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The Prevalence of Hepatitis B Surface Antigen (HBsAg) and its Influencing Factors in Pregnant Women Referring to Healthcare Centers of Dehloran, Iran in 2011-2012

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ABSTRACT

Background & aim: Hepatitis B virus (HBV) infection is a major global health concern. According to the statistics, the prevalence of this infection is moderate in Iran. Pregnant mothers, who are infected with the virus (virus carriers), can transmit the infection to their fetus. This study aimed to determine the prevalence of hepatitis B surface antigen (HBsAg) and its influencing factors in pregnant women, referring to healthcare centers of Dehloran, Iran.

Methods: In this descriptive, cross-sectional study, the sample consisted of all pregnant women with medical records, referring to healthcare centers of Dehloran city for prenatal care during 2011-2012. Census sampling was applied and subjects' medical records were reviewed. Demographic and pregnancy-related data, and HBV test results were recorded. For data analysis, descriptive statistics, t-test and Fisher's exact test were applied, using SPSS version 16.0. P-value < 0.05 was considered statistically significant.

Results: In this study, the medical records of 850 pregnant women were studied. The prevalence of positive HBsAg test results was 0.59% in the study population. Positive HBsAg was significantly correlated with parity (P=0.003) and abortion (P=0.04). However, there was no significant association between HBsAg results and other variables such as age (P=0.16), mother's educational level (P=0.16), spouse's educational level (P=0.66), place of residence (P=0.66), history of cesarean section (P=0.18), work experience at healthcare centers (P=1.0), blood transfusion (P=1.0) or HBV infection in the first-degree relatives (P=1.0).

Conclusion: Although the prevalence of positive HBsAg was relatively low among pregnant women in Dehloran city, HBV screening during pregnancy is highly recommended.

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Introduction

Hepatitis is a global public health concern. This condition refers to a wide range of clinical and pathological states, caused by immunological attacks to the liver or viral, toxic, and pharmacological factors (1). According to statistics, there are 350 million carriers of chronic hepatitis B virus (HBV), worldwide, among whom 75% are Asians (2). Additionally, almost one million deaths occur due to chronic hepatitis, cirrhosis and hepatocellular carcinoma (HCC) around the world (3, 4).

According to a report in 2014 by World Health Organization (WHO), the highest prevalence of HBV infection was reported in Sub-Saharan Africa and Eastern Asia. Most people in these regions become infected with this virus

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during childhood, and 5-10% of the adult population is chronically infected. Moreover, in the Middle East and the Indian subcontinent, almost 2-5% of the general population is chronically infected. Also, less than 1% of the population in Western Europe and North America is chronically infected by HBV (5).

Iran is located in the Middle East and has an intermediate prevalence of chronic HBV infection (2). According to previous research, prevalence of HBV infection in different regions of Iran ranges between 2.1% and 7.9% (6, 7). In this regard, a systematic review by Alavi et al. indicated that about 1.5 million people in Iran are living with HBV infection (mild to moderate prevalence, according to WHO classification), and it is assumed that 15-40% of this population will be at risk of developing cirrhosis and/or HCC.

HBV infection is a contagious disease which may transmit vertically from the mother to the newborn or horizontally by means of blood products and body secretions (8). In fact, mother-to-child transmission is one of the most important modes of transmission, associated with many adverse effects (9).

As previous studies have indicated, 50% of people with HBV have been infected during either the prenatal period or early childhood (10-12). The embryonic period is the most critical stage of the child's future development and fetus is in fact a part of mother's body. Fetal infection may occur in the early stages of pregnancy, and bacteria, viruses or parasites can pass through the membranes. Conversely, the fetus may be infected by organisms during labor (13).

In total, 98% of newborns will develop chronic HBV infection and only 2% of these cases will suffer from acute infection. Moreover, 10% of adults will develop chronic HBV infection and in 90-95% of cases, the surface antigen of the virus is negative in the blood during the first 6 months; this indicates a worse prognosis in newborns, compared to adults (1, 14). Fortunately, perinatal transmission of the disease can be reduced in up to 95% of cases with vaccination and hepatitis B immunoglobulin injection at birth (15).

The prevalence of hepatitis B surface antigen (HBsAg) in pregnant women varies in different parts of the world. According to a previous study in the United States, the prevalence rate has been estimated at 0.14-5.79 (16). Additionally, some studies have been performed in Iran. In this regard, in a study by Sahaf et al., the prevalence rates of HBsAg among pregnant women were reported to be 2.5% and 1% in Malekan and Gorgan cities in Iran, repsectively (17, 18).

Pregnant women with HBV infection are different from the general population. Therefore, the problems of this population such as the adverse effects of infection on the mother and fetus, the impact of pregnancy on HBV replication, undergoing HBV antiviral therapy during pregnancy, the effects of treatment on the mother and fetus, immunization of neonates after birth and the probability of hepatitis activity after childbirth need to be considered (19).

Since HBV infection during pregnancy can lead to pregnancy complications and may vertically transmit from the mother to the newborn, we aimed to identify the prevalence of HBsAg and the influencing factors in pregnant women, referring to healthcare centers of Dehloran city, Iran.

Materials and Methods

This descriptive, cross-sectional study was carried out after obtaining an approval from the ethics committee of Ilam University of Medical Sciences. The study sample consisted of all pregnant women with HBsAg test results, referring to healthcare centers of Dehloran city (No. 1 and No. 2) for prenatal care during 2011-2012. Census sampling was applied and the medical records of all pregnant women, receiving prenatal care at healthcare centers of Dehloran city between March 2011 and March 2012, were reviewed. Among 862 medical records, 850 cases with HBsAg test results were selected.

Demographic characteristics and data related to pregnancy history were assessed by a researcher-made questionnaire. Content validity of this questionnaire was confirmed by the experts. The reliability of data collection tool was confirmed by the researcher and a colleague (r=1).

Descriptive statistics, t-test and Fisher's exact test were performed, using SPSS version 16.0. P-value less than 0.05 was considered statistically significant.

Results

In total, 850 out of 862 medical records were assessed. The prevalence of subjects according to HBsAg test results is shown in Table 1. According to this table, the prevalence of positive HBsAg results was 0.59% in the study population (95% confidence interval: 0.08-1.1) (Table 1).

Table 1. The prevalence of HBsAg test results among pregnant women, referring to healthcare centers of Dehloran city

HBsAg test results	N (%)
Positive	5 (0.59)
Negative	845 (99.41)
Total	850 (100)

Table 2. Comparison of demographic and pregnancy-related characteristics in the study population, according to HBsAg test results

Variables	Positive HBsAg N (%)	Negative HBsAg N (%)	P-value
Age (year)			
<25	0 (0)	296 (35.0)	
≥25	5 (100)	549 (65.0)	0.16
Total	5 (100)	845 (100)	
Mother's Educational level			
Elementary or secondary school education	5 (100)	511 (60.5)	
University education	0 (0)	334 (39.5)	0.16
Total	5 (100)	845 (100)	
Spouse's educational level			
Elementary or secondary school education	4 (80)	547 (64.7)	
University education	1 (20)	298 (35.3)	0.66
Total	5 (100)	845 (100)	
Place of residence			
City	4 (80)	552 (65.3)	
Village	1 (20)	293 (34.7)	0.66
Total	5 (100)	845 (100)	
Parity			
<3	2 (40)	786 (93.0)	
≥3	3 (60)	59 (7.0)	0.003*
Total	5 (100)	845 (100)	
Abortion			
Yes	3 (60)	153 (18.1)	
No	2 (40)	692 (81.9)	0.04*
Total	5 (100)	845 (100)	
Cesarean section history			
Yes	2 (40)	134 (15.9)	
No	3 (60)	711 (84.1)	0.18
Total	5 (100)	845 (100)	
First-degree relatives infected by HBV			
Yes	0 (0)	4 (0.48)	
No	5 (100)	841 (99.52)	1.0
Total	5 (100)	845 (100)	
Blood transfusion history			
Yes	0 (0)	4 (0.48)	
No	5 (100)	841 (99.52)	1.0
Total	5 (5)	845 (100)	
Working at healthcare centers			
Yes	0 (0)	8 (0.95)	
No	5 (100)	837 (99.05)	1.0
Total	5 (100)	845 (100)	

* P-value is significant

The mean age of participants in positive and negative HBsAg groups was 31.80±2.38 and 28.43±6.91 years, respectively. There was no significant difference in terms of age between the groups (P=0.27).

Positive HBsAg was significantly correlated with parity (P=0.003) and abortion (P=0.04). However, there was no significant difference between HBsAg test results and other variables such as age (P=0.16), mother's educational level (P=0.16), spouse's educational level (P=0.66), place of residence (P=0.66), history of cesarean section (P=0.18), work experience at healthcare centers (P=1.0), blood transfusion (P=1.0) or HBV infection in first-degree relatives (P=1.0) (Table 2).

Discussion

The present study showed that the prevalence of positive HBsAg test results was 0.59% in the study population. In fact, the prevalence rate of HBV infection in pregnantwomen varies in different parts of Iran and the world. According to previous studies, the prevalence of HBV infection among pregnant women was estimated at 0.1% in Spain (20), 4.3% in Nigeria (21), 18.5% in Brazil (22), 5.6% in Sudan (23) and 3.7% in Ethiopia (24).

Some studies have been carried out in Iran in order to evaluate pregnant women as a high-risk group. According to these studies, the prevalence of HBV infection in pregnant women was estimated at 0.7% in Lorestan (25), 1% in Zanjan (26), 1% in Gorgan (18), 2.3% in Kerman (9), 2.5% in Malekan (17), 2.5% in Zahedan (27), 3.1% in Rafsanjan (28) and 3.4% in Qazvin (29). Compared to the mentioned rates, the prevalence of HBV infection in pregnant women, referring to healthcare centers of Dehloran city, was relatively low; this can reflect the social and cultural background of people in this region.

Dehloran is a sparsely populated city with a religious background, located in West of Iran in Ilam province (30). Apparently, due to Muslims' commitment to family roots and Islamic principles in Iran, sexual transmission among women is quite rare, especially in Dehloran city.

It should be noted that in our country, mass vaccination against HBV infection started in 1993 and neonates born after this period were required to be vaccinated. Implementation of this strategy has led to significant advances in the prevention of HBV infection in the infants of infected mothers (31, 32).

In this study, there was no significant relationship between HBsAg test results and other variables such as age, mother's educational level, spouse's educational level, place of residence, history of cesarean section, work experience at healthcare centers, history of blood transfusion or HVB infection in first-degree relatives. Our findings were consistent with the results reported by Tabasi et al. in Kashan, who found no significant relationship between HBsAg test results and variables such as age, prior history of surgery or blood transfusion (33).

Moreover, the results of a previous study on pregnant women in Kerman city showed no statistically significant relationship between the prevalence of HBV infection and spouse's occupational status, place of residence, history of blood transfusion or prior history of surgical operations (9).

The results of the present study showed that multiparous women with a prior history of abortion were at a greater risk of maternal HBV, compared to nulliparous women. Moreover, Suen et al. found that with *increasing number* of childbirths, risk of HBV infection may significantly increase (34). Additionally, the prevalence of HBV infection in women with a prior history of miscarriage may be higher, since multiparity increases the risk of abortion.

The most likely route of HBV horizontal transmission is sexual intercourse. It seems that the higher prevalence of HBV infection in multiparous women is due to more sexual intercourse during their lifetime, compared to nulliparous women. Also, it seems that with each pregnancy and childbirth, risk of exposure to HBV infection increases due to exposure to obstetric and surgical procedures (34).

This study was the first published research to determine the prevalence of HBsAg and the influencing factors in pregnant women, referring to healthcare centers of Dehloran city, Ilam Province; this is in fact the main strength of the present study. On the other hand, one of the limitations of this study was that the only source of data was the participants' medical records. Also, since the precision of healthcare staff in completing prenatal care records, demographic data and test results may vary, the gathered data

might have been affected. Moreover, HBV test results were documented in different laboratories. Therefore, the accuracy and precision of the results may not be similar; this was in fact another limitation of the present research.

Conclusion

Although further research is required to determine the prevalence of HBsAg and the influencing factors in pregnant women, the obtained results showed that the prevalence of positive HBsAg results among pregnant women was relatively low in Dehloran city. In fact, if the prevalence of positive HBsAg in the population is higher than 0.06%, screening is highly recommended. Therefore, in our country, HBV screening of pregnant women is performed during prenatal tests. With access to information about the incidence of HBV infection among pregnant women, we can take some effective steps in planning HBV vaccination, preventing complications during pregnancy and childbirth and designing strategies based on educational principles and hygiene standards in order to combat this infectious disease.

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Conflict of Interest

The authors declare no conflicts of interest.

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