

Evaluation of the Prevention of Maternal-Fetal Transmission of Viral Hepatitis B in the Delivery Room of the Libreville University Hospital in 2024

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Abstract

Introduction: Viral hepatitis B (HBV) remains a public health problem in sub-Saharan Africa, where maternal-fetal transmission represents a major route of infection. Preventing this transmission is essential to achieving the WHO's 2030 virus elimination goals. **Objective:** To assess the prevention of maternal-fetal transmission of viral hepatitis B (HBV) among women in labor admitted to the delivery room at Libreville University Hospital in 2024. **Methodology:** This was a retrospective, longitudinal, and analytical study conducted from February 1 to August 31, 2024. Data were collected from the delivery room records of the Libreville University Hospital, supplemented by phone calls to women in labor. All women admitted to the delivery room who had undergone HBsAg screening were included. Data entry and analysis were performed using Excel 2019. Descriptive statistical analysis and multivariate logistic regression were used to identify factors associated with infection. **Results:** The average age was 27.84 ± 6.78 years. Their marital profile revealed 83.13% single and 16.87% married. 75.97% were unemployed, 13.03% civil servants, and 11% businesswomen. The level of education was secondary in 76.94% of cases, primary in 20.72%, and higher in 2.35%. The hepatitis B screening rate was 83.56%, the hepatitis B seroprevalence was 3.64%. The analysis identified factors associated with infection, including a protective association for tattoos (OR 0.4 [0.15 - 0.87]; p 0.026) and risk associations for scarification (OR 3.47 [1.7 - 6.47]; p 0.000) and household size (OR 2 [1.12 - 3.89]; p 0.019). Among newborns born to HBsAg-positive mothers, only 70.18% received vaccination

at birth, and 63.16% serovaccination. No child born to seronegative mothers had received a hepatitis B vaccine at birth. **Conclusion:** Prevention of maternal-fetal transmission of hepatitis B at the Libreville University Hospital remains insufficiently implemented. Systematic screening, access to treatment, and vaccination at birth are necessary to meet international recommendations.

Keywords

Hepatitis B, Maternal-Fetal Transmission, Libreville

1. Introduction

Viral hepatitis B (HBV) is a serious public health problem, responsible for 83% of the 1.3 million deaths related to viral hepatitis in 2022 according to the Global Hepatitis Report 2024 [1]. Africa bears a heavy burden of this morbidity and mortality through the development of cirrhosis and hepatocellular carcinoma at an early age [2]-[5]. This health threat calls into question the effectiveness of the response led by the World Health Organization (WHO) since 2016, with a view to eliminating this disease by 2030 [1] [2]. Elimination is defined as a 90% reduction in incidence, treatment of 80% of eligible people, a 90% reduction in maternal-fetal transmission, and 90% vaccination coverage at birth with a view to a 65% reduction in mortality [1] [2]. Thus, the prevention of maternal-fetal transmission of hepatitis B represents a key strategy for the elimination of hepatitis B as a public health threat by 2030 [1] [2]. In this regard, systematic screening of pregnant women, early access to treatment and vaccination at birth represent the tripod of maternal-fetal prevention [1] [2]. Like the prevention of maternal-fetal transmission of HIV, which is systematic in the delivery room [6], we questioned the effectiveness of the prevention of maternal-fetal transmission of hepatitis B at the Libreville University Hospital.

2. Patients and Methods

We conducted a retrospective, longitudinal, analytical observational study in the delivery room of the Libreville University Hospital. We consecutively included all women admitted to the delivery room and registered in the delivery register between February 1 and August 31, 2024. We excluded patients admitted for ectopic pregnancies, intrauterine fetal death, and abortion. We collected data using registers, pregnancy logs, and the medical records of women in the delivery room.

We collected socio-demographic data, history, pregnancy monitoring data, the notion of hepatitis B screening, the notion of monitoring by a hepato-gastroenterologist, the performance of the pre-therapeutic assessment, the effectiveness of the child's vaccination from birth. The mothers were systematically contacted by phone to obtain consent and the missing information in the medical records. Data collection was done on standardized forms. Statistical analysis was carried out us-

ing Excel 2019 and SPSS 20.0 software. Quantitative variables were expressed as mean \pm standard deviation (median, IQR). Categorical variables were expressed as absolute or relative frequency. All explanatory variables with a p-value < 0.05 in the univariate analysis were included in the multivariate logistic regression model. The p-value < 0.05 in multivariate analysis was considered as statistical significance. The odds ratio with a 95% confidence interval was used to measure the strength of the association.

3. Results

3.1. General Characteristics of the Study Population

The mean age of the 1873 parturient women included was 27.84 ± 6.78 years. Their marital profile revealed that 83.13% were single ($n = 1557$) and 16.87% were married ($n = 316$). The distribution of women by occupation revealed that 75.97% were unemployed ($n = 1423$), 13.03% were civil servants ($n = 244$), and 11% were traders ($n = 206$). In terms of education, 76.94% had a secondary education ($n = 1441$), 20.72% had a primary education ($n = 388$), and 2.35% had a higher education ($n = 44$).

3.2. Obstetric Data and Medical History

Among the 1873 parturients, there were 1386 multiple pregnancies (74%), 463 multiparous (24.7%), 486 pauciparous (26%), and 924 primiparous (49.3%). The mean number of antenatal consultations (ANC) was 3.32 ± 1.5 . There were 1830 (97.7%) women who had more than 4 prenatal visits. Regarding gestational age, 1667 (89%) women gave birth at a gestational age greater than or equal to 37 weeks, while 206 (11%) gave birth before 37 weeks (**Table 1**).

Table 1. Reproductive characteristics of women who had more than 4 prenatal visits.

Representative variables	Number of participants (N = 1873)	Percentages (%)
Parity		
Primiparous	924	49.3
Pauciparous	486	26
Multiparous	463	24.7
CPN		
≥ 4	1830	97.7
< 4	43	2.3
Gestational age		
< 37 SA	206	11
> 37 SA	1667	89

Among the 1873 parturients, 1810 (96.6%) were tested for HIV, and among these, 49 were positive, corresponding to a frequency of 2.71%. Hepatitis B was

tested in 1565 parturients (83.56%), and 57 were positive, corresponding to a frequency of 3.64%. Hepatitis C was tested in 1181 (63%) with 2 parturients positive, corresponding to a frequency of 0.17%. There were no viral co-infections among the women tested. Risk factors for hepatitis B infection. The main factors that appeared to be associated with a positive maternal hepatitis B test were the presence of a tattoo (OR 0.4 [0.15 - 0.87]; p 0.026), the presence of scarification (OR 3.47 [1.7 - 6.47]; p 0.000), and the level of overcrowding with at least 5 people living in the household (OR 2 [1.12 - 3.89]; p 0.019) (**Table 2**).

Table 2. Risk factors for HBV.

Risk factors	Négative case n = 1508 (%)	Positive case n = 57 (%)	OR [IC 95%]	P-value
Tattoo				
No	1160 (76.9)	51 (89.5)	-	-
yes	348 (23.1)	6 (10.5)	0.4 [0.15 - 0.87]	0.026
Scarification				
No	1389 (92.1)	44 (77.2)	-	-
yes	119 (7.9)	13 (22.8)	3.47 [1.7 - 6.47]	0.000
No one in the house				
1 - 4	603 (40)	14 (24.5)	-	-
5	905 (60)	43 (75.5)	2 [1.12 - 3.89]	0.019
Notion of jaundice				
No	1448 (96)	55 (96.5)	-	-
yes	60 (4)	2 (3.5)	0.94 [0.14 - 3.12]	1
HVB family				
No	1368 (90.7)	55 (96.5)	-	-
yes	140 (9.3)	2 (3.5)	0.38 [0.06 - 1.24]	0.136
Risky sexual practices				
No	91 (6)	2 (3.5)	-	-
yes	1417 (94)	55 (96.5)	1.64 [0.5 - 10.91]	0.576
Transfusion				
No	1331 (88.3)	50 (87.7)	-	-
Yes	177 (11.7)	7 (12.3)	1.07 [0.43 - 2.25]	0.9

Prevention of mother-to-child transmission. Among the 57 HBsAg-positive women, two were followed by a gastroenterologist, representing a rate of 3.51%. None were on antiviral treatment. Of the 1873 newborns, 40 received the birth dose of the HBV vaccine, representing 2.14%. Among the 57 babies born to mothers who tested positive for hepatitis B, 40 had been vaccinated against hepatitis B at birth (70.18%), and 36 had simultaneously received hepatitis B serum (63.16%) (**Table 3**). No child born to a seronegative mother received the hepatitis B vaccine

at birth.

Table 3. Means of HBV prevention in newborns born to women.

Terms	Group AgHBs+ staff (n = 57) (%)		Group AgHBs- staff (n = 1508) (%)	
Vaccination				
yes	40	70.18	0	0
No	17	29.82	1508	100
Serum				
yes	36	63.16	0	0
No	21	36.84	1508	100

4. Discussion

4.1. Obstetric Data

The profile of the parturients was that of a young woman (27.84 ± 6.78 years), single (83.13%), unemployed (75.97%) with a secondary level of education (76.94%). This profile is similar to the data from the 2019-2021 Demographic and Health Survey (DHS) [7]. This profile is also found in some African studies [8]-[10]. In terms of obstetrics, 49.3% were primiparous and 25.95% were pauciparous. This confirms the data from the 2019-2021 DHS, in which the average age of first pregnancy was 20.4 years, and 83% of pregnancies occurred between 20 and 30 years old [7]. The quality of pregnancy follow-up, assessed by the number of prenatal consultations, revealed that 97.7% had benefited from more than 4 prenatal consultations as recommended by the WHO [11]. This threshold of 4 prenatal consultations is associated with a good obstetric prognosis [12]-[16].

4.2. Hepatitis B PMTCT Data

The prevalence of HBsAg among admitted parturients in the delivery room of the CHU of Libreville, was 3.6%. This prevalence was similar to that reported by Koumba *et al.* among pregnant women in the south of the country (Franceville), which was estimated at 3.9% [17]. It is also close to studies conducted among pregnant women in Rwanda and Tanzania, with HBsAg prevalence of 3.1% and 3%, respectively [18] [19]. This prevalence was lower than previous studies carried out in Gabon by Misso *et al.*, which reported a seroprevalence of 8.3% at the Melen Estuaire Regional Hospital in 2022 [20]. This difference could be related to variations in prevalence within the country as revealed by the DHS 2019-2021 [7]. In addition, Ndeboko *et al.* observed a decrease in the prevalence of hepatitis B among pregnant women since the COVID-19 epidemic at the Libreville Mother and Child University Hospital [21]. This prevalence of hepatitis B was lower than that observed among pregnant women in some sub-Saharan African countries, such as Benin, Cameroon, and Congo, where Alassan *et al.*, Mawouma *et al.*, and Ngalula *et al.* reported rates of 14.02%, 18.4%, and 6.9%, respectively [22]-[24].

These variations are consistent with the epidemiological data on hepatitis B, classifying Gabon as a zone of intermediate prevalence [25] [26].

4.3. Risk Factors for Mother-to-Child Transmission of Hepatitis B

Among the known risk factors for hepatitis B transmission, only the presence of scarifications and close living conditions were associated with an increased risk, by 3.47 and 2 times, respectively [27]. The notion of tattooing was associated with a 0.4-fold decrease in the risk of contracting hepatitis B. This was an unexpected finding contrary to some literature. Indeed, this observation is contrary to that of Nkoh in Cameroon [28]. This difference could be explained by a higher level of professionalism in the tattoo industry in Libreville but is a hypothesis requiring further investigation. A history of blood transfusion was not associated with the risk of hepatitis B. This result could be explained by increased transfusion safety measures, including strict donor selection and biological qualification of blood donations through appropriate virological tests at the national transfusion center [29] [30].

4.4. Prevention of Mother-to-Child Transmission of Hepatitis B

Among the 57 HBsAg-positive pregnant women, only 2 were monitored by a gastroenterologist (3.51%) and none were receiving treatment. This confirms WHO data, which indicate that more than 50% of people with viral hepatitis are unaware of their infection and over 80% of people do not have access to treatment [1] [2]. No child born to mothers who were hepatitis B seronegative or of unknown serological status received the hepatitis B vaccine. This is due to the fact that the monovalent hepatitis B vaccine is not available in the delivery room. Patients must pay for it themselves, and this cost is not reimbursed by national health insurance. This reality also explains why 70.18% of children born to mothers carrying hepatitis B were able to be vaccinated, and 63.16% of these children had received hepatitis B antiviral immunoglobulins. The absence of a national viral hepatitis control program could explain these shortcomings [31]. Although this data is limited to a single healthcare facility, the Libreville University Hospital is the largest healthcare facility in the country, and this data reflects the realities of all healthcare facilities in Gabon.

5. Conclusion

The prevention of mother-to-child transmission of hepatitis B is a key aspect of the fight against hepatitis B. It suffers from insufficient screening and limited access to preventive treatment, likely due to the absence of a national program to combat viral hepatitis. This program would allow for raising awareness about risk factors and establishing vaccination coverage against hepatitis B at birth.

Conflicts of Interest

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

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