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Prevalence and Management of Positive HBS Antigen in Pregnant Women and Recently Delivered Women at the Fousseyni Daou Hospital in Kayes (Mali)

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Abstract

Introduction: Hepatitis B virus (HBV) infection is one of the major public health problems at the national and global levels. The severity of hepatitis B is linked to the risk of becoming chronic and exposing patients to cirrhosis and hepatocellular carcinoma. This risk is all the more important when the infection occurs at an early age, particularly in the case of neonatal contamination [1]. The objective of this work was to study the carriage of HBsAg in pregnant women and recent deliveries at Fousseyni Daou Hospital in Kayes. **Materials and Methods:** This was a cross-sectional, descriptive study with prospective collection, which extended over a period of 12 months from January 1, 2023 to December 31, 2023. This study focused on all pregnant women and recent deliveries with positive HBsAg admitted to the obstetrics and gynecology department during the study period. Confidentiality and anonymity were respected. The processing and analysis of statistical data were carried out using SPSS 20.0 software. **Results:** During the study period, we collected 86 cases of

positive HBsAg out of a total of 4956 obstetric admissions, i.e. a frequency of 1.74%. The most represented age group was 20 to 35 years with 74.42%. They were mostly married at 88.38%, not in school at 51.16%, and housewives at 74.41%. In our sample, patients who came by themselves were the most represented with 56.98%. The parturients were in the 3rd trimester of pregnancy at the first prenatal consultation in 47.67% of cases. HBeAg was positive in 14.58% of the patients tested. HBV-HCV coinfection was found in 08.33% of the parturients. HBV-HIV coinfection was found in 02.33% of cases. The viral load was greater than 2000 IU/ml in 13.89% of patients. Pregnant women gave birth vaginally in 82.56% of cases. The APGAR at the first minute was greater than 8 in 85.23% of cases. Ninety point seventy percent of patients did not need tenofovir treatment during pregnancy after their biological assessment. Seventy-one point fifty-nine percent of newborns received ImmunoHBs + hepatitis B vaccine. **Conclusion:** The results of this work allow us to affirm that the carriage of HBsAg during pregnancy is a reality in our environments. Therefore, screening for HBsAg during pregnancy should imperatively be part of the prenatal assessment.

Keywords

Hepatitis B, Pregnancy, Kayes Hospital

1. Introduction

Hepatitis B virus (HBV) infection is one of the major public health problems at the national and global levels. The severity of hepatitis B is linked to the risk of becoming chronic and exposing patients to cirrhosis and hepatocellular carcinoma. This risk is all the greater when the infection occurs at an early age, particularly in the case of neonatal contamination [1]. The World Health Organization (WHO) estimates that 2 billion people worldwide are infected with this virus with nearly 10 to 30 million new infections per year, more than 350 million chronic carriers and nearly one million deaths per year [2]. Maternal-fetal transmission of the hepatitis B virus is a problem that continues to concern health authorities around the world and prompts the implementation of reinforced preventive measures. The replicative status of the virus in the mother carrying HBV, assessed by the positivity of HBeAg and the viral load rate, determines the risk of contamination, which is higher in the perinatal period. Chronic HBV carrier mothers constitute a real reservoir for the vertical transmission of this infection [3]. The prevalence of hepatitis B is highest in sub-Saharan Africa and East Asia, where between 5 and 10% of the adult population has chronic hepatitis B. High levels of chronic infection are also found in Latin America in the Amazon region and in southern Central and Eastern Europe. In the Middle East and the Indian subcontinent, it is estimated that 2 to 5% of the population suffers from chronic hepatitis [4]. The prevalence of HBsAg in pregnant women in Mali is 15.8%, higher than

that of the general population 13.97%, as well as 43.2% of children born to these HBsAg positive mothers [5]. Mali is in a hepatitis B endemic area with an overall prevalence of 13.97%. The prevalence of HBsAg in the Kayes region is 11.1%. Maternal-fetal transmission of HBV represents a key link in the maintenance of the infection, especially in countries with high endemicity. This risk is estimated at 90 to 100% if HBe antigen (HBeAg) is detected in maternal serum. The presence of HBeAg has also been associated with a high risk of neonatal prevention failure. However, even in the absence of HBeAg (pre-core mutants), the risk of HBV transmission exists and the interpretation must take into account viremia. It is established that contamination at the time of birth results in a chronic carriage rate of 90% for the child and that this rate remains high if the infection occurs in early childhood up to the age of 4 years (greater than 30%) [6]-[8]. This chronic carriage with prolonged viral replication is a determining factor in the oncogenesis of HBV [8]-[10]. The absence of studies on this subject in the Kayes region led us to initiate this work.

2. Methodology

The Kayes region is located in western Mali. It covers an area of 120,760 km2 and has 2,338,999 inhabitants. The Fousseyni DAOU hospital in Kayes is a 2nd reference public hospital establishment with a capacity of 160 beds. This was a cross-sectional, descriptive study with prospective collection, which extended over a period of 12 months from January 1, 2023 to December 31, 2023. This study focused on all pregnant women and recent deliveries with a positive HBsAg admitted to the obstetrics and gynecology department during the study period. Sampling was exhaustive on all patients with positive HbsAg during the study period. Included in this work were: all pregnant women and recent deliveries with a positive HBsAg diagnosed in the department or admitted to the department referred from another health facility with a positive HBsAg. Excluded from the study were: all pregnant women or recent mothers who did not have HBsAg serology, and those whose HBsAg result was negative. A data collection form was used to collect the information. Data collection was done from the obstetric file, supplemented as needed by the antenatal consultation booklet and register, the delivery and hospitalization register, and the mothers' reference and evacuation forms. Study procedure: a standard questionnaire was proposed to pregnant and postpartum women upon admission to the maternity ward; the questionnaire was used to collect demographic and clinical data and was completed after delivery. The data collection forms were designed by the main author, pre-tested before being validated by the other actors of the study. Newborns should receive, upon birth, intramuscularly and in two different sites, a first injection of vaccine (Euvax) and an injection of anti-Hbs immunoglobulin. Vaccination was then continued according to the vaccination schedule in Mali. Mothers were referred to the hepato-gastroenterology department for medical follow-up. Data entry was carried out using Microsoft Office World 2010 software. Statistical data processing and analysis were carried

out using SPSS 20.0 software. All subjects received counseling before sampling and at the time of results. Ethically: confidentiality and anonymity were respected. All subjects gave their consent and the results were confidential. Individuals without markers of hepatitis B virus infection were provided with necessary information on infection prevention.

Limitations and biases of the study: Our study had some limitations, namely the delay in follow-up, the lack of resources and socio-cultural beliefs negatively impacted this work, not all hepatitis B markers could be sought to assess the recent nature or not of the infection as well as the degree of viral replication. Similarly, serovaccination was not effective in all newborns for these reasons mentioned above.

3. Results

Table 1. Distribution of patients according to sociodemographic characteristics.

	Effective (n = 86)	%
Age groups (years)		
≤ 19	7	8.14
20 to 34	64	74.42
≥ 35	15	17.44
Occupation		
Housewife	64	74.41
Saleswoman	7	8.14
Civil Servant	7	8.14
Student	6	6.98
Hairdresser	2	2.33
Marital status		
Married	76	88.38
Single	5	5.81
Divorced	5	5.81
Education level of patients		
Not in school	44	51.16
Primary level	17	19.77
Secondary level	15	17.44
Higher level	10	11.63

During the study period, we collected 86 cases of HBsAg positive out of a total of 4956 obstetric admissions, i.e. a frequency of 1.74%. The most represented age group was 20 to 35 years with 74.42%. They were mostly married at 88.38%, not

in school at 51.16%, housewives at 74.41% (Table 1). The average gestation was 4.6 with extremities of 1 and 9 pregnancies, the average parity was 4.5 with extremities of 0 and 10 deliveries (Table 2). In our sample, the parturients were in the 3rd trimester of pregnancy at the first prenatal consultation in 47.67% of cases. Pregnancy monitoring was provided in 41.86% by midwives (Table 3). HBeAg was positive in 14.58% of patients tested. HBV-HCV coinfection was found in 08.33% of parturients. HBV-HIV coinfection was found in 02.33% of cases (Table 4). The viral load was greater than 2000 IU/ml at 13.89%, this biological examination was not performed by 50 patients (Table 5). The pregnant women had given birth vaginally in 82.56% of cases. The APGAR at the first minute was greater than 8 in 85.23% of cases (Table 6). Ninety point seventy percent of patients did not need tenofovir treatment during pregnancy after their biological assessment. Seventy-one point fifty-nine percent of newborns had received ImmunoHBs + hepatitis B vaccine (Table 7).

It is clear from the socio-demographic characteristics that it is uneducated women, housewives, married women, aged between 20 and 34 who constitute the profile of patients who are victims of this pathology.

The patients had a medical history of diabetes at 4.65%, high blood pressure at 3.49%, HIV, sickle cell disease, gastric ulcer at 1.16% each. The majority of parturients had no surgical history, *i.e.* 83.72% of cases; 10.47% had a history of cesarean section, 2.33% of myomectomy and salpingectomy each.

Table 2. Distribution of patients according to gestation and parity.

	Effective (n=86)	%	
Gesture			
Primigravida	11	12.79	The mean gestation was 4.6 with ranges of 1 and 9 pregnancies
Paucigesta	15	17.44	
Multigesta	39	45.35	
large Multigesta	21	24.42	
Parity			
Nulliparous	11	12.79	The mean parity was 4.5 with extremes of 0 and 10 deliveries
Primiparous	10	11.63	
Pauciparous	22	25.58	
Multiparous	28	32.56	
Large multiparous	15	17.44	

Patients who came by themselves were the most represented with 56.98%. Among those referred or evacuated 54.65% came from the Kayes reference health center, 17.44% from community health centers, 9.30% from private health structures.

Table 3. Prenatal consultation.

Prenatal consultation (CPN)	Effective (n=86)	%
Age of pregnancy at first CPN		
5 to 14 weeks of amenorrhea (WA)	27	31.40
15 to 28 WA	18	20.93
29 to 40 WA	41	47.67
Qualification of CPN staff		
Midwife	36	31.40
General practitioner	19	20.93
Matron/obstetrician nurse	17	47.67
Obstetrician-gynecologist	14	31.40

Table 4. Distribution of patients in biological assessment.

Effective (n = 48*)% *These biological tests were not carried out by 36 patients			
HBeAg result performed			
Négative	41	85.42	
Positive	07	14.58	
Hepatitis C virus result performed			
Négative	44	91.67	HBV-HCV coinfection 08.33%
Positive	04	08.33	
HIV result			
Négative	84	97.67	HBV-HIV coinfection 02.33%
Positive	02	02.33	
ALAT (alanine aminotransferase) level			
Less than 45 IU/L	45	93.75	
Greater than 45 IU/L	03	06.25	
ASAT (aspartate aminotransferase) level			
Less than 45 IU/L	46	95.83	
Greater than 45 IU/L	02	04.17	

Table 5. HBV viral load and liver ultrasound.

Viral Load (IU/ml)	Effective (n = 36*)	%	
Undetectable	23	63.89	*This biological test was not carried out by 50 patients
10 to 2000	8	22.22	
Greater than 2000	5	13.89	
Liver ultrasound result	**Effective (n = 59*)**		
Normal	56	94.92	*Liver ultrasound was not performed in 27 patients
Hepatomegaly	3	05.08	

The failure of patients to have all of these additional examinations carried out is due to the fact that in our country's health policy, patients pay for all the check-ups, because the social security system and third-party payment are not developed in our country. These additional examinations being relatively expensive, this explains why not all patients were able to have them carried out in their entirety.

Table 6. Mode of delivery and APGAR score at 1st minute.

Mode of delivery	Effective (n = 86*)	%	
Vaginal route without obstetric maneuver	71	82.56	*Type of obstetric maneuver: Vacuum suction (6)
Caesarean section	9	10.46	
Vaginal route with obstetric maneuver*	6	06.98	
APGAR score at the first minute	**Effective (n = 88*)**		
0	2	02.27	
1 – 4	2	02.27	*2 twin births
5 – 7	9	10.23	
≥ 8	75	85.23	

Table 7. Support.

Treatment		Effective%	
Treatment received during pregnancy (n=86)			
Tenofovir	08	09.30	
None	78	90.70	
Treatment by serovaccination (n=88)			
ImmunoHBs+ vaccine	63	71.59	
Vaccine*	21	23.86	
None	04	04.55	
ImmunoHBs+ vaccine	63	71.59	*Vaccine received = Euvax
Time to administer serovaccination (n=88)			
Less than 12 Hour (H)	64	72.73	
12 to 48 H	14	15.91	
Greater than 72 H	04	04.54	
Not done	06	06.82	

4. Discussion

We conducted a descriptive cross-sectional study with prospective data collection, which extended over a period of 12 months from January 1 to December 31, 2023. A total of 4,956 pregnant women were followed during the study period, among whom 86 women were carriers of HBsAg, i.e. 01.74% of cases in all consultations. The conduct of the study respected all ethical conditions. The frequency of the

association of viral hepatitis B and pregnancy varies from one country to another and from one center to another in the same country. Our rate is lower than that of Sbiti M. *et al.* [11] in Morocco who found 2.35% of hepatitis B in pregnant women. Rates significantly higher than ours were reported by Sidibé M. [12] at the reference health center of commune III of Bamako and Traoré A. [13] at the CHU-Gabriel Touré. These authors reported 10.54% and 17% of hepatitis B during pregnancy. The age group of 20 to 35 years was the most represented at 74.42% (**Table 1**), the mean age was 28.21±5.434 years; with extremes 18 and 44 years. The same age group had been reported by Konaté M. [14]; Sidibé M. [12] who had found respectively 73.7% and 78.8%. This young age could be related to early perinatal contamination with the hepatitis B virus. It is also a young and sexually active age group, therefore exposing itself to more risks. The majority of patients were married with 88.38% of cases. This rate is lower than that reported by Konaté M. [14] and significantly higher than that reported by Sangaré L. *et al.* [15] which was respectively 98.4% and 59.3%. The patients concerned by our study were not in school in 51.16% of cases (**Table 1**). This rate is identical to that reported by Konaté M. [14] who had reported 50%, but higher than that reported by Sidibé M. [12] with 22.9%. The level of education can be decisive in understanding health education messages in the context of prevention. The patients were housewives in 74.41% (**Table 1**). This rate is very close to the 72.3% reported by Konaté M. [14] and significantly higher than those reported by Sidibé M. [12] and Sangaré L. *et al.* [15] which were respectively 49.1% and 66.4%. This is explained by the fact that the majority of parturients live in rural areas. In pregnant women with positive HBsAg, seven (07) were carriers of the replication antigen (HBeAg) or 14.58% (**Table 4**), it was not sought in 44.19% of cases due to non-performance of assessments. This rate is comparative to the 13.6% reported by Traoré A. [13] and to that of a Danish study or 17.5% [16]; but largely lower than the 31.4% reported by Sangaré L. *et al.* [15]. Our low rate can be explained by the deficit in the search for HBeAg due to the reluctance of patients. The presence of HBeAg in the mother carrying HBsAg is the main factor in maternal-fetal transmission. Indeed, when the mother is in the replicative phase, the risk of transmission is 90%. The age group (19 - 34) years is the most affected and also sexually active so it is more exposed to HIV infection, these two viruses share the same modes of contamination. HBV-HIV coinfection leads to frequent changes in the serological expression of viral B infection with active replication phenomena (detection of viral DNA) contrasting with the absence of detection of HBsAg, any marker of infection by HBV-HIV coinfection thus significantly increases the risk of chronic hepatitis due to greater immunosuppression. In this work two (2) patients were HIV positive, i.e. a HBV-HIV coinfection rate of 02.33% (**Table 4**). This rate is identical to the 2% reported by Sangaré L. *et al.* [15]. But lower than those reported by Sidibé M. [12] and Konaté M. [14] which were 3.4% and 7.1% respectively. Early screening of HIV and HBV in pregnant women in high prevalence areas is an important medical management tool. HBV-HCV coinfection was found in 08.33% of pa-

tients (**Table 4**). Anti-HCV antibody was not performed in 44.19% of cases. Our rate is higher than that reported by Sidibé M. with 2.5% [12] and that reported by Konaté M. [14] with 5.6%. This coinfection may not promote vertical transmission of the hepatitis B virus, but certainly aggravates the underlying liver disease because the hepatitis C virus is more responsible for chronic hepatitis than the hepatitis B virus. In this work, ASAT was high in 04.17% of cases, which is much lower than 52.5% of Traoré A. [13]. ALAT was high in 06.25% (**Table 4**), this rate is comparative to that reported by Sidibé M. [12] which was 7.3%. In our sample, the viral load was higher than 2000 IU/L in 13.89% of cases. The viral load could not be performed in 58.14% of cases; due to non-performance of the assessment (**Table 5**). Among our patients, 03.49% had hepatomegaly; liver ultrasound was not performed in 31.40% of cases (**Table 5**). The failure of patients to have all of these additional examinations carried out is due to the fact that in our country's health policy, patients pay for all the check-ups, because the social security system and third-party payment are not developed in our country. These additional examinations being relatively expensive, this explains why not all patients were able to have them carried out in their entirety. There is a correlation between this hepatopathy and transmission, however the hepatopathy was not severe since in chronic active hepatitis and in cirrhosis, pregnancies are usually exceptional [2]. Serovaccination combines the injection of anti-HBs immunoglobulin and a first vaccine injection. In our study, 09.30% of pregnant women had received treatment with Tenofovir. Serovaccination in newborns was carried out in 71.59% and vaccination only in 23.86% of newborns, prevention was not carried out in 4.55% due to lack of resources and socio-cultural beliefs (**Table 7**). In newborns who did not benefit from prophylactic serovaccination, fulminant hepatitis can be observed [17]. The transition to chronicity of viral hepatitis B occurs after acute infection in 90 to 95% of perinatal infections [18]. No cases of immediate postpartum complications were recorded. All mothers were referred to a specialized consultation in the medical department (Gastrology). All newborns were discharged in satisfactory condition except four (4) who had not received serovaccination including the two (2) cases of apparent stillbirths. After delivery, all newborns of HBsAg (+) mothers were systematically referred to pediatrics within 12 to 24 hours after birth; an injection of hepatitis B-specific immunoglobulins at 100 IU and the first injection of hepatitis B vaccine were given at two different sites. The injections of the specific immunoglobulins and the vaccine are given intramuscularly after washing the baby in order to avoid possible contamination by natural secretions present on the child's skin during the injection. Subsequently, a second vaccination injection will be administered 1 month after the first, then the newborn follows the expanded vaccination program [19].

5. Conclusion

The results of our study allow us to affirm that HBsAg carriage during pregnancy is a reality in our regions. Our results show that HBsAg screening during preg-

nancy should imperatively be part of the prenatal assessment since vertical transmission remains the main route of transmission of the hepatitis B virus in hyperendemic areas. The importance of perinatal transmission requires rigorous prevention measures through passive immunoprophylaxis and universal vaccination of all newborns. In general, the fight against the HBV endemic requires the implementation of a good national prevention policy.

6. Recommendations for Health Authorities and Health Personnel

To the Ministry of Health:

(1) Ensure free vaccination of all newborns against the hepatitis B virus at birth.

(2) Make free or subsidize serotherapy for newborns of HBsAg positive mothers.

(3) Make HBsAg screening free for all pregnant women at first contact.

(4) Make complementary examinations free for all pregnant women with HBsAg positive.

(5) Promote Malian associations fighting hepatitis B (SOS Hepatitis Mali).

To hospital practitioners:

(1) Strengthen individual and collective hygiene measures.

(2) Ensure a file is archived for all patients with HBsAg (+).

(3) Ensure education and awareness of the population on hepatitis B (its modes of transmission as well as its consequences).

(4) Ensure serovaccination of all children born to HBsAg (+) mothers within 12 hours of life.

(5) Check the child's HBV serology from the 9th to the 15th month.

Conflicts of Interest

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

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