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Prevalence of HBsAg in Pregnant Women Monitored at the Mangol Health Center in the Urban Commune of Télimélé, Republic of Guinea

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Hepatitis B is a viral disease caused by a DNA virus, belonging to the hepadnaviridae family whose only reservoir is humans. It is found in most human biological fluids such as blood, semen, vaginal secretions, saliva and finally in smaller quantities in milk and urine. This infection attacks the liver and is transmitted through sexual intercourse or contact with bodily fluids from an infected person. It

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constitutes a public health problem. This is an analytical and descriptive survey study. It took place from April [1] as of June 29, 2024.
Objective: The main objective of this study is to determine the prevalence of HBsAg in the population of pregnant women followed at the Mangol Health Center.
Method: For the detection of hepatitis B virus (HBV) surface antigen in the tested serum, the Aichek type chromatographic immune test technique is used.
Results: At the end of the analyses, the results show that Out of a total of 234 pregnant women tested for hepatitis B, 5 were HBV carriers, or 2.14%, compared to 229 negative cases, or 97.86%. Married women, who were not only the most represented in this study, were also the most affected by HBV with 4 cases, or 80%. Housewives and hairdressers were the most affected by HBV with 2 cases respectively, or a respective prevalence of 20%. The 25-33 age group had 3 HBV positive cases, or 60%.

Keywords: Virus hepatitis B; pregnant women and telimele.

1. INTRODUCTION

"Viral hepatitis B is an international public health problem due to its frequency, complications and socio-economic consequences, comparable to those posed by other major communicable diseases such as HIV, tuberculosis or malaria. Sub-Saharan Africa, with a prevalence rate of between 8 and 18%, is an area of high endemicity" (WHO, 2016; Alpha et al. 2024). "The majority of chronic hepatitis B infections are contracted at birth by so-called vertical transmission. The risk is very high because infected children become chronic carriers of the B virus in 90% of cases. In utero transmission is relatively rare and represents less than 2% of perinatal infections in most studies. It has therefore been recommended since 1992 in France to systematically screen for the presence of the HBs antigen (HBs Ag) in all pregnant women during the sixth month" (HepatoWeb, n.d.).

"In Africa, the prevalence of hepatitis B is not uniform across countries due to social, economic and cultural disparities" (Alassan et al., 2019). In Mauritania, this prevalence appears to be exceptionally high, at 16.2%, it constitutes (Boushab et al., 2017).

"Studies have shown that mother-to-child transmission has been identified as one of the causes of the high prevalence of HBV infection than unprotected sexual intercourse" (Bittaye et al., 2019).

"Approximately 2 billion people have been infected with hepatitis B during their lifetime, or 30% of the world's population, according to the World Health Organization (WHO). The weak HIV virus is 100 times less contagious than that of HBV because of its very low resistance in the external environment. HBV is the second *most common human carcinogen after tobacco*. Of the world's patient population, 360 million (5%) suffer from chronic infections, mainly in Asia and Africa. More than a million of them die each year from complications related to this infection, including liver cirrhosis and hepatocellular carcinoma" (World Health Organization, 2017). Vaccination is routinely recommended for newborns because approximately 4.5 million women with this disease give birth each year, with the largest number in Africa and the Western Pacific regions (World Health Organization, 2017). It is estimated that a 16% reduction in this burden would be achieved if one dose of hepatitis B vaccine were routinely administered to prevent perinatal transmission (Terrault et al., 2021). In utero transmission appears to be rare, accounting for 2 to 5% of perinatal infections. This vertical transmission is common in asymptomatic carrier women who are unaware of their carrier status. In the event of high viral multiplication in the mother and in the absence of serovaccination, 90% of infected newborns are likely to develop chronic hepatitis B (Sogni, 2015). Transmission of HBV from mother to child is responsible for more than a third of chronic viral hepatitis (Nelson et al., 2016)*. The current prevalence of HBV in Tunisia is 1.7% (according to a Tunisian study conducted in 2016*) (Ben Hadj Boudali, 2019).

In the Democratic Republic of Congo, a low seroprevalence was observed in, at 6.69% (Ngalula et al., 2018). High prevalences have been observed in similar studies, 12% in Senegal (Dakar) in (Alassan et al., 2019), 14.02% in Benin in (Alassan et al., 2019).

In 2019, the Organization Global of there Health (WHO) estimated that more of 91 millions

Africans are living with hepatitis B and 1.2 million new HBV infections have been reported. Recorded in the African region, as well as 125,000 deaths related to this disease. Deaths which occur mainly among population groups comprising people young people And productive (World Health Organization, 2023).

In daily hospital practice, accessibility to immunological and especially virological markers remains a major problem and only HBsAg is often routinely sought for screening, diagnosis and monitoring of HBV infection (Makanera et al., 2019).

As elsewhere, the majority of the Guinean population does not have information on the circulation of HBV within it; the spread of this virus constitutes a real public health problem which could affect everyone.

2. MATERIALS AND METHODS

2.1 Environment and Framework of the Study

The Health Center Mangol in the Urban Commune of Télimélé served as the study area. The laboratory of medical biology the Institute Superior of Technology of Mom has served of the Study Framework for the accomplishment of this present work. The Higher Institute of Technology of Mamou is a professional public establishment, attached to the Ministry of Higher Education, Scientific Research and Innovation (MESRSI).

2.2 Working Material

For the realization of the present study, we used the following material: Aichek chromatographic immune test strip, stopwatch, electric centrifuge, Pasteur pipette, latex gloves, 5cc syringes, hemolysis tubes, trash can, hydrophilic cottons and boxes of security.

2.3 Working Method

Pregnant women monitored at the Mangol Health Center were our study population. Included in this study were all pregnant women received and followed up at the Mangol Health Center and who have accepted to submit to our study. The sampling has summer random simple and its size was n = 234 pregnant women, using the Schwartz formula.

2.4 Biomaterial

The biomaterial consisted of blood from pregnant women taken and analyzed.

2.5 Parameters Studied

Parameters studied were: age, number of births, sources of information (radio, television, social networks, newspapers), were socio-demographic data. Knowledge related to the existence of viral hepatitis B, the causal agent, routes of contamination, sources of information, means of prevention and risk factors for infection.

2.6 Variables Subject to Study

- **Variable Biological:** HBsAg and Transaminase were the biological variables;
- **Variables Sociodemographic:** Age, number of births, sources of information, routes of contamination, risky practices and the situation matrimonial were the variables sociodemographic.

2.7 Methods of Collection and Computer Analyses of Data

We used pre-established survey sheets and the register of the laboratory for the realization of the data collection. The information collected was analyzed manually, entered using Microsoft Word and Excel software under Windows 2016 and the analyses were carried out using Epi Data software. For the analysis, we used SPSS software version 21.

The data analysis consisted firstly in a descriptive analysis (means and frequencies) of sociodemographic parameters and knowledge of viral hepatitis B. Secondly, in the knowledge of the relationship between the existence of viral hepatitis B and sociodemographic factors in multivariate analysis by logistic regression. This relationship was expressed in the form of Odds ratio with its 95% confidence interval and in the form of degree of significance p (significance threshold at 5%).

2.8 Methods of Diagnosis Biological Hepatitis B

Aichek chromatographic immune test for the detection of the antigen of surface of VHB in the serum from the patient (pregnant woman) was used.

HBsAg Test Works: HBsAg test indicates the presence of the hepatitis B virus. Triggers immediate treatment. Helps stop the spread of the virus to others. Early detection is essential to avoid serious complications.

"In the practice of analysis, the HBs Ag rapid test strip (analysis total/serum/plasma) has summer designed for detect HBsAg by the interpretation visual of the evolution of the color on the strip. The membrane was immobilized with antibodies anti-Ag HBs on the test region. During the test, the sample reacts with the anti - HBsAg antibody colloid colored gold conjugate, which has been pre-coated on the test sample pad. The mixture then moves across the membrane by capillarity and interacts with the reagents present on the membrane. If so, there are some. enough of Ag HB In samples, a colored group appears in the region - membrane test. The presence of this colored band indicates a positive result, while its absence indicates a negative result. The appearance of the group colored in the control area serves as a procedural control during testing" (Boushab et al., 2017).

3. RESULTS

The results obtained by the application of the research methodology are in the form of the tables interpreted below in the Table 1.

The results of this table showed that the age group 43 years and above was the least represented in this study with a rate of 10.68%. The 34-42 age group was the most represented in this study with a rate of 38.46% followed by the 25-33 age group with a rate of 37.17%.

Primiparous women were the least represented with a rate of 26.07% compared to 73.93% for multiparous women.

The majority of pregnant women tested said they had no information about the existence of hepatitis B, 77.35% compared to 22.65% of those who said they had information about the existence of the disease. Newspapers were the least informative means of information about the hepatitis B virus for these women tested, 2.99%, followed by television with 30.76%. While the majority of pregnant women surveyed indicated radio as the most common means of information, 40.17% of these women.

Most of these tested women indicated sexual transmission as the main route of transmission of the virus, with 65.81%, followed by blood transmission with 30.34% and saliva transmission with 3.85%.

Most of these pregnant women subjected to this study cited prostitution as the main risky practice with 54.27%, followed by tattooing with 31.10%, acupuncture was the least indicated risky practice with 3.42%.

Most of the pregnant women tested reported having no knowledge of the vaccine, i.e. 81.62% of these women compared to 18.37% of those who reported knowing about the vaccine.

It is clear from this table that out of the 234 women subjected to this study, 229 women were negative to the HBsAg test, i.e. 97.86%, compared to 5 women positive to the same test with a rate of 2.14%. No cases of disability was not observed in this study.

In this study, the prevalence of HBsAg B in pregnant women monitored at the Mangol Health Center could be due to lack of knowledge of the virus, its modes of transmission and the existence of the vaccine.

Observation of the results of this table demonstrate a variation in the level of transaminases in the 5 pregnant women affected by the hepatitis B virus, there was:

- 3 patients tested had a normal ALAT level, i.e. 60%, compared to 2 others tested who had a high ALAT level, i.e. 40%.
- 4 patients tested had a normal AST level, i.e. 80%. 1 case of elevated AST was observed, i.e. 20%.

These results show that in patients with hepatitis B, there may be variations in transaminases. This reality could be explained by the fact that infections caused by the virus are capable of causing liver damage characterized by an increase in the ALT level. An increase in the AST level (non-specific liver enzyme), could mean damage to other sensitive organs including the heart, lungs, muscles, kidneys, etc.

Table 1. Presentation of the sociodemographic variables of the 234 patients subjected to our study

Settings	Effective	Percentage
Age groups		
16-24 years old	32	13.67
25-33 years old	87	37.17
34-42 years old	90	38.46
43 years and over	25	10.68
Number of pregnancies		
Primiparous	61	26.07
Multiparous	173	73.93
Information on the existence of hepatitis B		
Yes	53	22.65
No	181	77.35
Means of information		
Radio	94	40.17
Television	72	30.76
Newspapers	7	2.99
Social networks	36	15.38
Schools	25	10.68
Routes of contamination		
Blood	71	30.34
Sexual	154	65.81
Salivary	9	3.85
Risky activities		
Prostitution	127	54.27
Acupuncture	8	3.42
Piercing	26	11.11
Tattoo	73	31.10
Information on the existence of a vaccine		
Yes	43	18.37
No	191	81.62
Total	**234**	**100**

Table 2. Overall results

Exam	Results	Effective	Percentage (%)
Ag HBs	Positive points	5	2.14
	Negatives	229	97.86
Total		**234**	**100**

Table 3. Characteristics of the variation in transaminase levels in the 234 patients subjected to our study

Transaminases	Values					
	Weak		Normal		High	
	Effective	%	Effective	%	Effective	%
ALAT	-	-	3	60	2	40
ASAT	-	-	4	80	1	20

Table 4. Typology of socio-professional parameters of pregnant women positive for the HBsAg test

Socio-professional parameters	Number	Percentage
Age groups		
25-33 years old	3	60
43 years and over	2	40
Marital Status		
The brides	4	80
Bachelor	1	20
Professions		
Housewives	2	40
Hairdresser	2	40
Seamstress	1	20
Residential areas		
Kolly	3	60
Dara	1	20
Barkere	1	20
Total	**3**	**100**

The observation of results of this table informs that among the 5 pregnant patients tested positive for the hepatitis B virus, those in the age group 43 years and over had a prevalence of 40% against those of 25-33 years who were the most affected with a prevalence of 60%.

Single women positive for hepatitis B virus had a prevalence of 20% compared to 80% for married women who were also the most represented in this study.

Housewives and hairdressers were the most affected with 2 cases respectively, or 40% for each of these categories compared to 20% in the case of a single female seamstress.

According to the residence, these results show that 3 of these pregnant patients positive for HBV came from the Kolly district , i.e. 60% and the other 2 women positive for HBV came from one of the Dara district and the other from the Barkéré district , i.e. a respective prevalence of 20% . This demonstrates that HBV is circulating in this urban commune of Télimélé.

4. DISCUSSION

This study demonstrated a prevalence of 2.14% of HBsAg carriage among the 234 pregnant patients subjected to the study, or 5 positive patients tested. In countries with high endemicity of hepatitis B, mother-to-child transmission is the most common mode of transmission. To remedy this, or even reduce the transmission rate, it is recommended to screen all pregnant women from the first trimester of pregnancy for their medical follow-up (Alassan et al., 2019). “If pregnant women have been vaccinated before becoming pregnant with a view to regular monitoring to protect the fetus or baby at birth, the check can be done at any time” (Mast et al., 2005). When this study was carried out, the average gestational age at the time of screening was 31 weeks of amenorrhea observed in the pregnant woman tested. Most pregnant patients (58.88%) were in the 2nd trimester of their pregnancy at the time of testing. It is therefore up to the midwives and gynecologists of the Mangol Health Center to carry out this screening for all pregnant women from the first trimester of their pregnancy. “The HBsAg that we used in this study for screening is a good marker for assessing HBV carriage in a population since its presence indicates either acute viral hepatitis B or chronic carriage indicating a past infection. The age of the pregnant patient was not linked to HBsAg positivity during the conduct of this study. This is consistent with epidemiological data revealing the high prevalence of vertical and horizontal perinatal transmission of HBV in our country” (World Health Organization, 2017).

The results of this study are comparable to those produced by some authors. Khadidjatou et *al.,* 2019. In a study carried out in Benin, reported that out of 214 pregnant women interviewed, 30 women tested positive for HBsAg, a prevalence of 14.02%, much higher than that of our study which is 2.14% (Alassan et al., 2019). “The results of this study remain lower than those found by Bigot et al., in another prospective study carried out in 1989 in Cotonou where the prevalence was 8.26%” (Bigot et al., 1992).

"Indeed, according to the study carried out among new blood donors in 2013 throughout the Beninese territory, the prevalence of HBV infection was 20.15% in the north and 9.08% in the departments of the Coast and the Atlantic" (Kodjoh, 2015). Our results are similar to those obtained in other studies, particularly in sub-Saharan Africa. Indeed, Candotti et al. (2007).

Worldwide, the prevalence of HBsAg in pregnant women is variable (Christiane, 2004). The results of this study are lower than those reported in Guinea (17.90%) by Makanera et al. in 2019, in Mauritania (5%) by Boushab M. B et al. (2001) and in Gambia (9.2%) by Christiane, 2004. They are even lower than those reported in Senegal (12%) by World Health Organization, 2017. The results from these countries can be explained by the fact that sub-Saharan Africa is a region of high endemicity according to the World Health Organization (WHO) (Jemni & Chatti, 1994). The majority of pregnant women surveyed were aged 15-24 years, or 60.4%, with a mean age of 23.55 ± 5.36 years and extremes of 14 and 43 years, of which 8.6% were positive for the HBsAg test *(Bani et al., 2012)*. "In Saudi Arabia, a positive relationship has been demonstrated between HBsAg positivity and a history of jaundice in patients" (Makanera et al., 2019). It also emerges from the study by Khadidjatou et al., that the existence of scarifications was significantly associated with HBsAg carriage (Alassan et al., 2019). This same observation was made by Sidibé et al., in Mali in 2001 and Angounda et al. (2016). These results would be due to the practice in conditions of doubtful hygiene, of certain traditional rites throughout society.

"Several authors have reported that parity in pregnant women was not associated with HBsAg carriage" (Amsalu et al., 2018; Abongwa & Kenneth, 2016). However, in their study conducted in Australia, Kumar V et al found a statistically significant association between parity and HBsAg carriage with a p value < 0.05 (Giles et al., 2015).

5. CONCLUSION

At the end of this study, the application of the research methodology showed that out of a total of 234 pregnant women tested for hepatitis B, 5 were carriers of HBV, or 2.14%, against 229 negative cases, or 97.86%. Married women, who were not only the most represented in this study, were also the most affected by HBV with 4 cases, or 80%. Housewives and hairdressers were the most affected by HBV with 2 cases respectively, or a respective prevalence of 20%. The 25-33 age group had 3 HBV positive cases, or 60%.

Low level of knowledge of the women tested on HBV, particularly on prevention (routes of contamination, risky practices and vaccine) reflects the state of knowledge of the virus in the majority of the country's populations. Vaccination is the most effective means of prevention against this disease, which represents the second cause liver cancer in the world after tobacco.

Raising awareness among the population about the circulation of HBV and the existence of the vaccine could help them adopt responsible behavior in order to avoid or limit the transmission of this virus within society.

In summary, this study is part of a survey on the circulation of HBV among pregnant women received in the health structures of the Télimélé prefecture.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

ETHICAL APPROVAL AND CONSENT

Before conducting this study, we started with awareness raising to obtain the agreement and consent of each pregnant woman on confidentiality throughout the data collection and analysis procedure and the results obtained were used for strictly therapeutic and scientific purposes. Our study complies with the 1975 Helsinki Declaration on the ethical principles of medical research involving human beings, as amended in 2008.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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