

Assessment of hepatitis B virus infection and tuberculosis among people living with HIV at the Kankan Regional Hospital (Republic of Guinea)

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Abstract

Objective: The aim of this study was to determine the tuberculosis and hepatitis B virus co-infection among people living with HIV at the Kankan Regional Hospital (HRK) in Guinea and to describe the biological and clinical signs associated to the co-infections.

Methods: It was 4 years retrospective study (January 1st, 2015-December 31st, 2018. data was collected from lab registers and hospitalization files. Results: On a total of 345 PVVH, HBsAg testing was carried out. Thus 9.3% (32/345) were co-infected with HIV/HBV with the presence of jaundice in 8.1% (28/345). All patients (100%) had oropharyngeal candidiasis (thrush). About 44.1% (152/345) of patients tested positive for tuberculosis, while 49.6% (171/345) presented with prurigo. The results of the study showed that the female gender was predominant with a sex ratio (M/F) = 0.69. The average age of the patients was 38.45±13.38 [16-80 years]. The most represented age group was ≥35 years (55.9%), followed by 25-29 years (16.8%) and 30-34 years (14.2%). More than half of the patients were married (51.6%), and singles accounted for 31.0%. On a socio-professional level, workers were in the majority (54.7%), followed by farmers (15.1%) and traders (14.5%).

Conclusion: All of these results show that the prevalence of tuberculosis and hepatitis B was high among people living with HIV at the Kankan Regional Hospital.

Keywords: Co-infection; HIV; HBV; Tuberculosis; HRK; Kankan; Guinea

1. Introduction

Microbial infections are conditions often caused by pathogenic microorganisms such as human immunodeficiency virus (HIV) and hepatitis B virus (HBV), but also by opportunistic pathogens such as *Mycobacterium tuberculosis* (*M. tuberculosis*). For people living with HIV (PLHIV), cases of co-infection with HBV or with *M. tuberculosis* are sometimes observed. Cases of triple infections (combination of three microorganisms), although less frequent, can occur.

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Cases of co-infection by at least two of these germs or even the association of these three microbial species constitute a real global public health problem, especially in developing countries. Indeed, these are important factors of co-morbidity and co-mortality in many countries [1-7].

HIV and HBV have common transmission routes. In fact, these two viruses are transmitted sexually, by transfusion, percutaneously and from mother to child.

During HIV/HBV co-infection, HBV does not seem to influence the natural history of HIV infection. On the other hand, HIV significantly modifies the natural history of viral B infection [8,9]. Literature data show that compared to people infected with HBV alone, people co-infected with HIV/HBV may experience accelerated progression of liver disease, including increased risks of hepatocarcinoma, liver and all-cause mortality [8,9].

In Sub-Saharan Africa, the diagnosis of HIV infection is generally made at an advanced stage and the search for serological markers of HBV is not systematic [10]. Assessment of liver damage in co-infected patients is not often performed.

This assessment should therefore be systematic before and after initiation of retroviral treatment. Worldwide, it is estimated that approximately 5 to 20% of people living with HIV live with HBV [11]. More recently, studies have shown that globally, the prevalence of HIV/HBV co-infection among PLHIV is approximately 7.4% [12,13], with substantial regional variations and higher prevalence (11.8%) among injecting drug users [14]. In Western Europe and North America, the prevalence of HIV/HBV co-infection is reported to be 5%, while in developing countries it ranges from 2% to 30.6%.

In 2004, it was estimated in France that 37.6% of the population affected by HIV presented serological markers indicating infection or previous contact with HBV [15].

In Parakou in Benin, Dovonou et al (2015) reported a hospital prevalence of 16.9% of HIV/HBV co-infection [16]. In 2019, Makanéra et al found in Conakry (Guinea) a prevalence of HIV/HBV co-infection equal to 2.3% [17]. In the same study, these authors reported that the prevalences of HIV and hepatitis B were 10.5 and 17.9%, respectively [17]. These authors also reported that HIV prevalence was higher among females.

In Guinea, Makanéra et al reported in their study in 2019, prevalences of HIV and hepatitis B which were respectively 10.5 and 17.9% [17]. These authors also reported that HIV prevalence was higher among females. The objective of this present work was to determine the seroprevalence of HIV/HBV co-infection in the Biomedical Laboratory in patients hospitalized in the General Medicine Department of the Kankan Regional Hospital (HRK) and to describe the clinical and biological signs. associated with co-infection.

2. Patients and Methods

2.1. Framework of the study

2.2. Type and period of study

This was a retrospective, descriptive study over a period of three (3) years from January 2015 to December 2017.

2.3. Target population

Patients living with HIV hospitalized and followed in the general medicine department of the Kankan Regional Hospital (HRK) whose biological examinations were carried out at the biomedical laboratory of the said hospital.

The prefecture of Kankan is one of the administrative regions of Guinea. It is a prefecture in Upper Guinea located more than 600 km from the capital Conakry. It is located in the northeast of Guinea. Kankan prefecture covers an area of 11.56 km². It is limited to the East by that of Mandaiana and the Republic of Cote d'Ivoire. To the West by the prefecture of Kouroussa, to the North by the prefecture of Siguiroi and Mandiana and to the South by the prefectures of Kérouané and Kissidougou.

The population of Kankan was estimated in 2014 at 1,986,329 inhabitants.

2.4. Study population

PLWH patients hospitalized and followed at the HRK General Medicine department in whom HBsAg testing was carried out.

2.5. Inclusion criteria

All PLWH hospitalized and followed at the HRK General Medicine department in whom HBsAg testing was carried out and whose age was over 15 years old

2.6. Non-inclusion criteria

All PLWH hospitalized and followed at the General Medicine department of HRK in whom the test for HBsAg was not carried out.

2.7. Data collection

Data collection was carried out in the registers of the Biomedical Laboratory service using survey forms for patients meeting the inclusion criteria.

2.8. Data entry and analysis

Data entry and analysis were carried out using EPIinfo 7.1.3.3, Excel and Word 2013 software.

2.9. Ethical considerations

Respect for data confidentiality was observed.

3. Results

The table 1 shows that the distribution of patients according to age groups showed that the majority of patients were over 35 years old (55.9%). The female gender was predominant (58.8%) with a sex ratio = 0.69.

Table 1 Sociodemographic characteristics of the patients studied

Characteristics	Number (N=345)	Percentages
Age groups (years)		
0-20	29	8.40
21-30	86	24.92
31-40	103	29.85
41-50	62	17.97
≥ 51	65	18.84
Sex		
Male	142	41.2
Female	203	58.8
Profession		
Occupations	153	44.35
Farmers	52	15.07
Traders	51	14.78
Pupils/Students	40	11.59
workers	27	17.82
Unemployed	12	3.47

Dressmakers	8	2.32
Civil servants	2	0.57
Origin		
Kankan	180	52.17
Siguiri	72	20.86
Mandiana	38	11.01
Kérouané	29	8.40
Dabola	3	0.86
Banankoro	2	0.58
Conakry	1	0.29
Others	20	5.79

Sex ratio (M/F) = 0.69, Average age = 38.45±13.38 [16-80 years]

3.1. Civil state

The results of the distribution of PLHIV according to marital status showed a predominance of married people with 51.6%, followed by single people.

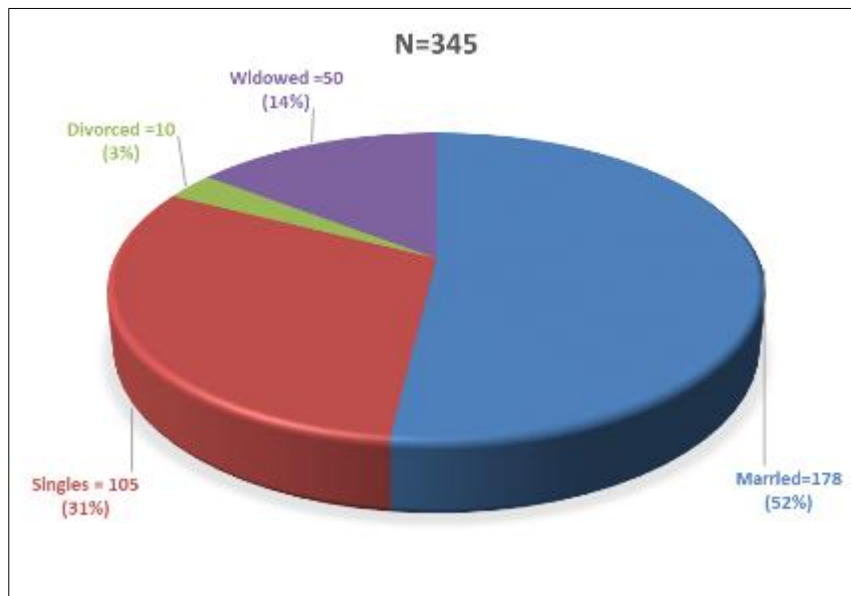


Figure 1 Distribution of patients according to marital status

Table 2 Prevalence of different types of HIV, HBV and Tuberculosis infections

Characteristics	Number (N=345)	Percentages	IC 95%
HIV			
Negative	0	0.0	
Positive	345	100	
Jaundice			
No	317	91.9	88.52 – 94.33
Yes	28	8.1	05.67 – 11.48

HBV			
Negative	313	90.7	87.20 – 93.35
Positive	32	9,3	6,65 – 12,80
Prurigo			
No	174	50.4	45,18 – 55.66
Yes	171	49.6	44,32 – 54.82
Tuberculosis			
Negative	193	55.9	50.67 – 61.09
Positive	152	44.1	38.91 – 49.33
Oral thrush			
No	0	0.0	
Yes	345	100	

Table 3 Distribution of PLWH according to the number of years after the first HIV screening

Time since HIV testing	Number	Percentage
less than 1year	340	98.55
2-5 years	4	1.16
more than 10 years	1	0.29
Total	345	100

Table 4 Prevalence of different associations of infectious germs in the patients studied

Characteristics	Number (N=345)	Percentages	IC95%
HIV/HBV			
Positive	32	9.3	6.65-12,80
Negative	313	90.7	87.20-93.35
VIH/TB			
Positive	152	44.1	38.91-49.33
Négative	193	55.9	50.67-61.09
HBV/TB			
Positive	15	4.3	2.65-7.05
Negative	330	95.7	95.65-97.35
HIV/HBV/TB			
Positive	15	4.3	2.65-7.05
Negative	330	95.7	95.65-97.35

Table 5 Impact of infections on hemoglobin level and blood sugar levels in PLHIV

Characteristics	Number (N=345)	Percentages	IC95%
Hemoglobin Level			
<9 g/dl	146	42.3	37.22-47.59
9-11 g/dl	199	57.7	52.41-62.78
≥12 g/dl	00	00	
Glycemia			
<1.2 g/l	313	90.7	87.20-93.35
≥ 1.2 g/l	32	9.3	6.65-12.80

4. Discussion

PLHIV constitute a population group at risk and are often subject to opportunistic infections.

4.1. Sociodemographic characteristics of the population

The results of the present study showed that the most represented age group was that of [31-40 years] with 29.85%, followed by that of [21-30 years] with 24.92%. The mean age of the patients was 38.45 ±13years with extremes of 16 and 80 years.

Our results are comparable to those reported by Attia et al (2007) in Côte d'Ivoire, in their work on the prevalence of hepatitis B in patients infected with HIV, where the average age was 36 years ± 8.68 years [10]. Likewise, these results are comparable to those reported by Makanéra et al., in 2019 who found an average age of 37 years in patients with HIV/HBV co-infection with extremes of 16 to 83 years [17]. On the other hand, these values was lower than those reported in 2007 in Mali, by Dao et al., [18]. Our study clearly shows that HIV infection affects the productive and active age group of the population.

The distribution of patients according to sex showed that the female sex was the most affected with 53% and a sex-ratio (M/F) = 0.69. Our results are close to those reported in Senegal in 2008 by Diop Ndiaye et al., [19] and in South Africa by Barth et al., [20]. This is explained by the great biological, social and economic vulnerability of women, but also by the high illiteracy rate of this social stratum in several African countries.

The distribution of patients according to origin showed that more than half of the patients came from the town of Kankan (52.17%), followed by Siguiri (20.87%) and Mandiana (11.01%), thus corresponding to 84% of the study population. This could be explained on the one hand by the fact that the town of Kankan is the capital of the region and includes the largest number of population in the region, followed by that of Siguiri and Mandiana. On the other hand, this difference could also be explained by the non-decentralization of the Care Units for PLHIV. Finally, this could be explained by the fact that the Kankan Regional Hospital is in the town of Kankan itself and that the towns of Siguiri and Mandiana are close to this town.

4.1.1. HIV infection is a pandemic affecting all socio-professional strata.

The distribution of patients according to profession showed a predominance of housewives (44.35%), followed by pupils/students (15.07%) and the unemployed (3.48%). Several factors could explain this predominance. These different rates could be explained by lack or insufficiency of knowledge about HIV, lack of access to care and financial dependence. Our results are partly comparable to those found by Ilboudo BM et al., [21] who reported in 2013 in Burkina Faso that housewives were predominant, with a higher prevalence rate (59.1%) than in the present study.

The distribution of patients according to marital status showed married people in the majority (52%), followed by singles (31%). This could be explained by the fact that until now HIV infection is still poorly tolerated by the population. Affected people are always stigmatized and left to their dependence, hence the refusal of early detection by patients and thus becoming silent contaminants to those around them.

Our results are comparable to those of Lunjwire et al., [22] who found in his studies a predominance of married people (45.5%) followed by single people (27.4%) and [21] with a married population of (59.3%). This leads us to deduce that transmission could be of a sexual nature among PLHIV.

Our results are also comparable to several sub-Saharan studies where HIV is still a scourge to be fought.

4.2. Clinical and biological characteristics

4.2.1. Hospitalization

All patients are hospitalized in the general medicine department. The existence of a patient file and the presence of the name in the hospitalization register could justify this fact.

4.2.2. The stages of progression of the disease according to the WHO

Patients only presented at WHO stages 3 and 4.

Indeed, in Africa, patients do not often go to the hospital early after surviving an illness. They prefer to make decoctions and only head to the hospital when they find no sign of possible cure.

Our results are comparable to those of Sagoe et al., (2012) [23] who found a rate of 96.5% of patients classified in WHO stages 3 and 4 and none asymptomatic. On the other hand, they are higher than those found by Ilboudo BM et al., [21] who found a rate of 51.6% of patients classified in stages 3 and 4. This difference could be explained by the fact that are included in his study even patients under treatment.

4.2.3. Opportunistic diseases

Thrush, prurigo and tuberculosis were identified with 95.65%, 49.57% and 43.90% respectively. These results could be justified by the fact that the patients only presented at an advanced stage according to the WHO classification or even at a stage of severe immunosuppression.

4.2.4. Retroviral serology

The majority of patients 98.55% versus 1.45% had retroviral serology upon hospitalization in the general medicine department.

4.2.5. Epidemiological aspect

In our study, HBsAg was tested in 345 PLHIV and positive in 32 PLHIV with a prevalence of 9.28%.

Our results are comparable to those reported in Ivory Coast by Combe et al., (2001), [24] who showed in a population of 223 HIV-positive pregnant women, a seroprevalence rate of 9.9%. Likewise, our results are also comparable to those of Rouet et al., (2004) who found, in Côte d'Ivoire, a prevalence of 9% in a group of 501 pregnant women [25].

Our results are superior to those reported in Guinea by Keita M et al., (2014) in Guinea who found a prevalence of 8.5% in a population of 306 PLHIV [26]. Our data are also superior to those found by other authors from different countries including Harania et al., (2008) in Kenya [27], Barth et al., (2011) in South Africa [20], Tounkara et al. ., (2009) in Mali [28] in a blood donor population, with respective values of 6%, 0.4%, 1.13%.

Furthermore, our results are lower than those found in Gambia in 2010 by Jobarteh et al., [29] with 12.2%, in Nigeria in 2008 by Otegbayo et al., [30] with 11.9%, in Ghana in 2010 by Geretti A.M. et al., [31] with 16.7%. Similarly, in France in 1997 by Denis et al., [32] with a prevalence of 13.8%.

The difference could be justified by the fact that HBsAg serology is not systematically requested or that the risk factors for co-infection in other studies are high. These factors include, among others, multiple sexual partners, scarification, repeated blood transfusions, acupuncture, homosexuality and injection drug use.

Although probably underestimated, the prevalence retained remains high and corroborates the geographical distribution of HBV endemicity according to which the prevalence of HBV is high in the sub-Saharan region (10-20%) [33].

In view of these results, the search for HBsAg must be systematic in all PLHIV.

4.3. Sociodemographic aspect

4.3.1. Age

It appears from our study that the most represented age group was [21-30 years] or 31.25% followed by [31-40 years] or 25%. The average age was 39.09 years \pm 14 years with extremes of 17 years and 80 years. These results corroborate the precocity of sexual relations in young girls, who at a young age (9-12 years old) are sexually active, without education and good knowledge of the risks they run, engage in it themselves.

Our results are superimposable to those of Lunjwire et al [22] who found an average age of 39 years and those of Goro et al [34] with 38.68 years and extremes of 16 and 72 years.

They are higher than those of Makuwa et al in Congo [35] with a population of 334 PLHIV and an average age of 28.6 years.

4.3.2. Gender

In our study, we found 17 women, or 53%, and 15 men, or 47%, with a sex ratio of 1.42. Our results are comparable to those of [22] where women represented 56%.

Our results could be explained by the fact that women are more vulnerable to sexually transmitted infections in general, and to HIV infections in Africa in particular; but above all the precocity of young girls' sexual relations.

The difference with the West could be explained by a large population of injecting drug users and homosexuals.

4.3.3. Profession

In our study, housewives were the most affected, i.e. 37.50%, followed by farmers with 18.76%.

Indeed, our results could be explained by the fact that these two layers do not have adequate knowledge about HIV and HBV, but also by the lack of information, communications and education relating to the risks of these diseases.

Our results are in line with those of Keita et al [26] who found housewives with 26.96% and workers with 15.38%.

4.3.4. Marital status

Singles are in the majority with 43.35% and married people with 37.50%. Our results are different from those of Lunjwire in Congo where married people predominated with 45.5% [22] The source :

The town of Kankan was the most represented place with 37.50%, then comes Siguiri with 31.25%.

Indeed, the town of Kankan, known for its trade, and that of Siguiri for its gold-bearing soil, constitute places of attraction for the population.

4.4. Clinical characteristics

4.4.1. Clinical signs

Our study showed the presence of jaundice in 96.88% and lymphadenopathy in 71.88%. This same observation was made by Keita et al [26] with jaundice 76.92%, but also with hepatomegaly at 34.61%, Kone J. et al [36] also mentioned jaundice at 45.5%.

This could be explained by the fact that patients present themselves to medical centers late for treatment or by the fact that HBsAg is requested only if the patient is in the frank jaundice phase of the disease.

4.4.2. Opportunistic infections among PPHIV

In Africa, socio-economic life means that patients wait too long at home before going to a medical center. They most often only present at a terminal stage of the disease.

Thus, opportunistic infections such as thrush, prurigo, tuberculosis were found in patients respectively at 100%, 90.63%, 46.88%.

Keita et al [26] found digestive candidiasis at 50%, tuberculosis at 26.92% and kaposi disease at 7.69%.

4.4.3. *Body mass index*

In our study, the BMI in co-infected patients was less than 18.5.

This could be explained by the fact that all patients presented to the hospital at WHO stage 3 or 4, but also by the delay in diagnosis as evidenced by most studies in Africa [22, 35.37].

4.5. **Biological characteristics**

In the general medicine department, retroviral serology is among the tests requested by the doctor at first contact, because the prevalence still remains high in this region after that of Conakry (1.5%). But also, because many hide their illness for fear of being stigmatized by the population.

4.5.1. *Glycemia*

Blood sugar was normal in 78.12% of co-infected, only 21.88% had blood sugar above normal.

Indeed, glucose serum is used much more for resuscitation.

4.5.2. *The thick drop blood spread on slide*

More than half were positive for malaria (56.25%); Malaria still remains a public health problem in Africa despite the efforts of taxpayers to prevent this disease.

4.5.3. *Hemoglobin level*

In our study, all patients had a hemoglobin level below normal (100%). In fact, patients presented themselves at the hospital with other ongoing illnesses such as: salmonellosis, syphilis, malaria, etc.

4.6. **The treatment**

In our study population, the treatment regimen initiated after HIV detection was: 2INTI+1NNTI, either TDF+3TC or FTC+EFV or AZT+3TC+NVP or EFV.

In co-infected people, we use the same treatment but with more lamivudine (3TC) i.e. TDF+3TC+EFV.

The new WHO 2013 recommendations for the treatment and prevention of HIV infection recommend starting antiretroviral treatment in any person with co-infection with HIV and HBV with signs of chronic liver damage. severe regardless of the clinical stage or CD4 lymphocyte count [38].

In our framework we use molecules that are more active on HIV1.

A study conducted in 2013 by Bado G. et al., [39], showed that 68.5% of patients were on anti-HBV monotherapy, lamivudine being the most prescribed antiretroviral. However, the use of lamivudine as monotherapy is not recommended in co-infected patients because its main disadvantage is to constantly induce HBV resistance mutations in the order of 15 to 25% per year and 70 to 80% in 4 years Sène D. et al [40].

At the Kankan Regional Hospital, the incidence of death is very high in the first three months, as well as cases of escapees from hospitalized PLHIV.

5. **Conclusion**

We therefore conducted a dynamic 6-month retrospective study from November to April 2018 at the Kankan Regional Hospital. At the end of our study we had 32 cases of co-infection in a population of 345 PLHIV, i.e. a prevalence of 9.28%, female predominance, mean age of 39.09 ± 12 years with extremities of 16 and 80 years.

The age group [21-30 years] was more represented. HBsAg was the only marker sought for this co-infection. Vaccination remains the most effective means of preventing hepatitis B.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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