

Original Article

Morbidity and Mortality Among People Living with HIV in Guinea: A 4-Year Retrospective Analytical Study of 1861 Cases

Morbidité et Mortalité chez les Personnes Vivant Avec le VIH en République de Guinée : Une Étude Analytique Rétrospective de 1861 Cas sur 4 Ans

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ABSTRACT

Introduction. HIV infection remains a global health priority. In Guinea, a 2013 study reported an 18.1% mortality rate among people living with HIV (PLHIV). Updated data are lacking. This study aimed to determine factors associated with morbidity and mortality in PLHIV hospitalized at the Donka Training and Research Care Unit (USFR-Donka) in Conakry. **Methods.** We conducted a retrospective descriptive and analytical study including all patients aged 15 years and older hospitalized from November 16, 2016, to December 31, 2020. Patients who died within 48 hours of admission were excluded. Demographic, clinical, biological, therapeutic, and outcome data were collected and analyzed. **Results.** Of 2,236 admitted patients, 1,861 (83.2%) were included. Mean age was 38.7 ± 12 years (range 15–79). Women accounted for 61.5% (sex ratio 0.62). At hospitalization, 61.7% were at WHO stage IV, 70.3% had associated tuberculosis, and 61.7% had severe malnutrition (BMI < 16.5 kg/m²). Viral load was detectable (>40 copies/mL) in 89.6%, and CD4 count was <200 cells/mm³ in 82.1%. Severe anemia (<8 g/dL) affected 47.6%, renal failure (creatinine >150 μmol/L) 44.4%, and liver cytolysis (SGPT >40 IU/L) 19.8%. The preferred regimen (TDF/3TC/EFV) was prescribed in 58.9%. Overall mortality was 32.9% (613 deaths). Factors associated with death in bivariate analysis were: liver failure ($p < 0.00001$), renal failure ($p = 0.0003$), WHO stage IV ($p < 0.0001$), and CD4 count <50 cells/mm³ ($p < 0.0001$). **Conclusion.** In-hospital mortality among PLHIV remains very high in Donka, affecting one-third of patients. It is linked to late diagnosis (advanced stage, severe immunosuppression) and associated comorbidities (tuberculosis, malnutrition, organ failure). Earlier screening, rapid ART initiation, and integrated management of comorbidities are urgently needed.

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RÉSUMÉ

Introduction. L'infection par le VIH reste une priorité sanitaire mondiale. En Guinée, une étude de 2013 rapportait une mortalité de 18,1 % chez les personnes vivant avec le VIH (PVVIH). Depuis, peu de données actualisées sont disponibles. Cette étude visait à déterminer les facteurs associés à la morbidité et à la mortalité des PVVIH hospitalisées à l'Unité de Soins, de Formation et de Recherche (USFR) Donka, à Conakry. **Méthodes.** Nous avons mené une étude rétrospective descriptive et analytique incluant tous les patients âgés de 15 ans et plus, hospitalisés du 16 novembre 2016 au 31 décembre 2020. Étaient exclus les patients décédés dans les 48 heures suivant l'admission. Les données démographiques, cliniques, biologiques, thérapeutiques et évolutives ont été recueillies et analysées. **Résultats.** Sur 2 236 patients admis, 1 861 (83,2 %) ont été inclus. L'âge moyen était de $38,7 \pm 12$ ans (extrêmes 15–79). Les femmes représentaient 61,5 % (sex-ratio 0,62). Au moment de l'hospitalisation, 61,7 % des patients étaient au stade OMS IV, 70,3 % présentaient une tuberculose associée, et 61,7 % une dénutrition sévère (IMC < 16,5 kg/m²). La charge virale était détectable (> 40 copies/mL) chez 89,6 % des patients, et le taux de CD4 inférieur à 200 cellules/mm³ chez 82,1 %. Une anémie sévère (< 8 g/dL) concernait 47,6 % des patients, une insuffisance rénale (créatininémie > 150 μmol/L) 44,4 %, et une cytolysé hépatique (SGPT > 40 UI/L) 19,8 %. Le régime thérapeutique préférentiel (TDF/3TC/EFV) était prescrit dans 58,9 % des cas. La mortalité globale s'élevait à 32,9 % (613 décès). En analyse bivariée, les facteurs associés au décès étaient : l'insuffisance hépatique ($p < 0,00001$), l'insuffisance rénale ($p = 0,0003$), le stade OMS IV ($p < 0,0001$), et le taux de CD4 < 50 cellules/mm³ ($p < 0,0001$). **Conclusion.** La mortalité hospitalière des PVVIH reste très élevée à Donka, touchant un tiers des patients. Elle est liée à un diagnostic tardif (stade avancé, immunosuppression sévère) et aux comorbidités associées (tuberculose, dénutrition, défaillances viscérales). Un dépistage plus précoce, une mise sous traitement antirétroviral rapide et une prise en charge intégrée des comorbidités sont urgents.

HIGHLIGHTS FOR READERS IN A HURRY

What is already known on this topic. HIV infection remains a major cause of death in sub-Saharan Africa despite expanded antiretroviral access. Delayed diagnosis and opportunistic infections worsen prognosis. Updated epidemiological data from Guinea are scarce.

The aspect of the subject addressed in this study. This study analyzes factors associated with morbidity and mortality among 1,861 HIV-infected adults hospitalized over four years (2016–2020) at USFR-Donka, Conakry's main referral center.

What this study adds. Nearly two-thirds of hospitalized patients are at WHO stage IV, with severe immunosuppression (CD4 <200 in 82%) and detectable viral load in 90%. Tuberculosis is associated in 70%, severe malnutrition in 62%. Mortality reaches 32.9%. Factors independently associated with death are liver failure, renal failure, WHO stage IV, and CD4 count <50 cells/mm³.

How this is relevant to clinical practice, policy or further research. These findings call for strengthening early HIV screening in the general population, immediate ART initiation, and systematic integration of tuberculosis, malnutrition, and renal/hepatic failure screening into PLHIV follow-up. A national HIV-related death registry would enable continuous epidemiological surveillance.

INTRODUCTION

The HIV/AIDS pandemic remains a global health and development priority; Global HIV-related mortality has declined since 2006, from 1.95 million deaths to 0.95 million in 2017 [1,2]. However, several studies have shown that mortality and morbidity are linked to delays in diagnosis and/or ART; however, in resource-limited countries, these findings are insufficiently documented [3]. In 2013, a study reported a mortality rate of 18.1% in Guinea [4]. USFR-DONKA, is a reference structure for the care of people living with HIV in the advanced stage. It seemed necessary to determine the factors to morbidity and mortality in this center.

METHODOLOGY

This was a retrospective cross-sectional descriptive and analytical study over 4 years (November 16, 2016 to December 31, 2020). It included patients aged ≥ 15 years, of both sexes, with advanced HIV infection who were hospitalized in the unit, and excluded patients who died within 48 hours of hospitalization and those without a complete medical record.

Advanced stage HIV criteria: CD4 <200 cells/mm³ or a characteristic manifestation of a clinical stage III or IV according to the WHO.

The parameters studied were: epidemiological (age and sex, marital status); clinical (the HIV type, the opportunistic infections: clinical stages according to the WHO, BMI); paraclinical (CBC, CD4, viral load, transaminases and the creatinine); therapeutic (kind of antiretroviral therapy and line of treatment) and evolving (favorable, transfer, death). Descriptive analyses were performed using frequency, mean, standard deviation, and

median calculations (Q1-Q3). Inferential statistics were performed using Pearson's chi-squared tests for comparing categorical variables. Analysis of variance (ANOVA) for comparing quantitative variables, with a significance threshold $\alpha = 5\%$.

Ethical considerations: Our research protocol was validated by the ethics committee of USFR-DONKA and data collection was anonymous.

RESULTS

We registered a total of 2236 patients during the study period, of whom 83.2% (n = 1861) were included, with a peak in participation observed in 2019 (Figure 1). The mean age of the patients was 38.7 years ± 12 years with extremes [15-79 years]. The female sex represented 61.5% (n:1144) with a ratio of 0.62 and the bride and groom were involved in 67.4% (n: 1255).

Patients at WHO stage IV represented 61.7% (Figure 2).

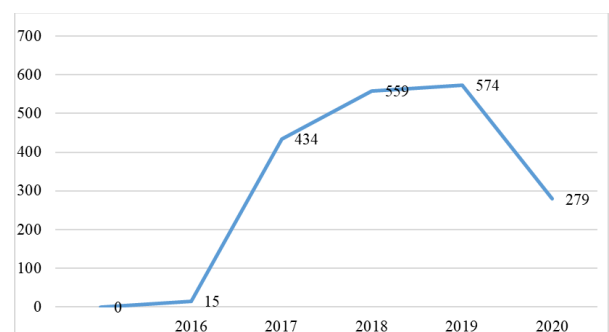


Figure 1: Patient flow included per year from 2016-2020

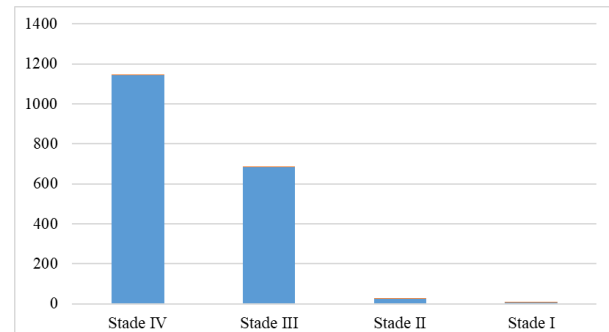


Figure 2: the distribution of the 1861 patients according to the WHO clinical stage

Tuberculosis infection was the most frequently associated comorbidity. 70.3% (n: 1305) and weight loss (BMI < 16.5) were observed in 61.7% (n: 1148) of patients. HIV-1 was the most frequently detected type, accounting for 99.2% (n: 1847), the viral load was detectable (>40 copies/ml) at the house of 89.6% (n: 1668) and the CD4 count was (< 200 cells/mm³) in 82.1% (n: 1527). Anemia (<8g/dl) was noted in 47.6% (n: 885) of patients, an abnormality in white blood cell count (leukopenia or hyperleukocytosis) was observed in 47.7% (n: 889) and serum creatinine was elevated (>150 $\mu\text{mol/L}$) in 44.4% (n: 826) of patients (Table I). The preferred therapeutic regimen (TDF/3TC/EFV) was used in 58.9% (n: 1096) of cases (Table II).

Table I: the distribution of the 1861 patients according to biological data

Variables		N	%
Virus type	HIV 1	1847	99.2
	HIV 2	11	0.6
	HIV 1+2	3	0.2
CD4 count (cells/mm3)	CD4 < 200	1527	82.1
	CD4 200-350	181	9.7
	CD4 > 350	152	8.2
Viral load (copies/ml)	Detectable >40	1668	89.6
	Undetectable<40	152	8.2
	Unknown	41	2.2
White blood cell (mm3)	<1,000	50	2.7
	>10,000	201	10.8
	1,000-5,000	839	45.1
	5,000-10,000	768	41.3
	Unknown	3	0.2
Hemoglobin level (g/dl)	<8	885	47.6
	8-10	654	35.1
	>10	322	17.3
Creatinine level (µmol/l)	<50	55	3.0
	>150	826	44.4
	100-150	497	26.7
	50-100	473	25.4
	Unknown	10	0.5
SGPT (IU/L)	<40	1488	79.9
	>40	369	19.8
	Unknown	4	0.2

Table II: Distribution according to therapeutic data of the 1861 patients

Treatment regimens	N	%
1st line		
TDF/3TC/EFV	1096	58.9
ABC/3TC/EFV	204	10.9
AZT/3TC/EFV	9	0.5
2nd row		
AZT/3TC/LPV/r	128	6.9
ABC/3TC/LPV/r	82	4.4
TDF/3TC/LPV/r	63	3.4
TDF/3TC/DTG	53	2.8
ABC/3TC/DTG	30	1.6
Not on ARV	197	10.6
OTHERS*	29	1.6

The overall mortality rate in our study was 32.9% (n: 613). It affected the 35-44 age group in 34.7% (n: 213), women were involved in 59.9% (n: 367) and the Malnutrition

(BMI < 16.5) was observed in 61.4% (n: 401) of the deceased (Table III). Death was observed in 15.3% (n: 187) of tuberculosis cases (Table IV). In bivariate analysis factors associated with mortality were: liver failure (p: 0.000007), kidney failure (p: 0.0003), and WHO stage IV (p: 0.00002) (Table V).

Table III : distribution of the 613 deceased patients, according to demographic data and nutritional status.

Variables	N	%	
Age range	15-24	46	7.5
	25 - 34	148	24.1
	35 - 44	213	34.8
	45-54	124	20.2
	55 - 64	64	10.4
≥ 65	18	2.9	
Sex	Female	367	59.9
	Male	246	40.1
BMI (kg/m2)	<16.5: Malnutrition	401	65.4
	16.5-18.5: Thinness	108	17.6
	18.5-25: Normal Weight	98	15.9
	25-30: Overweight	6	0.9

Table IV: the distribution of patients according to the lethality of associated diagnoses

Diagnostics	Total case	Case of death	Case fatality rate (%)
Tuberculosis	398	187	15.3
Cerebral toxoplasmosis	308	113	9.3
Digestive candidiasis	185	29	2.4
Kaposi's sarcoma	48	14	1.2
Neuro-meningeal cryptococcosis	19	7	0.6
Bacterial Meningitis	29	13	1.1
Bacterial pneumonia	73	12	0.9
Probable Pneumocystosis	75	22	1.8
Toxic hepatitis	57	25	2.1
Others	506	191	15.7
Total	1698	613	50.3

Table V: the distribution of the 613 deceased patients according to prognostic factors.

Settings		Living	Death	OR (95% CI)	p
BMI (kg/m2)	<16.5	747	401	1.26(1.03-1.55)	0.02
	16.5-18.5	238	108	0.87(0.67-1.12)	0.31
	18.5-25	231	98	0.83(0.64-1.08)	0.18
WHO Stadium	II	3	22	0.27(0.06-0.83)	0.024
	III	191	491	0.59(0.56-0.85)	0.0005
	IV	419	726	1.55(1.26-1.90)	0.00002
CD4 (cells/mm3)	CD4 < 50	337	558	1.5(1.24-1.83)	0.00003
	CD4 50-100	127	211	1.28(1.00-1.63)	0.045
	CD4 100-150	46	142	0.63(0.44-0.89)	0.009
	CD4 150-200	25	81	0.61(0.38-0.96)	0.034
	CD4 200-250	21	57	0.74(0.43-1.22)	0.24
	CD4 250-300	14	48	0.58(0.30-1.05)	0.07
Viral load (copy/ml)	Undetectable: <40	39	113	0.68(0.46-0.99)	0.04
	Detectable: >40	560	1108	1.33(0.96-1.87)	0.08
Creatinine level (µmol/l)	>150	302	524	-	0.0003
	100-150	146	351		
	50-100	143	330		
	<50	15	40		
SGPT (IU/L)	<40	447	1003	0.5(0.46-0.74)	0.000007
	>40	158	211		

DISCUSSION

As in most retrospective studies, our main limitations were missing data and the failure to perform certain examinations. However, our study allowed us to gain an overview of the main factors contributing to mortality in AIDS, in a tertiary reference service in the Republic of Guinea.

Young adults were the most represented in our study. Mongo DA and al. [5] in Gabon and Ouédraogo SM and al. [6] in Ouagadougou, a predominance of the 25-40 and 36-45 age groups was reported; this result could be due to the fact that this category seems to have a more active sex life, with risky practices. Women were predominant in our series. This observation is widely found in African literature [5,7,8]. This would be reflected, on the one hand, by the feminization of HIV in Africa due to biological vulnerability, by certain socio-cultural practices and on the other hand, by an early entry of this kind into sexual life.

We observed a high frequency of patients at advanced WHO stages (III and IV). A Moroccan and Tunisian study reported respective proportions of 94.5% and 46% of patients at WHO stages III and IV [7,9]. This demonstrates that our facility is a leading center for the care of people living with HIV in the advanced stages. Furthermore, in sub-Saharan Africa, patients are generally admitted to the hospital at the AIDS stage [10]. The main opportunistic infection in our patients was tuberculosis. Fortes DL and al. [11] in Dakar, reported 40.9% of tuberculosis co-infection and Ouédraogo SM and al. [6], 73.1% of cases were found to be pulmonary. It is clear that tuberculosis is the first major opportunistic infection in HIV-positive patients. Anemia and renal insufficiency were the main conditions in the patients in our study. Doekias AE et al. [12] reported anemia in 47.1%. Anemia is a common complication in people living with HIV related to opportunistic infections. In the work of Kaba ML and al. [13] and Monlet G and al. [14], the prevalence of renal insufficiency was 24% and 23.9%, respectively. This reflects the renal toxicity of certain antiretroviral (ARV) drugs, including tenofovir, which was administered to most of our patients. Furthermore, HIV itself can affect the kidneys.

Viral load was detectable in most of our patients. Cissé M et al. [8], they reported in their study a detectable viral load in 51.6% of cases. This could be explained by non-adherence to ART, which led to treatment failure, as most of our patients were on ART.

Overall HIV-related mortality in our study was high. In the series by Fortes DL and al. [11], mortality was observed in 44%. Many prognostic factors were significantly associated with death in our study, including severe immunosuppression, malnutrition, and liver and kidney failure. Ondounda et al. [15], had reported that 88.8% of deceased patients had a CD4 count <100 cells/mm³ (p: 0.018). Konate I et al. [10], in their study, they reported several prognostic factors associated with patient death, including WHO clinical stage IV (p<0.001) and tuberculosis coinfection (p: 0.049). Opportunistic infections, particularly tuberculosis, represent a major

cause of death among people living with HIV in the advanced stages of the disease [10]. Liver and kidney failure are also among the mortality factors; this could be explained by the fact that many people living with HIV use pharmaceuticals and/or are on multiple medications, which could lead to organ damage (liver, kidneys, etc.).

CONCLUSION

This study paints a concerning picture of in-hospital mortality among people living with HIV in Conakry. At 32.9%, the mortality rate is nearly double that reported in Guinea a decade ago. This reflects a triple failure: screening is too late, opportunistic infection prevention is insufficient, and comorbidity management is neglected.

The profile of deceased patients is that of young adults (median age 38), predominantly women, arriving at the hospital at a very advanced stage of the disease: 62% are at WHO stage IV, 82% have a CD4 count below 200, 90% have a detectable viral load. Tuberculosis, severe malnutrition, renal failure, and liver failure are the comorbidities that worsen prognosis.

Clinically, these findings mandate a revision of management strategies. Screening must be expanded and repeated, particularly among young women and at-risk populations. Antiretroviral therapy must be initiated immediately, regardless of CD4 count. Systematic screening for tuberculosis, nutritional assessment, and measurement of creatinine and transaminases should be integrated into the initial workup and follow-up.

At the level of the Guinean health system, creating an integrated care pathway combining internal medicine, pulmonology, nutrition, and nephrology within HIV referral centers is a priority. Establishing a national HIV-related death registry, with case audits, would help identify preventable determinants and adjust policies. Interventional studies evaluating the impact of community-based screening and early nutritional support are now needed.

DECLARATIONS

Conflicts of interest

The authors declare no conflict of interest

Funding

The work was carried out with own funds

Ethical considerations

All stages of the work were carried out in compliance with the Declaration of Helsinki. The approval of the institutional ethics committee was obtained prior to the start of the study.

Data availability

Data is available on reasonable request from the principal author.

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