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Original Article

Prevalence of HBsAg and Associated Risk Factors with Hepatitis B Infection among Pregnant Women in the Northeast of Iran

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ABSTRACT

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Background and Aims: About 350 million people worldwide are carriers of the hepatitis B virus. Iran is categorized as a country with a moderate prevalence of infection with this virus. In the developing countries, transmission from mother to fetus and newborn is considered as one of the main routes of transmission. Therefore, this study aimed to investigate the prevalence of hepatitis B surface antigen (HBsAg) and associated risk factors with hepatitis B infection among pregnant women in the northeast of Iran.

Material and Methods: In this descriptive cross-sectional study, 759 pregnant women had referred to the Central Laboratory of Academic Center for Education, Culture, and Research (ACECR) and medical laboratory of Mashhad Ghaem hospital for HBsAg testing, following obtaining consent form, they were included in the study with simple non-probability sampling, and a questionnaire was completed about demographic characteristics and related factors.

Results: The mean age of the participants was 28.16±4.8 years. the prevalence of HBsAg among pregnant women was reported 0.3%, and also, because only two cases of HBsAg positive was found, a significant correlation was not found on socio-demographic factors such as; a history of hepatitis B vaccination and risk factors including a family history of hepatitis B or hepatitis C.

Conclusions: Our study showed a low prevalence of HBsAg positive among pregnant women. Of course, further studies with more cases are necessary to achieve a real estimation of HBsAg positive among pregnant women in the northeast of Iran.

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Introduction

Infection with hepatitis B virus (HBV) is a serious global problem; two billion people are infected with this virus worldwide, and about 350 million people suffer from chronic hepatitis B, 75% cases of which are from Asian [1]. Based on reports from the World Health Organization, the high frequency of HBV infection was in Saharan Africa, and Eastern Asia [2]. Hepatitis B infection is considered as a 10th most important cause of death over the world and annually about 500000-1.2 million deaths occur due to chronic hepatitis B, cirrhosis, and hepatocellular carcinoma (HCC) [3]. As described in another study, the prevalence of HBV infection in diverse areas of Iran has been ranging between 2.1%-7.9% [4].

Nowadays, hepatitis B has remained as the major health problem worldwide. More than half of the world population is infected with the hepatitis B virus during their lifetime, and more than 5% of them suffer from chronic hepatitis B infection [5]. The prevalence of hepatitis B infection in the world is changing due to the use of a safe and effective vaccine. The areas with higher prevalence including Southeast Asia, China, and Africa, where nearly 10% of the population are chronic carriers for hepatitis B virus. Local levels of the virus in Australia, North America, and Western Europe are lower [6]. In addition to the effects of disability (morbidity) in patients with chronic hepatitis B, these people are at the risk of cirrhosis and HCC, and because of its complications, each year more than one million people die from hepatitis B [7]. Since hepatitis B surface antigen (HBsAg) was identified in 1965 and followed by the discovery of the complete virus (Dane Particle) by Bloomberg in 1970, the serologic diagnosis tests and monitoring of hepatitis B virus infection gradually entered the market [8].

In Southeast Asia countries, transmission from the mother-to-child is considered as the main way of infection [9]. Fetal infection with HBV may happen in the early stages of pregnancy; viruses can pass via the membranes and infect the fetus [10]. In general, in 98% of newborn cases, the most prevalent form of HBV infection is as chronic; in fact, only 2% of the cases suffer from an acute form. Is should be noted that in 90-95% of the patients, the HBsAg is negative in the blood during the first 6 months [11].

Mashhad, the capital of Khorasan Razavi province is the second most populous city in Iran. It is located in the northeast of the country with a population of about 3000000 (2016 census). Because, to date, there has been no study on the seroprevalence of HBV in the pregnant women of Mashhad population, this study aimed to investigate the prevalence of HBsAg and associated risk factors with hepatitis B infection among pregnant women in the northeast of Iran.

Materials and Methods

In this descriptive observational cross-sectional study which was conducted in 2011-2012,

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759 pregnant women who had referred to the Central Laboratory of Academic Center for Education, Culture, and Research (ACECR) and laboratory of Ghaem hospital in Mashhad for HBsAg testing, were included in the study with simple non-probability sampling.

The effect of independent variables such as age, education, occupation, race, income, remarriage, marriage, pregnancy and fertility characteristics, a previous history of hepatitis B vaccination, a history of high-risk behavior, a history of high-risk medical procedures in the wife, a family history of hepatitis B or C on the dependent variable (HBsAg) was analyzed. HBsAg is a qualitative-nominal variable based on the enzyme-linked immunosorbent assay (ELISA) test which was performed on patients' serum reported as positive or negative in the laboratories. Pregnant women with HBsAg test request who had referred to the laboratory and had voluntarily completed the questionnaire were enrolled. Then, a questionnaire was filled around their demographic characteristics and related factors. Content validity of the questionnaire was confirmed by the experts (researcher-made questionnaire). The reliability of the data collection tool was verified by the researcher and a colleague (r=1).

To conduct this research, no additional cost of the patients and insurance companies was imposed. Satisfaction of all patients was obtained and those who were not willing to participate were excluded from the study. This study was approved by the Ethical Committee of Mashhad University of Medical Science, Mashhad, Iran.

Statistical analysis

For descriptive statistics, Fisher's exact test and odds ratio were performed, using SPSS version 13. A p-value less than 0.05 were considered as statistically significant.

Results

Of 759 pregnant participants aged 15 to 44 (Mean; 4.8±28.16), only two individuals (0.3%) were HBsAg positive. As shown in Table 1, 58.2% of people had an academic literacy, 5.1% of individuals had a family history of hepatitis B or C, and 31.2% of cases had received hepatitis B vaccine.

In the current study, there was no significant correlation between age ($p>0.05$), education ($p=0.999$), occupation ($p=0.483$), race ($p=0.999$), income ($p=0.999$), remarriage ($p=0.999$), pregnancy ($p=0.686$) and fertility characteristics ($p=0.999$), previous history of hepatitis B vaccination ($p=0.527$), and family history of hepatitis B or C ($p=0.527$). The correlation between other related factors and HBsAg positive is listed in Table 1.

Discussion

The prevalence of hepatitis B infection varies in different regions of the world with the prevalence rate between 0.1% to 20% [12, 13]. The total number of deaths caused by hepatitis B in 2013 was assessed to be 686,000 [14]. The mortality associated with HBV in Asians and Pacific Islanders is 2.6 deaths/100,000 populations [15].

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Table 1. Socio-demographic factors associated with HBsAg positivity in pregnant women of Mashhad

Variable		Number	Percentage	P-value
Literacy	Non academic	317	41.8	0.999
	Academic	442	58.2	
Employment Status	Unemployed (housewife)	546	72	0.483
	Employed	213	28	
Ethnic background	Persian	722	95.1	0.999
	Other	37	4.9	
Household monthly income	Less than 150 $	450	59.3	0.999
	More than 150	309	40.7	
Remarriage	yes	24	3.2	0.999
	no	735	96.8	
Remarriage of spouse	yes	31	4.1	0.999
	no	728	95.9	
Numbers of pregnancies	0	434	57.2	0.999
	1	228	30	
	2	85	11.2	
	3-4	12	1.6	
Numbers of fertility	1	425	56.1	0.686
	2	205	27	
	3	95	12.5	
	4-5	33	4.4	
Previous history of hepatitis B vaccination	yes	237	31.2	0.527
	no	522	68.8	
A family history of hepatitis B or C	Yes	39	5.1	0.999
	no	720	94.9	
The number of abortion	0	598	78.8	0.379
	1	121	15.9	
	2-4	40	5.3	
Number of children	0	449	59.2	0.999
	1	232	30.6	
	2-3	78	10.2	
Prison history	yes	1	0.1	0.999
	no	758	99.9	
A history of tattoos	yes	37	4.9	0.999
	no	722	95.1	
A history of dental procedures	yes	670	88.3	0.999
	no	89	11.7	
A history of surgery	yes	346	45.6	0.999
	no	413	54.4	
Endoscopy history	yes	46	6.1	0.999
	no	713	93.9	
Dialysis history	yes	3	0.4	0.999
	no	756	99.6	
Blood transfusion	yes	17	2.2	0.999
	no	742	97.8	
A history of intravenous drug addiction	yes	1	0.1	0.999
	no	758	99.9	
A history of intravenous Drug addiction in their spouse	yes	5	0.7	0.999
	no	754	99.3	
HBsAg test results	Positive	23	3	0.999
	negative	736	97	

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Before 1993, the estimated frequency of chronic carriers in Iran was about 3%, but based on studies carried out in different parts of our country, today the prevalence of HBsAg-positive hepatitis has been reported to be 1.5% to 2.0% [16, 17]. However, our study revealed that the prevalence of HBsAg-positive hepatitis has been decreased to 0.3%. Raised people's knowledge about the risk factors of the disease, national vaccination program in 1993 for all neonates, and vaccination for high-risk groups could be some reasons for this decrease [6]. According to the statistics, about 97% of Iranian infants do receive hepatitis B vaccine [18]. International data in 2009 suggest that the vaccination coverage has reached 99% in Iran [19]. Some studies conducted in our country have surveyed the prevalence of HBsAg positive in pregnant women, but no research on the prevalence of hepatitis B in pregnant women has been conducted in Khorasan Razavi province. The novelty of this study was to investigate the prevalence and factors associated with HBsAg positive in pregnant women of Mashhad; also two centers with different types of people with diverse cultures and other different factors were chosen. In this study, because, fortunately, only two pregnant women were HBsAg-positive, the survey of the correlation between related factors and prevalence of HBsAg-positive cases was not possible. In line with our study, in studies conducted in other parts of Iran, no significant relationship had been found between the relevant factors and the prevalence of HBsAg positive. In a study carried out in Bonab city in 2006, among 187 pregnant women who had referred to health centers, 4 cases (2.3%) were HBsAg-positive and no significant relationship was found between the age of marriage and monthly income with hepatitis B [20]. Moreover, in a study carried out in 2008-2009 in Gorgan among the pregnant women who had referred to an educational hospital, out of 1553 patients, 15 cases (1%) were HBsAg-positive, and in 40 % of infected pregnant women, no known risk factor was identified [21]. In another study conducted by Sharifi et al. in Zahedan, no significant relationship was found between related factors and the prevalence of HBsAg positive [22]. However, several studies conducted in different regions of Iran have shown a significant association between the prevalence of HBsAg positive and related factors. For example, Leila Kheiri and et al. investigated the prevalence of HBsAg and factors affecting pregnant women referring to healthcare centers of Dehloran, in 2011-2012, in which among 850 people, 5 cases (5.9%) were HBsAg positive. They found a correlation between HBsAg positive and factors such as parity and abortion. But in the same study, no association was found between HBsAg positive and other factors studied [1]. In a study which was conducted by Cheraghali et al. in Gorgan in 2011, the family history of pregnant women with hepatitis B had a significant association with the prevalence of HBsAg positive [21]. The results of several studies conducted in the

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countries around and in the Persian Gulf on the prevalence of HBsAg have been varied. In the research conducted in 2005 on pregnant women in Saudi Arabia, totally 2.4% of the patients were HBsAg positive and 3% with a history of surgery were HBsAg positive. There was no significant difference between the history of tooth extraction and a history of blood transfusion with HBsAg positive [23]. In another study conducted in 2006 in India, the prevalence of hepatitis B in pregnant women was 4.8%, while there was no significant difference between the history of blood transfusion and tattooing, as well as, the history of surgery with the HBsAg positive [24]. As it was identified in the two mentioned studies, the incidence of HBsAg positive is higher in countries around us which probably relates to the correct vaccination program in Iran [25].

The strong point of our study is that we obtained samples from two centers with various types of people having different cultures, various incomes, different educational levels and diverse ethnic and race, therefore, it can be indicative of a pattern of a larger community, and the data obtained in this study can be generalized to the population of this community. However, the present study has several limitations: firstly, the study carried out only in Mashhad; secondly, the number of the participants was small. For this reason, extensive studies should be conducted with more samples from different parts of Khorasan Razavi province.

Conclusions

Our study revealed that the prevalence of HBsAg positive among pregnant women has decreased in the northeast of Iran. The prevalence of obtained HBsAg in this study compared to other studies is low; therefore, further studies with more cases in different regions of the province are needed to achieve a real estimation of HBsAg positive among pregnant women.

Conflict of Interest

Authors have no conflict of interest.

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