

Profile of HIV Inpatients, Mortality Rate and Associated Factors in the Era of Antiretroviral Therapy at an Urban Hospital in Burkina Faso

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Abstract

Background: HIV infection remains a public health concern mainly in infectious diseases department despite the availability of diagnosis and antiretroviral therapy. Our objectives were to describe the clinical and biological profiles of HIV inpatients and to determine mortality rate and associated factors in infectious diseases department among these patients.

Method: Retrospective cross-sectional study using medical records from January, the 1st 2011 to December, the 31th 2015 is conducted at an urban teaching hospital in Burkina Faso (Bobo-Dioulasso town). The study included patients over 15 years tested HIV-positive and hospitalized in the department of infectious diseases during the period of the study. Usual statistic was performing to describe study population and logistic regression to identify factors associated with death.

Result: A total of 730 medical records were included of which 440 inpatients were women with a sex-ratio of 0.6. Their average age were 40.3± 10.7 years-old. The three and four clinical stages according to the World health organization (WHO) classification were dominant with 37.1% and 56.9% respectively. The average of CD4 cell counts was 133.96 cell/μL and 79% of patients had less than 200 CD4 cell/μL. The main diagnoses were: tuberculosis (20.7%), gastroenteritis (19.3%) and bacterial pneumonia (15.7%). Before hospitalization, 40.9% of the patients were treated with antiretroviral therapy. The ARV treatment was started during hospitalization for 8% of the HIV infected patients without ARV treatment at entry, and for 2.8% of patient's detected HIV positive during the hospitalization. The overall mortality rate was 33.4%. By multivariate analysis, the factors associated to death in the study period were: general state at the input, age group, duration of hospitalization and presence of secondary diagnosis.

Conclusion: HIV-related infections are the main causes of hospitalization in our service. The mortality rate among HIV inpatients stayed high. Improvements of HIV inpatients health care management would be needed.

Keywords: ART, HIV, Inpatients, Mortality, Burkina Faso

Introduction

Acquired immunodeficiency syndrome (AIDS) is the consequence of HIV infection responsible for a cellular immunity decrease explaining the occurrence of opportunistic infections. According to the UNAIDS reports in June 2016, there were 18.2 million people on antiretroviral therapy [1]. In 2017, there were 36.9 million people lived with HIV (PLHIV) in the world, with 940000AIDS related deaths. Sub-Saharan Africa remains the most affected region with 70.0% infected people. In Burkina Faso, there were 94,000 PLHIV with a HIV prevalence rate of 0.8% and 2900 case dead in 2017 [2].

HIV morbidity, evolutionary stage, and mortality are determined by opportunistic infections, which are the most common reasons for hospitalization [3]. The introduction of antiretroviral therapy (ART) and cotrimoxazol chemo-prophylaxis has significantly reduced the incidence of opportunistic infections and that of hospitalization, and improved the living conditions and increased as well the life expectancy of people living with HIV [4].

In the world and Africa, several studies have examined the issue of hospitalization among people living with HIV [5-8]. In Burkina Faso, the studies focused on hospitalization frequency of specific diseases such as tuberculosis and cryptococcosis [9-11]. However, there is no database on the morbidity and mortality particularly

among HIV adult patients admitted to the SouroSanou University Hospital. Therefore, it is important to carry out this study in order to describe the patient's profile in the era of ART and analysis morbidity and mortality factors.

Patients and methods

This is a cross-sectional retrospective data collection study on hospitalization records from January 1st 2011 to December 31st 2015. The study included both male and female patients over 15 years tested HIV-positive and hospitalized in the department of infectious diseases during the period of the study regardless of the reasons for admission and whose medical records were usable. HIV-negative patients or patients with unknown serological status and those whose records were unusable were excluded.

Data were collected from patients' medical records by means of investigation files both in paper and electronic format including a four-page questionnaire. Reviewed variables included socio-demographic data (age, sex, marital status, and origin), clinical data (reasons for admission, consultation time limit, medical history, main and secondary diagnoses, and duration of admission), biological data (HIV serotype, CD4 count, viral load, hemoglobin level, leukocyte count), therapeutic and progressive modalities (discharge mode).

The main diagnosis was the diagnosis when exiting the patient or the diagnosis which motivated the hospitalization. The secondary diagnosis was any associated condition discovered during hospitalization that required or was not required for therapeutic intervention. Without the autopsy results, the principal diagnosis was considered as the cause of the death.

Data were input using Epi Data software and processed by STATA software in their respective 3.1 and 12Version. The characteristics of the study population were described by their numbers and percentages for the qualitative variables, by their means for the quantitative variables. The proportions comparison was made using Chi square test. The logistic regression (univariate and multivariate) were performed to identify factors associated with death. All statistic tests were fit for a significance level of p-value less than 5%.

The data were collected as part of routine care. The collection forms were anonymous in order to ensure the protection of the patient identity during the study and during the results dissemination.

Results

During the study period, we had 1,169 inpatients in the department of infectious diseases. Among them, 730 out were HIV-infected patients representing 62% of all admissions. Of the 730 infected with HIV, 185 (25.3%) were detected during hospitalization versus 545 (74.7%) previously known HIV-positive patients of which 316 (58%) were under ARV treatment prior to admission and 229 (42%) without ART.

Epidemiological patterns of study population

The average age of patients was 40.3(± 10.7) years-old with the range from 16 to 85 years. The most represented age group was 30 to 40 years representing 35.2 % [Table 1]. Our sample was mainly represented by females with 60.3% women with a sex ratio of 0.7. Most patients (77%) lived in couple. Housewives were mostly represented (49.0%) followed by farmers (19.9%). Most of the patients lived in urban area (74%).

Table 1: Socio demographic characteristics of HIV inpatients between 2011 and 2015 at the Department of Infectious Diseases, in Souro Sanou University Hospital, Bobo-Dioulasso, Burkina Faso

| Characteristics | Number | Percentage |
|------------------------------|--------|------------|
| Age group (years) | | |
| • <20 | 11 | 1.5 |
| • 20-30 | 94 | 12.9 |
| • 30-40 | 257 | 35.2 |
| • 40-50 | 233 | 31.9 |
| • >50 | 135 | 18.5 |
| Gender | | |
| • Male | 290 | 39.7 |
| • Female | 440 | 60.3 |
| Matrimonial situation | | |
| • In couple | 562 | 77.0 |
| • Single | 102 | 14.0 |
| • Widower | 61 | 8.3 |
| • Divorced | 5 | 0.7 |
| Profession | | |
| • Employees | 80 | 11.0 |
| • Private | 54 | 7.4 |
| • Farmers | 145 | 19.9 |
| • Housewives | 358 | 49.0 |
| • Others* | 93 | 12.7 |

*Others: shopkeepers (55), students (9), butchers (4), retired (7), laborers (1), bricklayers (6), unemployed (1), carpenters (1), gold digger (1), car drivers (1)

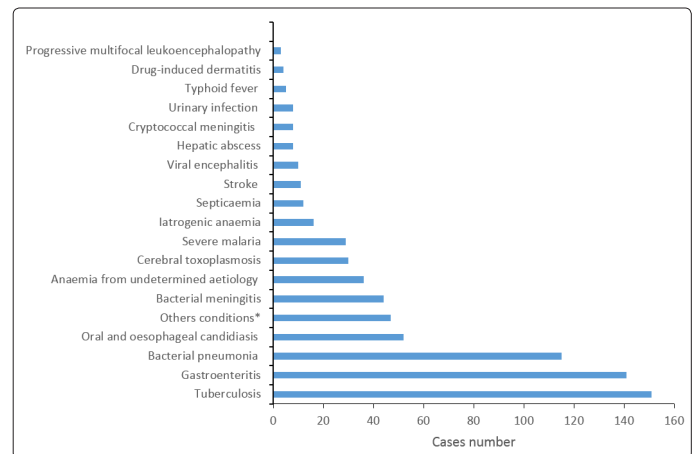


Figure 1: Main diseases among 730 HIV-infected inpatients between 2011 and 2015 in the Department of Infectious Diseases at Souro Sanou University Hospital in Bobo-Dioulasso, Burkina Faso

Clinical aspects

Patients were admitted for many reasons. The most common ones included fever with 58.6% cases, alteration of general health condition with 41.5% cases, and asthenia with 39.0% cases. Most patients were admitted in the emergency ward with a frequency of 44.4%. One thirds of the patients came from external consultation mainly from the day care unit of the department of infectious diseases (HIV

outpatient centre).

About the medical records, 74.7% of the patients were aware of their HIV status at entry. And 58% of the patients knowing their HIV status were on prior ARV treatment. There was poor treatment compliance concerning 50.5% of the patients. In the present study, 12.0% of patients declared have being previously hospitalized, mainly for HIV infection (70% of them).

The average time limit for consultation was 26 days with a standard deviation of 30 days. In 49% cases, patients consulted before two weeks and in 33% cases one month later. The average stay in hospital was 13 days with a standard deviation of 10 days. Most patients stayed less than 15 days representing 62.8%. More than three-quarters of our patients were in a general bad health condition before admission. The most common diagnosis was tuberculosis with 20.7% followed by gastroenteritis (19.3%), and bacterial pneumonia (15.8%) (Figure 1). Concerning tuberculosis infection, the pulmonary tuberculosis was the main clinical form and representing of 39.7%. Among the extra-pulmonary forms of tuberculosis, the most clinical form was pleurisy with 36.4% of the cases. The most frequent locations in multifocal tuberculosis were pulmonary (76.4%), lymph node (60%), and peritoneal (32.73%). The main secondary diagnoses were urinary infection (28.6%), malaria (15.9%), and bedsores in 12.7%. The three and four clinical stages according to the World health organization (WHO) classification were dominant with 37.1% and 56.9% respectively.

Therapeutic aspects

During hospitalization, 64.8% of the patients were treated with cotrimoxazol chemoprophylaxis. The Table 3 describes the different ARV protocols usually used in the service, the ARVs protocols used by patient before the hospitalization, and the ARVs protocols initiated during hospitalization. The most used molecule for the inpatients was tenofovir (47.7%).

Table 2: ART used among the 730 HIV-infected inpatients between 2011 and 2015 at the Department of Infectious Diseases, in SouroSanou University Hospital, Bobo-Dioulasso, Burkina Faso

| ART* | Number | Percentage |
|-------------------|------------|------------|
| TDF-FTC/3TC-EFV | 93 | 27,8 |
| AZT-3TC-NVP | 84 | 25.1 |
| AZT-3TC-EFV | 48 | 14.3 |
| TDF-FTC/3TC-NVP | 36 | 10.7 |
| TDF-FTC/3TC-LPV/r | 30 | 8.9 |
| AZT-3TC-LPV/r | 19 | 5.7 |
| DDI-ABC-LPV/r | 4 | 1.2 |
| D4T-3TC-NVP | 3 | 0.9 |
| D4T-3TC-EFV | 1 | 0.3 |
| Others** | 17 | 5.1 |
| Total | 335 | 100 |

*AZT=Zidovudine, 3TC=Lamivudine, FTC=Emtricitabine, EFV=Efavirenz, TDF= Tenofovir, NVP= Nevirapine, ABC= Abacavir, DDI= Didanosine, D4T= Stavudine, LPV/r= Lopinavir/ Ritonavir, IDV= Indinavir.

**Others=ABC-3TC-EFV(10), ABC-3TC-LPV/R(1), ABC-3TC-NVP(1), ABC-TDF-3TC(1), D4T-3TC-IDV(1), D4T-3TC-NVP(1)

Biological aspects

The form 1 of the HIV infection (HIV1) was the most dominant serotype (93.0%), HIV2 3.6% and HIV1+2 3.0%. Only 143 patients out of 730 had a CD4 count available representing an achievement rate of 19.0%. The average CD4 count was 134 cells/ul. About 79.0% of the patients had a severe immune-depression with less than 200 CD4/ul. The viral load was performed among 10 patients out of 730 representing 1%, a very low achievement rate. However, it could not be detected in half of the patients; yet it exceeded 1,000 copies in four patients. And 32.3% of the patients having hemoglobin test realized were declared having severe anemia (hemoglobin <7g / dl). About 54.4% of the patients had normal leukocyte counts.

Therapeutic aspects

During hospitalization, 64.8% of the patients were treated with cotrimoxazol chemoprophylaxis. The Table 3 describes the different ARV protocols usually used in the service, the ARVs protocols used by patient before the hospitalization, and the ARVs protocols initiated during hospitalization. The most used molecule for the inpatients was tenofovir (47.7%).

The ARV treatment was started during hospitalization for 8% of the HIV infected patients without ARV treatment at entry, and for 2.8% of patient's detected HIV positive during the hospitalization.

A change in therapeutic protocol was observed in 13.3% of patients and the most used molecule for the change of the therapeutic protocol was tenofovir. The main diagnoses associated with the change of therapeutic protocol were iatrogenic anemia (23.8%) and tuberculosis (19%).

Mortality rate and its related factors

In all, 244 patients died out of 730 representing an overall mortality rate of 33.4%. The cure rate was 55.5%. There were 6.2% of the patients exited against medical advice, 4.5% of the patients exited without medical advice, and 0.4% of the patients transferred. Mortality varied according to age groups. Indeed, it was about two times higher among elder patients compared to those from the 30-39 years age group. The main diseases commonly associated with death included tuberculosis (23.4%), gastroenteritis (16.4%), and bacterial meningitis (12.7%). The most lethal pathologies were meningitis cryptococcosis (75%), septicemia (75%) and bacterial meningitis (70.4%) as shown in the figure 2. In multivariate analysis general bad health condition at admission (P<0.001), age group above 40 (P<0.001), less than two weeks and more than 30 days hospitalization (P<0.001), and the existence of a secondary diagnosis (P=0.009) established during hospitalization were statistically significant death-related causes [Table 3].

Table 3: Associated Factors of mortality among the 730 HIV-infected inpatients between 2011 and 2015 at the Department of Infectious Diseases, in Souro Sanou University Hospital, Bobo-Dioulasso, Burkina Faso

| Associated factors | % | OR crude. [IC95%] | p | OR adjusted [IC95%] | P |
|---------------------------------|------|-------------------|--------|---------------------|--------|
| Gender | | | 0.42 | | |
| • Male | 35.2 | 1 | | | |
| • Female | 32.3 | 0.9 [0.6-1.2] | | | |
| General state | | | | | <0.001 |
| • Good | 12.7 | 1 | - | 1 | |
| • Bad | 37.9 | 2.7 [1.7 – 4.0] | | 2.7 [1.7-4.1] | |
| Age (years) | | | <0.001 | | 0.006 |
| • <20 | 18.2 | 0.6 [0.1 - 2.6] | | 0.6 [0.1-1.3] | |
| • 20-29 | 20.2 | 0.6 [0.4 – 1.1] | | 0.7 [0.4 - 1.3] | |
| • 30-39 | 28.4 | 1 | - | 1 | |
| • 40-49 | 41.6 | 1.8 [1.2-2.6] | | 1.8 [1,2-2,7] | |
| • ≥ 50ans | 39.3 | 1.6 [1.1-5.5] | | 1.5 [1.0-2.5] | |
| OMS stage | | | | | |
| • 1 and 2 | 23.3 | 1 | 0.14 | 1 | |
| • 3 and 4 | 34.1 | 1.7 [0.8 - 3.5] | | 1.6 [0.8 - 3.5] | |
| Hospitalisation duration | | | <0,001 | | <0.001 |
| • <15 | 38.9 | 2.4 [1.6-3.4] | | 2.6 [1.8-3.9] | |
| • 15-29 | 21.1 | 1 | | | |

Discussion

Limitations of the study

Like any cross-sectional studies based on retrospective recruitment, information bias due to incomplete items in report forms should be noted. However, the data collected need to be discussed and commented.

HIV frequency in our study was 62.0%. A high prevalence was also noted by Yehia & al. in Mali with 67.9% [12]. HIV infection is still playing a key role in among infectious diseases. This is much higher than that recorded in other studies conducted in West Africa. From 2007 to 2008 Déguénonvo & al. noted a prevalence of 27% at the Teaching Hospital of Fann in Dakar, whereas Apetse & al. reported a prevalence of 40.5% in Togo [13, 14]. Dissimilarities can be explained by the lower sero-prevalence rate estimated to 0.5% among the general population in Senegal and different methodology used both in Apetse's study and in our study, because the former was broader and covered several health centers in Togo [14].

At the epidemiological level, the patterns of the target population can be compared to those described in previous studies carried out in the sub-region. Our target population included young adults with an average age of 40; 81% of patients were less than 50. This result can be compared to that of other studies carried out in the sub-region as mentioned by Yehia in Mali and Apetse & al. in Togo and Lawson & al. in Senegal, who respectively pointed out average ages ranging from 38, 37 and 39 years [12, 14, 7]. This is a clear evidence of high HIV/AIDS prevalence among young patients that is the active population in Sub-Saharan Africa. HIV infection is therefore a real obstacle to development in poor countries. The female predominance observed in our study was also noted by Déguénonvo & al. and Yehia

respectively with a sex ratio of 0.9 and 0.79 [12, 13]. According to UNAIDS, HIV epidemic has female facet mainly in Sub-Saharan Africa where women represent over half of all HIV-infected adults [2]. It can be explained by the fragility of the vaginal mucosa and the surface of the cervix which add on contamination risks [15]. In addition, the virus is more concentrated in the sperm than in vaginal secretions [16].

As in the present study, the clinical stage three and four according to WHO were the main stages found by Yehia who noted 39% at stage 4 and 42% at stage 3 [12]. As well, Déguénonvo & al. reported 88% of patients at stage four [13]. The average TCD4 lymphocytes were 133 CD4/μl and 79 % of our patients had less than 200 CD4/μl. The conclusion is similar to the results of Moh & al. in Cote d'Ivoire which reported that 29.0% patients having less than 200 cell/μl, with a TCD4 average of 252 cell/μl [17]. This shows once again the delay in the screening and management of HIV infection among patients in our context.

About the type of HIV infection, HIV1 was the most dominant serotype as noted by Krawho stated that HIV1 was the predominant virus (94 %) in Côte d'Ivoire and 96% of the cases according to Yehia in Mali [18, 12]. The predominance of HIV1 is common with the data from the literature. Serotype 1 prevalence varies from 70 to 90% in Sub-Saharan Africa [19].

In the present study, most of the patients were in bad general health condition during hospitalization. This conclusion is similar to that by Kamsi & al. who noted that 71.8% of the patients had a Karnofski index below 70 [20]. Lawson & al found the same result in Senegal [7]. It could be explained by delayed consultation among patients.

In our cases, the most frequent diagnoses include tuberculosis, gastroenteritis, and bacterial pneumonia, oral and esophageal candidiasis. Such results are similar to those by Apetse & al. who indicated candidiasis (61.3%), bacterial infections (48.2%), and tuberculosis (14.2 %) as the most common pathologies encountered [14]. Déguénonvo & al. also pointed out tuberculosis (40.9 %) and oral and esophageal candidiasis (38.9 %) [13]. Lewden & al. reached similar conclusions with tuberculosis (29%), pneumonia (15%), malaria (10%), and cerebral toxoplasmosis (10%) as main diagnoses [21]. Lawson & al. also pointed out tuberculosis (29.7%), pneumonia (11%) [7].

General mortality in our series was 33.4% reached similar to Lawson & al. who reported 37% slightly lower than the findings by Yehia from Mali which represented 42.6%. Deguénonvo & al. and Namutebi & al. reported a higher mortality rate representing 44% [7, 12, 13, 22].

The significant death rate in hospital could be explained by poor technical facilities necessary for early diagnosis of severe opportunistic infections and poor financial means to access some medicines combined with delayed consultation with an average of 26 days as far as our series is concerned. A study conducted by Wajanga & al. reported as causes of death 5 health systems failures which may cause preventable in-hospital mortality, including: late presentation of HIV cases, low rates of in-hospital HIV testing, poor laboratory capacity which limits CD4 T-cell testing and the diagnosis of opportunistic infections, delay in initiation of anti-retroviral therapy in-hospital, and problems associated with loss to follow-up upon discharge from hospital [23]. In our study mortality risk factors included the length of stay in hospital below 15 days and beyond 30 days, bad general health condition at admission, age ≥ 40 years, and existence of a secondary diagnosis. Luo & al. found similar results with patients with age ≥ 40 -year old, or with 2 types of OIs were at higher risk for death in hospital [24]. Yehia reported higher mortality rate during the first two week-stays in hospital [12]. Perry & al. reported a low CD4 cell count (<200 cells/mm³) as a higher risk of death [25]. Such dissimilarities could be explained in our series by the low rate of achievement of CD4 count and the homogeneity of the targeted population who was mostly at an advanced WHO stage.

Conclusion

Although HIV infection can be screened and managed in our country, HIV-related diseases remain the main causes of hospitalization and deaths among patients in the department of infectious diseases in the teaching hospital of Bobo-Dioulasso. Therefore, there is need to strengthen sensitization for appropriate and early screening and treatment by: improving prevention policies in order to ensure early screening of people living with HIV; emphasizing on the prevention of tuberculosis as main opportunistic infection; and improving hospital technical facilities for appropriate diagnosis and treatment of opportunistic infections.

Conflict of interest: Authors declare that they have no conflict of interest.

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