ABCResearch

Original Article

Investigation of Hepatitis B, Hepatitis C, and Human **Immunodeficiency Virus Seroprevalence in Pregnant Patients** Admitted to a Secondary Level Hospital

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ABSTRACT

Objective: In this study, it was aimed to analyze viral hepatitis and human immunodeficiency virus serology of pregnant patients admitted to Cizre State Hospital.

Methods: Patients admitted to Cizre State Hospital Obstetrics and Gynecology Polyclinic between January 2017 and May 2022 due to pregnancy were included in the study. Hepatitis B surface antigen, hepatitis B surface antibody, hepatitis C virus antibody, human immunodeficiency virus antibody, and anti-HBc IgG values of the pregnant women studied by enzyme-linked immunosorbent assay method were examined.

Results: In the study, 24.22% of pregnant women were examined in terms of viral hepatitis and human immunodeficiency virus disease. The mean age of 4548 pregnant women included in the study was 29 ± 6.07 years. Serologically, hepatitis B surface antigen (93.99%) was the most requested test. Hepatitis B surface antigen positivity was detected in 45 pregnant women (1.05%), and 25 of them (55.55%) did not apply to the Infectious Diseases and Clinical Microbiology outpatient clinic for further examination and treatment. Eighty percent of patients with hepatitis B surface antigen positivity were hepatitis B e antigen-negative chronic hepatitis B virus infection. Hepatitis B surface antibody positivity was 35.68%. Hepatitis B surface antibody positivity was present in 33.79% of pregnant women who were born before 1998, when the routine hepatitis B vaccination program began, and in 47.78% of pregnant women born after 1998. As high as 0.41% of pregnant women were hepatitis C virus antibody positive. All of the 21 pregnant women whose first human immunodeficiency virus antibody tests were positive (0.64%) had negative control human immunodeficiency virus antibody results.

Conclusion: In this study, the low rate (24.22%) of pregnant women were examined in terms of viral hepatitis and HIV disease indicating that more importance should be given to viral hepatitis screening. Hepatitis B surface antigen positivity was detected in 1.05% of pregnant women. It was a positive data that the anti-HBs test was found to be positive at a higher rate (47.78%) in pregnant women born after the routine hepatitis B vaccination was started in our country.

Keywords: Hepatitis B, pregnancy, HBsAg, anti-HCV, anti-HBs, viral hepatitis

INTRODUCTION

Infections caused by hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) cause significant health problems.1 According to World Health Organization (WHO) reports, it is estimated that 296 million people were infected with chronic hepatitis

B (CHB) in 2019, 1.5 million people were infected each year, and 820 000 people died, mainly due to cirrhosis and hepatocellular carcinoma.² Hepatitis B endemicity varies in different regions of the world, and Türkiye is included in the intermediate endemicity zones.³ According to WHO, it is estimated that 58 million people were infected with

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chronic hepatitis C in 2019, 1.5 million people were infected each year, and 290 000 people died, mainly due to cirrhosis and hepatocellular carcinoma. The HCV prevalence is known to be lower than HBV (0.2%-2%).⁴ Human immunodeficiency virus infection remains a global public health problem. World Health Organization has announced that the number of patients with HIV infection in 2021 was 38.4 million.⁵ In Türkiye, between 1985 and 2021, 30 293 people were diagnosed as HIV(+) and 2083 of them had acquired immunodeficiency syndrome.⁶ Similar to HBV and HCV infections, HIV infection can be transmitted parenterally, through sexual intercourse, perinatal, and close contact with infected persons.⁷

Hepatitis B virus infection is an important problem for pregnant women, both because of the infection itself and because of the potential harm to the mother or fetus caused by the drugs used. Perinatal transmission is an important mode of disease transmission in areas with a high prevalence of HBV infection. This mode of transmission can lead to significant rates of chronic infection and complications such as cirrhosis and hepatocellular carcinoma. The likelihood of developing CHB is inversely proportional to the age at acquisition of HBV infection. It has been shown that CHB infection develops in 70-90% of infants born to mothers with a diagnosis of CHB and evidence of active HBV replication (HBeAg positive), 20-30% of children aged 1-5 years exposed to HBV, and <5% of adults.⁸ Screening pregnant women for the presence of HBV and administering HBV vaccine

MAIN POINTS

- In this study, it was seen that only 24.22% of pregnant patients were tested for viral hepatitis and human immunodeficiency virus serology. This is a very low rate. In line with the recommendations in the Guidelines for Prenatal Care Management issued by the Ministry of Health, screening for hepatitis B is especially vital.
- About half of the pregnant women with positive hepatitis B surface antigen (HBsAg) did not present to the Infectious Diseases and Clinical Microbiology outpatient clinic for further examination and treatment. It is also possible that some patients may have been referred to outside centers due to the absence of hepatitis B virus DNA testing in our hospital for some time in the past years. In the case of HBsAg positivity, more effort should be made to comply with the hepatitis B surveillance algorithm.
- It was an important data that anti-HBs test positivity was found at a higher rate, especially in those born after 1998 when the routine hepatitis B vaccination program started, but it is a low rate (47.78%). Hepatitis B vaccination of pregnant women who are found to be seronegative after viral hepatitis screening is important for both maternalinfant health and community immunity.

and hepatitis B hyperimmunoglobulin to the infants of pregnant women diagnosed with CHB within the first 12-24 hours after birth can prevent HBV transmission to the baby and the risk of developing a chronic infection by 90%-95%. Therefore, prenatal detection of hepatitis B surface antigen (HBsAg)-positive pregnant women is extremely important.^{9,10} The aim of this study was to investigate pregnant patients admitted to Cizre State Hospital for viral hepatitis and HIV serology.

METHODS

Pregnant women admitted to the Gynecology and Obstetrics Outpatient Department of Cizre State Hospital between January 2017 and May 2022 were included in this study. Patient information was obtained from the Hospital Information Management System. Hepatitis B surface antigen, hepatitis B surface antibody (anti-HBs), hepatitis C virus antibody (anti-HCV), human immunodeficiency virus antibody (anti-HIV), and hepatitis B core antigen IgG type (anti-HBc IgG) values of these patients analyzed by enzyme-linked immunosorbent assay (Cobas E411, Roche, Germany) were evaluated.

The HBV deoxyribonucleic acid (DNA), HBsAg, anti-HBe, aspartate aminotransferase (AST), alanine aminotransferase (ALT), creatinine, total/direct bilirubin values, and CHB treatment status of patients with positive HBsAg admitted to Infectious Diseases and Clinical Microbiology outpatient clinic for further investigation and treatment were evaluated. HCV ribonucleic acid (RNA) and control anti-HIV test results of patients with positive anti-HCV and anti-HIV were also evaluated. The values >1 IU/mL for HBsAg, anti-HCV, and anti-HIV, \geq 10 IU/mL for anti-HBs, and \geq 1 IU/mL for anti-HBc IgG were considered positive.

Statistical Analysis

Statistical Package for Social Sciences Statistics (IBM SPSS Corp., Armonk, NY, USA) 23.0 software was used for analyzing data. Mean, percentage distribution, and standard deviation were used as descriptive measures.

Ethics Committee

Written permission to conduct this study was obtained from the Clinical Research Ethics Committee of Harran University (decision dated July 4, 2022 and numbered 22.13.02) and the relevant institution, and the study was conducted in accordance with the international Declaration of Helsinki.

RESULTS

A total of 4548 patients among 18 771 patients (excluding duplicate admissions) admitted to the Obstetrics and Gynecology outpatient clinic for pregnancy between January 2017 and May 2022, who were examined for viral hepatitis and/or HIV disease (examination rate, 24.22%), were included in this study. The mean age of patients was 29 ± 6.07 years. Serologically, HBsAg (93.99%) was the most frequently requested test, while anti-HBc IgG was the least frequently requested test (1.07%).

Of 4275 patients tested for HBsAg, 62 (1.45%) were found to be positive. 'The HBsAg value of 17 of these patients was low-titer positive and the control tests were negative. Positive HBsAg was confirmed in 45 patients (1.05%), and the mean age of these patients was 28.08 \pm 6.48 (min-max=17-41) years. It was observed that 25 (55.55%) of 45 patients with positive HBsAg did not present to the Infectious Diseases and Clinical Microbiology outpatient clinic for further examination and treatment. Of the 20 patients with positive HBsAg, 16 (80%) were in HBsAg-negative chronic infection phase 3 (inactive HBsAg carriage according to the old terminology), while 3 patients (15%) received tenofovir disoproxil fumarate treatment for CHB.

A patient with positive HBsAg and treatment indication for HBV DNA 1.7×10^8 who was present at the beginning of the COVID-19 pandemic did not show up in the outpatient clinic to receive treatment. No patient had elevated AST, ALT, total/direct bilirubin, and creatinine results. In addition, HBeAg was positive in 3 patients (15%), anti-HBe in 17 patients (85%), and anti-HBs in 1 patient (5%). Of the 16 patients with HBeAg-negative chronic infection categorized as phase 3, 6 (37.5%) had negative HBV DNA.

Of 838 patients tested for anti-HBs, 299 (35.68%) were found to be positive. Of the 725 patients who were tested for anti-HBs and born before 1998 (the year the routine hepatitis B vaccination program started), 245 (33.79%) were anti-HBs positive, while 54 (47.78%) of 113 patients born after 1998 were anti-HBs positive. Of 49 patients tested for anti-HBc IgG, only 2 (4.08%) were positive.

Table 1. Viral Serology Test Results of Patients						
	Positive		Negative		Number of Patients Tested	Rate of Testing
Tests	n	%	n	%	n	%
HBsAg	45	1.05	4230	98.95	4275	93.99
Anti-HBs	299	35.68	539	64.32	838	18.42
Anti-HBc lgG	2	4.08	47	95.92	49	1.07
Anti-HCV	12	0.41	2884	99.59	2896	63.67
Anti-HIV	0	0	3241	100	3241	71.26

HBsAg, Hepatitis B surface antigen; Anti-HBs, Hepatitis B surface antibody; Anti-HBc IgG, Hepatitis B core antigen IgG type; Anti-HCV, Hepatitis C virus antibody; Anti-HIV, Human immunodeficiency virus antibody Of 2896 patients (63.67%) tested for anti-HCV, 13 were found to be positive at low titer (1.21-12.11). Control anti-HCV results of patients with positive anti-HCV were negative in 1 patient, while 12 patients (0.41%) continued to test positive at low titer. Only 2 of the patients with positive anti-HCV were admitted to the Infectious Diseases and Clinical Microbiology outpatient clinic and had negative HCV RNA values. A total of 3241 patients (71.26%) were tested for anti-HIV and 21 (0.64%) had positive initial tests. All patients with positive anti-HIV results also had negative control anti-HIV results (Table 1).

DISCUSSION

The fact that 90-95% of patients with chronic hepatitis in the world are not aware of their disease both causes the clinical picture of these people to progress and causes them to transmit the virus to others.⁸ Although the "Guidelines for Prenatal Care Management" issued by the Ministry of Health clearly states the need for HBV screening during pregnancy and an algorithm for the follow-up of pregnant women with the disease, it is known that HBV screening is inadequate in many institutions.^{7,8} A study conducted in Türkiye showed that the HBsAg test was requested from 16.7% of pregnant women who present to Obstetrics and Gynecology outpatient clinics in a 10-year period.9 In our study, 24.22% of pregnant women were tested for viral hepatitis and/or HIV disease. According to these data, it can be said that the rate of test ordering is guite low and awareness of viral hepatitis and HIV disease screening is not sufficient. However, the possibility that pregnant women may have been tested during their admission to other hospitals may be one of the reasons explaining the low test order rate.

In the TURHEP study by Tozun et al,¹² HBsAg positivity was found to be 4%, although there were differences between geographical regions. The prevalence of CHB in pregnant women is similar to the general population. About 5% of mothers worldwide are HBsAg-positive.8 In a meta-analysis investigating the prevalence of HBsAg in pregnant women in Eastern Mediterranean and Middle Eastern countries, where data for Türkiye were also available, HBsAg positivity ranged from 1% to 10.8%, while this rate was 2.8% for Türkiye.¹³ In a meta-analysis conducted in Iran, the prevalence of HBV infection in pregnant patients was found to be 1.2%.14 Various studies have been conducted to determine the seroprevalence of viral hepatitis in pregnant women. In a study, Furuncuoglu et al¹⁵ investigated the prevalence of HBV infection in pregnant women admitted between 1995 and 2015 and they found HBsAg positivity as 1.5%, and they stated that positivity gradually decreased over the years. In some studies conducted in different regions of Türkiye, HBsAg positivity in pregnant women was found to be 1% to 4.7%.^{11,16-20} In our study,

HBsAg positivity was 1.05%, and the results were similar to the literature. It was observed that 55.55% of pregnant women with positive HBsAg did not present to the Infectious Diseases and Clinical Microbiology outpatient clinic for further examination and treatment. The absence of HBV DNA testing in our hospital in the past years and the fact that patients applied to outside centers for testing may be one of the reasons explaining this low rate. In addition, 80% of HBsAg-positive pregnant women were considered HBeAg-negative chronic infection, while 15% of them received tenofovir disoproxil fumarate treatment for CHB.

Within the scope of the "Bus Project" carried out by the Association for the Fight Against Viral Hepatitis between 2009 and 2011, anti-HBs positivity was found at a very low rate of 16% on average across the country.²¹ Tozun et al¹² found 31.9% anti-HBs positivity in their hepatitis prevalence study. In seroprevalence studies conducted in different regions of Türkiye among pregnant women, anti-HBs positivity was found between 11.5% and 38.4%.^{15,16,18,19,22} World Health Organization decided to include hepatitis B vaccine in the routine vaccination schedule of all countries as of 1997, and Türkiye started routine hepatitis B vaccination of children aged 0 years in 1998.^{23,24} In the study by Şahin et al,²⁰ anti-HBs positivity was found to be 27.8% in pregnant women of all age groups and at a high rate of 54.5% in pregnant women born after 1998. In the study by Dağ et al,²⁵ anti-HBs positivity rate was found to be 58.51% in pregnant women aged 18-30 years and 29.6% in women aged >30 years. In our study, 35.68% of the pregnant women tested for anti-HBs were found to be positive and the results were similar to the literature. In addition, 33.79% of the pregnant women born before 1998 and 47.78% of the pregnant women born after 1998 were anti-HBs positive. Although these rates are a positive reflection of the routine hepatitis B vaccination program, it is also seen that more effort should be made to vaccinate seronegative pregnant women.

In our study, 63.67% of the pregnant women were tested for anti-HCV and 0.41% tested positive. In some studies in Türkiye, anti-HCV positivity in pregnant patients was found between 0.06% and 0.8%.^{16-20,22,26} In a study by Sayan et al,²⁷ 38 (0.27%) pregnant women were found to be anti-HIV positive, while the anti-HIV test result was defined as false positive in 36 of them and high anti-HIV values were detected in 2 cases confirmed by Western blot. In our study, 71.26% of the pregnant women were tested for anti-HIV, while 21 pregnant women (0.64%) with positive initial test results had negative control anti-HIV results.

In conclusion, viral hepatitis and HIV disease are extremely important diseases due to their negative consequences

on both the patient and the newborn in the intrapartum and postpartum periods. Early diagnosis and treatment of these diseases through screening programs during pregnancy are of vital importance. In our study, a low rate of 24.22% of pregnant women were tested for viral hepatitis and HIV disease, indicating that more attention should be paid to this issue. While 1.05% of pregnant women were HBsAg positive, 80% of them were HBeAg negative chronic infections. Although it is a positive result that the anti-HBs test was found to be positive at a higher rate (47.78%) in pregnant women born after 1998. when routine hepatitis B vaccination started in Türkiye, the vaccination program is far from the targeted rate. In this context, more attention should be paid to screening patients followed up for pregnancy for viral hepatitis serology and vaccination of seronegative patients for hepatitis B.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Harran University (Date: July 4, 2022, Number: 22.13.02).

Informed Consent: Informed consent was obtained from hospital management where the study was conducted.

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