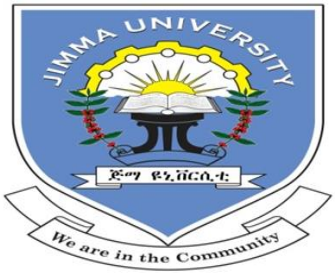
Clinical and Humanistic outcomes among hospitalized HIV/AIDS patients in Ethiopian tertiary care settings: Multi-method design.



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NOVEMBER, 2018

JIMMA, ETHIOPIA

Jimma University

Institute of health

School of Pharmacy

Clinical and Humanistic outcomes among hospitalized HIV/AIDS patients in Ethiopian tertiary care settings: Multi-method design.

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Abstract

Background: Evidences from developed countries showed that non- Acquired immunodeficiency syndrome(AIDS) related illnesses are becoming the leading cause of death among hospitalized Human immune virus (HIV)/ AIDS patients and their humanistic outcome (health related quality of life (HRQoL) is improved with scale up of combined antiretroviral therapy (cART). However; there is limited evidence regarding these outcomes among HIV infected patients admitted to hospitals in low-income settings like Ethiopia.

Objective: To determine the clinical and humanistic outcomes among admitted HIV/AIDS patients in selected Ethiopian tertiary care settings.

Methods: A mixed study design was conducted among admitted HIV/AIDS patients from April 1 to August 31, 2018 in selected tertiary hospitals of Ethiopia. Data of 136 patients was collected on socio-demographic, psycho-social, clinical characteristics and drug related variables. Data was entered into EpiData version 3.1 and analyzed using SPSS version 21. Study participants were categorized into two groups, as AIDS and non-AIDS related admission. Kaplan-Meier and Cox regression was used to compare survival experience of the patients and identify independent predictors of mortality. Data for humanistic outcome (quality of life) was collected using World Health Organization Quality of Life for HIV brief version (WHOQoL-HIV BREF) tool. For quality of life (QoL), study participants were divided into two groups based on the mean score of the facet, ‘’General QoL’’. Participants with mean scores of >3.0 were categorized as having good QoL, and their counterparts (mean scores of ≤ 3.0) as having poor QoL. Bivariate and multivariate logistic regressions were carried out to assess independent predictors of HRQoL taking QoL (good/poor) as the binary dependent variable.

Results: Of 136 patients, 80 (58.8%) were females. In-hospital death rates were 30.3% and 27.1% for AIDS (66 patients) and non-AIDS (70 patients) related admissions, respectively (p=0.68). The need of non-invasive ventilation (AHR: 2.99, 95%CI; [1.24, 7.28]; p=0.015) and body mass index (BMI) of less than 18.5(AHR: 2.6, 95%CI; [1.03, 6.45]; p=0.04) were independent predictors of mortality. Majority, 56(58.9%) of study participants had poor QoL. Being unemployed (AOR: 4.1, 95% CI; [1.23, 13.64]; p=0.02), loss of support from family (AOR: 3.6, 95% CI: [1.05-12.6]; p=0.04) and having comorbidity (AOR: 4.2, 95% CI: [1.08, 16.65]; p=0.039) were found to be independent predictors of poor quality of life.

Conclusion: There was no significant difference in mortality rate among patients admitted with AIDS and non-AIDS related illnesses and majority of patients had poor quality of life. The need of non-invasive ventilation and body mass index (BMI) of less than 18.5 were found to be independent predictors of mortality, while being unemployed, having comorbidity and loss of support from family were independent predictors of poor quality of life.

Key-words: clinical outcome, humanistic outcome, mortality, health related quality of life, Human immune virus, Acquired immunodeficiency syndrome, Jimma University Medical Center, Tikur Anbessa Specialized Hospital

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My dad and mom, you were with me all the time, encouraging and praying. Thank you. Brothers and sisters, who were looking after me, uplift me when I feel weary. You were amazing. I am thankful for having you in my life.

Lastly, but not least my heartfelt thanks will extend to my data collectors, study participants, physicians and all staff members of Jimma university medical center and Tikur Anbessa specialized hospital for their kind cooperation in conducting this thesis.

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List of Acronyms and Abbreviation

AIDS Acquired Immune Deficiency Syndrome

BMI Body mass index

cART Combined Antiretroviral Therapy

CD4 Cluster of Differentiation

HAART Highly Active Anti-Retroviral Therapy

HIV Human Immunodeficiency Virus

HRQoL Health-Related Quality of Life

JUMC Jimma university medical center

NIV Non- Invasive Ventilation

PLWHA People Living with HIV/AIDS

QoL Quality of Life

SPSS Statistical Package for Social Sciences

RVI Retroviral Infection

TASH Tikur Anbessa Specialized Hospital

WHOQoL-HIV BREF WHO Quality of Life of HIV specific instrument brief

UNAIDS United Nations Program on Human immune virus (HIV)/AID

INTRODUCTION

1.1 Back ground

In 1980's, Acquired ImmunoDeficiency Syndrome (AIDS) emerged as public health threat affecting the social, economic and political system of the world. As per the report of 2017, United Nations program on Human immune virus (HIV)/AIDS (UNAIDS), since the start of HIV epidemic, an estimated 77.3 million people have become infected and 35.4 million people have died of AIDS-related illnesses. In 2016 only, 1 million people died of AIDS-related illnesses (1). In sub-saharan African, about 24.7 million people are living with the virus, making it the most affected region in the world. According to the 2013 report, sub-saharan African region covers 74% of HIV-related deaths (2). Ethiopia has one of the largest populations of HIV infected people in the region. According to an estimate by the Federal HIV/AIDS Prevention and Control Office (FHAPCO), there are over 738,976 people living with HIV in Ethiopia alone, over 1.18% of the population. This makes the country under the category of 'outbreak of the virus'(3).

AIDS-related illnesses are responsible for morbidity and mortality in HIV infected persons (4). Since the widespread use of combined antiretroviral therapy (cART) in the mid-1990s, it had the most profound influence on reducing AIDS-related mortality (4). In 2017, 21.7 million people living with HIV were accessing antiretroviral therapy and AIDS-related deaths have been reduced by more than 51% since the peak in 2004 (1). However, AIDS-related illnesses continue to cause substantial morbidity and mortality in HIV/ AIDS patients even after the era of cART initiation (5).

In 2015, AIDS-related illnesses like tuberculosis, toxoplasmic encephalitis, cryptococcal meningitis, pneumocystis pneumonia and AIDS malignancies were responsible for in-hospital mortality rate of 20% worldwide (6). According to the UNAIDs report, AIDS-related illnesses had caused 1 million deaths in 2016, compared to 1.9 million in 2005 and 1.5 million in 2010 (7).

Studies from high income countries, showed that non-AIDS related illnesses surpassed AIDS-related illnesses as a major cause of death and hospitalization in HIV patients. This shift in cause of death and hospitalization is associated with widespread use of combined antiretroviral therapy(cART) and better care in developed settings (8–12).

In the late cART era, hospitalization rates have decreased, mostly due to a decrease in the rate of AIDS-related illnesses. Consequently, non-AIDS related illnesses became more common than AIDS-related illnesses as the cause of mortality and hospitalization (13–16). Several studies conducted in middle and high income countries documented reduction in the rate of AIDS-related mortality and non-AIDS related illnesses are becoming the leading cause of death (16–19).

Despite the reduction in AIDS-related mortality, in-hospital mortality in Sub-Saharan Africa remained higher (5,20,21). Study from 4 Sub-Saharan African countries showed that mortality of HIV-infected patients continues to be higher than in the general population (21). Study from Ghana reported an overall in-hospital mortality rate of 41% and AIDS-related illnesses were the leading cause of death (22).

In Ethiopia, despite free cART program, HIV/AIDS is still responsible for considerable amount of hospitalization with an overall bed occupancy rate of 18.9% (23). A study from Addis Abeba, reported an overall in-hospital mortality rate of 44.5% and AIDS-related illnesses accounted for majority of death and hospitalization (24).

Moreover, HIV associated non-AIDS and AIDS-related illnesses had also resulted in measurable impact on patient's quality of life (QoL). Therefore, it's imperative to measure the health related quality of life (HRQoL), which reflects the impact of both disease and treatment as perceived by the patient and it's recognized by HIV treatment guidelines as one of therapeutic objectives (25).

The presence of HIV/AIDS associated symptoms and complications have negative impact on quality of life and increased fatality among the infected patients. However, the introduction of cART has shifted the perception of HIV/AIDS from a fatal to a chronic and potentially manageable disease. cART has also improved the QoL domains of cognitive function, physical health, social activities, pain, sleep, feelings and emotions (26–28). cART improves patients' QoL by reducing the occurrence of AIDS-related illnesses and survival (29). However; comparing with general population, people living with HIV taking cART have significantly lower HRQoL, though virological and immunological stability can be achieved in most of them (30). This might be because of the fact that cART medications are associated with several acute and chronic toxicities and side effects. In addition, several studies have reported that cART side effects are one of the

major reasons that Peoples Living With HIV/AIDS (PLWHA) stop taking their cART medication (31,32).

Some of the specific acute and chronic toxicities that have got special attention in HIV-related quality of life research are diarrhoea, anaemia and lipodystrophy syndrome. Diarrhoea can have a significant negative impact on QoL and be responsible for decreased functional ability, social functioning, mental health and general health perceptions (33). A study conducted in patients on cART found that those with diarrhoea had poorer QoL compared with their counterpart, without diarrhoea (34). The negative impact of anaemia on overall functioning and well-being for PLWHA have been also well elucidated. It has been reported that mitigation of anemia through the treatment of co-morbid conditions, discontinuation of the responsible drugs and/or recombinant human erythropoietin is associated with improved QoL (35). Lipodystrophy is another important chronic toxicity of cART, particularly thymidine analogues nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs) such as stavudine and zidovudine. Lipoatrophy usually manifests as fat loss in the cheeks, extremities and buttocks, and may result in prominence of peripheral veins. This disfigurement often predisposes PLWHA to stigmatization, social isolation, derogation, discrimination and marginalization. Thus, lipodystrophy adversely affects QoL among PLWHA (36). HIV/AIDS patients carry double burden from the disease symptom and adverse effect of the medications used for the treatment which could have negative impact on their quality of life.

Lower adherence rate and QoL share an inverse relationship. Lower adherence rates results in higher HIV ribonucleic acid (RNA) levels and this virological failure causes lower QoL scores because of associated AIDS-related illnesses (37–39). Socio-demographic characteristics, such as age, gender, education, income, employment status, social support and disease related variables such as WHO clinical stage, opportunistic infection and CD4 count have been found to be strongly associated with the QoL of PLWHA (40,41). Furthermore, patient-reported HRQoL predicted survival among HIV-infected patients receiving cART (42).

1.2. Statement of the problem

Even though hospitalization and death have decreased dramatically, post cART, AIDS and non-AIDS related illnesses still continue to cause substantial morbidity and mortality in HIV-infected persons (4,43,44). AIDS and non-AIDS related illnesses had also significantly lowered their QoL , even in the era of cART(30).

A recent systematic review and meta-analysis reported a mortality rate of 20% among HIV/AIDS patients, worldwide (6).

In United States (USA), in-hospital mortality rate of 2.8% was reported and non-AIDS related illnesses were the major cause of death (8). A study from Canada showed an overall in- hospital mortality rate of 56.4%, among patients with AIDS-related illnesses (45). In Australia, non-AIDS related illnesses were the leading cause of death (12). Study from Spain revealed that AIDS–related illnesses accounted for 53% of deaths (46). Similar study from Mexico demonstrated reduction in a rate of mortality (43%) and AIDS-related illnesses were the leading cause of death (47). Study from Brazil showed that in-hospital mortality was almost two times higher in AIDS-related hospitalizations than in non-AIDS-related hospitalizations (48).

Despite increased access to cART, about 8-26% of African patients die in the first year of initiating cART, with most deaths occurring in the first three months (49–51). In sub-Saharan Africa, 1.1 million people died of AIDS-related causes in 2013 (1). AIDS-related illnesses remains the leading cause of HIV-associated mortality and morbidity among both adults and children (6). According to recent study from South Africa, in-hospital mortality was reported to be 38.9% and AIDS-related illnesses accounted for majority of death (52). Study from Uganda showed in-hospital mortality of 57% and AIDS-related illnesses were the leading cause of death and hospitalization (5).

There is limited studies conducted in hospitalized HIV/AIDS patients in Ethiopia. A study conducted in three major hospitals of Addis Ababa reported, AIDS-related illnesses as a main cause of death and hospitalization (23). Similar study conducted in HIV infected patients admitted to the All Africa Leprosy, Tuberculosis and Rehabilitation Training (ALERT) Centre, showed an overall mortality rate of 44.5% and AIDS-related diagnosis were the leading cause of death and

admission. This study also highlighted that patients who were not on cART had higher in-patient mortality than the cART group (24).

Evidences from developed countries showed shift in the cause of death and hospitalization from AIDS to non-AIDS related illnesses. However; there is scarcity of data regarding this outcome in low-income settings like Ethiopia. Almost all of the available studies were done retrospectively from patient card review, which might suffer from shortcomings of retrospective studies such as incomplete data acquisition (53).

Upon the advancement of HIV care with the introduction of cART, people living with HIV/AIDS now live a longer life due to their effectiveness in reducing HIV related morbidity and mortality; they now have to cope to live with a chronic disease (54). For this reason, health related quality of life (HRQoL) has been widely applied to measure outcome of treatment in HIV patients (55). However, it has not received adequate attention in several resource-limited settings, like Ethiopia (56). Furthermore, study assessing QoL is scarce among HIV/AIDS patients in Ethiopian tertiary care settings.

By now to the best of investigator's searching ability, there is limited data regarding the clinical and humanistic outcomes of admitted HIV/AIDS patients in Ethiopia. Therefore, this prospective study will provide evidence about in-hospital mortality, HRQoL and their respective predictors in admitted HIV/AIDS patients.

2. LITERATURE REVIEW

2.1 Literature Review

Since the introduction of cART, there is significant improvement in the rate of hospitalization and death of HIV/AIDS patients; their humanistic outcome (quality of life) is also improved. Current studies from developed settings demonstrated reduction in mortality attributable to AIDS-related illnesses. However, evidences from developing countries shows AIDS-related illnesses are still responsible for primary cause of mortality and there is discrepancy among different literatures, regarding quality of life (QoL) and factors associated with.

2.1.1 Clinical outcome

A retrospective chart review conducted in New York City, reported an overall in-hospital mortality rate of 2.6% and non-AIDS related illnesses were the major cause of death. Non-recurrent bacterial pneumonia, cardiac disease, liver disease and non-AIDS-related malignancy were the leading cause of death (8).

In a retrospective cohort study conducted in Australia, non-AIDS related illnesses were the leading cause of death and hospitalization. A total of 64 deaths occurred and the crude mortality rate was 1.4 per 100 person-years. Older age, lower CD4 cell counts, higher HIV ribonucleic acid(RNA) levels and at least four hospital admissions were independently associated with mortality (12).

Another retrospective cohort study done in London reported in-hospital mortality rate of 30% and AIDS-related illnesses contributed for majority of death. Receipt of cART, fewer HIV-associated admissions, higher CD4 counts and serum albumin levels were associated with better survival (53).

A prospective cohort study conducted in Switzerland reported a mortality rate of 84% among patients with non-AIDS related illnesses. Non-AIDS related malignancies were the leading cause of death (57).

Other retrospective cohort study conducted in East China demonstrated in-hospital mortality of 8.5% among HIV/AIDS patients hospitalized with AIDS-related illnesses. Patients with age ≥40-

year old or with 2 types of OIs were at higher risk for in-hospital death. Pneumocystis pneumonia was the commonest AIDS-related diagnosis (58).

A retrospective cohort study from Israel found in-hospital mortality of 20.8% and AIDS defining illnesses were the leading cause of death and hospitalization, 44.8% and 26.8% respectively. The commonest AIDS-related diagnosis were non-Hodgkin lymphoma(17.4%), pneumocystis jirovecii pneumonia (PCP) (15.9%), tuberculosis (14.8%), and recurrent pneumonia (14.6%)(19).

In a prospective cohort study carried out in Rio de Janeiro, Brazil, an overall in-hospital mortality rate of 9.2% was reported. AIDS and non-AIDS related illnesses accounted for 11.6% and 6.9% in-hospital mortality. The mortality rate was almost two times higher in AIDS-related hospitalizations than in non-AIDS-related hospitalizations (48).

A descriptive cross-sectional study conducted in Tehran showed an overall mortality rate of 18.2%. AIDS-related illnesses was the most (24.5%) common cause of in-hospital death. Pulmonary tuberculosis (37.6%), brain toxoplasmosis (18.2%) and pneumocystis jirovecii pneumonia (13.2%) were the most common AIDS-related illnesses diagnosed (59).

In prospective observational study conducted in South Africa, mortality rate of 38.9%, was reported and AIDS-related illnesses were the leading cause of death. WHO stage 4 disease, CD4 count on admission and APACHE II score were found to be independent predictors of mortality (52).

A multicentre prospective cohort study conducted in West Africa found mortality rate of 38% and AIDS related illnesses accounted for 63% of mortality, while non-AIDS related illnesses accounted for 26%. Being older age, clinical WHO stage 3 and 4, low CD4 count and AIDS-defining infectious diagnoses were associated with hospital fatality (20).

A retrospective cohort study conducted in Uganda found in-hospital mortality of 57% and AIDS-related illnesses were the leading cause of death. A high APACHE II score, acute respiratory distress syndrome (ARDS), and mechanical ventilation were found to be strong predictors of mortality (5).

A retrospective medical chart review from ALERT centre, Ethiopia, reported an overall mortality rate of 44.5% and AIDS- related illnesses were the leading cause of death and hospitalization (24).

A retrospective cohort study from Tikur Anbesa Specialized Hospital (TASH) showed an overall mortality of 45% among HIV/AIDS patients admitted with AIDS-related CNS infections (60).

Late presentation, low rates of in-hospital HIV testing, poor laboratory capacity which limits CD4 T-cell testing and the diagnosis of AIDS-related infections, delay in initiation of cART and problems associated with loss to follow-up contributed to high mortality (61). Some patients do not have a sustained response to antiretroviral agents for multiple reasons including poor adherence, drug toxicities, drug interactions, or initial acquisition of a drug resistant strain of HIV-1(62).

2.1.2 Humanistic outcomes

The availability of cART since 1996, has significantly improved survival among patients infected with human immunodeficiency virus (HIV) (63). However, patients are burdened to take the medications lifetime with potential adverse effects, which may reduce their health-related quality of life (HRQoL). Numerous studies documented improvement in QoL in patients taking cART, though it's lower compared with general population. Study showed that patient-reported HRQoL predicted survival among HIV-infected patients receiving cART (42).

A cross-sectional study conducted in United States(USA) among HIV-infected adults reported that physical functioning was about the same for adults with asymptomatic HIV disease as for the US population but was much worse for those with symptomatic HIV disease or who met criteria for the acquired immunodeficiency syndrome (AIDS). Patients with AIDS had worse physical functioning than those with other chronic diseases. This study also found HIV-related symptoms to be strongly associated with physical and mental health, whereas race, sex, health insurance status, disease stage and CD4 count were at most weakly associated with physical and mental health (64).

A cross sectional study from United Kingdom (UK) revealed that people living with HIV have significantly lower HRQoL than do the general population. Despite most HIV positive individuals in this study being virologically and immunologically stable (30).

A cross-sectional study conducted in china reported a good quality of life in all domains of HRQoL and those who were young, higher level of education, higher CD4 count and good adherence to cART, tend to have positive effects on QoL of PLWHA (41).

A cross-sectional study conducted in Brazil found a good quality of life in all domains of HRQoL. Being employed was associated with higher scores in five out of six domains; the only domain that was not related to higher scores was spirituality. The CD4 lymphocyte and viral Load levels were not associated with QoL (65).

A cross-sectional study conducted in Georgia, suggested that majority of Georgian HIV-infected patients had poor general QoL. Being younger than 40 years and lower education level were more likely to have poorer QoL, while cART, higher education level,CD4 cells ≥200 cells/mm3 and age ≥40 years were predictors of good general QoL (66).

A study from Nigeria which conducted a four month prospective longitudinal study revealed that the use of cART for four months is associated with significant improvement in the overall quality of life across four of the domains (67).

In a cross-sectional study conducted in Kenya, the presence of clinical symptoms and chronic illnesses were predictive of poorer physical component scores. The duration of cART was negatively associated with HRQoL. Patients with chronic diseases or clinical symptoms of acute illness had significantly worse HRQoL (68).

A cross-sectional study conducted in Ethiopia, showed that a higher level of depressive-symptoms were most strongly and consistently associated with a lower HRQoL across all the domains, both in terms of the magnitude of the relationship and in the number of HRQoL domains associated with it. Also, a higher level of HIV-stigma was associated with a lower HRQoL except for the physical domain. Among the socio-demographic variables, older age was a significant predictor of poor physical, social and level-of-independence domains (69).

Other cross-sectional study from North Ethiopia reported that the six domains of HRQoL were found to be moderate. Sex, age, educational status, residence and marital status were significantly associated with at least one domain of HRQoL. Moreover, the study revealed that WHO clinical stage was strongly associated with all HRQoL domain(70).

2.2 Significance of the study

With the advancement in HIV care there is dramatic improvement in AIDS-related mortality and health-related quality of life of peoples living with HIV (PLWHA). Current studies show change of trend from AIDS to non-AIDS related illnesses as a main cause of death in developed settings. However, studies are scarce in developing settings. This study will aspire to determine the clinical (mortality) and humanistic (HRQoL) outcomes with their respective predictors in selected Ethiopian tertiary care settings.

By determining in-hospital mortality, health-related quality of life and their respective predictors, this study will help the clinicians and policy makers to have insight on cause of death, quality of life priority condition or disease for prevention, screening and treatment. The finding of this study may also serve as an input for researchers and already existing HIV/AIDS management guidelines.

2.3 Conceptual Frame Work

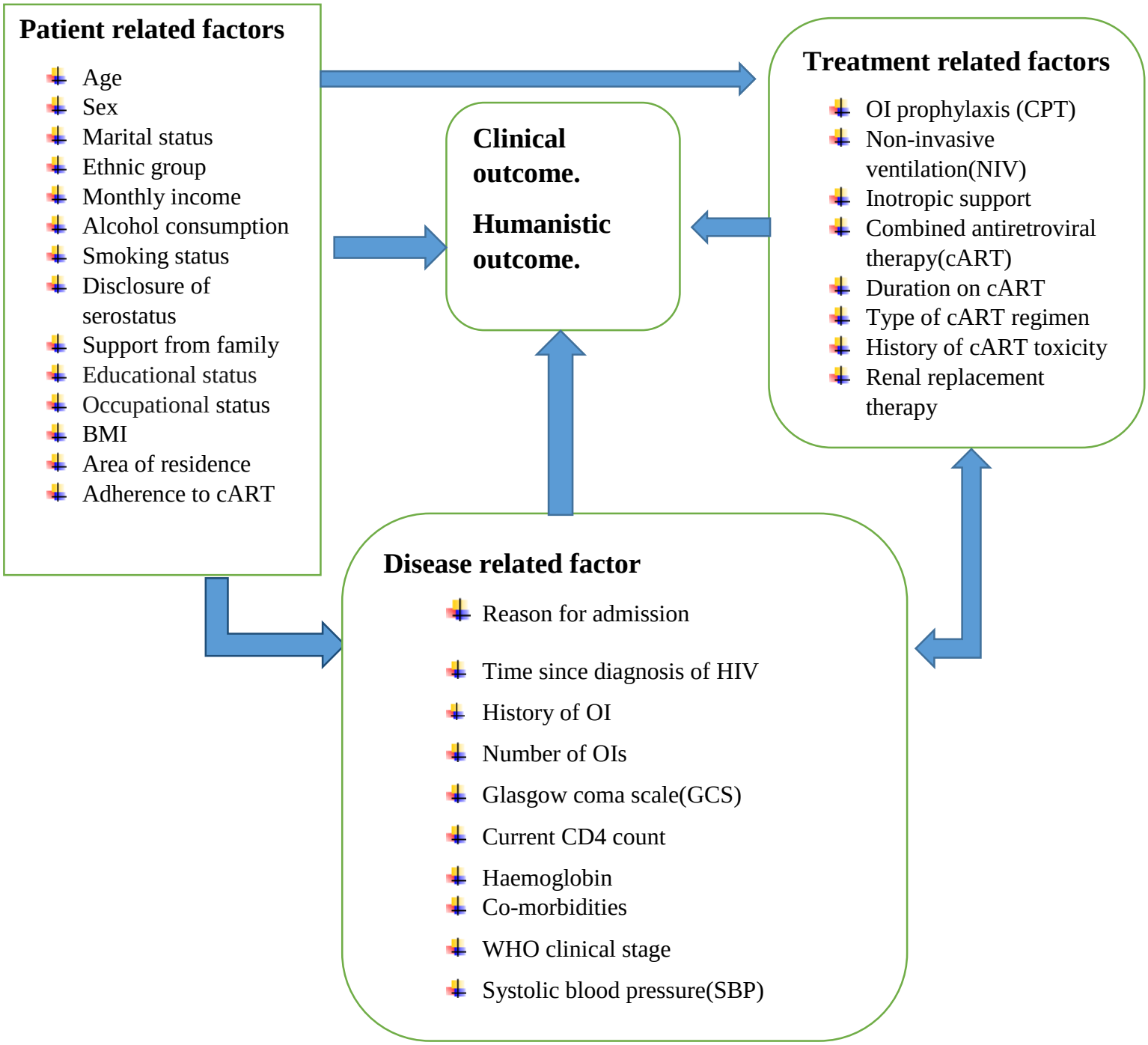


Figure: 1 Conceptual frame work for factors associated with clinical and humanistic outcomes

Source: developed after review of different literatures

3. OBJECTIVES

3.1 General objective

- To determine the clinical and humanistic outcomes among hospitalized HIV/AIDS patients in Jimma University Medical Center (JUMC) and Tikur Anbessa Specialized Hospital (TASH).

3.2 Specific objectives

- ✓ To determine in-hospital mortality among PLWHA admitted with AIDS and non-AIDS related illnesses in selected tertiary care setting of Ethiopia.
- ✓ To determine health related quality of life (HRQoL) among PLWHA in selected tertiary care setting of Ethiopia.
- ✓ To determine predictors of mortality among PLWHA in selected tertiary care setting of Ethiopia.
- ✓ To determine predictors of health related quality of life among PLWHA in selected tertiary care setting of Ethiopia.

4. METHODS AND PARTICIPANTS

4.1 Study area and period

The study was conducted in Jimma University Medical Center (JUMC) and Tikur Anbessa Specialized Hospital (TASH).

JUMC is located in Jimma town, 355 km from Addis Ababa in the South West, Jimma zone, Oromia regional state, Ethiopia. It is one of the oldest public hospitals in the southwest part of the country and comes under Jimma University. It is currently the only teaching and specialized hospital in the southwest of Ethiopia. The hospital serves as a referral site and provides specialized care for southwest Ethiopia with a catchment population of about 15 million.

TASH is the largest referral hospital in the country, with 700 beds. It is located in Addis Ababa, the capital of Ethiopia. It is now the main teaching hospital for both clinical and preclinical training of most disciplines. It is also an institution where specialized clinical services that are not available in other public or private institutions are rendered to the whole nation. The study was conducted from April 1, to August 31, 2018.

4.2 Study design

Multi-method study design was used (prospective cohort study was conducted for clinical outcome (mortality) and cross sectional study was conducted for humanistic outcome (HRQoL) measurement.

4.3 Source population

All HIV infected patients greater than 18 years old admitted to selected hospitals.

4.4 Sample population

All HIV infected adult patients who were admitted to medical, intensive care unit (ICU) and surgery wards during study period and fulfil inclusion criteria.

4.5 Eligibility criteria

- ***Inclusion criteria***

- ✓ Signed informed consent
- ✓ HIV positive patients who were admitted to medical, intensive care unit (ICU) and surgical wards.
- ✓ Admitted for at least 24 hours.

- ✓ Patients older than 18 years old.
- ✓ For HRQoL the patient should be mentally stable.

Exclusion criteria

- ✓ Whose medical records are incomplete
- ✓ Pregnant and obstetric admissions.
- ✓ Re-admission.

4.6 Sample size determination and sampling technique

Fisher's formula was used for calculating sample size using precision around a proportion

$$N = \frac{z^2 p(1-p)}{d^2}$$, where

N= minimal sample size required for the study.

z= 1.96 (normal deviate corresponding to 95% confidence interval)

d= 0.05 (degree of precision of 5%)

P= 0.445(A mortality rate of 44.5%;from study conducted in Addis Abeba (24)).

Thus $N = \frac{1.96^2 \times 0.445 \times 0.555}{(0.05)^2} = 379$

Since the target population is less than 10,000 using correction formula nf= no/1+no/N where nf is the corrected sample size and N is obtained from the last 5 months admission of patients in the two hospitals, it was 185. The corrected sample size is nf= 379/1+379/185= 124. By adding 5% contingency value, the final sample size was 131 patients. This number is proportionally divided for both hospitals in the ratio of 1:1.2. Accordingly, 71 and 60 patients were allocated for JUMC and TASH, respectively.

4.7 Study variables

- **Dependent variables**
  - Mortality.
  - Health-related quality of life (HRQoL).
- **Independent variables**

❖ **Patient Related factors**

Socio-demographic

- Sex, Age, Ethnicity
- Marital status, Area of residence
- Educational Status, Occupational status
- Monthly income, Body mass index (BMI)

Psycho-social

- HIV disclosure status
- Support from family

Diseases Related Factors

- Reason for admission
- Time of HIV diagnosis
- History of OI
- Number of OIs
- Glasgow coma scale(GCS)
- Current CD4 count
- WHO clinical stage
- Co-morbidities
- Systolic blood pressure

Treatment Related Factors

- OI prophylaxis (Cotrimoxazole prevention therapy(CPT))
- Non-invasive ventilation
- inotropic support
- Duration on cART
- Delay in initiation of cART
- History of toxicity from cART
- Type of cART regimen
- Adherence to cART

4.8 Data collection Instrument & Procedure

Data for clinical outcome was collected prospectively using English version checklist which have prepared after reviewing different relevant literatures and active patient follow-up charts. Data on socio-demographic characteristics; relevant baseline and routine clinical and laboratory parameters, Glasgow coma scale (GCS), diagnosis, reason for admission, type of cART regimen, duration on cART and type of cART regimen was collected. Self-reported adherence to cART medications was assessed using modified Morisky Medication Adherence Scale (MMAS-8), the validated questionnaire widely used in chronic diseases (71). It consists of 8 questions; seven questions with "yes" or "no" alternatives, and one question with a 5-point likert scale. The scores range from 0–8, with levels of adherence classified as: high adherence, medium adherence; and poor adherence. The questionnaire was translated to Amharic and Afan Oromo languages.

Data for health-related quality of life (HRQoL) was collected from patients using World Health Organization QoL for HIV brief version (WHOQoL-HIV BREF) tool (72). The instrument was translated into Amharic and Afan Oromo language. The Amharic and Afan Oromo questionnaires were translated back to English to ensure the translated version gives the proper meaning. The Amharic and Afan Oromo questionnaires were pre-tested using 10 patients. The data were collected using face to face interviewer administered structured questionnaire.

The WHOQOL-HIV BREF instrument produces six domain scores and contains a total of 31 items. Individual items are rated on a 5 point likert scale where 1 indicates low, negative perceptions and 5 indicate high, positive perceptions. In such away, domain scores are scaled in a positive direction where higher scores denote higher quality of life. However, seven facets (question number 3, 4, 5, 8, 9, 10, 31) are not scaled in a positive direction, meaning that for these facets higher scores do not denote higher quality of life. Those facets are recoded in positive direction so that high scores reflect better QoL.

The six domains of HRQoL includes physical health (4 items), psychological well-being (5 items), level of independence (4 items), social relation (4 items), environmental health (8 items) and spiritual health (4 items). The first two questions of WHOQOL-HIV BREF examine general quality of life: question 1 asks about an individual's overall perception of quality of life and question 2 asks about an individual's overall perception of health. The first domain, physical health deals with the presence of pain and discomfort, energy and fatigue, sleep and rest and symptoms related with HIV. The

psychological domain comprises of negative and positive feelings, thinking, memory and concentration, bodily image and appearance and self-esteem. The level of independence domain consists of mobility, activities of daily living, dependence on medication or treatments and work capacity. The social relationships domain describes; personal relationships, social support and sexual activity. Physical safety and security, home environment, financial resources, physical environment, opportunities for acquiring new information were described under environment domain. The last domain, spiritual health contains information about concern about the future death, forgiveness and blame. There is also a general facet that measures the overall QoL and general health perceptions. The two weeks' time frame was used to derive the patients QoL experience.

Data from patients' record was collected by 3 pharmacists and 3 nurses conducted interview for HRQoL.

4.9 Data Quality Assurance

Data collection tool was carefully prepared to enable the data collectors to collect all necessary information needed to address study objectives. Pre-test was conducted on 5% of patients. A 2 day training on data collection tool and general procedures of data collection was given for 3 pharmacists (B.Pharm) and 3 nurses who were assigned as data collectors and 2 medical interns who were acting as supervisor. The supervisors had a responsibility of supervising data collectors and facilitating the daily activities. All filled checklist were reviewed for completeness and consistency by principal investigator.

4.10 Data processing and analysis

Data was entered into EpiData 3.2 and exported to statistical package for social sciences (SPSS) version 21.0 software for windows for cleaning and analysis. Descriptive analysis was performed and a result was presented by text, tables and figures. Kaplan-Meier (log rank test) was used to compare survival experience of the patients. Linear regression was used to check for multicollinearity between independent variables. For death and quality of life (QoL) as outcome variables, chi-square test was performed to check adequacy of cells before performing cox and logistic regression. Bivariate cox regression was performed to identify candidate variables for multivariable cox regressions. Variables with p-value ≤ 0.25 in bivariate regression was considered as candidates for multivariable regression. Multivariable cox regression was performed using forward wald method to identify independent predictors of in-hospital mortality. Hazard ratio was

used as measure of strength of association. Predictors with p-value < 0.05 were considered to declare a statistical significance.

The WHOQOL- HIV BREF was used to produce a QoL profile of individuals. Domain scores were calculated by computing the mean of the facet score within the respective domain and eventually multiplied by 4 to make domain scores comparable with the scores used in the WHO quality of life-100 (WHOQOL-100), a commonly utilized scale. Accordingly, the scores range from 4 to 20 points, reflecting the worst and the best QoL, respectively (72). The WHOQOL HIV instrument user's manual was rigorously followed for scoring and checking domain scores. Cronbach's alpha coefficient was calculated for each domain of WHOQOL-HIV BREF instrument to determine the internal consistency.

For the purpose of identifying factors associated with QoL, study participants were divided into two groups based on the mean score of the facet, "overall quality of life and general health perceptions" (range 1 to 5). Participants with mean scores of >3.0 were categorized as having good QoL, and their counterparts (mean scores of ≤ 3.0) as having poor QoL. Based on the domain mean, participants with mean score >12.0 were categorized as having good QoL and their counter parts mean score ≤ 12.0 as having poor QoL. Bivariate and multivariate logistic regressions were carried out to assess independent predictors of HRQoL taking QoL (good/poor) as the binary dependent variable. Bivariate logistic regression was performed to identify candidate variables for multivariable logistic regression. Variables with p-value ≤ 0.25 in bivariate regression was considered as candidates for multivariable regression. Multivariable logistic regression was performed using backward method to identify independent predictors. Regression coefficients and their 95% confidence intervals together with p-value < 0.05 were used to identify independent predictor of poor QoL. Goodness of fitness of the final model was checked using Hosmer and lemeshow statistic.

4.11 Outcome and validating methods

Patients were enrolled and followed starting from hospital admission until discharge with improvement or die in-hospital. In-hospital mortality was the clinical outcome of this study. The primary cause of admission was determined based on the diagnoses of the disease conditions considered to have led to hospitalization by physicians. If a patient had multiple diagnoses during hospitalization, we determined one underlying cause of hospitalization by applying the following

priority order:(1) WHO stage 4 opportunistic disease; (2) WHO stage 3 opportunistic disease; (3) non-AIDS related infections; (4) non-AIDS defining cancer(NADC) and (7) nonspecific event. We then grouped the patients into two groups: those admitted with AIDS and non-AIDS related events. We considered the underlying cause of death, the disease or injury, which initiated the train of morbid events leading to death, as reported by physicians on death summary (possible cause of death) (73). Patients were interviewed for HRQoL, after they become clinically stable or near discharge.

4.12 Ethical consideration

Letter of ethical clearance was obtained from Institutional Review Board (IRB) of Jimma University. Ethical clearance together with support letter from Jimma University was given to Chief executive officer (CEO) of the selected hospitals which provided to ward senior/ or responsible person to get permission. Further, principal investigator or data collectors briefed about the study to the patients stating the main objective and any unclear points related to the study. During data collection, confidentiality was ensured and for this reason, name and address of the patient was not recorded in the data collection check list.

4.13 Dissemination plan

The final result of the study will be disseminated to responsible bodies such as department of pharmacy of Jimma University, JUMC administrators, TASH administrators, patients, Ethiopian federal ministry of health and center for disease control (CDC).

Finally, the study finding will be submitted to reputable professional journal for publication so as to serve as an input for further studies.

4.14 Operational and definition of terms

Adherence: The extent to which a patient continues the agreed upon medication as prescribed(74). It will be measured using Morisky Medication Adherence Scale (MMAS-8), the validated questionnaire widely used in chronic diseases. The MMAS-8 range from 0-8 with the total score of **<6=poor adherence, 6-<8=medium adherence,>8=high adherence**

Adult: patients above 18 years old.

AIDS-related admission: patients will be categorized under AIDS-related admission, if they are admitted with AIDS-related illnesses as described under the category of the CDC definition of AIDS, or WHO stage 4(75).They are listed on annex part. All OIs are under this category.

CART (combined antiretroviral therapy): refers to the use of a combination of three or more antiretroviral (ARV) drugs for treating HIV infection.

Clinical outcome: refers to death of hospitalized HIV/AIDS patients.

Co-morbidity: is the presence of one or more additional diseases or disorders co-occurring with HIV.

Censored: If for a given patient, the study ends while the patient is still without event of interest or discharged from hospital with improvement (i.e. death does not occur) or lost to follow up.

Discharged with improvement: refers to patients who are discharged from hospital after improvement.

Event: for this study event is in-hospital mortality of study participants.

Family support: Those who have close support/follow up from their relatives or friends

Opportunistic infections (OIs): are infections that occur more frequently and are more severe in people with weakened immune systems, including people with HIV.

HIV serostatus: refers to whether a patient is known retroviral infection (RVI) patient or newly diagnosed at admission.

Incomplete medical record: refers to medical records of patients who died before full investigation after staying in hospital for more than 24 hours.

Known Patients: refers to patients who are diagnosed with HIV before hospital admission

Lost to follow-up: Refers to a patient who is missed from ward during follow up period.

Mentally stable: those patients who don't have any psychiatric diagnosis and conscious to time, person, and place and able to respond.

New patients: refers to patients who are diagnosed with HIV at admission.

Non-AIDS-related admission: patients will be categorized under this category if they are admitted with illnesses other than AIDS-related events.

Non-invasive ventilation (NIV): refers to the administration of oxygen without using an invasive artificial airway (endotracheal tube or tracheostomy tube). Such as: intranasal oxygen and facial mask.

OI prophylaxis: a medication the patient is taking in order to prevent opportunistic infections. (E.g. CPT).

Humanistic outcome: is measured by Health related quality of life (HRQoL) using WHOQoL-HIV Bref tool.

Quality of life: an individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

Unemployed: refers to those participants that do not have any government/private job or their own business.

5. RESULTS

5.1 Overview of the study participants

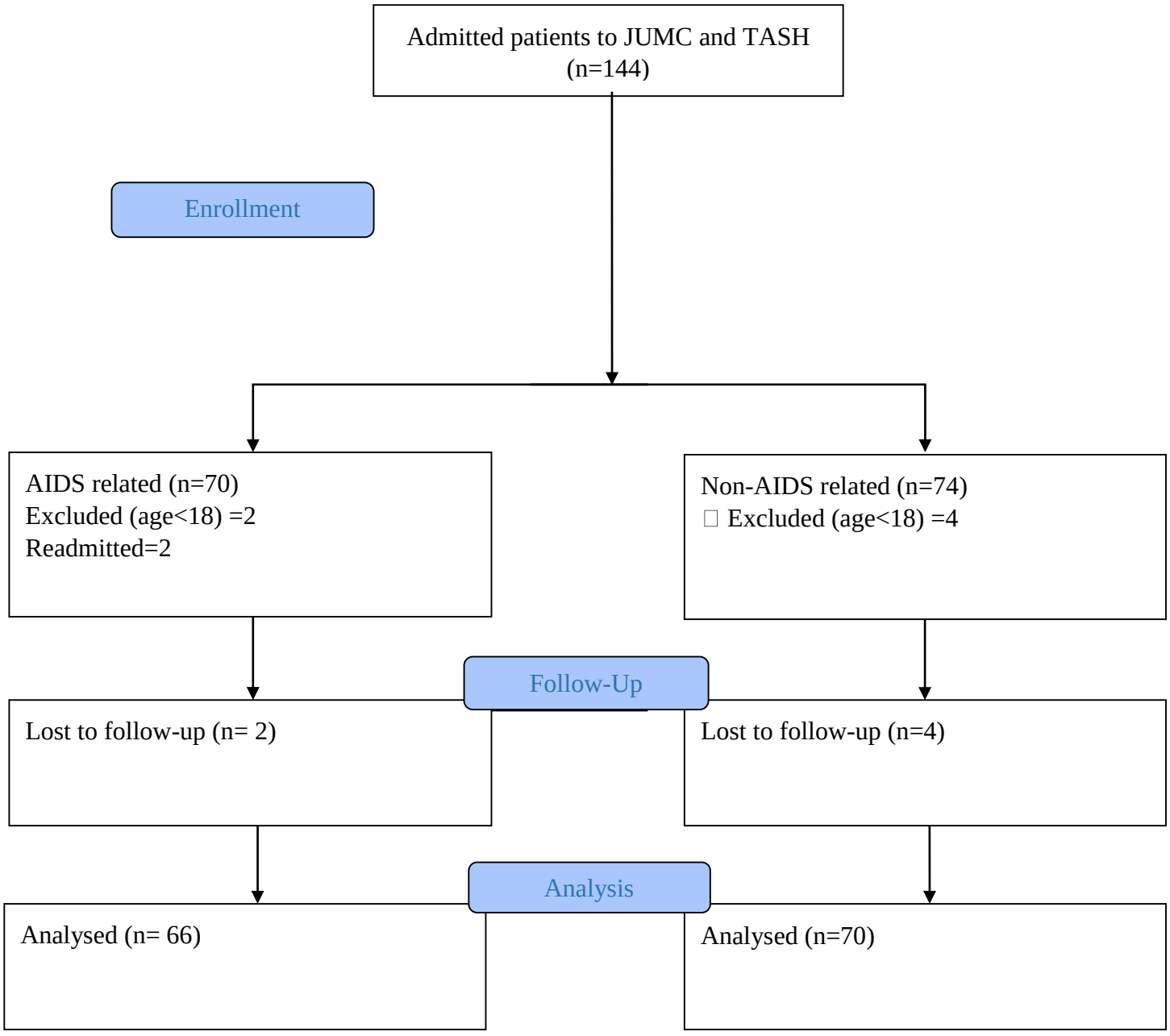


Figure 2: Flow diagram showing patient enrolment at JUMC and TASH, from April 1 to August 31, 2018.

During the study period, 144 HIV-positive patients were admitted to JUMC and TASH. Of these, 8 patients were excluded (age <18=6, readmitted=2). So, the final cohort of 136 patients followed prospectively for 5 months. Majority, 76(55.9 %) of the patients were from JUMC. During the follow up period six patients were lost to follow up.

The study was conducted by dividing the total patients in two major classes with AIDS and non-AIDS related admissions. The non-AIDS group was chosen for the comparison. Subjects were considered as censored if: they do not develop the event (death) during study period or lost on follow-up. The overall analysis time under risk was 2249 days (74.9 months or 6.24 years).

5.1.1 Socio-demographic characteristics

The mean $\pm$ SD age of the study participants was 34.4 $\pm$ 9.6 and 39.1 $\pm$ 12.4 years for the AIDS and non-AIDS related admissions respectively(p=0.95). Majority, 80 (58.8%) of study participants were females and they were almost equally distributed between the two groups (59.1%vs. 58.6%). Most, 42(60%) of patients admitted with non-AIDS related illnesses had baseline body mass index (BMI) of > 18.5 kg/m^2

Majority, 99(72.8%) of the study participants were from urban. Of these, 50(71.4%) were from non-AIDS related admissions. Fifty one ((37.5%) of them had attended primary education and 36(26.5%) of them had higher education. Half, 69(50.7%) of the study participants were unemployed. Most, 58(42.64%) of the study subjects were married and the lowest, 22(16.2%) share of marital status was divorced.

Fifty nine (43.4%) of the study participants were from Oromo ethnic group followed by Amhara 43(31.6%). Thirty four (25%) patients were alcohol consumers and they were slightly higher, 18 (52.9%) in AIDS-related admissions. Fourteen (10.3%) patients were smokers and they were distributed equally among the two groups. Majority, 56(41.2%) of the study participants had monthly income of <1500 and only 15(11%) patients had monthly income of >5000. **(Table-1).**

Table 1: Baseline socio-demographic and behavioural characteristics of the study cohort at JUMC and TASH, from April 1 to August 31, 2018.

Variables		AIDS-related admission (n, %)	Non-AIDS related admission (n, %)	Total n=136	P-value*
Study site	JUMC	48(72.7)	28(40)	76	<0.001
	TASH	18(27.3)	42(60)	60	
Age, mean(+ SD)		34.4(+9.6)	39.1(+12.4)	36.8+11.3	0.95
Sex	Female	39(59.1)	41(58.6)	80	0.016
	Male	27(40.9)	29(41.4)	56	
BMI (Kg/m^2	<18.5	35(53)	28(40)	63	0.12
	>18.5	31(47)	42(60)	73	
Residence	Urban	49(74.2)	50(71.4)	99	0.71
	Rural	17(25.8)	20(28.6)	37	
Educational level	No formal Education	16(24.2)	13(18.6)	29	0.53
	Primary	27(40.9)	24(34.3)	51	
	Secondary	8(12.1)	12(17.1)	20	
	Higher Education	15(22.7)	21(30)	36	
Occupation	Employed	38(57.6)	29(41.4)	67	0.06
	Unemployed	28(42.4)	41(58.6)	69	
Marital status	Married	27(40.9)	31(44.3)	58	0.40
	Single	19(28.8)	13(18.6)	32	
	Divorced	12(18.2)	12(17.1)	24	
	Widowed	8(12.1)	14(20)	22	
Ethnicity	Oromo	32(48.5)	27(38.6)	59	0.50
	Amhara	19(28.8)	24(34.3)	43	
	Others**	15(22.7)	19(27.1)	34	
Alcohol	Drinker	18(27.3)	16(22.9)	34	0.55
	Non drinker	48(72.7)	54(77.1)	102	
Smoking	Smoker	7(10.6)	7(10)	14	0.90
	Non-smoker	59(89.4)	63(90)	122	
**Monthly income (ETB)	(<1500)	26(44.1)	30(46.9)	56	0.96
	(1500-3000)	19(32.2)	20(31.3)	39	
	(3000-5000)	7(11.9)	6(9.4)	13	
	(>5000)	7(11.9)	8(12.5)	15	

***** P-values are from the chi square tests for the categorical variables and from independent t-tests for the continuous variables (age).BMI: body mass index, SD: standard deviation. **Tigre, Gurage, Kafa, Nuer. ** Based on Ethiopian Civil Service monthly salary scale for civil servants.ETB: Ethiopian birr

5.1.2 Baseline Clinical characteristics

Majority, 48(73.8%), of study participants with AIDS-related admissions had a CD4 cell count of <200cells/µL. The mean ± SD haemoglobin (g/dl) for AIDS and non-AIDS related admissions was 10.8 ±4.7 and 9.9 ±3.1 respectively (p=0.32). Thirteen (9.6%) and 9 (6.6%) of the patients had positive hepatitis B virus (HBV) and hepatitis C virus (HCV) surface antigen respectively.

Most, 107(78.7%) of the patients were already on cART. Of patients on cART, 94(69.1%) had been on treatment for more than 6 months. Majority, 87(81.3%) of the patients were on first line cART regimen and a combination of Tenofovir, Lamivudine with Efavirenz (TDF+3TC+EFV) was the most, 77(56.6%) prescribed cART regimen. Forty eight (44.8%) patients were highly adherent to their cART regimen and 28(26.2%) had poor adherence.

Majority, 60(44.1%) of the patients were at WHO clinical stage four. Of these, 44(66.7%) patients were from AIDS-related admissions. Most, 22(31.4%) of the patients with non-AIDS related admissions were at WHO clinical stage 3.

The mean (±SD) since the diagnosis of HIV was 4.5±4.49 and 5.6±4.52 years for AIDS and non-AIDS related admissions, respectively (p=0.16). Majority, 111(81.6%) of the patients were on cotrimoxazole preventive therapy (CPT) at admission. Of these, 61(56.5%) were from non-AIDS related admission. About, 59(43.4%) of patients had previous history of opportunistic infection and majority, 28(26.2%) of them were in AIDS-related illnesses. **(Table: 2).**

Table 2: Clinical characteristics and drug-related variables of study participants at JUMC and TASH, from April 1 to August 31, 2018

Variable		AIDS-related; n (%)	Non-AIDS related; n (%)	Total	P value
Current CD4 cells/µL	≤200	48(73.8)	32(47.1)	80	0.002
	>200	17(26.2)	36(21.7)	53	
Haemoglobin(g/dl), mean ± SD		10.8 ±4.7	9.9 ±3.1	10.3± 3.9	0.325
HBV status	Not known	31(46.2)	25(35.7)	56	0.062
	Negative	26(40)	41(61.2)	67	
	Positive	9(13.8)	4(5.7)	13	
HCV status	Not known	29(44.6)	24(34.3)	54	0.008
	Negative	28(43.1)	45(64.3)	73	
	Positive	8(12.3)	1(1.4)	9	
cART status	Yes	46(69.7)	61(87.1)	107	0.013
	No	20(30.3)	9(12.9)	29	
cART regimen	TDF+3TC+EFV	32(69.6)	45(73.8)	77	0.04
	AZT+3TC+NVP	5(10.9)	5(8.2)	10	
	Others**	9(19.5)	11(18)	20	
Duration on cART	<6 months	7(14.9)	6(10)	13	0.037
	>6 months	40(85.1)	54(90)	94	
Adherence to cART	High	14(31.1)	34(54.8)	48	<0.001
	Medium	21(46.7)	10(16.1)	31	
	Poor	10(22.2)	18(29.1)	28	
WHO clinical stage	I	2(3.0)	15(21.4)	17	<0.001
	II	8(12.1)	17(24.3)	25	
	III	12(18.2)	22(31.4)	34	
	IV	44(66.7)	16(22.9)	60	
HIV sero-status	Known RVI patient	51(77.3)	60(85.7)	111	0.204
	Newly diagnosed	15(22.7)	10(14.3)	25	
Time since diagnosis in years (mean±SD)		4.5±4.49	5.6±4.52	5.1 ± 4.5	0.16
Prophylaxis(CPT)	Yes	50(75.8)	61(87.1)	111	0.087
	No	16(24.2)	9(12.9)	25	
Comorbidity	Yes	49(74.2)	38(54.3)	87	0.015
	No	17(25.8)	32(45.7)	49	
History of OIs	Yes	31(47%)	28(40%)	59	0.412
	No	35(53%)	42(60%)	77	
Length of hospital stay(mean± SD)days		16.7±11.2	16.4±10.7	16.5±10.9	0.89

***** *P-values are from the chi square tests for the categorical variables and from independent t-tests for the continuous variables (current CD4 count, time since diagnosis), using significance level of 0.05.Fisher's exact test for WHO clinical stage, HBV status, and HCV status. ***AZT+3TC+ATV/R,TDF+3TC+NVP,AZT+3TC+EFV,TDF+3TC+ ATV/R,*
CD4: cluster of differentiation. HBV: hepatitis B virus, HCV: hepatitis C virus, cART: combined antiretroviral therapy, WHO, world health organization, RVI: retroviral infection, CPT: cotrimoxazole preventive therapy, OIs: opportunistic infections.

5.2 Clinical outcome

5.2.1 Mortality

Of 136 patients admitted to JUMC and TASH, 39(28.7%) patients were died in-hospital. The incidence rate of mortality was 17.3 per 1000 person days. The in-hospital death rates were 30.3% and 27.1% for AIDS (66 patients) and non-AIDS (70 patients) related admissions, respectively (p=0.68). Twenty (28.6%) patients were died from JUMC, while nineteen (28.8%) died from TASH (p=0.49). The diagnosis of HIV was made in 111(81.6%) patients before current hospital admission and there was no statistically significant difference in case-fatality between known HIV/AIDS patients and those newly diagnosed at admission (p= 0.166).

There was significant difference in mortality rate between those on cART and non-cART (p=0.030). There was also statistically significant difference in mortality between patients who were on CPT and non-CPT (p=0.02). Significantly higher number of patients who were on non-invasive ventilation were died (p<0.001). The mean±SD, length of hospital stay was 16.7+11.2 and 16.4+10.7 days for AIDS and non-AIDS related admissions respectively (p=0.89). **(Table: 2 & 3)**.

Table 3: Follow up outcome of hospitalized HIV/AIDS patients at JUMC and TASH, from April 1 to August 31, 2018

Variables		**Death**			**p-value**
		Yes	**No**	**Total**	
Study site	JUMC	20	56	76	0.49
	TASH	19	41	60	
Reason for admission	AIDS-Related	20	46	66	0.68
	Non-AIDS Related	19	51	70	
HIV serostatus	Known	29	82	111	0.16
	Newly	10	15	25	
cART status	Yes	26	81	107	0.030
	No	13	16	29	
CPT status	Yes	26	82	108	0.02
	No	13	15	28	
Non-invasive ventilation	Yes	26	22	48	<0.001
	No	13	75	88	

Patients with AIDS-related admissions contributed for 20(51.3%) of in-hospital death. Among AIDS-related admissions, cryptococcal meningitis (25%), was the leading cause of death. **(Figure: 3).**

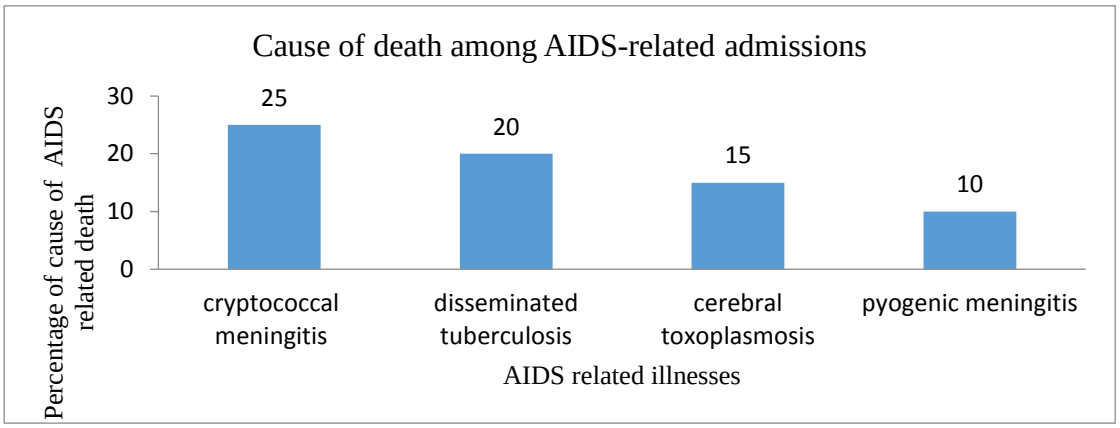


Figure: 3 Attributed cause of death among AIDS-related admissions at JUMC and TASH, from April 1 to August 31, 2018

Severe anaemia (37.8%), non-recurrent bacterial infections (36%), non-AIDS defining cancers (NADC) (35%), cardiovascular disease (15.8%), pancytopenia (10.5%) and stroke (5.2%) were the major contributors for case fatality among non-AIDS related admissions. **(Figure: 4).**

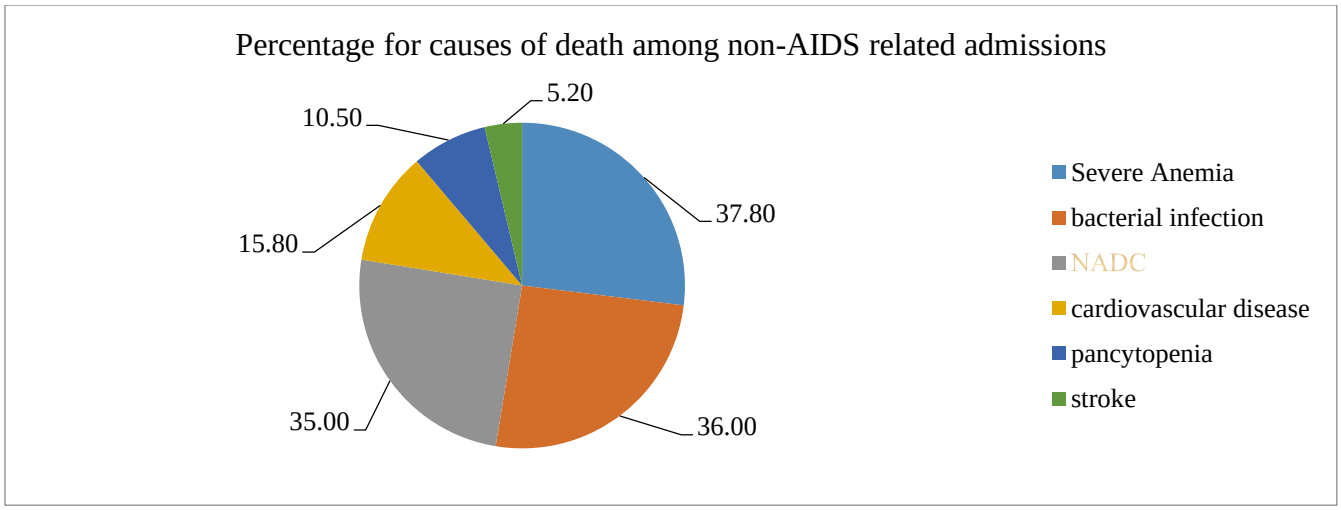
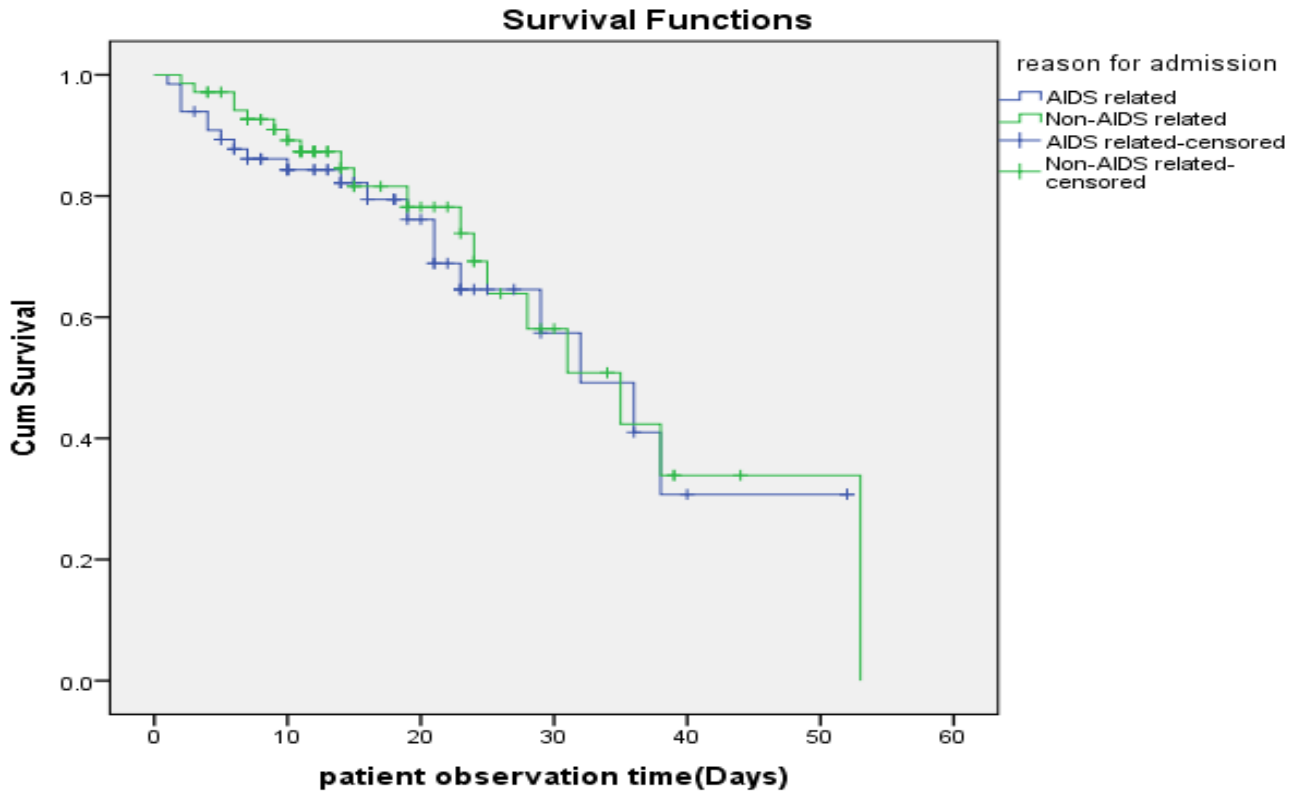


Figure: 4 Attributed causes of death in non-AIDS related admissions at JUMC and TASH, from April 1 to August 31, 2018.

The median survival time among patients with non-AIDS related illness was 35[53, 23] days and 32 days for AIDS-related admissions (log rank p=0.599).



Log rank p=0.599

Figure: 5Survival estimates for patients with AIDS and non-AIDS related admissions at JUMC and TASH, from April 1 to August 31, 2018.

5.3 Humanistic outcome

5.3.1 Health related quality of life (HRQoL) of the study subjects

Among 136 patients followed in-hospital, 97 of them survived during the study period. Of these, one patient had psychiatric problem and one patient was not willing for interview. Finally, 95 patients were interviewed for HRQoL.

Sample characteristics

The study sample (n=95) had a higher percentage, 56(58.9%) of female participants and the mean age (±SD) of study participants was 35.8(±10.5) years. Majority, 73(76.8%) of the study participants were urban residents and more than half, 51(53.7%), of the participants were unemployed. Majority, 80(84.2%) of them were on cART. The mean (±SD) of current CD4 counts for poor and good QoL

was 305(± 315) and 278(±292) cells /mm3, respectively (p=0.68). More than half, 53(55.8%) of them had social support from family.

Participant's characteristics by general QoL

Majority, 56(58.9%) of the participants had poor general health related quality of life. Participants with poor general QoL were older (p =0.01). The percentage of participants who were unemployed was significantly higher in those with poor QoL compared with good QoL (p= <0.001). The mean (±SD) time period since diagnosis of HIV was 4.1(±4.1) and 4.9(±4.2) for participants with poor and good QoL respectively (p=0.36).

Significantly higher number of participants with comorbid disease had poor general QoL (p=0.001). The percentage of participants who had no family support were significantly higher in those with poor vs. good QoL (p=0.001). Significantly higher number of participants who had disclosed their HIV serostatus had poor general QoL (p=0.01). There was no difference in general QoL between those on cART and non-cART (P=0.29). **(Table: 4).**

Table 4: Socio-demographic, clinical and psychosocial characteristics of study participants by general QoL (poor vs. good).*

Variable		Poor QoL	Good QoL	Total	p-value **
Sex	Female	34(60.7%)	22(39.3%)	56	0.67
	Male	22(56.4%)	17(43.6%)	39	
Age in years, mean(±SD)		38.1(±11.3)	32.6(±8.2)	35.8± 10.4	0.01
Residence	Urban	43(58.9%)	30(41.1%)	73	0.98
	Rural	13(59.1%)	9(40.9%)	22	
Current CD4 count mean(±SD)		305(± 315)	278(±292)	293± 303.4	0.68
HIV serostatus	Known	51(63%)	30(37%)	81	0.056
	New	5(35.7%)	9(64.3%)	14	
Time since HIV diagnosis in years, mean(±SD)		4.1(±4.1)	4.9(±4.2)	4.5±4.1	0.36
cART status	Yes	49(61.3%)	31(38.8%)	80	0.29
	No	7(46.7%)	8(53.3%)	15	
Occupation	Employed	16(36.4%)	28(63.6%)	44	<0.001
	Unemployed	40(78.4%)	11(21.6%)	51	
Comorbidity	Yes	26(83.9%)	5(16.1%)	31	0.001
	No	30(46.9%)	34(53.1%)	64	
HIV disclosure	Yes	28(73.7%)	10(26.3)	38	0.01
	No	28(49.1%)	29(50.9%)	57	
Support from family	Yes	23(43.4%)	30(56.6%)	53	0.001
	No	33(78.6%)	9(21.4%)	42	

**General QoL score is calculated from the questionnaire as the mean of question 1 (''how would you rate your quality of life?'') and question 2 (how satisfied are you with your health?'') using users' manual for scoring and coding WHOQOL-HIV-BREF by WHO. The general QoL score ranges from 1 to 5, with 1 corresponding to very poor QoL and 5 corresponding to very good QoL. Participants with mean scores of >3.0 were categorized as having good QoL, and their counterparts (mean scores of ≤ 3.0) as having poor QoL. **P-values are from the chi square tests for the categorical variables (sex, residence, HIV serostatus, cART status, co-morbidity, HIV disclosure, support from family); and from independent t-tests for the continuous variables (age, CD4 count, time since HIV diagnosis), using significance level of 0.05.*

The overall health related quality of life (HRQoL)

The mean (±SD) scores for the overall QoL and general health and six domains of the study participants are presented in the Table 5. For the 6 domains (physical, psychological, level of independence, social relationship, environmental health and spiritual health), score of >12 is considered to be good quality of life and if it is ≤12, it will be considered poor QoL. For general QoL, score of >3 is considered good QoL, while ≤ 3 is poor QoL. Accordingly, the study participants had poor quality of life in all domains of quality of life except for social relationship and spiritual health domains. The domain score of health related quality of life (HRQoL) was highest for social relationship (13), followed by spiritual health (12.9), environmental health (12), psychological domain (11.3), level of independence (9.4) and the lowest score was for physical domain (8.7). The mean (± SD) for overall QoL &general health perception was 2.9(±0.8). Based on general QoL

(overall QoL &general health perception) score, more than half, 56(58.9%) of the study participants had poor quality of life.

Cronbach's alpha was calculated to determine the internal consistency of the WHOQOL-HIV tool. All domains of the WHOQOL-HIV had a high value of cronbach's alpha ($\alpha > 0.7$).The cronbach's alpha coefficient of general QoL (0.74), physical domain (0.72), psychological domain(0.70),level of independence domain (0.72),social domain (0.79),environmental domain (0.71), spiritual domain (0.81), were adequate, indicating acceptable reliability of the questionnaire.**(Table:5).**

Table 5: Scores for 6 domains and general QoL with their respective Cronbach's alpha

Domains	Mean (±SD)	Cronbach's alpha
General QoL (Overall QoL &general health perception)	2.9 ± 0.9	0.74
Physical domain	8.7 ±3.1	0.72
Psychological domain	11.3± 2.8	0.70
Level of independence domain	9.4 ± 4.2	0.72
Social relationship domain	13 ± 2.4	0.89
Environmental health domain	12±2.1	0.71
Spiritual health domain	12.9± 2.4	0.81

5.4. Predictors of in-hospital mortality

Binary cox regression was done to identify the association between baseline characteristics and death among patients admitted with AIDS and non-AIDS related illnesses. Accordingly, sex, body mass index (BMI), residence, HIV sero-status, history of OI, current CD4+ count, reason for admission, WHO clinical stage, cotrimoxazole preventive therapy (CPT), non-invasive ventilation and comorbidity had p-value of < 0.25. Further multivariate cox regression was conducted by including reason for admission as it was a variable of interest.

Following multivariate Cox regression modelling, being on non-invasive ventilation (AHR: 2.99; 95%CI: [1.24, 7.28]; p=0.015) and body mass index (BMI) of less than 18.5(AHR: 2.6; 95%CI: [1.03, 6.45]; p=0.04) remained significant predictor of mortality. Therefore, the hazard of death in patients who were on non-invasive ventilation (NIV) was 2.99 compared with those who were not on NIV (AHR: 2.99; 95%CI: [1.24, 7.28]). The hazard of death among patients with a BMI of < 18.5 Kg/m2 was 2.6 compared with their counter-part (AHR: 2.6; 95%CI: [1.03, 6.45]). There was no significant difference in mortality among patients admitted with AIDS and non-AIDS related cases (AHR: 0.76 95%CI [0.29, 1.92]; p=0.56). **(Table: 6).**

Table 6: Crude and adjusted cox-proportional hazard regression for predictors of mortality at JUMC and TASH, from April 1 to August 31, 2018

Variables		**Death**		***CHR [95%CI]**	**P-value**	***AHR [95%CI]**	**P-value**
		Yes	No				
Sex	Female	22	58	1			
	Male	17	39	1.57[0.82,3.01]	0.17	1.8[0.77,4.54]	0.16
BMI (Kg/m^2)	>18.5	19	54	1			
	<18.5	20	43	1.5[0.79,2.90]	0.20	2.6[1.03,6.45]	0.04
Residence	Urban	25	74	1			
	Rural	14	23	2.0[1.03.3.90]	0.04	1.35[0.57,3.12]	0.49
WHO clinical stage	I	2	15	1			
	II	7	18	1.79[0.36.8.88]	0.47	1.1[0.16,8.01]	0.89
	III	6	28	1.22[0.25.6.09]	0.80	1.2[0.17,8.5]	0.85
	IV	24	36	3.5[0.84,15.05]	0.08	2.4[0.44,13.02]	0.31
Reason for Admission	Non- AIDS related	19	51	1			
	AIDS-related	20	46	1.18[0.63,2.24]	0.60	0.76[0.29,1.92]	0.56
CPT use	Yes	26	82	1			
	No	13	15	2.79[1.4,5.55]	0.003	1.4[0.34,5.81]	0.63
Co-morbidity	No	20	67	1			
	Yes	19	30	1.52[0.81,2.89]	0.19	1.6[0.68,3.77]	0.27
Non-invasive ventilation	No	13	75	1			
	Yes	26	22	3.03[1.55,5.95]	0.001	2.99[1.24,7.28]	0.015
History of OI	Yes	14	45	1			
	No	25	52	1.98[1.01,3.9]	0.048	2.3[0.86,6.04]	0.63
HIV serostatus	New	10	15	1			
	Known	29	82	2.2[1.06,4.55]	0.03	3.2[0.63,16.6]	0.15
Current CD4 count (mean±SD)				0.999[.998,1.0]	0.18	1.0[0.99,1.002]	0.95

**BMI-body mass-index, cART-combined antiretroviral therapy, AHR-adjusted hazard ratio, CHR-cumulative hazard ratio, CPT-Cotrimoxazole preventive therapy, OI-Opportunistic infection*

5.5. Predictors of health related quality of life (HRQoL)

Factors associated with quality of life were assessed for their associations with socio demographic, clinical and psychosocial characteristics of study participants. In a binary logistic regression, the factors which significantly increased the likelihood of poor QoL in the facet, "overall QoL and general health perceptions", included age (p=0.01), being unemployed (p<0.001), low in-come (p=0.03), HIV disclosure (p=0.02), support from family (p=0.001), co-morbidity (p=0.001) and HIV serostatus (p=0.064).

However, after including variables significant in bivariate analysis into multivariate analysis, being unemployed (AOR: 4.1, 95% CI: [1.23-13.64]; p=0.02), those that had no support from family (AOR: 3.6, 95% CI: [1.05-12.6]; p=0.04) and having comorbidity (AOR: 4.2, 95%CI: [1.08-16.65]; p=0.039) were found to be independent predictors of poor quality of life. Therefore, unemployed participants were 4.1 times more likely risk to have poor quality of life than employed participants(AOR: 4.1, 95% CI: [1.23-13.64];p=0.02).The odds of having poor quality of life for those with no social support was 3.6 times higher compared to their counterpart (AOR: 3.6, 95% CI: [1.05-12.6]; p=0.04). Furthermore, patients with comorbidity had 4.2 times poorer QoL compared with their counterpart (AOR: 3.6, 95% CI: [1.05-12.6]; p=0.039). **(Table: 7).**

Table 7: Crudes and adjusted odds ratio (OR) for predictors of HRQOL at JUMC and TASH, from April 1 to August 31, 2018.

Characteristics		**Quality of life**		**COR (95% CI)**	**P-Value**	**AOR (95% CI)**	**P-Value**
		Poor	Good				
Socio-demographic							
Age (years) (mean age± SD)		38.1(±11.3)	32.6(±8.2)	1.1[1.01-1.11]	0.01	1.03[0.96-1.1]	0.38
Occupation	Employed	16	28				0.02
	Unemployed	40	11	6.4[2.57-15.76]	0.00	4.1[1.23-13.64]	
Income (ETB)	>5000	7	7	1		1	0.06
	<1500	27	9	4.0[1.09-14.67]	0.03	5.3[0.91-30.7]	
Psychosocial							
HIV disclosure	Yes	28	10	2.9[1.19-7.1]	0.02	1.6[0.48-5.35]	0.45
	No	28	29	1		1	
Support from family	Yes	23	30	1		1	0.04
	No	33	9	4.8[1.9-11.1]	0.001	3.6[1.05-12.6]	
Comorbidity	No	30	34	1		1	0.039
	Yes	26	5	5.9[2.01-17.27]	0.001	4.2[1.08-16.65]	
HIV sero-status	Known	51	30	3.01[0.94-9.9]	0.064	4.6[0.92-22.8]	0.063
	New	5	9	1		1	

6. DISCUSSION

This study assessed the clinical and humanistic outcomes of hospitalized HIV/AIDS patients in selected Ethiopian tertiary care settings (Jimma University Medical Center and Tikur Anbessa Specialized Hospital). Objectives addressed in this study includes: in-hospital mortality, health related quality of life and their respective predictors.

Our study does not found any significant difference in median survival time among patients admitted with AIDS and non-AIDS related illnesses; It was, 32 and 35 days for AIDS and non-AIDS related admissions respectively (p=0.599). Body mass index (BMI) of less than 18.5(AHR: 2.6; 95%CI: [1.03, 6.45]; p=0.04) and non-invasive ventilation (AHR: 2.99; 95%CI: [1.24, 7.28]; p=0.04) were independent predictors of mortality.

Majority, (58.9%) of study participants had poor general health related quality of life. Being unemployed (AOR: 4.1, 95% CI: [1.23-13.64]; p=0.02), loss of support from family (AOR: 3.6, 95% CI: [1.05-12.6]; p=0.04) and having comorbidity (AOR: 4.2, 95%CI: [1.08-16.65]; p=0.039) were found to be independent predictors of poor quality of life.

The (mean $\pm$ SD) age of the admitted patients was (36.8$\pm$ 11.34) years. This is similar with study conducted in Uganda (5). But less than reported figures in the United states (17) and Canada (76). This indicates that the virus affected more in the economically productive age group of the society. This would have a significant economic impact on their family and country as a whole. About 13(9.6%) and 9(6.6%) of them had HBV and HCV co-infection. This finding is comparable for HBV with CDC report that 10% of HIV infected Americans are co-infected with HBV but lower than reported figure for HCV in which 25% of them are co-infected with hepatitis C virus (HCV) (77).

In this study, the over all in-hospital mortality was 28.7%. This finding is similar with figure reported in Nigeria(28.6%) (78). However, a study conducted in Ghana reported higher in-hospital mortality rate of 40.6% (22). The higher death rate might be due to, study design (retrospective), larger sample size (547 vs. 136) and study setting. Similar study from New York City and Colombia reported a lower in-hospital mortality rate of 2.6 % and 5.4% respectively (8,79). The possible explanation may be because of better socioeconomic and care setting in those countries. The proportion of death among patients with AIDS and non-AIDS related illnesses were 30.3% and 27.1% (*p=0.68*), respectively. There was no statistically significant difference in median survival time between those admitted with AIDS and non-AIDS related cases; it was 32 and 35 days for AIDS and non-AIDS

related illness respectively (p=0.599). The number of death is slightly higher in patients admitted with AIDS related illnesses (51.3%), even though it's not statistically significant (p=0.68). This finding is comparable with a study conducted in Spain in which 53% of deaths were attributed to AIDS defining illnesses (46). Similar study from Brazil reported that in-hospital mortality was almost two times higher in AIDS-related hospitalizations than in non-AIDS-related hospitalizations (48). However, several studies from developed countries reported non-AIDS-related illnesses as being the most common cause of death (80–82). In a Swiss cohort, conducted between 2005 and 2009, majority (84%) of deaths were caused by AIDS unrelated cases (83). This difference could be because of better socio-economic, education, adherence to cART and patient care in developed settings. Cryptococcal meningitis (25%), disseminated tuberculosis (20%), cerebral toxoplasmosis (15%) and pyogenic meningitis (10%), were the leading cause of death. This finding is comparable with study conducted in West Africa (20). The possible reason that cryptococcal meningitis was a leading cause of death is because of the fact that, majority of patients admitted with AIDS-related illnesses had a CD4 cell count of <200 cells/µL. Tuberculosis is the leading cause of morbidity and mortality among people living with HIV worldwide (77).

Among patients admitted with non-AIDS related illnesses, severe anaemia (37.8%), non-recurrent bacterial infections (36%), non-AIDS defining cancers (NADC) (35%), cardiovascular disease (15.8%), pancytopenia (10.5%) and stroke (5.2%) were the major cause of death. However, studies conducted in New York (8) and West Africa (20) reported sepsis as a major cause of death in non-AIDS related admissions. There was statistically significant difference in the rate of mortality among patients on cART and non-cART (p=0.030).This finding is in-line with the study conducted in ALERT centre (24).

This study revealed that the majority,56(58.9%) of HIV patients had poor quality of life score in general QoL and in all domains of health related quality of life except social relationship and spiritual health. Similar finding was reported in cross sectional study of 82 HIV-infected people conducted in Bangladesh (84) and other countries (66,85,86). However, this finding is not comparable with a study conducted in Brazil (65),china (41), Finland (87) and Norway (88). This difference is may be due to difference in socioeconomic, clinical status of the participants, study design and better patient care.

The mean general QoL (overall QoL &general health perception) score for the participants (2.90 ± 0.9) was comparable with Estonian study (85) but lower than that reported from other similar studies (89,90). The lowest health related quality of life was documented for physical domain of QoL. In

contrary to this finding, several studies reported better physical health-related QoL in Ethiopia (69,70) and other regions (41,65,66). The possible explanation for this finding is that the participants were symptomatic and burdened with physical symptoms of the disease, which in turn, impairs HRQoL (91). Additionally, as most (36.8%) of the participants were at WHO clinical stage 4 with CD4 count of less than 200cells/µL (56.8%), they were prone to a number of OIs causing them to be bed ridden. Among the study participants, the best HRQoL was observed in the dimensions related to social relationship and spirituality. This finding is in line with Georgian study (66) but its inverse picture of Nigerian study (92). The possible explanation may be our community has long standing culture of social interaction and most of the participants had not exposed their HIV status so that they were not a victim of social isolation, stigmatization and discrimination. The high score of spiritual domain may be because of the fact that many Ethiopians are religious especially when they acquire chronic disease hoping divine healing.

In our cohort, patients with low body mass index (<18.5kg/m2) were found to be at increased risk of death (AHR: 2.6[1.03, 6.45]; p= 0.04). This finding is supported by a 2 year prospective cohort study conducted in Kigali, Rwanda(93). According to Anjali Sharma et.al (94),underweight(BMI<18.5 kg/m^2) patients were associated with over double rate of AIDS- related death(AHR:2.04, 95% CI [1.03, 4.04]). Even though, the underlying mechanisms placing underweight HIV-infected patients at risk of death are unclear, several factors which could have facilitated progression to death were more prevalent among study participants, including majority of patients at advanced stage of the disease, low CD4 count and poor adherence. Furthermore, malnutrition (typically defined as a body mass index (BMI) of <18.5 kg/m^2) aggravates the underlying immunosuppressant enhancing their susceptibility to various infections and HIV disease progression (95,96).

The need of non-invasive ventilation (NIV) was also significantly associated with higher hazard of mortality (AHR: 2.99[1.24, 7.28]; p=0.015). This finding is in line with study conducted in Uganda (5),Mexico (47) and Brazil (97), which reported that patients who were in need of ventilation support had higher risk of death. The possible explanation could be most of patients in this study were at advanced stage of the disease and patients usually put on ventilator support when they are critically ill with multi organ failure. Those patients would have worse prognosis independent of oxygen therapy.

In this study the current CD4 count of patients was not significantly associated with in-hospital mortality (AHR: 1.0[0.99, 1.002]; p=0.95). This finding is in line with South African study which reported that, CD4 count had no significant association with in-hospital and intensive care unit (ICU) mortality (98).

This study also identified factors associated with health related quality of life. Our study found unemployment status of participants as predictor of poor quality of life. Therefore, unemployed participants were 4.1 times more likely to have poor health related quality of life than their employed counterparts (AOR=4.1, 95% CI, [1.23, 13.64]; p=0.02). Similar findings were reported from Ethiopia (69,86,99) and other countries (65,85). According to Fernanda et.al (65), unemployment was significantly associated with worse QoL in all the domains of QoL, except for the domain of spirituality and religion . The reason could be most of participants in this study were at advanced disease state that they get difficult to keep jobs. When they lose their job, they will not have enough money to access what they need in life. This could contribute for poor quality of life. Furthermore the distribution population of unemployment rate was higher in poor quality of life category based on general QoL.

Moreover, participants who had no social support from family were 3.6 times more likely to have poor quality of life than their counterpart (AOR=3.6, 95% CI, [1.05, 12.6]; p=0.04). Similar findings showed that social support is significantly associated with QoL (92,100). It's not surprising that individuals who are satisfied with social support would likely have better QoL. Legese A. Mekuria and his colleagues reported that satisfaction with social-support was associated with higher social and spiritual HRQoL (69).

The presence of comorbid disease state was also found to be predictor of poor overall quality of life. Patients with comorbidity had 4.2 times more likely risk to have poor quality of life (AOR=4.2, 95%CI, [1.08, 16.65]; p=0.039) compared with those without comorbid disease. This finding is supported by numerous studies (101–104). A study from Kenya reported that HIV patients with comorbid chronic diseases had significantly worse HRQoL especially in physical dimension (68). HIV/AIDS patients with additional comorbid disease suffer from double burden of illnesses which could significantly compromise their quality of life.

Unlike other studies which reported socio-demographic variables such as gender, age, marital status, educational level and place of residence to have significant association with HRQoL, this study has not found such association, including Clinical variables (84,105–107).

Strength and limitation of the study

The strength of this study was its prospective study design which allowed better control of data quality and enrollment of consecutive patients. The study was conducted in two (JUMC and TASH) tertiary hospitals which could improve the representativeness. Furthermore, this study allowed assessment of health related quality of life of HIV/AIDS patients who were both on cART and non-cART, unlike other studies which included only patients on cART.

This study had also suffered from some limitations. Identifying the exact cause of death and hospitalization for some patients was challenging. All of the patients were not on cART, this hindered us from analysis of some important variables such as adherence. Lack of some important laboratory investigations such as viral load was also among the limitation. For quality of life assessment; the respondents were one who was actively seeking for medical admission. Those who were not admitted could not be included; therefore the result of the study may not be generalized to all of HIV positive patients of the study area. In view of the fact that the WHOQoL-HIV BREF instrument measures QoL within two weeks prior to the interview, the recall bias may influence the information obtained. Sample size is small and may affect power of the test.

7. Conclusion and recommendation

7.1 Conclusion

This study demonstrated that there was no significant difference in mortality rate among patients admitted with AIDS and non-AIDS related illnesses. However, mortality is slightly higher in patients admitted with AIDS-related illnesses. Cryptococcal meningitis (25%), disseminated tuberculosis (20%), cerebral toxoplasmosis (15%) and pyogenic meningitis (10%), were the leading causes of AIDS-related deaths. The overall mortality rate in our study is still higher than middle and high income countries. Furthermore, this study found the need of non-invasive ventilation and low body mass index as independent predictors of mortality. This target group's needs special attention as they carried higher hazards of mortality.

Majority of participants had poor quality of life in all domains of quality of life except for social relationship and spiritual health domains. The domain score of health related quality of life (HRQoL) was highest for social relationship. Being unemployed, those that had no support from family and having comorbidity were found to be independent predictors of poor quality of life. Special attention should be given to those patients to enhance, employment status, social support services delivery and comorbid disease management in order to improve an overall HRQoL.

The majority of hospitalized HIV/AIDS patients in the study period were females and majority of them were admitted at advanced stage of the disease. The mean age of the admitted patients was 37 years; indicating that the virus affected more in the economically productive age group of the society. This would have a significant economic impact on their family and country as a whole.

7.2 Recommendation

Improving the clinical and humanistic outcomes of HIV/AIDS patients requires a collaborative work of various stakeholders.

For JUMC and TASH

- Importance of adherence to cART regimen should be highlighted in order to achieve maximal suppression of viral load in HIV/AIDS patients.
- Early detection of serostatus and initiation of cART should be considered in all HIV contracted individuals.
- Nutritional supplementation should be considered in patients with low BMI.

For Ministry of Health and center for disease control (CDC)

- Enhancement of social support services delivery should be considered for HIV/AIDS patients in order to improve their QoL.
- Job opportunity should be facilitated for HIV/AIDS patients in order to cope up with their daily living.
- Providing supplementary food stuffs like, plumpynut should be considered to improve their nutritional status.

For Patients

- Strict adherence to combined antiretroviral therapy (cART).

For researchers

- Further study has to be conducted on clinical and humanistic outcomes with better study design and large sample size including other tertiary hospitals.

8. REFERENCES

1. Joint United Nations Programme on HIV/AIDS(UNAIDS). Report on the Global AIDS Epidemic.Geneva:UNAIDS [Internet]. 2018. Available from: http://www.unaids.org/en/resources/fact-sheet

2. UNAIDS(2014). Regional fact sheet, Sub-saharan Africa. Available from: www.unaids.org/en/media/unaids/.../factsheet/2014/20140716_FactSheet_en.pdf

3. National guidelines for comprehensive hiv prevention, care and treatment [Internet]. 2017. Available from: https://aidsfree.usaid.gov/sites/default/files/resources/ethiopia_art_guidelines_2017.pdf

4. Gebo KA, Fleishman JA, Moore RD. Hospitalizations for Metabolic Conditions , Opportunistic Infections , and Injection Drug Use Among HIV Patients. J Acquir Immune Defic Syndr. 2005;40(5):609–16.

5. Kwizera A, Nabukenya M, Peter A, Semogerere L, Ayebale E, Katabira C, et al. Clinical Characteristics and Short-Term Outcomes of HIV Patients Admitted to an African Intensive Care Unit. Crit Care Res Pract. 2016;2016:1–7.

6. Ford N, Shubber Z, Meintjes G, Grinsztejn B, Eholie S, Mills EJ, et al. Causes of hospital admission among people living with HIV worldwide : a systematic review and meta-analysis. Lancet HIV. 2015;3018(15):1–7.

7. Joint United Nations Programme on HIV/AIDS (UNAIDS). Global AIDS. [Internet]. Report on the Global AIDS Epidemic.Geneva. 2017. Available from: www.unaids.org/sites/default/files/media_asset/20170720_Data_book_2017_en.pdf

8. Psevdos JHKG, Gonzalez JE. All-cause mortality in hospitalized HIV-infected patients at an acute tertiary care hospital with a comprehensive outpatient HIV care program in New York City in the era of highly active antiretroviral therapy (HAART). Infection. 2013;41:545–51.

9. Buchacz K, Baker RK, Moorman AC, Richardson JT, Wood KC, Holmberg SD et al. Rates of hospitalizations and associated diagnoses in a large multisite cohort of HIV patients in the United States. AIDS. 2008;22:1345–54.

10. Berry SA, Fleishman JA, Moore RD GK. Trends in reasons for hospitalization in a multisite United States cohort of persons living with HIV, 2001–2008. J Acquir Immune Defic Syndr. 2012;59:368–75.

11. Crum-Cianflone NF, Grandits G, Echols S et al. Trends and causes of hospitalizations among HIV-infected persons during the late HAART era: what is the impact of CD4 counts and HAART use? J Acquir Immune Defic Syndr. 2010;54:248–57.

12. Falster K, Wand H, Donovan B, Anderson J, Nolan D, Watson K, et al. Hospitalizations in a cohort of HIV patients in Australia, 1999–2007. AIDS. 2010;24(9):1329–1339.

13. Farahani M, Farahani A, Marlink R. Prevalence and distribution of non-AIDS causes of death among HIV-infected individuals receiving antiretroviral therapy : a systematic review and meta-analysis. Int J STD AIDS. 2016;1–15.

14. Paul S, Gilbert HM, Ziecheck W, Jacobs J, Sepkowitz KA. The impact of potent antiretroviral therapy on the characteristics of hospitalized patients with HIV infection. Aids. 1999;13(3):415–8.

15. Gutierrez F, Padilla S, Masiá M, Iribarren JA, Moreno S, Viciana P, et al. Clinical outcome of HIV-infected patients with sustained virologic response to antiretroviral therapy: Long-term follow-up of a multicenter cohort. PLoS One. 2006;1(1):1–7.

16. Mocroft A, Barry S, Sabin CA, Lepri AC, Kinloch S, Drinkwater A, et al. The changing pattern of admissions to a London hospital of patients with HIV: 1988-1997. Royal Free Centre for HIV Medicine. AIDS. 1999;13(10):1255–61.

17. Bachhuber M a, Southern WN. Hospitalization rates of people living with HIV in the United States, 2009. Public Health Rep. 2014;129:178–86.

18. Cenderello G, Tittle V, Pasa A et al. Inpatient admissions of patients living with HIV in two European centres (UK and Italy); comparisons and contrasts. J Infect. 2015;70:690–4.

19. Al M et. Hospitalizations of HIV patients in a major Israeli HIV/AIDS center during the years 2000 to 2012. Medicine (Baltimore). 2017;96(18):1–7.

20. Charlotte Lewden, Youssoufou J Drabo DZ et al. Disease patterns and causes of death of hospitalized HIV-positive adults in West Africa : a multicountry survey in the antiretroviral treatment era. J Int AIDS Soc. 2014;17(18797):1–12.

21. Brinkhof A, Weigel R, Messou et al. Mortality of HIV-infected patients starting antiretroviral therapy in sub-Saharan Africa: Comparison with HIV-unrelated mortality. PLoS Med. 2009;6(4):1–11.

22. Adriana Saavedra, Nia Campinha-Bacote MH et. a. HIV-infected adults admitted to Korle-Bu Teaching Hospital. Pan Afr Med J. 2017;27(48):1–7.

23. Tamiru M, Haidar J. Hospital Bed Occupancy and HIV / AIDS in three Major Public Hospitals of Addis Ababa , Ethiopia. Int J Biomed Sci Vol. 2010;6(3):195–201.

24. Kondo M, Woldegiorgis A, Tilahun H, Harris C. Characterization of inpatient admission within a large HIV treatment program in Ethiopia. Ann Glob Heal. 2015;81(1):128–9.

25. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1–infected adults and adolescents. Washington, DC: Dept of Health and Human Services, 2008. [Internet]. Available from: https://aidsinfo.nih.gov/contentfiles/lvguidelines/adultandadolescentgl.pdf

26. Kohli RM, Sane S, Kumar K, Paranjape RS MS. Dramatic improvement in survival among adult Brazilian AIDS patients. Indian J Med Res. 2005;122:297–304.

27. Casado A, Consiglio E, Podzamczer D BX. Highly active antiretroviral treatment (HAART) and health-related quality of life in naive and pretreated HIV-infected patients HIV. Clin

Trials. 2001;2(6):477–83.

28. Stangl A, Wamai N, Mermin J, Awor A BR. Trends and predictors of quality of life among HIV-infected adults taking highly active antiretroviral therapy in rural Uganda. AIDS Care. 2007;19(5):626–36.

29. Marins JRP, Jamal LF, Chen SY et al. Dramatic improvement in survival among adult Brazilian AIDS patients. AIDS. 2003;17:1675–1682.

30. Miners A, Phillips A, Kreif N, Rodger A, Speakman A, Fisher M, et al. Health-related quality-of-life of people with HIV in the era of combination antiretroviral treatment : a cross-sectional comparison with the general population. Lancet HIV. 2014;1(1):e32–40.

31. Chen WT, Shiu CS, Simoni J, Fredriksen-Goldsen K, Zhang F, et al. Attitudes toward antiretroviral therapy and complementary and alternative medicine in Chinese patients infected with HIV. J Assoc Nurses AIDS Care. 2009; 20:203–217.

32. Simoni JM, Pantalone DW, Plummer MD, Huang B. A randomized controlled trial of a peer support intervention targeting antiretroviral medication adherence and depressive symptomatology in HIV-positive men and women. Health Psychol. 2007; 26:488–495.

33. Lubeck DP, BennettCL, MazonsonPD, et al. Quality of life and health service use among HIV-infected patients with chronic diarrhea, J Acquir Immune Defic Syndr.1993. 6 (478-84).

34. Tramarin A, Parise N, Campostrini S et al. Association between diarrhea and quality of life in HIV-infected patients receiving highly active antiretroviral therapy. Qual Life Res 2004; 13: 243–50.

35. Volberding P. The impact of anemia on quality of life in human immunodeficiency virus-infected patients. J Infect Dis 2002; 185 Suppl 2: S110–S114.

36. Shenoy A, Ramapuram JT, Unnikrishan B E a. Effect of Lipodystrophy on the Quality of

Life among People Living with HIV (PLHIV) on Highly Active Antiretroviral Therapy. J Int Assoc Provid AIDS Care. 2014;13(5):471–5.

37. Gifford AL, Bormann JE, Shively MJ, Wright BC RD, SA B. Predictors of self-reported adherence and plasma HIV concentrations in patients on multidrug antiretroviral regimens. J Acquir Immune Defic Syndr. 2000;23:386–395.

38. Nieuwkerk PT, Reijers MH, Weight HM, Lange JM SM. Quality of life in maintenance versus prolonged induction for HIV. JAMA. 2000;284:178–179.

39. Nieuwkerk PT, Reijers MH, Weight HM, Lange JM SMa. Quality of life in maintenance versus prolonged induction for HIV. JAMA. 2012;2000(284):178–179.

40. Basavaraj KH, Navya MA, Rashmi R. Quality of life in HIV/AIDS. Indian J Sex Transm Dis 2010; 31(2):75- 80.

41. Liping M, Peng X, Haijiang L, Lahong J, Fan L. Quality of Life of People Living with HIV / AIDS : A Cross-Sectional Study in Zhejiang. PLoS One. 2015;10(8):1–14.

42. Kolk IMDB Der, Sprangers MAG, Prins JM, Smit C, Wolf F De, Nieuwkerk PT. Health-Related Quality of Life and Survival among HIV-Infected Patients Receiving Highly Active Antiretroviral Therapy : A Study of Patients in the AIDS Therapy Evaluation in the Netherlands (ATHENA) Cohorth. CID. 2010;50:255–63.

43. Fleishman JA, Reilly ED, Mathews WC. Patterns of Diagnoses in Hospital Admissions in a Multistate Cohort of HIV-Positive Adults in 2001. Med Care. 2005;43(9):3–14.

44. Teshale EH, Hanson DL, Wolfe MI, Brooks JT, Kaplan JE, Bort Z, et al. Reasons for Lack of Appropriate Receipt of Primary Pneumocystis jiroveci Pneumonia Prophylaxis among HIV-Infected Persons Receiving Treatment in the United States : 1994 – 2003. Clin Infect Dis. 2007;44:879–83.

45. David M,Carlos Zala,Ognjenka Djurdjev et al. Determinants of Short- and Long-term

Outcome in Patients With Respiratory Failure Caused by AIDS-Related. Arch Intern Med. 1999;159:741–7.

46. Hernando V et al. Differences in the causes of death of HIV-positive patients in a cohort study by data sources and coding algorithms. AIDS. 2012;26:1829–1834.

47. Vargas-Infante YA, Guerrero ML, Ruiz-Palacios GM, Soto-Ramírez LE, Del Río C, Carranza J, et al. Improving Outcome of Human Immunodeficiency Virus-Infected Patients in a Mexican Intensive Care Unit. Arch Med Res. 2007;38(8):827–33.

48. Coelho LE, Ribeiro SR, Veloso VG, Grinsztejn B, Luz PM. Brief communication Hospitalization rates , length of stay and in-hospital mortality in a cohort of HIV infected patients from Rio de Janeiro , Brazil. Brazilian J Infect Dis. 2016;21(2):190–5.

49. Lawna SD, Anthony D. Harriesb, Anglarete X, Myerg L, Robin Wood. Early mortality among adults accessing antiretroviral treatment programmes in sub-Saharan Africa. 2013;22(15):1–20.

50. Müller M, Wandel S, Colebunders R, Attia S, Furrer H, Egger M. Incidence an lethality of ommune reconstitution disease in HIV-infected patients starting antiretroviral therapy: systematic review and meta-analysis. NIH public access. 2010;10(4):251–61.

51. Castelnuovo B, Manabe YC, Kiragga A, Kamya M, Easterbrook P, Kambugu A. Cause-Specific Mortality and the Contribution of Immune Reconstitution Inflammatory Syndrome in the First 3 Years after Antiretroviral Therapy Initiation in an Urban African Cohort. Clin Infect Dis. 2009;49(6):965–72.

52. Balkema CA, Irusen EM, Taljaard JJ, Zeier MD, Koegelenberg CF. prospective study on the outcome of human immunodeficiency virus-infected patients requiring mechanical ventilation in a high-burden setting. An Int J Med. 2018;109(1):35–40.

53. Adlakha A, Pavlou M, Walker DA, Copas AJ, Dufty N, Batson S, et al. Survival of HIV-infected patients admitted to the intensive care unit in the era of highly active antiretroviral

therapy. Int J STD AIDS. 2011;22:498–504.

54. Kebede Beyene. Kebede Abera, Teferi Gedif, Ephrem Engidawork & Tsige Gebre-Mariam. African J AIDS Res. 2010;9(1):31–40.

55. Kim WC, Hwang P, Burgers WP, Strategic S, Journal M, May N, et al. Health-related quality of life and virologic outcomes in an HIV clinic S.A. Qual life Res. 2000;9(4):977–85.

56. Federal Democratic Republic of Ethiopia Ministry of Health (2007b) (FMOH). HIV prevention and control office. Guidelines for the management of opportunistic infections and anti-retroviral treatment in adolescents and adults in Ethiopia. Addis Ababa [Internet]. Available from: www.who.int/hiv/pub/guidelines/ethiopia.pdf

57. Weber R, Ruppik M, Rickenbach M, Spoerri A, Furrer H, Battegay M, et al. Decreasing mortality and changing patterns of causes of death in the Swiss HIV Cohort Study. HIV Med. 2013;(14):195–207.

58. Luo B, Sun J, Cai R, Shen Y, Liu L, Wang J, et al. Spectrum of opportunistic infections and risk factors for in-hospital mortality of admitted AIDS patients in Shanghai. Med (United States). 2016;95(21):1–8.

59. Hajiabdolbaghi M, Jafari S, Mansouri S. Hospitalizations and its related factors in HIV/AIDS patients in Tehran, Iran. Med J Islam Repub Iran. 2014;28(70):1–7.

60. Berhe T, Melkamu Y, Amare A. The pattern and predictors of mortality of HIV/AIDS patients with neurologic manifestation in Ethiopia: A retrospective study. AIDS Res Ther. 2012;9(1):1–7.

61. Wajanga BMK, Webster LE, Peck RN, Downs JA, Mate K, Smart LR, et al. Inpatient mortality of HIV-infected adults in sub-Saharan Africa and possible interventions: A mixed methods review. BMC Health Serv Res. 2014;14(1):1–8.

62. Benson CA, Kaplan JE, Masur H, Pau A HK. Treating Opportunistic Infections among

HIVInfected Adults and Adolescents: Recommendations from CDC, the National Institutes of Health, and the HIV Medicine Association/Infectious Diseases Society of America. CID. 2005;40(S):131–235.

63. frank j. p alella k athleen m. d elaney ancmo et al. Human Immunodeficiency Virus Infection. N Engl J Med. 1998;338(13):853–860.

64. Hays RD, Cunningham WE, Sherbourne CD, Wilson IB, Wu AW, Cleary PD, et al. Health-related Quality of Life in Patients with Human Immunodeficiency Virus Infection in the United States : Results from the HIV Cost and Services Utilization Study. Am J Med. 2000;108:714 –722.

65. Razera F. Factors associated with health-related quality-of-life in HIV-infected Brazilians. Int J STD AIDS. 2008;19:519–23.

66. Karkashadze E, Gates MA, Chkhartishvili N, Dehovitz J. Assessment of quality of life in people living with HIV in Georgia. Int J STD AIDS. 2017;28(7):672–8.

67. Motilewa OO. A Comparative Study of Health Related-Quality of Life Among HIV Patients on Antivirals & Antiretrovirals. A Comp Study Heal Related-Quality Life Among HIV Patients Pre-HAART HAART Uyo South-South Niger. 2015;7(2):60–8.

68. Mu E. Does duration on antiretroviral therapy determine health-related quality of life in people living with HIV? A cross-sectional study in a regional referral hospital in Kenya. Glob Health Action. 2014;7(1):1–11.

69. Legese A. Mekuria, Mirjam A.G. Sprangers, Jan M. Prins AWY& PTN. Psychological and Socio-medical Aspects of AIDS / HIV Health-related quality of life of HIV-infected adults receiving combination antiretroviral therapy in Addis Ababa. AIDS Care. 2015;37–41.

70. Abdrrahman Shemsu Surur, Fitsum Sebsibe Teni, Wondwessen Wale YA and BT. Health related quality of life of HIV / AIDS patients on highly active anti-retroviral therapy at a university referral hospital in Ethiopia. BMC Health Serv Res. 2017;17(737):1–8.

71. Morisky DE, Green LW LD. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care 1986;2467-74. 1986;24:67–74.

72. WHOQOLHIV group.WHOQOL-HIV for quality of life assessment among people living with HIV and AIDS: results from the field test. AIDS Care 2004; 16:882-889. Available from: apps.who.int/iris/handle/10665/77776

73. World Health Organization. International classification of diseases [Internet]. 1993. Available from: www.who.int/classifications/icd/ICD10Volume2_en_2010.pdf

74. Zaid Demoz, Befikadu Legesse, Gebrehiwot Teklay, Birhanu Demeke, Tewodros Eyob ZS, Abera M. Medication adherence and its determinants among psychiatric patients in an Ethiopian referral hospital. DPJ. 2014;1329–35.

75. Schneider E, Whitmore S, Glynn KM, Dominguez K, Mitsch A, McKenna MT, et al. Revised surveillance case definitions for HIV infection among adults, adolescents, and children aged <18 months and for HIV infection and AIDS among children aged 18 months to <1 [Internet]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/19052530

76. Krentz HB, Dean S, Gill MJ. Longitudinal assessment (1995-2003) of hospitalizations of HIVinfected patients within a geographical population in Canada. HIV Med. 2006;7:457–66.

77. Centers for disease control and prevention. 2018; Available from: https://www.cdc.gov/hepatitis/hiv-hepatitis-coinfection.htm

78. Ifbejoh P, Npsubmjuz S, Bevmu B, Qbujfout N, Ufsujbsz JOB. HIV.AIDS related mortality among adult medical patients in a tertiary health institution in south-south,Nigeria. Asian Pac J Trop Med. 2010;141–4.

79. Fernanda M, Barreneche Á, Andrés C, Castro R, Botero AH, Pablo J, et al. Hospitalization causes and outcomes in HIV patients in the late antiretroviral era in Colombia. AIDS Res Ther. 2017;14(60):3–9.

80. Kowalska JD et al. Long-term exposure to combination antiretroviral therapy and risk of death from specific causes: no evidence for any previously unidentified increased risk due to antiretroviral therapy. AIDS. 2012;26:315–323.

81. Weber R et al. Decreasing mortality and changing patterns of causes of death in the Swiss HIV Cohort Study. HIV Med. 2013;14:195–207.

82. Marin B et al. Non-AIDS-defining deaths and immunodeficiency in the era of combination antiretroviral therapy. AIDS. 2009;23:1743–1753.

83. Weber R et al. Decreasing mortality and changing patterns of causes of death in the Swiss HIV Cohort Study. HIV Med. 2013;14:195–207.

84. Imam MH, Karim MR, Ferdous C AS. Health related quality of life among the people living with HIV. Bangladesh Med Res Counc Bull. 2011;37:1–6.

85. Rüütel K, Pisarev H, Loit H, Uusküla A. Factors influencing quality of life of people living with HIV in Estonia : a cross-sectional survey. J Int AIDS Soc. 2009;12(13):1–8.

86. Alemu A, Yenealem A, Feleke A MS (2013). Health Related Quality of Life Assessment and Associated Factors Among AIDS & Clinical Health Related Quality of Life Assessment and Associated Factors Among People on Highly Active Antiretroviral Therapy at Felege Hiwot Referral. J AIDS Clin Res. 2013;5(272):1–5.

87. Nobre NMR. Quality of life of people living with HIV / AIDS in Finland Department of Public Health Faculty of Medicine Doctoral Programme in Population Health (DocPop) University of Helsinki. 2018.

88. Groenningsaeter A (2002) Living condition and quality of life among people living with HIV (PLWH) in Norway. XV International AIDS conference, Bangkok, Thailand 3856.

89. Marzieh Nojomi, Khatereh Anbary MR. Health-Related Quality of Life in Patients with HIV/AIDS. Arch Iran Med 2008; 2008;11(6):608–12.

90. WHOQOL-HIV Group. Preliminary development of the World Health Organization's Quality of Life HIV Instrument (WHOQOL-HIV): analysis of the pilot version. Soc Sci Med. 2003;57:1259–75.

91. Mrus JM, Leonard AC, Yi MS, Sherman SN FS, Justice AC TJ. Health-Related Quality of Life in Veterans and Nonveterans with HIV/AIDS. J Gen Intern Med. 2006;21(S5):S39–S47.

92. Folasire OF, Irabor AE, Folasire AM, Folasire O. Quality of life of People living with HIV and AIDS attending the Antiretroviral Clinic , University College Hospital , Nigeria. Afr J Prm Heal Care Fam Med. 2012;4(1):1–8.

93. Lindan CP, Allen S, Serufilira A, Lifson AR, Perre P Van De, Chen-rundle A, et al. Predictors of Mortality among HIV-infected Women in Kigali, Rwanda. Ann Intern Med. 2017;116(4):320–8.

94. Sharma A, Hoover DR, Shi Q, Gustafson D, Plankey W, Hershow RC, et al. Relationship between Body Mass Index and Mortality in HIV-Infected HAART Users in the Women Interagency HIV Study. PLoS One. 2015;10(12):1–16.

95. Chandra RK. Nutritional deficiency and susceptibility to infection. Bull World Health Organ.1979; 57:167–177.

96. Shah S, Whalen C, Kotler DP, et al. Severity of human immunodeficiency virus infection is associated with decreased phase angle, fat mass and body cell mass in adults with pulmonary tuberculosis infection in Uganda. J Nutr. 2001; 131:2843–2847.

97. Duarte L, Luna S, Soares DDS, Bezerra G, Cavalcante MG. Clinical characteristics, outcomes and risk factors for death among critically ill patients with hiv-related acute kidney injury. Rev Inst Med Trop Sao Paulo. 2016;58(52):1–6.

98. Mkoko P, Chb MB, Medicine M, Sa FCP, Raine RI, Chb MB, et al. HIV-positive patients in the intensive care unit : A retrospective audit. S Afr Med J. 2017;107(10):877–81.

99. Tolla L. Measuring the Quality Of Life (QOL) of People Living With HIV/ AIDS (PLWHA) With Highly Active Antiretroviral Therapy (HAART) in Addis Ababa Zenebework Hospital. Ethiop Med J. 2006;21–40.

100. Abera K, Gedif T, Engidawork E, Gebre-mariam T. Quality of life of people living with HIV / AIDS and on highly active antiretroviral therapy in Ethiopia Quality of life of people living with HIV / AIDS and on highly active. African J AIDS Res. 2010;9(1):37–40.

101. Jia H, Uphold CR, Zheng Y, Wu S, Chen GJ et al. A further investigation of health-related quality of life over time among men with HIV infection in the HAART era. Qual Life Res. 2007;16:961–8.

102. Liu C, Johnson L, Ostrow D, Silvestre A, Visscher B et al. Predictors for lower quality of life in the HAART era among HIVinfected men. J Acquir Immune Defic Syndr. 2006;42:470–7.

103. Ibrahim AW, Wakil MA. The Impact of Comorbid Clinical Depression on The Health-Related Quality of Life of Adults on Highly Active Antiretroviral Therapy in Maiduguri , Northeastern Nigeria Vol 36 Issue 4 Oct-Dec 2014. 408 Indian J Psychol Med. 2014;36(4):408–17.

104. Emuren L, Welles S, Evans AA, Polansky M, Okulicz F, Macalino G, et al. Health-related quality of life among military HIV patients on antiretroviral therapy. PLoS ONE. 2017;12(6):1–17.

105. Gebremichael DY, Hadush KT, Kebede EM, Zegeye RT. Gender difference in health related quality of life and associated factors among people living with HIV / AIDS attending anti-retroviral therapy at public health facilities , western Ethiopia : comparative cross sectional study. 2018;1–11.

106. Belak S, Vuru T, Duvan K, Ma M. Quality of Life of HIV-Infected Persons in Croatia. 2006;30:79–84.

107. Kumar A, Girish HO, Nawaz AS, Balu PS VKB. Determinants of quality of life among people living with HIV/AIDS: A Cross sectional study in central Karnataka, India. Int J Med Sci Public Heal. 2014;3(11):1413–7.

ANNEXES

ANNEX I: Informed consent

Consent form: Hello, my name is Getandale Zeleke, MSc Clinical Pharmacy graduate candidate from Jimma University. I am conducting study on "The clinical and humanistic outcomes among hospitalized HIV/AIDS patients in Ethiopian tertiary care settings. I would like to interview you a few questions about you, your disease and adherence status, prophylaxis or treatment you are getting and your laboratory findings (from medical chart).The study will provide information that might enable the health personnel and the government to get an insight of outcomes of hospitalization among HIV/AIDS patients and its predictors. We would like to take your time to respond to our interview questions and it will take approximately 15 minutes. We also request you to answer as truthfully as possible. Your answer will not be revealed to the health personnel or any other people, and the information you give will be treated anonymously and confidential. This research imposes no risk and therefore no compensation will be provided for your participation in this study. Your participation is totally voluntary and you can withdraw anytime or refuse to continue, and this will not influence the way you are treated in the health institution or in the community.

Are you willing to participate?

YES ☐ No ☐

Signature of the participant_____

Day_____

Signature of data collector_____

Day_____

Name of Principal Investigator: Getandale Zeleke

Phone No: 0912892539

Email:Getandale@gmail.com

ANNEX II: Data collection tool

A. Demographic, psychosocial and behavioural characteristics of the patients

Card No._____

Hospital site: JUMC☐ TASH☐

Admission ward: internal medicine☐ ICU☐ surgery☐

1) Sex Male ☐ Female☐
2) Age _____
3) BMI_____
4) Educational level No formal education☐ Primary school [1-8] ☐
   Secondary school [9-12] ☐ College/university\☐
5) Area of residence: Urban ☐ Rural☐
6) Ethnicity: Oromo☐ Amara☐ SNNP☐ Tigre☐ other
7) Risky behaviours :smoking status Smoker ☐ Non-smoker ☐
   Alcoholic status: Drinker ☐ Non-drinker ☐
   Other Substance abuse: _____
8) Occupation : Employed ☐ unemployed ☐
9) Marital status: Single ☐ Married☐
   Divorced ☐ Widowed ☐
10) HIV disclosure: yes ☐ No☐
11) Support from family yes☐ No☐
12) Monthly income_____

B. Laboratory Characteristics

1. Base line CD4 (At initiation of cART)

   -------cells/micro liter

1. Current CD4

   -------cells/micro liter

2. Viral load

   --------RNA/micro liter

3. HBV status: positive ☐ Negative ☐
4. HCV status: positive ☐ Negative ☐

Vital sign	BP ——— PR ——— RR ——— Temp ———
CBC	WBC
	RBC
	Hgb
	Hct
	PLT
	Neut
	Lym
	MCV
	MCH
	MCHC
LFT	ALT
	AST
	ALP
Serum albumin	
RFT	Scr
	bilirubin
	Urine output
Electrolyte	Na^+
	K^+
	cl^-
	Ca^{2+}

C. Clinical characteristics

1. Date of admission: _____
2. Chief complaint:_____
3. Diagnosis at admission_____
4. Clinical presentation(GCS)_____
5. HIV sero-status: newly Diagnosed at admission ☐ Known HIV patient ☐
6. If known RVI patient, Age at diagnosis___ Time since diagnosis in years__mode of acquisition___
7. WHO clinical stage at diagnosis_____
8. Treatment for the diagnosis

   _____
9. Number of OIs_____
10. Previous history of OI Rx Yes ☐ No ☐
11. If yes, what OI _____
12. Is the patient on cART yes ☐ NO ☐
13. If yes what cART regimen:: [1e] TDF+3TC+EFV ☐ [1c] AZT+3TC+NVP ☐

    [1f] TDF+3TC+NVP ☐ [1d] AZT+3TC+EFV ☐

    If other specify_____
14. Duration on cART <6month ☐ >6months ☐
15. Delayed in initiation of cART? Yes ☐ No ☐
16. Is there any history of toxicity from cART? Yes ☐ No ☐
17. Have you ever received OI prophylaxis Yes ☐ No ☐
18. If yes, which prophylaxis CPT ☐ IPT ☐ Other_____
19. Co-morbidity Yes ☐ No ☐
20. If yes specify _____

21. Non-invasive ventilation: yes ☐ no ☐

22. Inotropic support yes☐ no☐

23. Renal replacement therapy (RRT) yes☐ no☐

24. Admitted to ICU Yes ☐ NO ☐

25. If yes, ICU complication AKI☐ Sepsis ☐ AKI and sepsis☐

26. Levels of adherence if on cART(use Adherence measuring tool below):

Poor adherence☐

Medium adherence☐

High adherence☐

27. Outcome of Hospitalization: Discharged with improvement or transferred☐date_____

: Left against medical advice☐: date_____

: Died☐: date_____ possible cause of death_____

: lost to follow up☐: date_____

D. Adherence Measurement Tool

Morisky 8-Item Medication Adherence Questionnaire

Question	No	Yes
1. Do you sometimes forget to take your medicine?	+1	0
2. People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?	+1	0
3. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	+1	0
4. When you travel or leave home, do you sometimes forget to bring along your medicine?	+1	0

5. Did you take all your medicines yesterday (reverted)?	0	+1
6. When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	+1	0
7. Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	+1	0

8. How often do you have difficulty remembering to take all your medicine? __ A. Never/rarely __ B. Once in a while __ C. Sometimes __ D. Usually __ E. All the time	**The item result ÷4** A. 1.00 B. 0.75 C. 0.50 D. 0.25 E. 0.00
Total score=	
Scores: <6 = poor adherence **6-<8 = medium adherence** **8 = high adherence**	

Scoring scale

Each "no" response rated as 1 and each "yes" rated as 0 for items 1 to 7, except for item 5 reversed. For item 8, thecode (0-4) has standardized by dividing the result by 4 to calculate the summated score. The MMAS-8 range from 0-8 with the total score of **<6=poor adherence, 6-<8=medium adherence,>8=high adherence**

E. List of AIDS-related illnesses

The current list of AIDS-defining illnesses according to the CDC are:

- Bacterial infections, multiple or recurrent
- Candidiasis of bronchi, trachea, or lungs
- Candidiasis of the oesophagus
- Cervical cancer (invasive)
- Coccidioidomycosis, disseminated
- Cryptococcosis, presenting outside of the lung
- Cryptosporidiosis, chronic intestinal for more than one-month duration
- Cytomegalovirus disease (other than in the liver, spleen, or lymph nodes)
- Cytomegalovirus disease with loss of vision
- Encephalopathy (HIV-related, also known as AIDS dementia complex)
- Herpes simplex virus (HSV), lasting longer than a month or appearing in an area other than the skin (such as oesophagus or lungs)
- Histoplasmosis, disseminated
- Kaposi's sarcoma (KS)
- Lymphoid interstitial pneumonia or pulmonary lymphoid hyperplasia complex
- Burkitt lymphoma (or equivalent term)
- Immunoblastic lymphoma (or equivalent term)
- Primary lymphoma of the brain
- Mycobacterium avium complex or Mycobacterium kansasii, disseminated
- Mycobacterium tuberculosis of any site in or out of the lungs
- Mycobacterium or similar species, disseminated beyond the lung
- Pneumocystis pneumonia caused by the fungus Pneumocystis jiroveci
- Pneumonia, recurrent
- Progressive multifocal leukoencephalopathy (PML)
- Salmonella septicemia, recurrent
- Toxoplasmosis of the brain
- Tuberculosis
- Wasting syndrome

ANNEX III: WHOQOL-HIV BREF Questionnaire

Instructions

This assessment asks how you feel about your quality of life, health, or other areas of your life. Please answer all the questions**.** If you are unsure about which response to give to a question, please choose the one that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life in the last two weeks. You should circle the number that best fits how well you are able to concentrate over the last two weeks.

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you**.**

	Very poor	Poor	Neither poor nor good	Good	Very good
1. How would you rate your quality of life?	1	2	3	4	5
	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2. How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

	Not at all	A little	moderate amount	Very much	An extreme amount
3. To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4. How much are you bothered by any physical problems related to your HIV infection?	1	2	3	4	5
5. How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
6. How much do you enjoy life?	1	2	3	4	5
7. To what extent do you feel your life to be meaningful?	1	2	3	4	5
8. To what extent are you bothered by people blaming you for your HIV status	1	2	3	4	5
9. How much do you fear the future?	1	2	3	4	5
10. How much do you worry about death?	1	2	3	4	5

	Not at all	A little	A moderate amount	Very much	Extremely
11. How well are you able to concentrate?	1	2	3	4	5
12. How safe do you feel in your daily life?	1	2	3	4	5
13. How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

	Not at all	A little	Moderately	Mostly	Completely
14. Do you have enough energy for everyday life?	1	2	3	4	5
15. Are you able to accept your bodily appearance?	1	2	3	4	5
16. Have you enough money to meet your needs?	1	2	3	4	5
17. To what extent do you feel accepted by the people you know?	1	2	3	4	5
18. How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
19. To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
	Very poor	Poor	Neither poor nor good	Good	Very good
20. How well are you able to get around?	1	2	3	4	5

The following questions ask you how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
21. How satisfied are you with your sleep?	1	2	3	4	5
22. How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
23. How satisfied are you with your capacity for work?	1	2	3	4	5
24. How satisfied are you with yourself?	1	2	3	4	5

25. How satisfied are you with your personal relationships?	1	2	3	4	5
26. How satisfied are you with your sex life?	1	2	3	4	5
27. How satisfied are you with the support you get from your friends?	1	2	3	4	5
28. How satisfied are you with the conditions of your living place?	1	2	3	4	5
29. How satisfied are you with your access to health services?	1	2	3	4	5
30. How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

	Never	Seldom	Quite often	Very often	Always
31. How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

THANK YOU FOR YOUR HELP

ANNEX IV: Amharic version of informed consent

<u>የአማርኛ የመረጃ መስጫና የስምምነት ቅፅ</u>

ስሜ ጌታእንዳለ ዘለቀ፣በጀማ ዩኒቨርሲቲ የሁለተኛ ድግሪ የክሊንካል ፋርማሲ ተማሪ ስሆን በአሁኑ ግዜ ለድህረ-ምረቃ ጽሁፍ የምሆን ጥናት ከ HIV በሺታ ጋር ተያይዘ ያሉትን ችግሮችን እና ስለ ህይወትሆ ያለበት ሁኔታ፣ስለ ጤንነትህ/ሽና ሌሎች የህይወት ዘርፎች ላይ ምርምርን እያደረኩ ስለሆነ ከዕርሶ ጋር ዕንዳደርግ እንድሁም ከካርዶ መረጃን እንድወስድ እነድፈቀድልኝ በትህትና እጠይቆታለው፡፡ በዝህ ምርምር ውስጥ በመሳተፎ የምደርስቦት ጉዳት ወይም ባለመሳተፍዎ በፊት ከምያገኙ የህክምና አገልግሎት የሚቀርቦት የለም፡፡ እርሰዎ የስጡን መረጃ ሁሉም በምስጢር ይያዛል፡፡ አንድም የግሌዎ መረጃ አይጻፍም፡፡ በተጨማሪም በዚህ ምርምር ውስጥ መሳታፍዎ ሙሉ በሙሉ በፍላጎትዎ ላይ የተመሰረተ ነው፡፡ ስለምርምሩም ሆነ ስለምትጠየቁት ነገርያልገባዎት ነገር ካለ በማንኛውም ግዜ ዋናውን ተመራማሪ መጠየው ይችላሉ፡፡

የተሳታው ፈርማ----------

ቀን----------

የመረጃ ሰብሳቢ ፈርማ----------

ቀን----------

የዋናው ተመራማሪ መረጃ፤ 1 ጌታእንዳለ ዘለቀ

. ስልክ ቁጥር 0912892531

E-mail= getandale@gmil.com

ANNEX V: Afaan Oromoo version of Informed consent

Odeeffaannoo/raga dhunfaa hirmattotaa

Akkam jirtu? Ani maqaan koo Geetaindaalee zallaqaan jedhama.Qorannoon kun Jimma Univeersitiitti,mana barumsaa Faarmasitin kan qophaa'ee yoo ta'u,gaaffilee muraasa waa'ee dhukkuuba HIV/AIDS faana walqabatee rakkinoota jiranii fi sadarkaa jireenya,fayyumaa fi naanno keessa jiraatu sigaafachuf kan qophaa'e dha.Odeffannoo/raga sirra funaanamu qorannoo kana qofaf itti fayyaadamna.Maqaanke asirratti hin bareeefamu.Gaaffi deebisuu hin barbaadne kamiyyuu deebisuu dhiisuu dandeessa,yeroo barbaadde kamittiyuu addaan kutuu ni dandeessa.Deeggarsa naaf gootanif galatooma.

Odeeffanno kana keessatti hirmachuuf fedha qabdu?

Eyyee ☐ Lakki ☐

Mallatoo hirmaata_____

Guyyaa_____

Mallatoo odefannoo sassaaba_____

Guyyaa_____

Email:Getandale@gmail.com

ANNEX VI: Amharic version of Adherence Measurement Tool

Morisky 8-Item Medication Adherence Questionnaire

questions	በፈፀም	አዎ
ነ.እንድአንድግዜየ HIV መድሃንትህንመውሰድትረሳለክ ?	+1	0
2.ባለፉት 2 ሳምንታትየ HIV መድሃንትህንሳትወስድየቅረህበትቀንአለ ?	+1	0
3.የ HIV መድሃንትህንስትወስድህመምስለተሰማህሃኪምስታማክርያቆምከበትግዜአለ	+1	0
4.ጉዞስኖረህወይምቤትለቀህስትሄድየHIV መድሃንትህንይዘህመሄድአንድአንድግዜትረሳለክ ?	+1	0
5.ትናንትሁሉንምየHIV መድሃንትህንወስደካለ ?	0	+1
6.ህመምክስሻልክየHIV መድሃንታቸውንመውሰድአንድአንድግዜታቆማለክ ?	+1	0
7.ለተወሰኑሰዎችየHIV መድሃንታቸውንሁልግዚመውሰድላይመቻቸውይችላል::አንተሁልግዜመድሃኒትህንመውሰድህአሳስቦክያውቃል ?	+1	0
8.የHIV መድሃንታቸውንመውሰድምንያህልማሳታወስያስችግራሃል ? A. ፈፀሞ=1.00 B. አልፎአልፎ=0.75 C. አንድአንድግዜ=0.50 D. አብዛኛውንግዜ=0.25 E. ሁልግዜ=0.00		
Total score		
Scores: <6 = poor adherence **6-<8 = medium adherence** **8 = high adherence**		

ANNEX VII: Afaan Oromoo version of Adherence Measurement Tool

Morisky 8-Item Medication Adherence Questionnaire

Gaaffilee	**Lakki**	**Eyyee**
1.Yeroo tokko tokko qoricha HIV fudhachuu ni dagattaa?	+1	0
2.Torbelee darban lamaan keessatti,qorichaa HIV osoo hin fudhatiin guyyaan hafte jira?	+1	0
3.yeroo qorichaa HIV fudhattuu,dhukkuubnike waan sif wayyeef ogeessa fayyaa osoo hin mariisisin yeroon dhaabde jira?	+1	0
4.karaa yeroo deemtu yookin manaa yeroo baatu qoricha HIV fudhachu takka takkaa ni dagataa?	+1	0
5. kaleessa qoricha HIV kee fudhateetta?	0	+1
6.dhukkuubnike yeroo sif wayyuu,qoricha HIV kee fudhachuu takka takka ni dhaabda?	+1	0
7.namoota tokko tokkoof ,qoricha HIV yeroo hunda fudhachuun isaanitti tolu dhiisu danda'a.Ati yeroo hundaa qorichakee fudhachuun si yaaddesse beeka?	+1	0
8.Qoricha HIV kee fudhachuuf yaaddachuun hagam si rakkisa? **__ A.gonkuma** **__ B.darbee darbee** **__ C.yerootokko tokko** **__ D.Yeroo baay'ee** **__ E.Yeroo hundaa**		
Total score		
Scores: <6 = poor adherence **6-<8 = medium adherence** **8 = high adherence**		

ANNEX VIII: Amharic version of HRQoL-HIV BREF Questionnaire

መመሪያዎች

በዚህ ምዘና/መጠይቅ ስለህይወትህ ያለበት ሁኔታ፣ስለጤንነትህና ሌሎች የህይወት ዘርፉች የሚስማህን ወይም የሚታስበውን በጥያቄ መልክ ይቀርብልሐል፡፡ ስለሆነም መልስ በመስጠት ላደረጉልን ትብብር ከወዲሁ እናመሰግናልን፡፡ እባኮን ለሁሉም ጥያቄዎች መልስ በመመለስ ይተባባሩን፡፡ ለሚሰጡት መልስ እርግጠኝነት ከተጠራጉ መልስ ይሆናል ብሎ የገመቱትን ይምረጡ፡፡ ይህ ሁሌም የሚስጡት የመጀመሪያ መልስ ልሆን ይችላል እባኮን መለኪያዎችን ፣ ተስፉ፣ ደስታና የሚያሳስቦትን ከግንዛቤ ውስጥ ያስገቡ የሚቀርብሎ ጥያቄ ስለ አስለፉት ሁለት ሳምንታት ህይወት እንደ ሆነ ያስቡ፡፡

	በጣም ትንሽ	ትንሽ	መካከለኛ	ጥሩ	በጣም ጥሩ
1. የኑሮ ደረጃህን እንዴት ትለካለህ/ሽል ?	1	2	3	4	5
	በጣም አልረካም	አልረካም	መካከለኛ	እረካለው	በጣም እረካለው
2. ምን ያህል በጤናህ ደስተኛነህ/ሽ?	1	2	3	4	5

የሚከተሉት ጥያቄዎች ባለፍካቸው ሁለት ሳምንታት ውስጥ የገጠሙህ አንዳንድ ነገሮች ምን ያህል እንደሆኑ የሚያተኩሩ ናቸው፡፡

	በፍፁም	ትንሽ	መካከለኛ	በጣም	እጅግ በጣም
3.የአካለዊ ህመም የሚትፈልገውን ለማከናወን መሰናክል ስሆንብህ ምን ይሰማሃል/ሽል	1	2	3	4	5
4.ከ HIV ጋር በተያያዘ እንፈክሽን ላለብህ አካላዊ ችግር ምነ ይህል ያሳስበሃል/ሻል?	1	2	3	4	5
5.በየቀኑ ላለህ ህይወት ምን ያህል የህክምና እርዳታ ትፈልጋለህ፡፡	1	2	3	4	5
6.ምን ያህል በህይወት ደስተኛነህ?	1	2	3	4	5
7. ስላላህበት የHIV ሁኔታ ወቀሳ ወይም ነቀፋ ስደርስብህ ምን ያህል ይሰማሃል?	1	2	3	4	5
8.ስለ ወደፊት ምን ያህል ትፈሪያለሽ/ትፈራለህ ?	1	2	3	4	5
9.ስለ መሞት ምን ያህል ይሰማሃል/ሻል?	1	2	3	4	5
10. ህይወትህ ምን ያህል ትርጉም እንዲኖራ ትታስባለህ ?	1	2	3	4	5
	በፍፁም	ትንሽ	መካከለኛ	በጣም ከፍተኛ	እጅግ በጣም ከፍተኛ
11.የመረጋጋት አቅምህ እንዲትነው ?	1	2	3	4	5
12. የየእለቱን ደህንነትህን በተመለከተ ምን ታስባለህ/ምንይሰማሃል/ሻል ?	1	2	3	4	5
13. የምትኖርበት አከባቢ ምን ያህል ጤነኛ ነው ?	1	2	3	4	5

የሚከተሉት ጥያቄዎች ያለፉት ሁለት ሳምንት እንዴት እንደነበሩ ፣ በምን ዓይነት ሁኔታ እንዳሳለፉና አንደንድ ሁኔታዎችን እንዴት እንደከናወኑ ይጠይቃል

	በፍፁም	ትንሽ	መካከለኛ	በጣም ከፍተኛ	እጅግ በጣም ከፍተኛ
14.ለእለተለት ኑሮህ በቂ አቅም አለህ ?	1	2	3	4	5
15.የምትፈልገውን ለማሟላት በቂ ገንዘብ አለህ/ሽ ?	1	2	3	4	5
16.ተከለ ሰውነትህን ወይም ቁመነህን እንዴት ትቀበላለህ/ሽ ?	1	2	3	4	5
17.በምታወቃቸው ሰዎች ዘንድ ምን ያህል ተቀባይነት አለህ/ሽ	1	2	3	4	5
18.ለእለተለት ኑሮህ የሚትፈልገውን መረጃ ምን ያህል ትታገኛልህ/ሽ ?	1	2	3	4	5
19. የእረፍት ጊዜ የሚታገኝባቸው ዕድሎች ምን ያህልናቸው?	1	2	3	4	5
	በጣም ትንሽ	ትንሽ	መካከለኛ	ጥሩ	በጣም ጥሩ
20.ባለክበት አከባቢህ/ሽ ምን ያህል መንቀሳቀስ ችላለህ/ሽ?	1	2	3	4	5

ቀጥሎ የቀረቡት ጥያቄዎች ባለፉት ሁለት ሳምንታት ውስጥ በሃይወቶ በተሰማዎት ጥሩ ነገሮችና ያገኘሄው እርካታ ላይ ያተኩራሉ

	በጣም አልረካም	አልረካም	መካከለኛ	እረካለው	በጣም እረካለው
21. ስትተኛ እንቅልፍ ይወሰዶታል ፣ በቂ እንቅልፍ ታገኛለህ?	1	2	3	4	5
22.በምታረገው የዕለተለት እንቅስቃሴ ምን ያህል እርካታ ይሰማሃል/ሻል?	1	2	3	4	5
23.ሥራ በምትሰራበት ሰዓት ባለህ አቅም ትረካለህ /ሽ ?	1	2	3	4	5
24. በራስህ እርካታ ይኖረሃል?ደስተኛነህ?	1	2	3	4	5
25. በግል ከሰዎች ጋር በምታደርገው ቅርርብ ደስተኛነህ/ሽ ?	1	2	3	4	5
26.በፍቅር ዓለም ወይም በሴክስ ህይወትህ ደስተኛናት?	1	2	3	4	5
27.ከጓደኛችህ በሚደረግልህ ድጋፍ ደስተኛነህ/ትረካለህ?	1	2	3	4	5
28.በምትኖርበት አከባቢ ያለህ እርካታ ምን ይመስላል?	1	2	3	4	5
29.በህክምናው ዘርፍ በሚደረግልህ አገልግሎት ትረካለህ?	1	2	3	4	5
30.በትራንስፖርት አገልግሎት ምን ያህል ትረካለህ?	1	2	3	4	5

ቀጥሎ የቀረቡት ጥያቄዎች ሁልጊዜ የሚስማዎትና ሚገጥሞት አንዳንድ ነገሮች ላይ ያተኩራል

	በፍፁም	አንድ አንድ	በመጠ	አብዛኛውን ግዜ	
3ነ. ምን ያህል መጥፍ ስሜቶች ለምሳሌ ተስፋ መቁረጥ፣ ሥጋት፣ መጨነቅ ሀዘን ይሰማዎታል?	1	2	3	4	

ስለ ትብብሮ ከልብ እናመሰግናለን!

ANNEX IX: Afaan Oromoo version of WHOQOL-HIV BREF Questionnaire

Qajeelfama

Madaalin kun waaye sadarkaa jireenya,fayyumaa fi naanno keessa jiraatu sigaafachuf kan qopha'edha.kabajaan gaaffi kana akka naaf deebistu sin gaafadha.Deebiin gaaffi siif hingalle yoo jiraate,deebi sitti fakkaatu kenni.Sadarka jireenyake,abdikee,waanta si gamachiisu fi waanta siyaadessu qalbiitti qabadhu. Gaaffilen ati gaafatamtu torbeele darban laman keessa akkaata jirtudha.

	Baay'ee gadaana	**Gadaana**	**Giddugaleessa**	**Gaarii**	**Baay'ee gaarii**
1. Sadarkaa jireenya ke akkamitti madaalta?	**1**	**2**	**3**	**4**	**5**
	Baay'ee gammadaa miti	Gammadaa miti	Giddugaleessa	Gammadaadha	Baay'ee Gammadaadha
2.Haalli fayyaake quubsadha?	1	2	3	4	5
	Gonkuuma	Xiqqoo	Giddugaleessa	Baay'ee	Akka malee
3.Dhukkuubni qaamakeetti dhagahaamu hammam hojii guyyukee akka hin hojjene sidhorka?	1	2	3	4	5
4.Rakkinii qamakee HIV faana walqabatee hammaam siyaadessa?	1	2	3	4	5
5.Hojii guyyuuke dalaguuf hammam gargaarsa ogeessa sibarbaachisa?	1	2	3	4	5
6.Jireenya keetti hammam itti gamaadda?	1	2	3	4	5
7.Jireenyike hammam akka hiika qabu sitti dhagahama?	1	2	3	4	5
8.HIV waan qabduuf jecha namaatti hangam yaaddofta?	1	2	3	4	5
9.Egeereke hagam sodaatta?	1	2	3	4	5
10.waaye du'a hagam yaaddofta?	1	2	3	4	5
11.hangam qalbikee walitti qabatta?	1	2	3	4	5
12.Waaye jireenyake guyyuu hagam eegamadha jette yaadda?	1	2	3	4	5
13.Naannon kee hagam fayyaa qabeessa?	1	2	3	4	5
	gongumaa	xiqqoo	giddugaleessa	Baay'inaan	guutumagututti
14.Jireenyake guyyuu keessatti humna gahaa qabda?	1	2	3	4	5
16.Waan feetu argachuuf maallaqa gahaa qabda?	1	2	3	4	5

17.Namoonni ati beektu hagam si fudhatu?	1	2	3	4	5
18.Jireenyake guyyuu keessatti odeefanno sibarbaachhisu hagam argatta?	1	2	3	4	5
19.Hagam carraa bashanaana qabda?	1	2	3	4	5
	Baay'ee xiqqoodha	xiqqoo	giddugaleessa	gaarii	Baay'ee gaaridha
20.Naanno jirtutti socho'u hagam dandeessa?	1	2	3	4	5
	Baay'e gamadaa miti	gamadaa miti	giddugaleessa	gamadadhaa	Baay'ee gamadadhaa
21.Hagam Boqotte rafta?	1	2	3	4	5
22.Jiruuke guyyuu dalaguuf dandeettin qabdu quubsadha?	1	2	3	4	5
23.Humni jiruuke guyyukee hojechuuf qabdu sigamachiisa?	1	2	3	4	5
24.Ati ofitti gamadadha?	1	2	3	4	5
25.Namoota faana hariiro qabduun gamadadhaa?	1	2	3	4	5
26.Quunamti saalaketin gammadaadha?	1	2	3	4	5
27.Gargaarsa hiriyootakeerra argatuun gamadadha?	1	2	3	4	5
28.Haala bakka jireenyake faana gamadadha?	1	2	3	4	5
29.Tajaajili fayyaa argatu quubsadha?	1	2	3	4	5
30.Geejjiba gargaaramtutti gamadadha?	1	2	3	4	5
	gonguma a	Yeroo tokko tokko	Yeroo baay'e	Yeroo garacaala	Yeroo hundaa
31.Hagam qophumaan, sodaani fi of-jibbuun sittidhagahama?	1	2	3	4	5

Galatooma !