

# Epidemiological and Paraclinical Aspects of *Helicobacter pylori* Infection among Hepatitis B Virus Carriers in the Republic of Congo

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## Abstract

**Objective:** Describe the epidemiological and paraclinical aspects of HP infection in hepatitis B virus carriers. **Population and Method:** This was a descriptive cross-sectional study running from January 1 to August 30, 2019, a period of 8 months. It took place in the Hospital Centers of the two major cities of Congo (Brazzaville and Pointe-Noire). The target population of our study consists of patients carrying HBV under antiviral treatment or not. Patients aged at least 18 years and consenting with a biological and morphological assessment were included. We did not include in our study patients taking or having taken antibiotics and/or PPIs less than 4 weeks ago. We excluded all patients who did not deposit fresh stools and those in whom stool extraction could not be done manually. The variables studied covered sociodemographic, clinical and paraclinical aspects. Data entry was done using Excel 8.0 software. Statistical analysis was carried out with SPSS 20.0 software. **Results:** During our study, we included 169 patients. The frequency of HPAG in the stools of HBV carriers in our study population was 63.9% (n = 109). Male patients represented 69% (n = 75) and female patients represented 31% (n = 34). The average age of the patients is  $43.92 \pm 13.51$  years with extremes of 18 years and 80 years. Concerning profession, unemployed patients and those working in the private sector were the most represented in respectively 28.4% (n = 31) and 22.9% (n = 25) without statistical link. Households comprising between 4 - 10 people and the use of public latrines were the risk factors most represented in respectively 69% (n = 75) and 88% (n = 96) without statistical link. Clinically, hepatomegaly and signs of portal hypertension were most represented in 53% (n = 58) and 47% (n = 51). Biologically, HBV DNA

was detectable in 60.5% of cases (n = 66).

## Keywords

*Helicobacter pylori*, Hepatitis B Virus, Congo

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## 1. Introduction

Hepatitis B virus (HBV) and *Helicobacter pylori* (HP) infections each constitute a major public health problem worldwide [1] [2].

According to the World Health Organization (WHO), the global prevalence of HBV in 2015 was estimated at 10.5% [2] [3]. Sub-Saharan Africa is located in an area of high endemicity of HBV infection. The prevalences are generally greater than or equal to 8% [4]. In 2015, Atipo Ibara *et al.* reported a frequency of 9.9% in a study on the seroprevalence of HBV among blood donors in Congo [5]. A recent study carried out by Itoua Ngaporo Ngala *et al.* in 2018 reported a frequency HP of 79.8% among adults in Brazzaville [6].

A primary event in the natural history of viral hepatitis B is the development of cirrhosis and hepatocellular carcinoma (HCC) are largely responsible for the high morbidity and mortality of this condition [7]. The occurrence of these complications involves factors linked to the virus, the environment and the terrain. Apart from age and gender, comorbidities play an important role.

The association between HP infection and chronic viral hepatitis B has been the subject of several studies in recent decades. Abu Al-Soud *et al.* reported that the presence of hpDNA in HBV-contaminated samples is associated with a high risk of developing HCC [8] [9].

A Chinese study carried out on patients with liver disease at different stages, showed a high rate of HP infection [10].

Ponzetto *et al.* in the 2000s found a prevalence of 89% versus 59% [11].

In Congo, no study has been conducted on HP-HBV co-infection. The objective of this work was to describe the epidemiological and paraclinical aspects of HP infection in HBV carriers.

## 2. Patients and Method

This was a descriptive cross-sectional study ranging from January 1 to August 30, 2019, a period of 8 months. It took place in the Hospital Centers of the two major cities of Congo (Brazzaville and Pointe-Noire). The target population of our study consists of patients carrying HBV under antiviral treatment or not. Patients aged at least 18 years and consenting with a biological and morphological assessment were included. We did not include in our study patients taking or having taken antibiotics and/or PPIs less than 4 weeks ago. We excluded all patients who did not deposit fresh stools and those in whom stool extraction could not be done manually. Data collection was carried out in the different locations

of the study. Data collection took place in two phases. Data collection using a pre-established survey form followed by stool sampling and analysis. This sampling consisted of searching for the HP antigen in the patients' fresh stools using a 'CerTest Hp<sup>®</sup>' rapid detection kit. The variables studied covered sociodemographic, clinical and paraclinical aspects. Data entry was done using Excel 8.0 software. Statistical analysis was carried out with SPSS 20.0 software. The quantitative variables were presented as mean and/or standard deviation and the qualitative ordinal and nominal variables as number and percentage. Comparative tests were carried out with the Pearson chi2 test or the Fischer test. The test was considered significant when  $p \leq 0.05$ .

### 3. Results

#### 3.1. Sociodemographic Aspects

During our study, we included 169 patients. The frequency of HPAG in the stools of HBV carriers in our study population was 63.9% (n = 109).

Male patients represented 69% (n = 75) and female patients represented 31% (n = 34). The average age of the patients is  $43.92 \pm 13.51$  years with the extremes of 18 years and 80 years. HP infection predominated in the age group over 40, at a rate of 64.50%. Sociodemographic aspects are represented in **Table 1**.

**Table 1.** Socio-demographic factors of HP+ patients.

	VHB-HP+ (N = 109)		P
	N	%	
<b>Sex</b>			
Male	75	69	0.396
Female	31	34	
<b>Age groups (year)</b>			
<20	3	2.7	0.894
20 - 30	11	10	
31 - 40	24	22	
≥40	71	66	
<b>Occupations</b>			
Public sector	21	19.2	0.05
Private sector	25	22.9	
Informal private sector	15	13.7	
Retirement	3	2.7	
Student	14	12.8	
Unemployed	31	28.4	

### 3.2. Transmission Risk Factors

Households comprising between 4 - 10 people and the use of public latrines were the risk factors most represented in 69% (n = 75) and 88% (n = 96), respectively. The distribution of transmission risk factors is shown in **Table 2**.

**Table 2.** Transmission risk factors among HP-HBV co-infected.

	HP-VHB (N = 109)		P
	N	%	
<b>Type of latrine</b>			
<b>Public</b>			
Yes	96	88	0.668
No	13	12	
<b>Private</b>			
Yes	79	72	0.015
No	30	27.5	
<b>Family number</b>			
0 - 1	13	11.9	0.723
2 - 3	21	19.2	
4 - 10	75	68.8	
<b>Water sources</b>			
<b>Tap water</b>			
Yes	95	87	
No	14	13	
<b>Mineral water</b>			
Yes	74	68	0.953
No	35	32	
<b>Well water</b>			
Yes	3	3	
No	106	97	
<b>Spring water</b>			
Yes	1	1	
No	108	99	
<b>Water borehole</b>			
Yes	9	8	
No	100	92	
<b>Hand washing</b>			
Yes	47	43	0.668
No	62	57	

### 3.3 Clinical and Biological Signs

During our study, half of the patients had hepatomegaly (**Table 3**). Biologically, the viral load of the hepatitis virus was detectable in 60.6% of cases (n = 66). **Table 4** shows the distribution of patients according to biological signs

**Table 3.** Clinical signs of HP-HBV co-infected patients.

	VHB-HP+ (N = 109)		P
	N	%	
<b>Hepatomegaly</b>			
Yes	58	53.2	0.0008
No	51	46.8	
<b>Portal hypertension</b>			
Yes	28	19.2	0.894
No	81	20.8	
<b>Hepatocellular insufficiency</b>			
Yes	10	9.1	0.523
No	99	89.9	
<b>Hematemesis and melena</b>			
Yes	9	8.2	0.603
No	100	90.8	

**Table 4.** Biological signs of HP-HBV co-infected patients.

	VHB-HP+ (N = 109)		P
	N	%	
<b>ADN VHB (Copies/mL)</b>			
Yes	66	60.6	0.008
No	43	39.4	
<b>AFP (ng/mL)</b>			
Yes	29	18.3	0.894
No	80	81.7	
<b>Liver fibrosis (fibrosan)</b>			
Yes	43	39.4	0.523
No	66	60.6	
<b>Thrombocytopenia</b>			
Yes	20	18.4	0.603
No	89	81.6	

## 4. Discussion

The frequency of HP infection was 63.9% among chronic HBV carriers. Our results are superimposable to data from the literature. Indeed, work carried out in China by Hao Q *et al.* in 2017 as well as Li BS *et al.* in 2011 found a prevalence of 63.9% and 63.82% respectively [12] [13]. In Egypt, Amal AM *et al.* reported a prevalence of 60% in 2018 [14]. A study carried out in 2019 in Benin reported a frequency of 57.9% [15]. The similarity of the results observed in these studies could be explained by the fact that the sampling method used is identical and that the population of HBV carriers is predominantly male. On the other hand, some authors have reported frequencies below ours. This is Wang MY *et al.* in 2011 in China who found a prevalence of 38.67% [16]. This difference could be explained by the fact that the patients included in their study were asymptomatic carriers of HBV and probably have unevolved chronic hepatitis B with a relatively uncollapsed immune system.

The average age in this study was  $43.92 \pm 13.51$  years with extremes of 18 and 80 years. There is no statistically significant difference between different age groups and HP infection in HBV carriers. But HP infection predominated in the age group over 40, at a rate of 64.50%. This average is similar to that reported by Wang MY *et al.* in China in 2011 of 43 years, as well as Séhonou J *et al.* in Cotonou (Benin) which was  $42.3 \pm 11.6$  years [15] [16].

In our study, the average number living under the same roof is  $4.33 \pm 2.32$  people per household with no statistically significant link with HP infection. This result is higher than that of the study carried out by the EDSC-II which reports an average of 4.3. This result could be explained by the fact that large households are common in our countries [16].

These results are contrary to those reported by Ji SW *et al.* in 2008 in China [9]. This discrepancy could be explained by the precarious conditions that we find in our countries, thus promoting promiscuity in households.

In our study, the use of public latrines was the most frequent in 88% of cases.

These results are similar to those of Itoua Ngaporo *et al.* in Brazzaville in 2018 as well as Aguenom *et al.* in Benin in 2005 who found a significant link between the type of latrine and HP infection with  $p = 0.016$  [6] [17]. These similarities could be explained by the poor hygienic conditions of public latrines. Additionally, HP infection is known as dirty hands disease. After using public latrines, hand washing is not systematic.

The frequency of hepatomegaly in this population is 43.8%. This frequency is higher in patients carrying the hepatitis B virus. The existence of the large liver could be explained by the fact that half of the population was at the F4 fibrosis stage.

Our study noted a link between HBV viral load levels and HP infection. In Benin, Séhonou J *et al.* in 2018 as well as in China, Wang MY *et al.* in 2013 and Ji *et al.* in 2008 reported that there was no statistically significant link between HP infection and HBV DNA [9] [15] [16].

On the other hand, Huang J *et al.* in 2017 and Xi *et al.* in 2015 reported that the rate of HP infection in patients with an HBV viral load greater than 103 copies/mL was significantly higher than in subjects with HBV viral load less than 103 copies/mL [7] [18]. Huang J *et al.* had suggested that HBV replication could increase the infection rate of Hp.

## 5. Conclusion

This study highlighted a high frequency of *Helicobacter pylori* infection in chronic HBV carriers. The use of public latrines has been identified as a factor associated with co-infection.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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