



## Original Article

## Prevalence of Hepatitis B Virus Infection Among Adults in Ebolowa, Cameroon

### *Prévalence du Virus de l'Hépatite B chez les Adultes à Ebolowa (Cameroun)*

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#### ABSTRACT

**Background.** Hepatitis B viral infection remains a public health problem worldwide. A meta-analysis in 2017 revealed that Cameroon had a national prevalence of 11.2%. Data on the epidemiology of hepatitis B in the South region of Cameroon is scarce. This study aimed at contributing to the knowledge of the epidemiology of hepatitis B virus (HBV) infection in Ebolowa, South of Cameroon. **Patients and method.** It was a cross sectional community-based study hosted in the premises of the Ebolowa Regional Hospital. All participants who met our selection criteria were enrolled. Demographic data, risk factors and HBsAg results (using an enzyme-linked immunosorbent assay) were analyzed using the CS-Pro and SPSS softwares. P-values less than 0.05 were considered significant. **Results.** A total of 800 participants (with a mean age of 38.2 years) were enrolled in the study, most of whom were female, unemployed and at most of secondary school level. The overall HBsAg prevalence was 8.9%. This prevalence significantly decreased with age. There was also a significant correlation between HBsAg status and a past history of surgery. Participants with a history of jaundice were 1.9 times more at risk of being infected, though the association was not significant. There was no correlation between the HBsAg status and a history of blood transfusion, scarification, piercing and infection among first degree relatives. **Conclusion.** The prevalence of HBV was 8.9%. Policies must be strengthened to stop new infections as well as adequately following up infected people.

#### RÉSUMÉ

**Introduction.** L'infection par le virus de l'hépatite B demeure un problème de santé publique à l'échelle mondiale. Une méta-analyse publiée en 2017 révélait que la prévalence nationale de cette infection était 11,2%. Peu de données existent sur l'épidémiologie de cette infection dans la région du Sud. Cette étude avait pour but de contribuer à la compréhension de l'épidémiologie de l'infection par le virus de l'hépatite B dans la ville d'Ebolowa, au Sud du Cameroun. **Matériel et méthodes.** Il s'agissait d'une étude transversale, réalisée dans le cadre d'une campagne de dépistage communautaire du virus de l'hépatite B. Tout participant remplissant nos critères de sélection étaient inclus. Les données sociodémographiques, les facteurs de risque de l'infection ainsi que les résultats de la recherche de l'antigène HBs (AgHBs) ont été analysés à l'aide des logiciels CS Pro et SPSS. Le seuil de significativité était de 0,05. **Résultats.** Au total, 800 individus ont été enrôlés dans notre étude, avec un âge moyen de 38,2 ans. La majorité était constituée de femmes, sans emploi, ayant atteint un niveau d'études secondaires. La prévalence était de 8,9% et diminuait avec l'âge. Une association significative existait entre le portage du VHB et un antécédent de chirurgie. Ceux ayant un antécédent d'ictère étaient 1,9 fois plus à risque d'être infectés, bien que cette corrélation ne fût pas significative. Il n'existait pas d'association entre le portage du VHB et l'antécédent de transfusion sanguine, de scarifications, de piercing et d'histoire d'infection par le VHB dans la parenté au premier degré. **Conclusion.** La prévalence du VHB est 8,9%. Il y a lieu d'améliorer les stratégies visant à diminuer les nouvelles infections tout en optimisant la prise en charge des sujets infectés.

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**HIGHLIGHTS****What is already known on this topic**

The national prevalence of hepatitis B virus (HBV) in Cameroon was 11.2% in 2017.

**What question this study addressed**

The prevalence of HBV infection in Ebolowa, South of Cameroon.

**What this study adds to our knowledge.**

1. The overall HBsAg prevalence was 8.9% and the prevalence significantly decreased with age.
2. There was a significant correlation between HBsAg status and a past history of surgery.
3. Participants with a history of jaundice were 1.9 times more at risk of being infected.
4. There was no correlation between the HBsAg status and a history of blood transfusion, scarification, piercing and infection among first degree relatives.

**How this is relevant to practice, policy or further research.**

Policies must be strengthened to stop new infections as well as adequately following up infected people.

**INTRODUCTION**

Hepatitis B virus remains a serious public health problem across the globe, being the leading cause of liver cirrhosis and hepatocellular carcinoma [1-5]. In 2019, it was estimated by the World Health Organization (WHO) that 296 million people were chronically infected by the virus, with close to 1.5 million new infections yearly. In the same year, the virus resulted in close to 820000 deaths in the world, mostly as a result of cirrhosis and hepatocellular carcinoma [6]. Africa is disproportionately affected, with four million children younger than five years of age living with HBV infection and 990,000 children newly infected annually. In addition, one in ten deaths due to HBV infection globally occur in Africa [7]. In sub-Saharan Africa, the prevalence rate of HBV infection is between 8 - 20% [8]. It has been clearly established that most infections in sub-Saharan Africa occur either from an infected mother to her baby during child birth or during the first years of life. This is substantiated by the fact that most cases of both cirrhosis and hepatocellular carcinoma related to hepatitis B occur in young adults [3-5]. Cameroon, with a national prevalence of 11.2% [9], introduced the hepatitis B vaccine in the expanded immunization program in 2005. This prevalence varies with respect to age groups, regions and occupations. [9].

Ebolowa is the regional headquarters of the South region. Few studies have been carried out within the region to evaluate the prevalence of hepatitis B virus infection. This study aimed at contributing to the knowledge of the epidemiology of hepatitis B virus (HBV) infection in Ebolowa, South of Cameroon.

**PATIENTS AND METHODS**

It was a cross-sectional community-based study hosted within the premises of the Ebolowa Regional Hospital during a three months period (from August to October 2019), during a voluntary screening campaign. Participants came for screening following sensitization prior to the campaign. After registration of participants, a structured questionnaire was used to collect data.

Participants were assisted by a health care provider in filling the questionnaire. Informed verbal consent was obtained from them prior to the procedure. The questionnaire had three sections: a section for demographic data (age, gender, academic level), a section for risk factors of hepatitis B virus infection, and one for the result of the HBsAg test (which was filled later on after blood analysis)

A volume of 5ml of blood was aseptically collected from the participants into an EDTAK3 (ethylene diamine Tetra-Acetic Tri- Potassium) tube and sent to the hospital's laboratory for analysis. Following centrifugation, plasma was used for the detection of HBsAg by an immunochromatographic method using the PKL® kit of PARAMEDICAL srl laboratories (Corso Vittorio Emanuele 127-84123 Salerno (SA) Italy). The analysis was performed as per the manufacturer's instructions. Positive results were further confirmed by the ELISA method using the DIALAB® Laboratories kit (DIALAB, A-2351 Neudorf Austria). Positivity was established for a sample with an absorbance greater than 1.

Each participant who tested negative was referred to the Ebolowa International Vaccination Center for hepatitis B vaccination while those who tested positive were addressed to the hepatogastroenterologist of the hospital for management.

The data collected were compiled using the SPSS software version 18.0 and CPro software version 7.7.3. The lone quantitative variable (age) was expressed as mean (with standard deviation). Qualitative variables were expressed as percentages with their respective confidence intervals (CI) set at 95%. To establish the relationship between two discrete variables, Chi square test was performed, with a Fischer's test done where appropriate. Statistical significance was set at a 0.05.

**RESULTS**

A total of 800 participants were enrolled in the study. The mean age of participants was  $38.2 \pm 6.3$  years old. The majority of participants were young (of the 15 to 45 age group), female (60%, sex ratio of 1.5), single, unemployed and at most of secondary school level. (Table 1)

The overall prevalence was 8.9% (95%CI: 7.1 – 11.1). (Table 1)

There was a significant correlation between HBsAg and participants age ( $p=0.015$ ). The prevalence dropped with age. In the same vein, single participants were significantly at risk of being infected than others ( $p=0.02$ ). (Table 2)

When considering the surgical history of participants, 3.4% of those who had undergone surgery were infected while 10.2% of those who had not undergone surgery were infected (OR : 0.3 [95% CI:0.1 – 0.7],  $p=0.013$ ). Likewise, 14.5% of the infected participants had a history of jaundice while it was 8.4% among those with no history of jaundice (OR :1.9 [95% CI:0.9 – 3.8],  $p=0.086$ ). (Table 2)

There was no correlation between HBsAg and a history of blood transfusion ( $p=0.5$ ), scarifications ( $p=0.868$ ), tattoos ( $p=0.5$ ), piercing ( $p=0.234$ ) and infection among first degree relatives ( $p=0.305$ ). (Table 2)

Variables	n	%	HBsAg positive n	Prevalence (CI)
<b>Overall</b>	<b>800</b>	<b>100</b>	<b>71</b>	<b>8.9 (7.1 – 11.1)</b>
<b>Gender</b>				
Male	320	40	33	10.3 (7.3 – 14.2)
Female	480	60	38	7.9 (5.6 – 11)
<b>Age groups, years</b>				
15-29	285	35.6	32	11.2 (7.7 – 14.7)
30-44	263	32.9	29	11 (7.2 -14.8)
45-59	166	20.7	9	5.4 (2.4 – 9.0)
60-74	66	8.3	1	1.5 (0 – 6.1)
75-89	20	2.5	0	0 (0 – 100)
<b>Academic level</b>				
Illiterate	9	1.1	0	0 (0 – 100)
Primary	102	12.7	14	13.7 (6.9 – 20.6)
Secondary	414	51.7	37	8.9 (6.3 – 11.6))
University	275	34.5	20	7.3 (4.24 – 10.5)
<b>Occupation</b>				
Unemployed	360	50.1	33	9.2 (6.1 – 12.2)
Employed	232	29	23	9.9 (6.5 – 14.2)
Self-employed	167	20.9	15	9.0 (4.8 – 13.8)
<b>Marital status</b>				
Married	331	41.4	21	6.3 (3.9 – 9.1)
Single	434	54.3	50	11.5 (8.8 – 14.7)
Widow/widower	31	3.8	0	0 (0 – 100)
Undeclared	4	0.5	0	0 (0 – 100)

Variables	HBsAg		OR (95% CI)	p value
	Positive	Negative		
<b>Age groups, years</b>				<b>0,015</b>
15-29	32 (11.2)	253 (88.8)	1.5 (0.9 – 2.5)	
30-44	29 (11.0)	234 (89.0)	1.5 (0.9 – 2.4)	
45-59	9 (5.4)	157 (94.6)	0.5 (0.3 – 1.1)	
60-74	1 (1.5)	65 (98.5)	0.1 (0.02 – 0.9)	
75-89	0 (0)	20 (10)	NA	
<b>Gender</b>				0.21
Male	33 (10.4)	284 (89.6)	1.4 (0.8 – 2.2)	
Female	38 (7.9)	445 (92.1)		
<b>Academic level</b>				0.95
Illiterate	0 (0)	9 (100)	NA	
Primary	14 (13.7)	88 (86.3)	2.0 (0.9 – 3.3)	
Secondary	37 (8.9)	377 (91.1)	1.0 (0.6 – 1.7)	
University	20 (7.3)	255 (92.7)	0.7 (0.4 – 1.3)	
<b>Occupation</b>				0.79
Unemployed	33 (9.2)	327 (90.8)	1.1 (0.7 – 1.7)	
Employed	23 (9.9)	209 (90.1)	1.2 (0.7 – 2.0)	
Self-employed	15 (9.0)	152 (91.0)	1.0 (0.6 – 1.8)	
<b>Marital status</b>				<b>0.02</b>
Married	21 (6.3)	310 (93.7)	0.6 (0.3 – 0.9)	
Single	50 (11.5)	384 (88.5)	2.1 (1.3 – 3.6)	
Widow/widower	0 (0)	31 (100)	NA	
<b>Past history</b>				
Surgery	5 (3.4)	144 (96.6)	0.3 (0.1 – 0.7)	<b>0.013</b>
Blood transfusion	4 (7.7)	48 (92.3)	0.8 (0.3 – 2.4)	1.000
Scarification	22 (9.1)	219 (90.9)	1.0 (0.6 – 1.8)	0.868
Tattooing	2 (6.9)	27 (93.1)	0.8 (0.2 – 3.2)	1.000
Piercing	36 (7.8)	423 (92.2)	0.7 (0.5 – 1.2)	0.234
Jaundice	10 (14.5)	59 (85.5)	1.9 (0.9 – 3.8)	0.086
Family history	11 (11.7)	83 (88.3)	1.4 (0.7 – 2.8)	0.305

## DISCUSSION

Our study aimed at determining the prevalence of hepatitis B surface antigen (HBsAg) as well as describing the associated risk factors to the infection. Our population was made up of 480 females which represent 60% of our participants.

The overall prevalence of HBsAg in our population was 8.9% (95%CI : 7.1 – 11.1). In a recent meta-analysis, the national prevalence of hepatitis B in Cameroon was estimated at 11.2% in 2017 [9]. This prevalence in a

national survey, has been shown however to vary from one region to the other [10]. Our prevalence was higher than the 7.1% reported by Ankouane (in 2013 in a population of workers in Yaounde and Douala), the 7.6% reported by Eloumou (in 2014 in a population of medical and pharmacy students in Douala), the 5.08% reported by Tadongfack (in 2020 in a community study in Dschang), the 4.1% reported by Mbopi-Keou (in 2015 in a community study in Bafoussam) and the 5.1% reported by Tazinkeng (in Buea in 2022). It was however lower than

the 22.82% reported by Noah Noah in 2015 in Ebolowa [11-16].

The prevalence of HBsAg dropped with increasing age. It was 11.2% (95% CI : 7.7 – 14.7) among those aged between 15 to 29 years old to 0% among those aged 75 years old and above. This correlation was statistically significant ( $p=0.015$ ). This goes a long way to support the fact that most infections occur very early in life, most of which go unnoticed as most cases of end stage liver diseases related to hepatitis B occur among young adults [3-5]. A similar correlation was reported by Mbopi-Keou et al. in 2015 in another community-based study in Bafoussam [15].

Though the sex ratio was in favour of females (1 :1.5), the prevalence was 10.3% (95% CI : 7.3 – 14.2) among males while it was 7.9% (95% CI : 5.6 – 10.2) among females. This difference was however not statistically significant ( $p=0.216$ ). Ankouane et al. in 2013 reported a statistically significant male predominance in the carriage of the HBsAg among workers in Yaounde and Douala [16]. Mbopi-Keou et al. in their study did not find the association significant [15].

When considering the marital status, the prevalence was 11.5% (95% CI : 8.8 – 14.7) among those who were single, while it was 6.3% (95% CI : 3.9 – 9.1) among those who were married. This difference was statistically significant ( $p=0.02$ ). This association could be accounted for by the fact that more than a third of our population (which happen to have the greatest prevalence) is made up of people aged between 15 to 29 years old, most of whom are not yet married. Four hundred and thirty-four of our population, made up of 800 participants were single. Tadongfack et al. in a community-based study in Dschang had a similar predominance of single participants, but the difference was not statistically significant [12]. Mbopi-Keou et al. in their study reported in 2015 that though married participants were slightly more than single participants, the prevalence of HBsAg was 5.5% among those who were single while it was 2.8% among the married. The difference was however not statistically significant ( $p=0.265$ ) [15].

The prevalence of HBsAg did not vary significantly with respect to occupation and academic level ( $p$ -values respectively of 0.227 and 0.194). Tadongfack et al. reported a statistically significant association between academic level and HBsAg [12]. This could be accounted for by the fact that having conducted his study in a university environment, most of their participants were young university students. Mbopi-Keou equally reported no significant association between occupation and HBsAg [15].

Of the 149 participants who had undergone surgery, 5 (3.4%) were positive for HBsAg. There appeared to be an association between surgery and hepatitis B infection (OR 0.31 [95% CI : 0.11-0.71],  $p=0.013$ ). Ankouane et al. found no significant association between surgery and HBsAg [16].

## CONCLUSION

The prevalence of hepatitis B infection in Ebolowa is high (8.9%). Policies must be strengthened to prevent new infections as well as adequately managing infected individuals if we are to meet the WHO 2030 goals of reducing by 90% the number of new infections as well as reducing by 65% the number of premature deaths.

## Conflicts of interest

The authors declare no conflict of interest.

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