Causes of hospitalization and predictors of mortality among adult HIV positive patients at the Benue State University Teaching Hospital, Makurdi

Abstract

Introduction:

HIV/AIDS is one of the leading causes of morbidity and mortality worldwide. In Africa, opportunistic infections are the leading causes of morbidity among HIV patients and there is need to establish the causes of morbidity and/or mortality among the patients in our environment.

Methods:

This was a retrospective study in which the case files of adult HIV positive patients admitted from January 2018 to December 2018 were retrieved. Their socio-demographic profile, HIV stage at admission, outcomes and other relevant information were extracted. The Center for Disease Control staging for HIV was used for the study.

Results:

A total of 94 patients were enrolled into the study. At admission, most of the patients, 57(61%) were in CDC Stage B while the remaining patients were in stage C. Pulmonary tuberculosis was responsible for most of the admissions.

The total number of deaths were 27 giving a mortality ratio of 28.7%; 9 (33%) of them were in stage B and the remaining 18

(67%) were in stage C. The predictors of mortality were male sex, short duration of admission, substance use and referral from non-specialist centres.

Conclusion:

The major disease cause of morbidity among PLHIV in Makurdi is Pulmonary Tuberculosis. Male sex, substance use, referral from non-specialist centres and short duration of admission were significant predictors of mortality. All stakeholders involved in HIV care should intensify efforts at early HIV diagnosis, scale up HAART where necessary and implement task shifting at non-specialist centres to improve treatment outcomes.

INTRODUCTION:

The Human Immunodeficiency Virus (HIV) which was discovered in 1981 has been responsible for significant morbidity and mortality worldwide since its advent till date.(1)Most of the HIV related ailments and deaths occur in persons at the late stage of the disease referred to as the Acquired Immune Deficiency Syndrome (AIDS).(2)

Globally, People Living with HIV (PLHIV) often fall ill mostly from opportunistic diseases due to immunosuppression and would require hospitalization. The diseases responsible for hospital admissions vary from one geographical region to another. A meta-analysis and systemic review done by Ford et al revealed that globally, AIDS-related illnesses and bacterial infections were the leading causes of hospital admission in adults.(3)In Africa, the commonest causes of hospital admissions in PLHIV included malnutrition and wasting, parasitic infections, and haematological disorders while respiratory diseases were most prevalent in Europe.(3)

In Nigeria, there is a dearth of studies on the causes of hospitalization among adult HIV patients. These studies conducted revealed that tuberculosis was the leading causes of morbidity and mortality.(4,5) The predictors of mortality in these studies were male sex, short duration on admission and low CD4 counts.

It is therefore pertinent to conduct more studies to determine the causes of hospitalization and death among PLHIV in Nigeria and apply adequate measures to reduce morbidity and mortality in them. Hence the need for this study which would

identify the causes of hospital admissions among PLHIV in Makurdi, North-Central Nigeria.

Nigeria is one of the countries in the world with the highest number of people living with the Human Immunodeficiency Virus (HIV). The current national prevalence of the disease is 1.4% with an estimated population of 1.9 million people living with the virus. The figures were obtained from the National HIV/AIDS Indicator and Impact Survey (NAIIS) which was conducted in 2018. Benue state with a prevalence of 5.3% is the second highest state with HIV persons in Nigeria(6).
Over the past two decades, partners in the global AIDS response have intensively supported health facilities in Nigeria to scale-up prevention, treatment, care and support, with a concomitant synergetic impact on a vast range of interrelated public health and development challenges.

However, these interventions have not met the desired effects as PLHIV in Benue state still come down with various diseases which require hospitalization and often times have poor outcomes following in-hospital care. This study is aimed at identifying the disease causes of hospitalization and predictors of in-hospital deaths and proffer ways to reduce morbidity and mortality among PLHIV.

AIM

To determine the causes of morbidity and mortality among adult HIV positive inpatients at Makurdi

OBJECTIVES

1. To identify the various diseases responsible for hospitalization and mortality among adult HIV positive patients in our environment.
2. To determine the predictors of mortality among the HIV positive inpatients.

METHODS

This was a retrospective study in which the case files of adult (aged 16 years and above) HIV positive patients admitted from January 2018 to December 2018 were retrieved. Their socio-demographic profile, HIV stage at admission, outcomes and

other relevant information was extracted. The Center for Disease Control (CDC) staging for HIV was used for the study. Patients who spent less than 24 hours on admission and all pregnant females were excluded from the study.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel and analyzed using Epi info version 7. The demographic and baseline clinical and laboratory characteristics were summarized into frequencies, medians and interquartile ranges (IQR). The Chi-square test was used to test for association between patients' characteristics and stage of HIV. The causes and outcomes of hospitalization were summarized into frequencies and proportions. Logistic regression was done to determine the predictors of mortality. A p value less than 0.05 was considered statistically significant.

RESULTS

Patients' characteristics

The total number of HIV positive patients admitted during the study period was 112 of whom 94 were enrolled after excluding18 patients because they were either pregnant or had insufficient data. At admission, the patients were staged using the CDC HIV staging and 57 (61%) of them were in Stage B while 37 (39%) were in stage C. The total number of patients that died was 27 and most of them (18) were in Stage C as shown in Figure 1.

The median age of the subjects was 40 years and most of them were males (51.1%). Majority of the patients were married (59.6%), had secondary level of education (57.4%), had informal jobs (60.6%) and were referred from Non-specialist hospitals (70.2%).

The system which was had most of the diseases was the Respiratory system (25.5%). Also, most of the patients (56.4%) were naïve to Anti-Retroviral Therapy prior to admission and had CD4 counts less than 200 cells/µL (67%). A small proportion of the hospitalized HIV patients (7.4%) had co-morbid conditions such as Diabetes Mellitus and Chronic Bronchitis and substance(alcohol and/or cigarette) use was recorded in 43.6% of the subjects. The median duration of admission for the patients was 8 days. These details are depicted in Table 1.

Relationship between Patients' characteristics and disease severity

Most of the patients, irrespective of their sociodemographic variables and clinical characteristics were evaluated to fall into the CDC stage B class. Of note is the site from which patients were referred from; about a third of the patients were from within the hospital (internal referrals) while most of the remaining two-thirds of the patients who were referred from other clinics (external referrals) had a more advanced disease and this was statistically significant. This is illustrated in Table 2.

Disease causes of hospitalization

Table 3 illustrates the various diseases responsible for hospitalization of the subjects. The top 5 diseases in decreasing order of frequency are: pulmonary tuberculosis (16%), acute diarrhea (9%), cirrhosis (9%), bacterial pneumonia (8%) and cerebral toxoplasmosis (8%).

Outcomes of hospitalization

Twenty-seven out of the ninety-four patients died, giving a mortality of 28.7%. The top 3 diseases that were responsible for the deaths in decreasing order of frequency are: tuberculosis (14.8%), cerebral toxoplasmosis (14.8%) and cirrhosis (11.1%) as depicted in Table 3. The significant predictors of mortality are male sex, substance (alcohol and/or cigarette) use, site of referral and duration of admission as illustrated in Table 4.

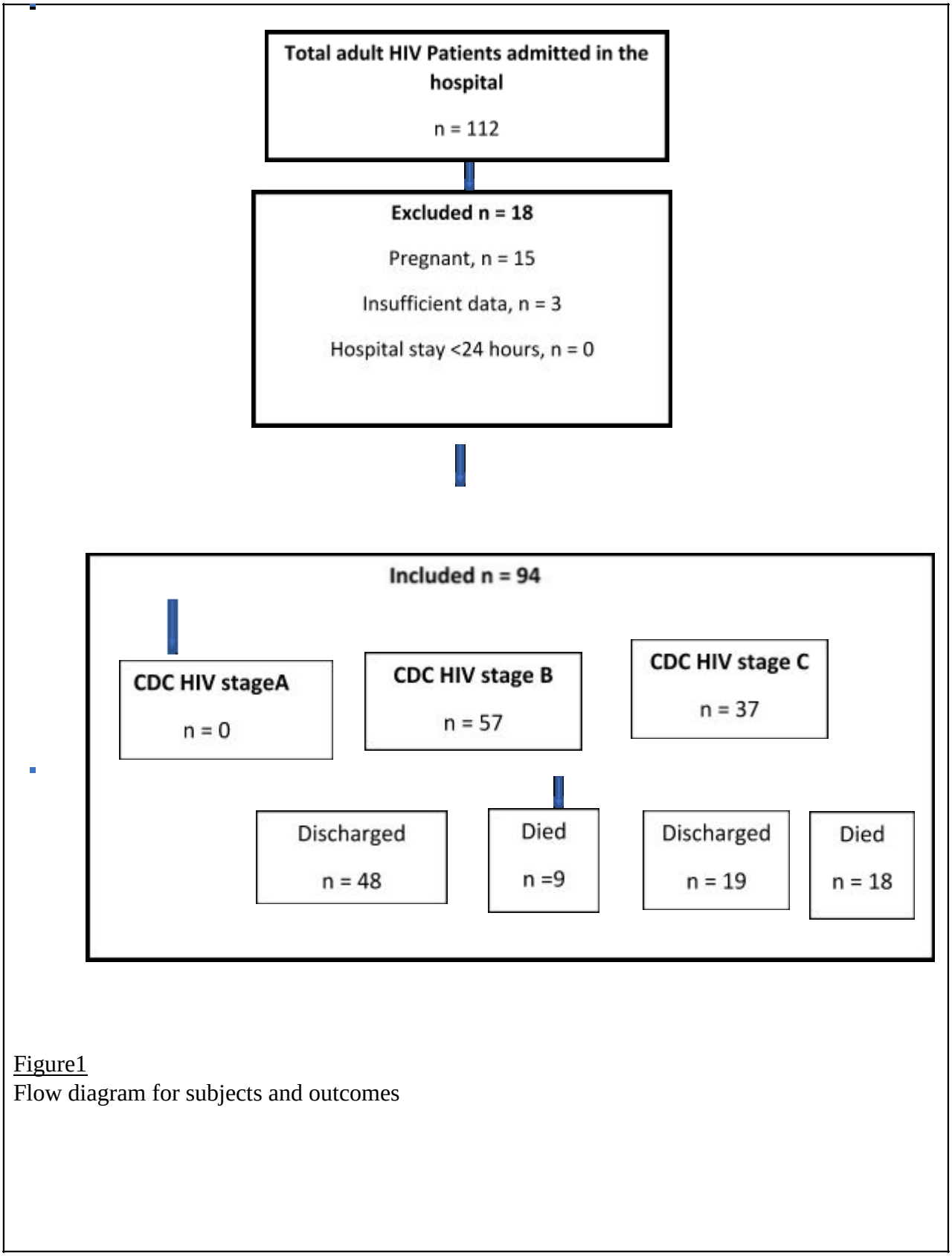

Figure1
Flow diagram for subjects and outcomes

DISCUSSION

The findings from this study showed that 94 patients were admitted during the study period. Most of the patients were middle aged and had formal or informal jobs. This is very significant as they constitute the bulk of the work-force population in the community. There were slightly more males than females in this study which is similar to the findings in a similar study by Ogonia et al (4). The male sex predominance among the admitted cases is because males in the general population have poor health seeking behavior and often present at the late stage of their ailments (7,8).

Majority of the patients were over 40 years. However, most of them probably acquired the infection earlier as they had never been screened for HIV prior to admission but had features of Late-stage disease. This suggests that they were infected earlier as younger people are more likely to engage in high-risk sexual behavior which increases the possibility of HIV acquisition. The studies conducted by Ogoina et al(4) and Eguzo et al(9) also showed that the median age of the hospitalized HIV patients were 36 and 37 respectively. This is similar to the findings in this study where the median age of the patients is 40. The NAIIS study also revealed that the HIV prevalence was more in the 15-44 years age group though more females than males were affected (6).

Most of the patients were married and which presupposes that hetero-sexual route was the predominant mode of transmission which was also a similar finding by Ogonia et al(4). It is known that the heterosexual route is the predominant mode of HIV transmission in Nigeria and also in Benue state located in North-Central Nigeria(6,10)and it is therefore important that this is addressed seriously. Most sero-discordant married couples have a high risk of being infected because of poor usage of condoms(11). Also a lot of persons do not know the HIV status of their partners and this could enhance acquiring the virus(11).

For the site of referral, most of the patients came from non-specialist centres and this was a very significant finding. Most of the non-specialist centres do not have doctors and other medical staff trained in HIV care and management but have a lot of patients who go there for treatment because they are located within the communities and closer to their residence. Therefore, there is need to implement and strengthen the task shifting and task sharing policy which has been adopted by the Federal

Ministry of Health of Nigeria(12) and World Health Organization(13) in these settings. The task shifting is aimed at rational redistribution of tasks among

health workforce teams. In practice, specific tasks are moved, where appropriate, from highly qualified health workers such as doctors to health workers with shorter training and fewer qualifications such as Community Health Officers in order to make more efficient use of the available human resources for healthcare. This would enable prompt assessment of the patients and swift referral when necessary.

Most of the HIV patients were treatment-naïve prior to admission either because they did not know their HIV status or were seeking alternative treatment. Interestingly, there was no case of the Immune Reconstitution Inflammatory Syndrome in this study which often occurs when treatment naïve patients commence HAART as documented in previous studies(14,15). Furthermore,
there is a great need to improve community awareness about HIV/AIDS and emphasize on the need to get screened and commence therapy early if anyone tests positive. Community-based HIV Counselling and Testing when combined with behavioral interventions have been found to be more effective in increasing the uptake of HIV testing as well as other outcomes when compared to the conventional health facilities-based testing and counselling approaches (16,17).

The top 5 diseases responsible for the admissions are pulmonary tuberculosis, acute diarrhoeal diseases, liver cirrhosis, bacterial pneumonia and cerebral toxoplasmosisin in decreasing order of frequency. This is similar to the findings obtained in most studies in Nigeria and sub-saharan Africa where most of the hospital admissions were from Opportunistic Infections such as Tuberculosis (1,4,9,18,19). Also, Nigeria has the highest Tuberculosis burden in Africa. (20) Thus, it is pertinent to screen and manage all HIV positive patients for tuberculosis and manage them appropriately.

It is also worthy to note in other regions of the world that non-infectious disorders are responsible for most of the HIV admissions(1). The major causes of death in decreasing order of frequency are; Tuberculosis, cerebral toxoplasmosis and liver cirrhosis which are also infections.

It is therefore important that Intensive Case Finding for Tuberculosis must be done up for patients diagnosed of HIV infection to ensure early diagnosis and treatment that will ultimately prevent morbidity and mortality from Tuberculosis.

On the other hand, persons living with HIV without active Tuberculosis should be provided with Isoniazid Preventive Therapy. This uptake should be implemented and scaled up as necessary. This has also shown to reduce the prevalence of Tuberculosis among PLHIV in various studies.

Other infection prevention and control measures such as proper hand-washing techniques should be routinely taught at ART treatment centres as this would be invaluable in reducing the spread of communicable diseases in the communities. All PLHIV should be screened for Hepatitis B and C viruses and managed appropriately if found to be co-infected with any of the viruses. Co-trimoxazole should be given as adjunctive therapy when indicated as it protects against some Opportunistic infections such as Pneumocystis jirovecii and toxoplasmosis(21,22). If all these are implemented, there would be a significant decline in HIV related admissions and deaths as most of the causes would have been addressed effectively.

The predictors of mortality which were of statistical significance in this study were male sex, substance (alcohol and/or tobacco) use, site of referral and short duration of admission. These factors suggest that most patients being referred from non-specialist centres were in the late stage of the disease with poor performance status and died a few days after admission due to the severity of their ailment. Male sex and short duration of
admission were also predictors of mortality in the study conducted by Agaba et al(9).

Although a few of the patients were found to use substances such as alcohol and cigarette, this habit was a significant predictor of mortality. Previous studies have shown that PLHIV who consume alcohol or smoke cigarette, have poor compliance to anti-retroviral therapy which would further worsen the course of the disease(23,24).

From the findings in this study, it is pertinent that more support should be given to the non-specialist HIV treatment care centres where the bulk of the patients usually access for healthcare. This is to ensure quality uptake of care in such health facilities. This would enable prompt and proper sorting of cases and eventually reduce the need to refer cases or ensure swift referral. The ultimate aim would be to achieve the set target of 90-90-90; which is ensuring that 90% of all people living with HIV know their HIVstatus; 90% of all people with diagnosed HIV infection receive sustained anti-retroviral therapy; and 90% of all people receiving antiretroviral therapy have sustained viral suppression.

CONCLUSION

The major disease cause of morbidity among PLHIV in Makurdi is Pulmonary Tuberculosis. Male sex, substance use, referral from non-specialist centres and short duration of admission were significant predictors of mortality. All stakeholders involved in HIV care should intensify efforts at early HIV diagnosis, scale up HAART where necessary and implement task shifting at non-specialist centres to improve treatment outcomes.
Furthermore, it is important to note that in Nigeria, Tuberculosis is a leading cause of death among PLHIV. Knowledge about Tuberculosis among the general population is poor (24%). Tuberculosis treatment coverage is low (24%), while TB case fatality ratio is high at 38%.(20) Therefore, TB screening services should be extended to all health facilities in the state to provide information and increase knowledge about the disease and more importantly, to promptly identify and screen persons with symptoms of Tuberculosis. Health facilities should at least be able to identify symptoms of Tuberculosis and refer to Directly Observed Treatment Short course (DOTS) centers where Tuberculosis is being treated. This is to facilitate the achievement of the Universal Health Coverage (UHC) and the United Nations high level target for finding the missing Tuberculosis cases.

Ethical approval

Ethical clearance was obtained from the Institution Ethical Committee.

Consent Disclaimer:

As per international standard or university standard written patient consent has been collected and preserved by the author(s).

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Table 1: Patients' characteristics

Characteristics	n (%)
Age in years, median (IQR)	40 (34 – 50)
>40	49 (52.1)
16 – 40	45 (47.9)
Sex	
Female	46 (48.9)
Male	48 (51.1)
Occupation (sector)	
Formal	28 (29.8)
Informal	57 (60.6)
Unemployed	9 (9.6)
Marital status	
Divorced	9 (9.6)
Married	56 (59.6)
Single	23 (24.5)
Widowed	6 (6.4)
Level of education	
Primary	3 (3.2)
Secondary	54 (57.4)
Tertiary	37 (39.4)
Patients' site of referral	
Internal	28 (29.8)
External (Non-Specialist hospitals)	66 (70.2)
Causes of hospitalization (systemic classification)	
Cardiovascular	2 (2.1)
Dermatologic	11 (11.7)
Gastrointestinal	20 (21.3)
Haematologic	1 (1.1)

Multisystemic	11 (11.7)
Nervous	16 (17)
Renal	9 (9.6)
Respiratory	24 (25.5)
CD4 Count (cells/µL)	
>200	31 (33)
≤200	63 (67)
ART Exposure (Prior to admission)	
Experienced	41 (43.6)
Naïve	53 (56.4)
Comorbid conditions	
Present	7 (7.4)
Absent	87 (92.6)
Duration of admission in days, median (IQR)	8 (6 – 13)
>7	41 (43.6)
1 – 7	53 (56.4)
Substance use (Alcohol/Tobacco)	
Yes	41 (43.6%)
No	53 (56.4%)

Table 2: Patients' characteristics and HIV stages

		CDC HIV STAGES				
		Stage B		**Stage C**		
Characteristics (N=94)		**n = 57**	**(%)**	**n= 37**	**(%)**	**P Value**
Age (years)						
>40	49	34	(59.6)	15	(40.5)	0.070
16 – 40	45	23	(40.4)	22	(59.5)	
Sex						
Female	46	28	(49.1)	18	(48.6)	0.964
Male	48	29	(50.9)	19	(51.4)	
Occupation (sector)						
Formal	28	14	(24.6)	14	(24.6)	0.387
Informal	57	37	(64.9)	20	(54.1)	
Unemployed	9	6	(10.5)	3	(8.1)	
Marital Status						
Divorced	9	2	(3.5)	7	(18.9)	0.081

Married	56	37	(64.9)	19	(51.4)	
Single	23	15	(26.3)	8	(21.6)	
Widowed	6	3	(5.3)	3	(8.1)	
Level of Education						
Primary	3	2	(3.5)	1	(2.7)	0.573
Secondary	54	35	(61.4)	19	(51.4)	
Tertiary	37	20	(35.1)	17	(45.9)	
Site of referral						
External	66	34	(59.6)	32	(8.65)	0.005
Internal	28	23	(40.4)	5	(13.5)	
Cause of hospitalization(Systemic Classification)						0.000
Cardiovascular	2	0	(0)	2	(5.4)	
Dermatologic	11	4	(7)	7	(18.9)	
Gastro-Intestinal	20	20	(35.1)	0	(0)	
Haematologic	1	1	(1.8)	0	(0)	
Multisystemic	11	1	(1.8)	10	(27)	
Nervous	16	2	(3.5)	14	(37.5)	
Renal	9	5	(8.8)	4	(10.8)	
Respiratory	24	24	(42.1)	0	(0)	
Co-morbid conditions						0.317
Absent	87	54	(94.7)	33	(92.6)	
Present	7	3	(5.3)	4	(7.4)	
ART Exposure (prior to hospitalization)						0.182
Experienced	41	28	(49.1)	13	(35.1)	
Naïve	53	29	(50.9)	24	(64.9)	
Substance use (alcohol/tobacco)						0.182
No	41	28	(49.1)	13	(35.1)	
Yes	53	29	(50.9)	24	(64.9)	

Table 3
Disease causes of hospitalization and mortality among the patients

Diagnosis	Frequency, N=94 n (%)	Deaths, N=27 n (%)
Acute diarrhoea	9 (9.6)	-
Bacterial meningitis	2 (2.1)	1 (3.7)
Bacterial pneumonia	8 (8.5)	-
Cerebral toxoplasmosis	8 (8.5)	4 (14.8)
Cirrhosis	9 (9.6)	3 (11.1)
Disseminated TB	8 (8.5)	4 (14.8)
HAND	6 (6.4)	2 (7.4)
Herpes zoster	1 (1.1)	-
HIV wasting syndrome	1 (1.1)	1 (3.7)
HIVAN	4 (4.3)	2 (7.4)
Kaposi sarcoma	4 (4.3)	2 (7.4)
Lymphogranuloma venereum	1 (1.1)	-
Monkey pox	3 (3.2)	-
Oropharyngeal candidiasis	3 (3.2)	-
Pneumocystis jirovecii pneumonia	1(1.1)	1 (3.7)
Pulmonary TB	15(16)	2 (7.4)
Pyelonephritis	4 (4.3)	-
Severe sepsis	1 (1.1)	-
SJS 2^0 Nevirapine	1 (1.1)	-
Sporotricosis	1 (1.1)	-
TB Pericarditis	2 (2.1)	2 (7.4)
Tenofovir induced nephropathy	1 (1.1)	1 (3.7)
Zidovudine induced anaemia	1 (1.1)	-

Table 4: Predictors of mortality among the patients

Characteristics	Category	Relative Risk (RR)	95% CI	P value
Sex	Female	Reference		
	Male	3.8	1.207-11.709	0.022
Age	>40	Reference		
	16-40	1.4	0.477-4.015	0.550
Art exposure	Naïve	Reference		
	Experience	0.9	0.323-2.480	0.830
Substance use	Yes	Reference		
	No	0.3	0.1-0.861	0.026
Site of referral	Internal	Reference		
	External	1.1	0.326-13.391	0.011
TB status	Yes	Reference		
	No	0.8	0.087-7.478	0.851
CDC HIV stage	B	reference		
	C	1.6	0.167-2.489	0.524
CD4 count>200	reference			
≤200 5.8		0.563-59.201	0.140	
Duration of Admission	>7 days	Reference		
	1-7 days	10.1	0.420-4.818	0.001