

PREVALENCE OF HEPATITIS B VACCINATION AND SEROLOGICAL IMMUNITY OF WOMEN IN PRENATAL CARE AT AN UNIVERSITY OUTPATIENT CLINIC IN SOUTHERN BRAZIL

PREVALÊNCIA DA VACINAÇÃO CONTRA HEPATITE B E IMUNIDADE SOROLÓGICA EM MULHERES QUE REALIZARAM O PRÉ-NATAL EM UM AMBULATÓRIO UNIVERSITÁRIO NO SUL DO BRASIL

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ABSTRACT

Introduction: Viral Hepatitis B is an infection with a high transferability, and delivery is the main form of transmission to newborns. Investigating HBV infection in pregnant women should be undertaken through research on the surface antigen of Hepatitis B virus (HBsAg), and the immunity to the virus should be assessed by the presence of the antibody against the surface antigen of the Hepatitis B virus (anti-HBs). Vaccination is recommended during pregnancy to all patients with non-reactive HBsAg and anti-HBs results. **Objective:** To analyze data related to the preventive measures of HBV infection in pregnant women who underwent prenatal follow-up at the Gynecology and Obstetrics outpatient clinic of the Medical School of Universidade Federal de Pelotas (Rio Grande do Sul State). **Methods:** A cross-sectional study was carried out by analyzing the medical records of patients from the Obstetrics and Gynecology outpatient clinic. Data related to the preventive measures of HBV infection, the socioeconomic profile and ethnicity of these patients were analyzed and described. **Results:** The total number of pregnant women studied was 121, aged between 15 and 46 years old, mostly white, who had a partner, and earned more than two minimum wages. Seventy-one patients presented non-reactive HBsAg, and no patient showed a reactive test. Roughly 40% of pregnant women had not undertaken the HBsAg test. Among the 121 analyzed pregnant women, 74 (61%) performed the anti-HBs test, and only 14 (19%) showed they were reactive. Approximately 15% showed complete vaccination before prenatal care, but only 9 of them had taken the reactive anti-HBs test. **Conclusion:** A lower expected number of pregnant women who underwent screening for infection (HBsAg), and immunity (anti-HBs) from Hepatitis B, and there was a strong incomplete adherence to vaccination. It is necessary to encourage the request and performance of the tests and adequate medical records filling out, as well as confirmation on the adherence to the three doses of the vaccination schedule recommended by the Brazilian Ministry of Health.

Keywords: hepatitis B; seroconversion; vaccination; prenatal care.

RESUMO

Introdução: A hepatite viral B (HVB) é uma infecção com elevada transmissibilidade, sendo o parto a principal forma de transmissão para recém-nascidos. A investigação da infecção por HBV na gestante deve ser realizada com pesquisa do antígeno de superfície do vírus da hepatite B (HBsAg); já a imunidade ao vírus deve ser avaliada pela presença do anticorpo contra o antígeno de superfície do vírus da hepatite B (anti-HBs). A vacina é recomendada durante a gestação para todas as pacientes com resultado HbsAg e anti-HBs não reagentes. **Objetivo:** Analisar dados relacionados às medidas preventivas da infecção por HBV em gestantes que realizaram o acompanhamento pré-natal no ambulatório de Ginecologia e Obstetrícia da Faculdade de Medicina da Universidade Federal de Pelotas (Rio Grande do Sul). **Métodos:** Estudo transversal por análise dos prontuários das pacientes do ambulatório de Ginecologia e Obstetrícia, analisando e descrevendo dados relacionados às medidas preventivas da infecção por HBV, perfil socioeconômico e etnia dessas pacientes. **Resultados:** O número total de gestantes analisadas foi de 121, de idades entre 15 e 46 anos, maioria branca e com companheiro, e com renda maior que dois salários mínimos. Setenta e um pacientes apresentaram HBsAg não reagente e nenhuma paciente apresentou o exame reagente. Pouco mais de 40% das gestantes não havia realizado o exame HBsAg. Entre as 121 gestantes analisadas, 74 (61%) realizaram o teste de anti-HBs, e apenas 14 (19%) tiveram o teste reagente. Cerca de 15% comprovaram vacinação completa antes do acompanhamento pré-natal, porém apenas nove delas apresentaram o exame anti-HBs reagente. **Conclusão:** Foi encontrado um número inferior ao desejado de gestantes que realizaram os exames de triagem de infecção (HBsAg) e imunidade (anti-HBs) da hepatite B, e expressiva adesão incompleta à vacinação. É necessário incentivo à solicitação e realização de exames, e um preenchimento adequado do prontuário médico, além de confirmação da adesão das três doses do esquema vacinal recomendado pelo Ministério da Saúde.

Palavras-chave: hepatite B; soroconversão; vacinação; cuidado pré-natal.

INTRODUCTION

Viral Hepatitis B is an acute infection that can develop into chronicity with high transferability and impact on public health⁽¹⁾. It can be transmitted by parenteral, sexual, and vertical transmission, and delivery is the main form of transmission to newborns⁽²⁾. Hepatitis

B virus (HBV) infection does not interfere in the course of pregnancy, nor does pregnancy worsen the progression of Hepatitis B, which is not related to an increase in maternal mortality or to a teratogenic effect on the fetus⁽¹⁾. However, infection of the newborn shows a chronic percentage far superior when compared to infection of adults, with about 90% of neonates evolving into the disease's chronic form, with higher rates of morbidity and mortality, especially related to cirrhosis and hepatocellular carcinoma⁽²⁾.

The investigation of HBV infection in pregnant women should be conducted through research on the surface antigen of

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Hepatitis B virus (HBsAg) during the 1st trimester of pregnancy, or when prenatal care is started. The test should be repeated in the 3rd trimester of pregnancy to detect possible infections occurring during pregnancy⁽³⁾. Pregnant women with reactive HBsAg test, an indicative of active infection, should be guided to early administration of immunoglobulin to Hepatitis B virus (HBsAg) specific vaccine to the newborn, as well as later, at the time of delivery, to services that provide such care⁽²⁾. Pregnant women not evaluated during prenatal care for the infection should undergo a search for HBsAg at the time of hospital admission for delivery⁽³⁾.

Despite the introduction of the vaccine, the vertical transmission of Hepatitis B is still a reality⁽²⁾. Immunization against Hepatitis B is performed in three doses, with a month interval between the first and second doses, and of six months between the first and the third dose, and can be performed at any age⁽³⁾. The vaccine for Hepatitis B during pregnancy is recommended for all patients with no reactive HBsAg results, and administered at any quarter⁽³⁾. This is an opportunity to vaccinate those women who had not been immunized for some reason.

After administering three doses of vaccine against Hepatitis B, about 90% of adults and 95% of children and adolescents are expected to develop immunity against Hepatitis B. This rate may be reduced in premature neonates, individuals over 40 years old, immunocompromised, obese, smokers, drinkers, or patients with other chronic diseases, like cirrhosis⁽⁴⁾.

Testing for the development of immunity by detecting antibody (anti-HBS) after vaccination is not routinely recommended by the Brazilian Ministry of Health, only in specific cases, such as when it is done by health professionals or people who work in risk environments of an accident with instruments contaminated with the Hepatitis B virus, dialysis, HIV-positive patients, people who have sex with partners who are HBsAg positive, and children of HBsAg positive mothers⁽⁵⁾.

The American College of Obstetricians and Gynecologists (ACOG), as well as the Centers for Disease Control and Prevention (CDC) recommend the prenatal screening of all HBsAg pregnant women⁽⁶⁾. The recommendation by the Advisory Committee on Immunization Practices (ACIP) is to perform the Anti-HBs test on all pregnant women. There is no evident risk to the fetus when taking Hepatitis B vaccine during pregnancy. Pregnancy itself is not a contraindication for vaccination if it is formally indicated⁽⁷⁾.

Research has been approved by the Research Ethics Committee (REC) of the Medical School of Universidade Federal de Pelotas, Rio Grande do Sul State.

OBJECTIVE

To analyze adherence to the recommended Hepatitis B vaccination schedule, by the Ministry of Health, and to conduct a research test for Hepatitis B virus (HBsAg) infection, in addition to the serological immunity survey (anti-HBS) after the vaccine is performed in pregnant women who attended prenatal care at the Gynecology and Obstetrics outpatient clinic of the Medical School of Universidade Federal de Pelotas (Rio Grande do Sul State).

METHODS

A cross-sectional study was carried out through the analysis of the medical records of patients from the Gynecology and Obstetrics outpatient clinic of Universidade Federal de Pelotas, in Rio Grande do Sul State, Brazil. Data collection was performed by the co-authors of this study, who are academics at the Medical School of Universidade Federal de Pelotas. The students, who performed the curricular internship in Gynecology and Obstetrics at the outpatient clinic, voluntarily initiated the review of the medical records and the accounting of the number of pregnant women in prenatal care, accessing the results of serological tests for Hepatitis B.

The criterion used in the selection of the analyzed medical records was pregnant women in prenatal care from November 2017 to May 2018, regardless of their gestational age. Thus, all medical records of pregnant women who were on that day in prenatal consultations were daily evaluated by the students. The review of the medical records included data related to preventive measures of HBV infection, such as rapid tests and vaccination, socioeconomic profile and ethnicity, complete age in years, skin color, marital status, and family income. All pregnant women in prenatal follow-up during the study period were included, and the data were updated in the subsequent antenatal consultations, as serological tests were performed.

RESULTS

The total number of pregnant women analyzed was 121, aged between 15 and 46 years old, and the mean age was 26.7 years. For mothers, white skin color was predominant (66.1%), most of the pregnant women had a partner (66.7%), and a monthly income more than 2 minimum wages (59.5%) (**Table 1**).

Table 1 – Sociodemographic characteristics of pregnant women who received prenatal care at the Medical School outpatient clinic of Universidade Federal de Pelotas, Rio Grande do Sul State, from November 2017 to May 2018.

Variable	N	%
Age		
15 to 20	19	15.70
21 to 25	31	25.62
26 to 30	34	28.10
31 to 35	22	18.18
36 to 40	7	5.79
Over 40	3	2.48
Not notified	5	4.13
Partner		
With partner	66	54.54
No partner	13	10.74
Not notified	42	34.72
Color		
White	80	66.12
Not White	32	26.44
Not notified	9	7.44
Income		
Less than 2 minimum wages	10	8.26
More than 2 minimum wages	72	59.51
Not notified	39	32.23

Regarding the laboratory HBsAg test, 71 patients (58.7%) showed non-reactive results, indicating the absence of acute infection, and no patient showed reactive tests. As opposed to the recommendations by the Ministry of Health, 50 pregnant women (41.3%) had not undergone the HBsAg exam until data collection time. When analyzing the immunity of patients, only 14 (11.6%) showed the reactive anti-HBS test, representing immunity to Hepatitis B virus. However, 47 pregnant women (38.8%) had not undergone the anti-HBS examination during data collection. Only one patient (0.8%) showed an inconclusive result, but there was no information on the vaccination status of this patient in medical records. Concerning the vaccination status, 16 patients (13.2%) confirmed complete vaccination before prenatal care, and 24 pregnant women (19.8%) did not present information on vaccination in medical records (**Table 2**).

Of the 30 patients with complete vaccination status, only 9 (30%) presented the anti-HBS reactive test, proving immunity to Hepatitis B virus, and eight patients (26.7%) did not undergo the examination. However, 13 patients with pre or peri-gestation with complete vaccination schedule had non-reactive anti-HBS (43.3%) and could be interpreted as a failure in the serological shift after vaccination. Among the 24 patients who did not have information on their vaccination status, 3 (12.5%) showed reactive anti-HBS exams, immunized against Hepatitis B. This may have happened

because of previous vaccination, or also immunization after contact with Hepatitis B virus (**Table 3**).

DISCUSSION

The vaccine against Hepatitis is recommended by the WHO (World Health Organization) since 1991, and was only included in the Brazilian National Program of Immunizations in 2009. In 2013, the Brazilian Ministry of Health included pregnant women as a priority group for vaccination⁽⁸⁾. Prenatal follow-up is the ideal time to trace Hepatitis B virus infection, and also to indicate the vaccination to patients who are not immune⁽⁸⁾.

Evidence shows that the vaccination schedule in three doses is highly effective in preventing the disease and creating antibodies, with a response rate higher than 90%⁽⁷⁾.

This study, however, showed an adherence less than the ideal; approximately 20% of the patients did not take any doses of the vaccine. Among the non-vaccinated pregnant women, 54% did not have any test performed, which corresponds to 11% of the total number of pregnant women under prenatal care during the study period. It means that one-tenth of pregnant women are at high risk of acquiring or even carry the HBV virus, which may contribute to a more significant number of newborns who acquire Hepatitis B by vertical transmission.

According to the Clinical Protocol and Therapeutic Guidelines for Vertical Prevention transmission of HIV, syphilis, and viral hepatitis, congenital Hepatitis B corresponds to 5-10% of cases of the disease in Brazil, and the risk of transmission to the fetus increases from 10%, in the first quarter of pregnancy, to 60% in the third quarter⁽¹⁾. Therefore, virus research in non-vaccinated pregnant women, as well as the antigen that provides immunity against HBV, is of utmost importance. Furthermore, the vaccination schedule control is necessary to protect these patients throughout pregnancy, especially in their third quarter, when the risk of transmission to the fetus increases. Another study held in the Teresina City, Piauí State, in 2012, evaluated the vaccine coverage and showed that 77.5% of women did not receive any doses of Hepatitis B vaccine, a higher percentage than the one found in this study⁽⁸⁾. Therefore, it can be concluded that monitoring and caring for pregnant women served and evaluated, both in this study and in the aforementioned study, was not carried out respecting all requirements for Hepatitis B control, according to the Protocol by the Ministry of Health⁽¹⁾.

A survey conducted in 1993 assessed both pregnant women and non-pregnant women, and reported that after 6 months of the 3-dose-vaccination schedule application, 25% of pregnant women showed non-reactive anti-HBS⁽⁹⁾. This result resembles the one found in our study, where 43% of pregnant women with the full vaccination

Table 2 – Immunological, Hepatitis B infection virus, and vaccine characteristics of pregnant women served at the Medical School prenatal outpatient clinic of Universidade Federal de Pelotas, Rio Grande do Sul State, from November 2017 to May 2018.

Vaccination status	N	%
Hepatitis B Vaccine		
Pre-gestation complete vaccination schedule	16	13.22
Peri-gestation complete vaccination schedule	14	11.57
Only first dose	56	46.29
Only two doses	11	9.09
Not notified	24	19.83
Anti-HBs		
Reactive	14	11.57
Non reactive	59	48.76
Not performed	47	38.84
Inconclusive	1	0.83
HBsAg		
Reactive	0	0.00
Non reactive	71	58.68
Not performed	50	41.32

Anti-HBs: hepatitis B virus surface anticorp; HbsAg: hepatitis B virus surface antigen.

Table 3 – Correlation between vaccination status and immunogenic response to Hepatitis B of pregnant women served at the prenatal outpatient clinic of Universidade Federal de Pelotas, Pelotas City, Rio Grande do Sul State, from November 2017 to May 2018.

Vaccination Status	N	Anti-HBs reactive	Nonreactive	Not performed	Inconclusive
Complete pre-gestation	16	9 (56.25%)	4 (25%)	3 (18.75%)	0
Complete peri-gestation	14	0	9 (64.29%)	5 (35.71%)	0
Only 1 dose	56	1 (1.79%)	26 (46.42%)	29 (51.79%)	0
Only 2 doses	11	1 (9.09%)	9 (81.82%)	1 (9.09%)	0
Not notified	24	2 (8.33%)	8 (33.33%)	13 (54.17%)	1 (4.17%)

Anti-HBs: hepatitis B virus surface anticorp.

schedule had no reactive anti-HBS. Furthermore, among the 30 pregnant women with fully completed vaccination schedule, eight did not undergo antigen research, which can result in a higher number of patients with anti-HBS negative tests.

Another study evaluating the prevalence of Hepatitis B vaccination in health care workers, in the state of Bahia, showed 59.9% of adherence to the full vaccination schedule, more than four times the percentage found in this study⁽¹⁰⁾. Only 61.7% of workers who have completed the three dose-scheme underwent an exam to check immunity after vaccination, and in 13.4% of patients there was no seroconversion, represented by the negative anti-HBS smaller number than the one found in this study, which revealed 46.7% of patients with full vaccination schedule, with negative anti-HBS⁽¹⁰⁾.

Although vaccination against Hepatitis B is highly successful, from 5% to 10% of individuals did not complete the serological turning⁽¹¹⁾. Some causes that contribute to the non-response to the vaccine are the following: genetic predisposition, immunosuppression, and chronic diseases⁽¹¹⁾.

It is crucial to distinguish non-response after full vaccination schedule from declining levels of anti-HBs⁽¹¹⁾. Individuals with decreasing levels of anti-HBS may still be protected by immunologic memory in acute HBV infections, or can prevent chronic infections⁽¹¹⁾.

According to clinical data published by Gilbert Greub et al. in 2001, care should be provided when considering patients vaccinated with non-reactive anti-HBS as non-responders, and those vaccinated whose anti-HBS showed falling titles as not being better protected, due to their immunological memory⁽¹²⁾. Therefore, patients should not necessarily receive additional doses or be revaccinated⁽¹²⁾.

When performing anti-HBs testing, it is necessary to identify those patients who have not reacted to the vaccination schedule and should be revaccinated. It is not required to revaccinate patients whose vaccination schedule is complete and has lower levels of anti-HBs. However, adhering to the three doses of the vaccination schedule recommended by the Ministry of Health must be confirmed.

CONCLUSION

A lower expected number was observed in pregnant women who underwent Hepatitis B infection screening tests (HBsAg) and immunity (anti-HBS), and a strong incomplete adherence to vaccination. Besides that, incomplete medical records were found, whereas almost one-third of patients did not present information on vaccination. Probably, more accurate and systematic supervision were missed during prenatal medical records, not only concerning Hepatitis B serological data, but also of all the elements involved in an appropriate prenatal. Our results are in agreement with those of another study conducted in the same city among puerperal women⁽¹³⁾.

It is necessary, therefore, to encourage the testing request and accomplishment, as well as a proper medical report. According to WHO, less than 5% of people in the world living with chronic hepatitis are aware of their serological status⁽⁶⁾.

It is of the utmost importance that vaccination against Hepatitis B is encouraged by health professionals to reduce Hepatitis B infection and mortality rates. In view of the above, further guidance and supervision must be carried out in a more systematic and frequent

way, and an audit system to be held periodically to verify the correct medical records filling out must be created. Moreover, promoting training is essential to raise the awareness of professionals who will serve pregnant women on the importance of vaccination against Hepatitis B, and also about the correct medical records filling out.

Participation of each author

Carolina Silveira da Silva and Mariangela Freitas Silveira created and developed research. All authors participated in the data collection and analysis, and assisted in the completion of the article.

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Conflict of interests

There is no conflict of interest to be reported.

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