advanced WHO clinical stage (AOR=6.068, 95%CI:1.273-28.880, P=0.024), high white blood cell count(AOR=1.205, 95% CI:1.015-1.429, P=0.033), and hemoglobin (AOR=0.704, 95% CI: 0.540-0.918,P=0.009) remained significantly associated with mortality (look *Table 7* for more details).

Mortality was not associated with CD4 count at presentation (P=0.476) and viral load at presentation(P=1.000)(look *Annex 4* for more details).

***Table 7: Factors associated with ED Mortality of HIV-positive patients presenting to the ED of TASH 2025(N=104).***

| Factors | | Died | Survived | COR (95%CI) | P-value | AOR (95%CI) | P-value |
|---|---|---|---|---|---|---|---|
| **Sex** | Female | 12 | 52 | 2.50 (0.750-8.320) | 0.112 | 2.559(0.548-11.955) | 0.232 |
| | Male | 3 | 37 | 1 | | 1 | |
| **Address** | AA | 11 | 79 | 1 | 0.116 | 1 | 0.088 |
| | Regions | 4 | 10 | 2.873(0.767-10.754) | | 4.496(0.799-25.286) | |
| **WHO clinical Stage** | **Early (1, 2 and 3)** | **3** | **60** | **1** | **<0.001** | **1** | **0.024** |
| | **Advanced (stage 4)** | **12** | **29** | **8.276(2.166-31.624)** | | **6.068(1.273-28.880)** | |
| **Triage category** | Critical (R+0) | 11 | 44 | 2.69(0.0.79-9.1) | 0.102 | 2.960(0.600-14.600) | 0.183 |
| | Stable (G+Y) | 4 | 45 | 1 | | 1 | |
| **Comorbidity** | No | 2 | 44 | 1 | 0.009 | 1 | 0.215 |
| | Yes | 13 | 45 | 6.356(1.355-29.813) | | 3.107(0.518-18.627) | |
| **WBC(median(IQR))** | | **11.3(3.21-13.10)** | **6.5(4.8-10.45)** | **----** | **0.169** | **1.205(1.015-1.429)** | **0.033** |
| **Hemoglobin (mean ±SD)** | | **8.8(6.1-11.0)** | **11.50(9.30-13.15** | **----** | **0.005** | **0.704(0.540-0.918)** | **0.009** |

***ART**: Antiretroviral Therapy. **AOR:** Adjusted Odds Ratio. **WHO**: World Health Organization. **CI**: Confidence Interval **COR**: Crude odds Ratio, **Advanced WHO stage**: stage 4, **R+O**: Red + Orange , **G+Y**: Green +yellow, **WBC**: White blood cell count, **IQR**: Interquartile range, **SD**: standard*

## 7. DISCUSSION

This study emphasizes the significant clinical burden met at the TASH ED and offers one of the first comprehensive accounts of emergency presentations and outcomes among adult HIV-positive patients in Ethiopia. Most patients were middle-aged and female [5,9,19] showing higher HIV prevalence and mortality among women, and from Addis Ababa. Nearly all the patients (99%) had previously received an HIV diagnosis and were receiving ART(98.1%), a higher percentage than that reported in South Africa (82.7%) [9] but comparable to the 98% national report[5]. This shows that ED visits at TASH were more often caused by complications of pre-existing conditions than by new diagnoses. However, in contrast to national expectations of widespread viral suppression[5], the availability of CD4 counts(35.6)% and viral load assessment(4.8%) is suboptimal and suggests a failure of routine care follow up, immunologic monitoring, and documentation.

Vomiting (14.1%), diarrhea(10.5%), fatigue(10.1%), dyspnea (9.7%), and fever (9.3%) were the most common presentations, distinct from the South African study, which indicated chronic cough (40%) and night sweats (25%) were the most common [9]. The FMOH report also showed weight loss(87.5%), fever(84.3%), and chronic diarrhea (59.2%) were the commonest symptoms in the outpatient settings[10].

Hematologic disorders (48.1%), respiratory diseases (35.6%) and gastrointestinal illnesses (28.8%) were ranked among the highest prevalent ED diagnoses. This reflected TASH as the major hematologic care center in the country, unlike the South African study which reported most patients with respiratory system diseases (43.5%), followed by pathology involving the genitourinary system (20.3%), and gastrointestinal system (18.2%) [9]. Bacterial pneumonia (41.3%) then pulmonary TB(36.2%) were identified as the most common OIs like global and regional studies [9,15], but differing from local studies where Pulmonary TB was the most common OI reported[16,17]. Approximately 11.5% of patients were classified as red, often needing immediate lifesaving interventions.

Anemia was the primary laboratory abnormality, with a median(IQR) hemoglobin of 11.45(8.73-13.10) g/dL [9]. Bacterial pneumonia and pulmonary TB stood for the most common imaging findings, consistent with reports from South Africa and China [9,15].

Results revealed a heavy burden, with a death rate of 14.2% in the ED, comparable to results from South Africa [9], while exceeding the 10.3% death at Shashemene and Assela hospitals [20], and the 6.85% death at Dessie Comprehensive Hospital [22]. Advanced WHO clinical stage [20,22], low hemoglobin [20], and white blood cell count all predicted mortality independently. This was mainly because of the advanced and critical presentations and more hematological and infectious disease cases in the TASH ED. ICU admissions were still low (3.8%), below the 16.7% reported in Johannesburg [9] due to limited ICU bed availability or poor prognosis. Extended ED duration (76.4% of patients staying ≥24 hours) mirrors system level constraints such as bed shortages, delayed diagnostic turnaround times, and need for hospital management.

Overall, this study provides insight into the thorough sociodemographic, clinical, and laboratory characteristics as well as outcomes from HIV-positive adults presenting to the ED. Conducted at the country's largest tertiary teaching hospital and using descriptive and multivariable analyses, the study allowed for a detailed characterization of HIV-related emergencies, provides important foundational evidence for further research, and has clear implications on triage, early intervention, and resource distribution. Its retrospective design, single-center setting, small sample size, six-month data collection period, and missing CD4 and viral load reduced consistency of the variables, representativeness, generalizability, and potential for causal inferences.

## 8. CONCLUSION

Many HIV-positive adult patients presenting in TASH ED had advanced diseases, high mortality, and prolonged length of stay in the ED. Advanced WHO stage, high WBC, and low hemoglobin are independently associated with increased mortality. High ART coverage did not prevent advanced disease presentations, due to gaps in immunologic and virologic monitoring and poor continuity of care. These findings underscore the need for early HIV diagnosis, proper monitoring, optimized care, and intervention.

## 9. RECOMMENDATIONS

I recommend strengthening ED data systems via HIV specific EMR recordings, such as CD4 count, viral load, and ART regimen. I further suggest multicenter prospective studies to nationally characterize HIV emergency patterns. I also recommend increasing the availability of laboratories and imaging modalities within the hospital environment. Ultimately, clear ED to ward transfer protocols need to be set up to reduce avoidable morbidity and prolonged stays.

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# ANNEXES

## Annex 1: Data Collection Abstraction Tool

(The data collection tool was developed by the principal investigator based on existing literature, with components adapted from Laher et al. (2021), which profiled HIV-positive patients in emergency departments in Johannesburg, South Africa, to ensure contextual relevance and comparability**.)**

**Section 1: Sociodemographic Characteristics**

**1.** Patient ID: _____

2. Age: _____ years

3. Sex: ☐ Male ☐ Female

4. Address

☐ Addis Ababa ☐ Regions, specify: _____

5. Source:

☐ Self-referred

☐ Regular OPD

☐ Referred from Health Center

☐ Private Hospital

☐Government hospital

**Section 2: HIV clinical history**

6.When was HIV Diagnosis made

- Previously before ED presentation: _____ years
- Newly diagnosed at presentation

7. WHO Clinical Stage:

- ☐ Stage 1
- ☐ Stage 2
- ☐ Stage 3
- ☐ Stage 4

8. ART Status:

- ☐ ART naive
- ☐ On ART:
    1. Duration on ART……. years
    2. Line of therapy: ☐ 1st line ☐ 2nd line ☐ 3rd line
    3. ART Regimen currently on (if applicable): _____
    4. Side effects if on ART currently (if any) ----------

**Section 3: Immunological Data**

9. CD4 Count at presentation: ☐Yes ☐No

☐ If yes, Amount: _____ cells/μL

10. Viral Load at Presentation: ☐Yes ☐No

☐ If yes, Amount_____ copies/mL

**Section 4: Clinical presentation**

**11. Vital sign at presentation**

- Respiratory Rate: _____ breaths/min
- Oxygen Saturation: _____%
- Blood Pressure: _____ mmHg
- Heart Rate: _____ bpm
- GCS Score: _____

**12: Triage category**

- ☐ Green
- ☐ Yellow
- ☐ Orange
- ☐ Red

13. Main reason ED visit (**Chief Complaints**)(Check all that apply):

- Vomiting
- Shortness of breath
- Fever
- Cough
- Easy fatigability
- Diarrhea
- Headache
- Abdominal pain
- Loss of consciousness
- Yellowish discoloration of eyes
- Urinary complaints
- Poor appetite
- Body weakness
- Bloody vomiting
- Difficulty of swallowing
- Chest pain
- Others (Specify): _____

**Section 5: laboratory findings and Imaging**

**14. Baseline investigations**

- CBC
    - WBC----------
    - Hemoglobin----------
    - Platelet----------

- LFT
  - AST----------
  - ALT----------
  - ALP----------
- RFT
  - Cr----------
  - BUN----------
- Serum Electrolytes
  - Sodium----------
  - Potassium----------
  - Chlorine----------
  - Calcium----------
  - Magnesium----------
- Other specify --------=----------

**15. Imaging**

- Any imaging done:
  - Yes
  - No
- X-ray: ☐Yes ☐No
  - Finding ……
- Ultrasound: ☐Yes ☐No
  - Finding ……...
- CT scan ☐Yes ☐No
  - Finding ……...
- MRI: ☐Yes ☐No
  - Finding ……...
  - Others, specify……...

**Section 6: Emergency Department Diagnosis**

16. **Diagnosis:**

- ☐ Hematologic disorders
  - Anemia,
  - Pancytopenia
  - DVT
  - Neutropenic fever
  - Lymphoma
  - Leukemia
  - Others specify _____

- ☐ Respiratory conditions
    - Pneumonia,
    - TB
    - PCP
    - PE
    - Other specify_____
- ☐ Gastrointestinal conditions
    - AGE,
    - Oral candidiasis
    - Esophageal candidiasis
    - PUD
    - Upper GI bleeding
    - Lower GI bleeding
    - Others specify …….
- ☐ Neurological conditions
    - CNS toxoplasmosis,
    - Seizure disorder
    - Cryptococcus meningitis
    - Bacterial meningitis
    - TB meningitis
    - Brain abscess
    - CNS lymphoma
    - Others specify_____
- ☐ Cardiovascular conditions
    - CHF,
    - MI
    - Others specify_____
- ☐ Renal conditions
    - AKI
    - CKD
    - ACKD
    - UTI
    - Electrolyte disturbance
    - Others specify……
- ☐ Sepsis and Shock
    - Sepsis
    - Septic shock
    - Focus of infection

- ☐ Drug-related conditions
    - ART toxicity
    - ART failure
    - Others specify _____
- ☐ Surgical conditions: Yes/No
    - (Specify): _____
- ☐ Psychiatric conditions
    - Psychosis
    - Substance use
    - Others specify.
- ☐ Skin and soft tissue
    - Cellulitis
    - Kaposi sarcoma
    - Herpes Zoster
    - Others specify.
- ☐ Other systems: specify------

**Section 7: Comorbidities**

**17. Co-morbidities:**

☐ Malignancy specify _____

☐ cardiovascular disease specify_____

☐ Chronic viral hepatitis_____

☐ Seizure disorder_____

☐ Other (Specify): _____

☐ None

**Section 8: Emergency Department Management**

18. **Treatment Provided**:

☐ Parenteral antibiotic

☐ Oral antibiotic

☐ Resuscitation

☐ Blood transfusion

☐ Co-trimoxazole

☐ Heparin

☐ Fluconazole

☐ Supportive care specify _____

☐ Other (Specify): _____

**Section 9: Emergency Department outcome**

19. **Final Outcome:**

☐ Admitted to the wards

☐ ICU Admission

☐ Discharged

☐ Referred

☐ ED Death

☐ DAMA

## Section 10: Mortality Data

20. Cause of Death:

☐ Septic shock

☐ multi-organ failure

☐ Respiratory failure

☐ CNS toxoplasmosis

☐ Other (Specify): _____

**Section 11: Length of ED stay.**

**21.** Stay at ED

- Less than 24 hours in the ED: specify ---------days.
- ≥24 hours stay in the ED: specify ----------day.

**Annex 2: Completeness of key variables.**

| Variable | Frequency (missing) | Percent missing | Comment |
|---|---|---|---|
| Age | 0 | 0 | Complete |
| Sex | 0 | 0 | Complete |
| CD4 count | 65 | 62.5 | Limited laboratory documentation |
| Viral load | 99 | 95.2 | Limited laboratory documentation |
| White Blood cell count | 0 | 0 | Complete |
| Hemoglobin | 0 | 0 | Complete |
| Address | 0 | 0 | Complete |
| WHO clinical stage | 0 | 0 | Complete |
| Triage category | 0 | 0 | Complete |
| Comorbidity | 0 | 0 | Complete |
| Mortality | 0 | 0 | Complete |
| Length of stay | 0 | 0 | Complete |

## Annex 3: Ethics approval and consent to take part.

This study received ethical approval from the Institutional Review Board of Addis Ababa University College of Health Sciences, Department of Emergency and Critical Care Medicine (IRB approval no. Em/sm/443/17). The IRB waived the requirement for informed consent from everyone, given the retrospective, de-identified nature of the research design. All procedures were performed following institutional and national ethical guidelines. All documents were kept safe and secure, with all proper precautions taken.

## Annex 4: Univariate/Bivariate analysis result of mortality and ICU admission.

| | | Mortality | | | | ICU admission | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Categorical variables** | | **Died** | **Survived** | **$\chi^2$/ FET** | **P-value** | **Not admitted** | **admitted** | **$\chi^2$/ FET** | **P value** |
| Sex | Female | 13 | 52 | $\chi^2$=4.37 | 0.037 | 64 | 1 | FET | 0.147 |
| | Male | 2 | 37 | | | 36 | 3 | | |
| Address | AA | 10 | 78 | FET | 0.116 | 85 | 4 | FET | 1.00 |
| | Regions | 5 | 11 | | | 15 | 0 | | |
| WHO clinical stage | Early | 3 | 60 | $\chi^2$=12.09 | <0.001 | 61 | 2 | FET | 0.646 |
| | advanced | 12 | 29 | | | 39 | 2 | | |
| ART status | ART naive | 0 | 2 | FET | 1.000 | 1 | 1 | FET | 0.076 |
| | On ART | 15 | 87 | | | 99 | 3 | | |
| Triage category | critical | 13 | 44 | $\chi^2$=2.68 | 0.102 | 54 | 3 | FET | 0.625 |
| | stable | 2 | 45 | | | 46 | 1 | | |
| Comorbidities | Yes | 13 | 45 | $\chi^2$= 6.78 | 0.009 | 57 | 1 | FET | 0.319 |
| | No | 2 | 44 | | | 43 | 3 | | |
| CD4 count at presentation | <250 | 9 | 15 | FET | 0.476 | 23 | 1 | FET | 1.00 |
| | ≥250 | 3 | 10 | | | 13 | 0 | | |
| Viral load at presentation | <50 | 1 | 1 | FET | 1.00 | 2 | 0 | † | |
| | >50 | 1 | 2 | | | 3 | 0 | | |
| **Continuous variables** | | **Died** | **survived** | **t/U** | **P value** | **Not Admitted** | **admitted** | **t/U** | **P value** |
| Age | | 47.73±8.96 | 45.45±14.97 | t=-0.81 | 0.422 | 45.64±14.40 | 49.25±10.5 | t=-0.49 | 0.622 |
| CD4 at presentation | | 178(146-193) | 187(119-506) | U=112 | 0.525 | 186(137-418) | 1 | U=0.00 | 0.092 |
| White Blood cell count | | 11.3(3.21-13.1) | 6.5(4.8-10.45) | U =519 | 0.169 | 6.69(4.7-11.55) | 11.8(6.4-14.5) | U=114 | 0.148 |
| Hemoglobin | | 8.8(6.10-11.0) | 11.5(9.3-13.15) | U=365 | 0.005 | 11.35(8.65-13.05) | 12.65(9.58-14.0) | U=142 | 0.331 |

*$\chi^2$=chi-square tests, **t**=Independent t test, **U**=Mann -Whitney u test, **FET**= Fisher Exact Test, **WHO**=World Health Organization, **ICU**=Intensive Care Unit. **ART**=Antiretroviral Therapy.*

*†=No statistics are computed because ICU admission is a constant*