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HIV/HBV Co-Infection Among Cameroonian Patients Followed at the EPC Hospital of Djoungolo, Yaoundé - Prevalence and Associated Factors

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Abstract

Background: Co-infection with Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) worsens liver prognosis and accelerates immunosuppression. In sub-Saharan Africa, updated data on this co-infection remain limited. This study aimed to determine the prevalence of HBV serological markers and identify factors associated with HIV/HBV co-infection among People Living with HIV (PLHIV) followed at the EPC Hospital of Djoungolo (Yaoundé, Cameroon).

Methods: A descriptive and analytical cross-sectional study was conducted in February 2026 among 119 consecutively enrolled PLHIV. Sociodemographic, clinical, and therapeutic data were collected using a standardized questionnaire. Five HBV serological markers (HBsAg, anti-HBs, anti-HBc, HBeAg, anti-HBe) were detected using rapid immunochromatographic tests. R Studio version 4.5.1. was used for analysis, associations were tested using bivariate logistic regression and $p<0.05$ was set as statistically significant.

Results: The patients' mean age was 46.2 years, and the population was predominantly female (67.2%). The prevalence of HBsAg was 10.1% (95% CI: 5.3-17.2%), that of anti-HBc was 44.5%, and that of anti-HBs was 16.0%. According to HBV status, 45.4% of patients were susceptible to infection, 34.5% had resolved infection, 10.1% had post-vaccination immunity, and 10.1% had active co-infection. Advanced HIV stage, stage III, was significantly associated with co-infection (OR=5.65; $p=0.007$), as was the occupation of housewife ($p=0.05$). Age≥40 years ($p=0.001$) and duration on antiretroviral therapy ≥10 years ($p=0.02$) were associated with the presence of anti-HBc.

Conclusion: HIV/HBV co-infection is frequent (10.1%) in this Cameroonian cohort, and nearly half of PLHIV remain vulnerable to HBV infection. These findings advocate for systematic HBV screening among all PLHIV and targeted vaccination of seronegative patients.

Keywords: HIV; HBV; Co-Infection; Prevalence; Associated Factors; Cameroon

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Introduction

Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) are two major public health problems, sharing common transmission routes (blood borne, sexual, and vertical). In 2022, approximately 39 million people were living with HIV worldwide, two-thirds of them in sub-Saharan Africa [1]. In Cameroon, the prevalence of HIV among adults aged 15-49 years is estimated at 2.0% according to recent national surveys [2]. Improved access to Antiretroviral Therapy (ART) has transformed HIV infection into a chronic condition, exposing patients to infectious comorbidities, particularly viral hepatitis [3]. HIV/HBV co-infection is particularly concerning:

HIV-induced immunosuppression favours HBV chronicity (up to 90% in co-infected individuals *vs.* <5% in immunocompetent adults) and accelerates progression to cirrhosis and hepatocellular carcinoma [4]. Liver-related mortality is increased from 8.5- to 19.0-fold in co-infected patients [5]. Globally, 5 to 20% of PLHIV are chronic carriers of HBsAg [5]. In sub-Saharan Africa, the prevalence of co-infection ranges from 6% to 25%, with a mean estimated at 15.4% [6]. In Cameroon, a study conducted in Yaoundé reported 11.2% HBsAg among ART-naive PLHIV [7]. The World Health Organization (WHO) recommends systematic HBV screening for all PLHIV [8], but implementation remains limited in resource-constrained settings. The EPC Hospital of Djoungolo, Yaoundé), manages a large number of PLHIV, but no local data on the HBV status of its cohort were available. This study aimed to determine the prevalence of HBV serological markers and identify factors associated with HIV/HBV co-infection among PLHIV followed at this hospital.

Methods

Study type and setting

This was a descriptive and analytical cross-sectional study conducted at the EPC Hospital of Djoungolo, Yaoundé, Cameroon, in February 2026.

Study population and sampling

All adult patients (age≥18 years) with a confirmed HIV diagnosis, followed at the PLHIV care unit, and who provided written informed consent were included. Patients receiving specific treatment for hepatitis B were excluded. Sampling was consecutive over the study period.

Sample size was calculated using the Daniel Schwarz and Lorenz formula, with an expected HBsAg prevalence among PLHIV of 8.4% (CAMPHIA survey [9]), a type I error α=5%, and a precision of 5%. The minimum required sample size was 119 patients.

Data collection

Sociodemographic data (age, sex, education level, occupation, marital status), clinical data (HIV stage, history of blood transfusion, unprotected sexual intercourse, alcohol consumption), and therapeutic data (ART duration and treatment line) were collected using a standardized questionnaire.

Blood sampling and laboratory analyses

Venous blood was collected in a dry tube after obtaining consent. After centrifugation (1500 rpm for 3 min), serum was used to detect the five HBV serological markers: HBsAg, anti-HBs, anti-HBc, HBeAg, and anti-HBe. Rapid immunochromatographic tests (ONE STEP RAPID TEST DEVICE, Alltest Biotech CO LTD) were performed according to the manufacturer's instructions. Results were read between 15 and 20 minutes.

Definitions of HBV status

- Active infection (co-infection): HBsAg positive
- Resolved infection: HBsAg negative, anti-HBc positive (anti-HBs ±)
- Post-vaccination immunity: anti-HBs positive alone (anti-HBc negative)
- Susceptible subject: all markers negative

Statistical analysis

Data were analysed using MS Excel 2019 and R Studio version 4.5.1. Categorical variables were described as counts and percentages. Associations between HIV/HBV co-infection and explanatory variables were tested using the Chi-square test or Fisher's exact test (when expected cell counts were <5). The statistical significance threshold was set at p<0.05. Odds Ratios (OR) and their 95% confidence intervals (95% CI) were calculated.

Ethical considerations

This study was conducted in accordance with the Declaration of Helsinki. The study protocol was approved by the competent Regional Ethics Committee, ethical clearance number CE N0 0406/CRERSHC/2026. Administrative authorization was obtained from the direction of the EPC Hospital of Djoungolo and registered on number 0100/HD/DOM/EPC. written informed consent/assent for inclusion before participating in the study, was done. Data confidentiality was strictly guaranteed through anonymization.

Results

Characteristics of the study population

A total of 119 PLHIV were included in the study. Their sociodemographic and clinical characteristics are summarized in Table 1. The study population was predominantly female (67.2%), with a mean age of 46.2±10.5 years. Most participants had at least secondary education (69.7%), and housewives represented the largest occupational group (38.7%). Clinically, all participants were

Table 1: Sociodemographic and clinical characteristics of the study population.

Variable	n	%
Sex		
Female	80	67.2
Male	39	32.8
Age (years)		
Mean ± SD	46.2 ± 10.5	
Age range	24–60	
Most represented age group (51–60 years)	33	27.7
Education level		
Secondary/Higher	83	69.7
Primary/None	36	30.3
Marital status		
Single	48	40.3
Other	71	59.7
Occupation		
House wives	46	38.7
Other occupations	73	61.3
WHO HIV clinical stage		
Stage I	9	7.6
Stage II	93	78.2
Stage III	17	14.3
ART regimen		
First-line regimen (2NRTI + DTG)	78	65.5
Second-line regimen (2NRTI + IP)	41	34.5
Median ART duration (years)	7 (1–30)	
Alcohol consumption	85	71.4
History of unprotected sexual intercourse	40	33.6

Table 2: Prevalence of HBV serological markers among 119 PLHIV.

Marker	Positive (n)	Prevalence (%)
HBsAg	12	10.1
Anti-HBs	19	16.0
Anti-HBc	53	44.5
HBeAg	7	5.9
Anti-HBe	14	11.8

Table 3: Sociodemographic factors associated with HIV/HBV co-infection - bivariate analysis.

Factor	Co-infected (n=12)	Non-co-infected (n=107)	OR (95% CI)	*p*
Age≥40 years	8 (66.7%)	71 (66.4%)	1.01 (0.29-3.58)	0.98
Female sex	11 (91.7%)	69 (64.5%)	6.06 (0.75-48.8)	0.09
Housewife	7 (58.3%)	39 (36.4%)	3.32 (0.98-11.2)	0.05
Primary/no education	4 (33.3%)	32 (29.9%)	1.17 (0.33-4.17)	0.80

receiving Antiretroviral Therapy (ART). Most patients (65.5%) were on first-line ART regimens, whereas 34.5% were receiving second-line regimens. The median duration of ART was 7 years (range: 1-30 years).

Prevalence of HBV serological markers

The prevalence of HBsAg was 10.1% (95% CI: 5.3-17.2%). Anti-HBc, indicating prior contact with HBV was present in 44.5% of patients. Anti-HBs, a marker of immunity, was positive in 16.0% of cases. HBeAg, active replication, was detected in 5.9% of patients and anti-HBe, seroconversion, was 11.8% (Table 2).

Patients' Classification according to HBV status

According to serological classification, 45.4% of patients were susceptible to HBV infection (all markers negative), 34.5% had resolved infection, 10.1% had post-vaccination immunity, and 10.1% had active infection (HIV/HBV co-infection). The active co-infection rate was therefore 10.1%.

Characteristics of co-infected patients

Among the 12 co-infected patients with a positive HBsAg, there were 11 women (91.7%) and 1 man (8.3%), with a mean age of 43.4±10.5 years. Five patients (41.7%) were at advanced HIV stage (stage III). HBeAg was positive in 7 patients (58.3%), indicating active viral replication in the majority of cases.

Factors associated with HIV/HBV co-infection

In bivariate analysis (Tables 3 and 4), advanced HIV stage (stage 3) was significantly associated with co-infection (OR=5.65; 95% CI: 1.58-20.2; p=0.007). The occupation of housewife was also associated (OR=3.32; 95% CI: 0.98-11.2; p=0.05). Unprotected sexual intercourse showed a trend toward association without reaching significance (OR=3.14; p=0.06), as did female sex (p=0.09). Age, education level, marital status, ART line, ART duration, history of blood transfusion, and alcohol consumption were not significantly associated.

Factors associated with the presence of anti-HBc

Age≥40 years (OR=4.33; 95% CI: 1.83-10.2; p=0.001) and ART duration≥10 years (OR=2.40; 95% CI: 1.15-5.00; p=0.02) were significantly associated with the presence of anti-HBc, indicating cumulative exposure to HBV over time. Advanced HIV stage (stage III) showed a trend towards association with HBV exposure (OR=2.62; p=0.07).

Discussion

This study showed a prevalence of HIV/HBV co-infection of 10.1% among PLHIV followed at the EPC Hospital of Djoungolo. This result falls within the range of prevalence reported in sub-Saharan Africa (5-30%) [6] and is comparable to previous Cameroonian data: 11.2% in Yaoundé [7], 12.4% in Dschang [10], and 14.3% at the Yaoundé Central Hospital [11]. The slight variability observed between studies may be explained by differences in sample size, population characteristics (age, duration of HIV infection, stage of infection), and methodology as the tests used [12].

The prevalence of anti-HBc (44.5%) indicates that a high proportion of PLHIV have been exposed to HBV during their lifetime, a result similar to that reported in Douala (48.3%) [13]. This high exposure is explained by the common transmission routes of the two viruses and the greater transmissibility of HBV [14].

The proportion of patients susceptible to HBV infection (45.4%) is of concern, as nearly half of PLHIV remain vulnerable. This figure is close to that observed at the Douala General Hospital (42%) [15] and underscores the urgent need to strengthen HBV vaccination among PLHIV, in line with WHO recommendations [8]. The low proportion of post-vaccination immunity (10.1%) reflects insufficient vaccine coverage among Cameroonian adults, despite the introduction of the vaccine into the Expanded Program on Immunization in 2005 [16].

The association between advanced HIV stage (stage III) and co-infection (OR=5.65; p=0.007) is a major finding of this study, already reported in Ethiopia (OR=3.8) [17]. This association may reflect a bidirectional effect: immunosuppression favours HBV chronicity and replication, while chronic liver disease may accelerate HIV infection progression [18].

The occupation of housewife was significantly associated with co-infection (p=0.05). This result, consistent with qualitative Cameroonian data [19], may be explained by several factors: often limited education, economic dependence making it difficult to negotiate protected sexual intercourse, and possible exposure to unsafe care (home deliveries, traditional medicine) [20].

Unprotected sexual intercourse showed a trend toward association (OR=3.14; p=0.06), which is biologically plausible because HBV is 50 to 100 times more transmissible than HIV through sexual contact [21]. The lack of significance may be due to insufficient statistical

Table 4: Clinical factors, factors associated with HIV/HBV co-infection - bivariate analysis.

Factor	Co-infected (n=12)	Non-co-infected (n=107)	OR (95% CI)	*p*
Advanced HIV stage (stage III)	5 (41.7%)	12 (11.2%)	5.65 (1.58-20.2)	0.007
Unprotected sex	7 (58.3%)	33 (30.8%)	3.14 (0.94-10.5)	0.06
ART duration≥10 years	3 (25.0%)	46 (43.0%)	0.44 (0.11-1.72)	0.23
Blood transfusion	4 (33.3%)	31 (29.0%)	1.22 (0.35-4.34)	0.75
Alcohol consumption	8 (66.7%)	77 (72.0%)	0.78 (0.22-2.78)	0.70

power or reporting bias (underreporting of risk behaviours). Female sex also showed a trend toward association (p=0.09), consistent with an African meta-analysis that reported a higher risk among female PLHIV [22].

The association between age≥40 years and the presence of anti-HBc (OR=4.33) reflects the cumulative effect of HBV exposure with age, a classic finding already observed in Senegal [23]. Similarly, ART duration≥10 years was associated with HBV exposure (OR=2.40), likely because patients on long-term ART have a longer-standing HIV infection and therefore a longer potential period of exposure to HBV.

Conclusion

This study shows a high prevalence of HIV/HBV co-infection (10.1%) among PLHIV followed at the EPC Hospital of Djoungolo, Yaoundé, Cameroon, with nearly half of patients remaining vulnerable to HBV infection. Advanced HIV stage and the occupation of housewife are the main associated factors. These findings underscore the urgent need for systematic HBV screening among all PLHIV and for a targeted vaccination policy to reduce the burden of chronic liver disease in this vulnerable population.

Study Limitations

This study has several limitations. The modest sample size (n=119) reduces statistical power and required the grouping of certain categories. The use of rapid tests, although standardized, is less sensitive than ELISA or PCR techniques, which may have underestimated certain prevalences. The absence of CD4 count and HIV viral load data limited analysis of immunosuppression. The cross-sectional design does not allow causal relationships to be established. Finally, the study was conducted at a single hospital, limiting the generalizability of the results.

Implications for Practice and Research

Our findings advocate for the systematic integration of HBV screening (HBsAg, anti-HBc, anti-HBs) into the initial workup of PLHIV and for targeted vaccination of susceptible patients. Multicentre longitudinal studies, including immunological and virological follow-up, are needed to confirm these associations and evaluate the impact of systematic screening on liver morbidity and mortality.

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