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The Prevalence of HBsAg and HBsAb among Pregnant Women Referring to Zeinabiyeh Hospital, Shiraz Iran

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Abstract

Background: Hepatitis B virus infection is a worldwide health problem. Vertical transmission is a route of Hepatitis B virus infection that is regarded as a considerable factor in Hepatitis B virus prevention program all over the world.

Objective: This study was conducted to screen the hepatitis B surface antigen, hepatitis B surface antibody and hepatitis B e antigen in pregnant women.

Methods: From September to October 2009, two hundred fifty pregnant women in Zeinabiyeh hospital in Shiraz, Iran, were recruited consecutively to this study at the time of their delivery. Their sera were examined for detection of hepatitis B surface antigen, hepatitis B e antigen and hepatitis B surface antibody, using enzyme-linked immunosorbent assay. Different demographic data (i.e. age, nationality, vaccination and family history of Hepatitis B virus infection) were investigated to determine the presence or absence of hepatitis B surface antigen, hepatitis B e antigen and hepatitis B surface antibody.

Results: Among 250 subjects, the prevalence of hepatitis B surface antigen and hepatitis B surface antibody was 1.2 % and 50%, respectively. Demographic data that showed significant association with prevalence of hepatitis B surface antigen were family history of Hepatitis B virus infection ($X^2 = 7.735$, $P = 0.05$), age ($X^2 = 3.762$, $P = 0.05$) and nationality ($X^2 = 5.41$, $P = 0.02$).

Conclusion: The findings of this study recommended the necessity of hepatitis B surface antigen screening test for pregnant women especially for those younger than 25 years of age and with the family history of Hepatitis B virus infection and also for Afghani residents.

Keywords: HBV; HBsAg; HBsAb; Pregnant Women

Introduction

Hepatitis B virus (HBV) infection is considered as a major public health problem in many various countries.(1-3) The prevalence of HBV infection is estimated up to 2 billion people worldwide with 350 million chronic carriers that may progress to chronic active hepatitis, cirrhosis and hepatocellular carcinoma.(4, 5) According to the reports, different geographic regions can be divided into three prevalence zones: low (less than 2 %), intermediate (between 2-7 %) and high (higher than 8 %) infection level in people.(6)

Parenteral, vertical and horizontal routes can be the most important modes of acquiring HBV infection in children. In areas of intermediate prevalence like Iran (with a carrier rate of 2 % and past infection in 20-30 % of population), vertical transmission of infection from mothers to infants could be a very important route of transmission of HBV.(7, 8)

It is generally accepted that risk of chronic infection with HBV is in-

versely related to age of getting the infection. The risk of acquiring HBV chronic infection for a neonate is as high as 70 to 90 % in those born from hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg) positive mothers to as low as 10-40 % in infants born from mothers who are positive for HBsAg but negative for HBeAg.(9)

The disease in these children becomes chronic most often and represents the most important reservoir of infection in the community for as long as their life. Prevention policy of transmission of infection in this group would be most important to decrease overall carrier rate.(9, 10) Therefore, identification of HBV prevalence in pregnant women as a main source of infection in this high risk group is very important in HBV prevention programs. A universal vaccination program against HBV infection in infancy was implemented in Iran in January, 1992 after a successful pilot study in two provinces in 1989. The program includes a first dose of vaccine at birth and subsequent doses

at the ages of 1 and 6 months. This schedule is expected to induce protective antibody response in 95 % of the infants.(11) Although passive immunization in addition to active immunization is given at birth to newborns of previously diagnosed HBsAg carrier mothers, but it has been reported that perinatal transmission of HBV to newborns still occurs despite passive and active immunoprophylaxis.(12)

Although HBV markers have been frequently reported in pregnant women in different provinces of Iran.(13-18), there is no published data from Fars province. The study was conducted to determine the frequency of HBV markers and to identify potential risk factors of this infection in pregnant women in Fars province. Information on this high risk group was expected to be important in (i) deciding whether modifications, such as HBsAg screening in pregnancy and passive immunization of newborns of carrier mothers, are necessary, (ii) implementing control program for high risk pregnant women.

Patients and Methods

Subjects

Patients (N = 250) were recruited consecutively from the Department of Gynecology at Zeinabiyeh Hospital in

Shiraz, Iran from September to October 2009. All the subjects were pregnant women admitted at the hospital for delivery. The demographic data including age, nationality, residential city, parity number, family history of HBV infection and other complementary information were collected by a questionnaire. The study was approved by the Ethics Committee of Shiraz University of Medical Sciences and written informed consent was obtained from each participant before sampling.

Sampling

A blood sample of 5 mL was drawn from each participant and allowed to clot for 2 h. Then, the blood samples were spun at 3000 rpm for 10 min and the serum was separated, aliquoted and stored at -20°C until testing.

ELISA tests

HBsAg (DIMA, Gottingen, Germany), hepatitis B surface antibody (HBsAb) (DIMA, Gottingen, Germany) and HBeAg (Dia.Pro.Milano, Italy) were detected by commercial quantities Enzyme linked Immunosorbent Assay kits according to the manufacturer's instructions.

Statistical analysis

Statistical analysis was performed using SPSS (version 16.0; SPSS Inc., Chicago, IL, USA). In addition to the descriptive test, crosstab test and Chi-

square test were used to compare different variables and find out the association of two-way tables. A p-value of ≤ 0.05 was considered significant. Multivariate analysis was carried out using logistic regression method.

Results

The frequency of HBsAg and HBsAb among 250 subjects was 1.2% (3 subjects) [1 Afghan and 2 Iranian] and 50% (125 subjects), respectively (Tables 1 and 2). Among all the participants, 57 cases were vaccinated. None of the positive HBsAg cases had received HBV vaccine.

As displayed in Table 1, in the present study the prevalence of HBsAg in women younger than 25 years of age was significantly higher than those older than 25 years ($X^2 = 3.762$, $P = 0.05$); however, in the case of Anti-HBs Ab no significant association was found between two age groups ($X^2 = 0.329$, $P = 0.566$). We also found that the prevalence of HBsAg in pregnant women who have family history of HBV infection was statistically significant compared to those with no history of HBV family infection ($X^2 = 7.735$, $P = 0.05$) (Table 2).

Another demographic criterion was nationality. The prevalence of HBsAg was somehow higher in Afghani sub-

jects compared to Iranians, but in the case of HBsAb, it was more prevalent among Iranian participants compared to Afghani subjects, but statistical analysis showed no significant association ($X^2 = 3.124$, $P = 0.07$). Among them, 229 subjects were housewives and the rest were employees. All of those with HBsAg positive were housewives. Although the frequency of HBsAb was higher in employed women (61%) than in housewives (49%) but it was not significant ($X^2 = 0.924$, $Sig = 0.336$).

Finally, we detected no association between the parity number of the subjects with the frequency of HBsAg and HBsAb positivity. The participants in this study were from different areas of Fars province; however, they were mostly from Shiraz (38.94%), Kavir (7.63%), Marvdasht (7.23%), Kharameh (4.42%) and Darab (3.64%). The prevalence of HBsAb in different areas of Fars province is shown in Figure 1.

HBeAg of one HBsAg positive subjects was positive and the two others were negative.

Table 1. The Prevalence of HBsAg and HBsAb among Different Age Groups of the Studied Pregnant Women.

	≤ 20	20-25	25-30	30-35	35-40	> 40	Unknown age
- HBsAg	42	64	90	32	10	3	5
+ HBsAg	1	2	0	0	0	0	0
Total	43	66	90	32	10	3	5
- HBsAb	19	33	46	14	7	3	3
+ HBsAb	24	32	44	18	3	0	2
Total	43	65	90	32	10	3	5

HBsAg and HBsAb stand for hepatitis B surface antigen and antibody, respectively.

Table 2. The Prevalence of HBsAg and HBsAb among Studied Participants and Their Association with Demographic Data Including Nationality, Family History of HBV Infection and Age.

		- HBsAg	+ HBsAg	Total	- HBsAb	+ HBsAb	Total
Nationality	Afghan	11	1	12	3	9	12
	Iranian	236	2	238	121	116	237
	Total	247	3	250	124	125	249
	$X^2 = 5.41, P = 0.020$				$X^2 = 3.124, P = 0.07$		
Family history of HBV infection	Negative	239	2	241	120	120	240
	Positive	8	1	9	4	5	9
	Total	247	3	250	124	125	249
	$X^2 = 7.735, P = 0.05$				$X^2 = 0.107, P = 0.743$		
Age	≤ 25	106	3	109	52	56	108
	25 <	135	0	135	70	65	135
	Total	241	3	244	122	121	243
	$X^2 = 3.762, P = 0.05$				$X^2 = 0.329, P = 0.566$		

HBsAg and HBsAb stand for hepatitis B surface antigen and antibody, respectively.

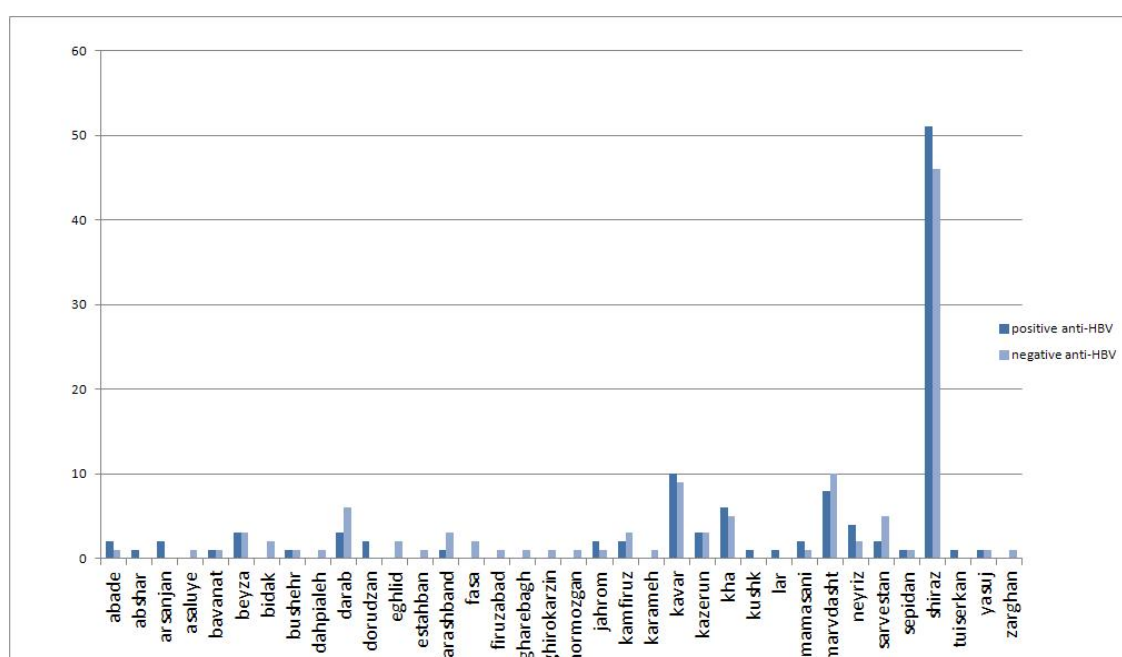


Figure 1: The Prevalence of Hbsab in Different Areas of Fars Province.**Discussion**

At present, more than 350 million individuals endure chronic HBV infection worldwide, of which 20 % are likely to develop end stage liver disease including cirrhosis and/or HCC. (19) Due to the importance of Hepatitis B infection, many studies have been conducted to determine the prevalence of chronic HBV infection in different countries. (2, 3) In Iran the prevalence of HBsAg was reported from 2.5 % to 7.2 % in low and high prevalence provinces, respectively in 1979. (20) It has been reported that in the 1980s, approximately 3 % of the population had chronic HBV infection, ranging from a 1.7 % in the Fars province to 5 % in Sistan- Balouchestan Province. (21) Recently, the prevalence of HBsAg in blood donors of various provinces has been decreased, ranging from .063 % in Fars to 2.3 % in Siatan- Blauchestan. (20) Regarding the importance of prenatal transmission of HBV, pregnant women are a target for researchers.

In our study, the average prevalence of HBsAg in the mothers was 1.2 % that was somewhat higher than those recently reported from Esfahan (0.5 %) (13), Khorramabad (0.7 %) (14) and

Gorgan (1 %) (22) but lower than those reported from Zahedan (6.5 %) (15), Qazvin (3.4 %) (16), Bonab (3.2 %) (17) and Kerman (2.3 %). (18) HBsAg prevalence in pregnant women has also been reports in other countries. The prevalence of HBsAg reported from Cameroon (7.8 %) (23), Turkish (4.2 %) (24), Oman (7.8 %) (25) and Saudi Arabia (1.6 %) (26) were higher than the prevalence of HBSAg in pregnant women of Iran, Fars province, but the data reported from USA (0.56 %) (27) India (0.9 %) (28) and United Arab Emirates (UAE) (1 %) (25) indicating the lower prevalence of HBsAg than our study group.

Positive HBeAg in pregnant women implies the highest risk for developing chronic HBV infection to over 90 % in their babies. (29, 30) It has been reported that in Nederland and Saudi Arabia 8.9 % and 0.15 % of HBsAg positive pregnant women were HBeAg positive, respectively. (31, 32) In our study, one of the HBsAg positive subjects was HBeAg positive that could increase the rate of HBV transmission and chronicity in her baby compared to those are positive for HBsAg but negative for HBeAg. Only two Iranian reports, Ghazvin and Gorgan, have been

conducted HBeAg test on the sera of HBsAg positive pregnant women. They reported no HBeAg positive cases among HBsAg positive pregnant women, indicating a very low rate of Iranian pregnant women with both HBsAg and HBeAg positivity.(16, 22) Moreover, 50 % of the subjects were positive for HBsAb, indicating immunity to HBV infection. The rate of HBsAb in our study group was higher than that in general population²¹; somewhat this may be related to vaccination of the subjects. The result of this study also shows that the prevalence of HBsAg in pregnant women of Fars province is somehow higher than that in blood donors (1.2 % vs. 0.063 %).(20) The selection of blood donors by physician and exclude the individuals with high risk factors may interpret the lower rate of HBV chronic infection in blood donor than our study group.

Clarifying the risk factors for the HBV infection is important for introduction control procedures. Alavian et al. were evaluated 500 chronic hepatitis B subjects and 434 negative subjects' for finding possible risk factors associated with HBV transmission. They reported that, "age, male sex, marital status (being married), history of contact with hepatitis B infected subject, extramari-

tal sexual activity, intravenous drug use, major surgery, experimental dentist visit and some jobs (barber, and driver) are the independent risk factors of HBV chronic infection".(11)

In the present study several risk factors including, household contact, occupation and nationality were surveyed as parameters that increase the risk of infection in pregnant women. Interestingly, the prevalence of HBsAg was somehow higher in Afghani subjects compared to Iranians.

Quddus et al reported that the 8.3 % of 903 Afghan refugees, 301 families, living in the camps of Baluchistan Province, Pakestan, had chronic HBV infection.(33) Our data might also represent higher HBsAg prevalence among Afghani residents in Iran, if a larger sample size confirms our results. It may then necessitates an HBV immunization program for people migrating to Iran.

Higher prevalence of HBsAg in pregnant women who have a family history of HBV infection compared to those with no family history of HBV infection may represent the importance of close contact in HBV transmission. Moreover, in logistic regression analysis, the family history of HBV infection was a parameter that has a powerful association with HBsAg ($P = 0.045$,

Exp (B) = 44.658); this is in agreement with another recent report.(34) It has also been reported that the family history of hepatitis B infection is an independent risk factors of chronic HBV infection in blood donors, Tehran, Iran.(11)

In our study, all the positive HBsAg cases were younger than 25 years old and there was a significant association between age and HBsAg prevalence. In agreement with this finding, researchers from Jordan and Taiwan reported the highest prevalence of HBsAg in pregnant women up to 25 years old.(9, 35) Also younger age was the risk factor for HBsAg positivity in pregnant women in Oman, Qatar and UAE in 2000.(25) However, in some studies no significant difference was reported between age and HBsAg prevalence.(36, 37) As mention previously, although intravenous drug use has been reported as independent risk factors of chronic HBV infection, but in this study, none of the participants were belonged to the this high risk group. Also none of our participants were health care worker. In conclusion according to the prevalence of HBsAg in our study group, HBsAg screening test is recommended for pregnant women especially for those younger than 25 years old, family history of HBV infection and also

for Afghani residents. Also due to the increase rate of chronicity in infants born to mothers who are positive for both HBsAg and HBeAg, HBeAg test is necessary for those who are HBsAg positive. It can be noted that one of the limitations of our study was a relative small sample size which can be overcome in similar future studies, by considering a larger sample size especially from other nationalities.

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