



Hepatitis C and Hepatitis B Virus Infection: Epidemiology and Risk Factors in a Large Cohort of Pregnant Women in Lorestan, West of Iran

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ABSTRACT

Background: There are little data on the prevalence of serological markers of hepatitis B and hepatitis C viruses in pregnant women in Iran.

Objectives: This study was designed to determine the prevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) infection among pregnant women in Lorestan, west of Iran.

Patients and Methods: Serum samples of 827 pregnant women who lived in rural (36.8%) and urban areas (63.2%) of Lorestan were collected during 2007-2008. Data were obtained through questionnaires. Samples were first screened for anti-HCV and anti-HBc by ELISA. Those who were positive for anti-HBc were tested for HBsAg.

Results: Anti-HBc was found in 28 of 827 pregnant women (overall prevalence, 3.4%; 14 of 523 in urban areas, 2.7%; 14 of 304 in rural areas, 4.6%). Of the 28 positive samples, 6 (0.7%) were positive for HBsAg. Only 2 samples (0.2%) were anti-HCV-positive.

Conclusions: These results underscore the need for prenatal screening for HBV infection in pregnant women and treatment of newborns from HBsAg-positive mothers. More studies are needed to identify risk factors of HCV infection and highlight the importance of HCV screening and treatment programs.

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► *Implication for health policy/practice/research/medical education:*

The authors mentioned that low prevalence of HBV and HCV in this region establish a national program for regular screening of all pregnant women. Most pregnant women are asymptomatic and clinically disease free and they might not be aware that they are infected and can transmit their infection to newborns. Therefore, prenatal screening for HBV infection in pregnant women and treatment of newborns from HBsAg-positive mothers and also identify risk factors of HCV infection is necessary.

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1. Background

Hepatitis B virus infection (HBV) and hepatitis C virus infection (HCV) are serious public health problems worldwide; an estimated 170 and 400 million persons suffer from these infections (1, 2). HBV and HCV are a

contagious diseases in Iran that can be transmitted vertically from mothers to their neonates or horizontally by blood products and body secretions (3, 4). According to the latest data in Iran, 1.2% to 9.7% of the general population has acquired hepatitis B surface antigen (HBsAg) (about 1.5-2.5 million people), and 0.12% to 0.89% has anti-hepatitis C virus, which corresponds to about 0.5 million chronic carriers of hepatitis C (3, 5-7). Chronic HBV infection at birth occurs in approximately 90% of infants who are born to HBsAg- and HBeAg-positive mothers (8). Even if they are not infected during pregnancy, children

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of HBV-infected mothers have a high risk of acquiring HBV infection by horizontal transmission during the first years of life (9). On the other hand, the range of transmission of HCV from mother to child during pregnancy is between 0% and 15% (10). The prevalence of HBV among pregnant women worldwide is approximately 5% (11), ranging from 0.6% in low-endemic regions to > 20% in high-endemic areas in the Far East and Africa (11). In contrast, the prevalence of HCV among pregnant women worldwide is between 1% and 8% (12).

2. Objectives

There are little data on the prevalence of serological markers of HBV and HCV among pregnant women in Iran. Thus, the aim of the present study was to determine the prevalence of HBV and HCV infection among pregnant women who attended the reproduction section of rural and urban health care centers in Lorestan province, west of Iran, to identify target groups for postpartum immunization.

3. Patients and Methods

3.1. Population

In this cross-sectional study, we recruited all pregnant women who attended the reproduction section of rural and urban health care centers in Lorestan province, west of Iran, between 2007 and 2008. Those who did not wish to participate in this project were excluded from study. Of 827 pregnant women, 304 (36.8%) and 523 (63.2%) samples were collected from rural and urban areas, respectively. The subjects had a history of spontaneous deliveries, miscarriages, and previous successful pregnancies. The purpose and procedures of the study were explained to

all participants by a trained researcher, and written informed consent was obtained from all subjects. Participant information, including sociodemographic information, clinical manifestation, behavioral data, age, job, prison history, tattooing, and IV drug abuse, were gathered. The study was approved by the Institutional Ethics Committee of the Research Center for Gastroenterology and Liver Disease (RCGLD), Shahid Beheshti University of Medical Sciences.

3.2. Blood Sample

To obtain serum, blood samples were taken and centrifuged to separate the serum. Serum samples were transferred to RCGLD under cold conditions by airplane and stored at -20°C. Samples were first screened for anti-HBc and anti-HCV using commercially available ELISA kits (DIA PRO Diagnostic Bioprobes, Srl., Italy). Those who were positive for anti-HBc were tested for HBsAg (ELISA kits DIA PRO Diagnostic Bioprobes, Srl., Italy).

3.3. Statistical Analysis

SPSS, version 15.0, was used for descriptive statistics. We also used corrected χ^2 test or Fisher's exact test to compare percentages, and $P < 0.05$ was considered statistically significant.

4. Results

Eight hundred twenty seven pregnant women with mean age of 26.1 ± 5.4 (mean \pm SD) years (range: 13-42 years) and mean gestational period of 5.5 ± 2.3 months, were studied. Anti-HBc was found in 28 of the 827 women. There was no difference between mean age of anti-HBc

Table. Demographic Feature of Study Population

	No, (n = 827)	Anti-HBc positive, No. (%), (n = 28)	P value	HBs Ag positive, No. (%), (n = 6)	P value	Anti-HCV positive, No. (%), (n = 2)	P value
Age, y			0.81		0.89		0.56
≤ 20	127	4 (3.1)		1 (0.8%)		1 (0.8%)	
21-30	526	20 (3.8)		3 (0.6%)		1 (0.2%)	
≥ 31	174	4 (2.3)		2 (1.1%)		0 (0%)	
Location			0.14		0.86		0.53
Urban	523	14 (2.7)		4 (0.8%)		2 (0.4%)	
Rural	304	14 (4.6)		2 (0.7%)		0 (0%)	
Educational level			0.87		0.57		0.63
Illiterate	41	1 (2.4)		1 (2.4%)		0 (0%)	
Under Diploma	308	8 (2.6)		3 (1%)		0 (0%)	
Diploma	357	14 (3.9)		1 (0.3%)		2 (0.6%)	
University Degree	121	5 (4.1)		1 (0.8%)		0 (0%)	
Occupation			0.62		0.63		0.78
Housekeeper	796	28 (3.5)		6 (0.8%)		2 (0.3%)	
Employee	31	0 (0)		0 (0%)		0 (0%)	
History of miscarriage			0.69		0.49		0.83
Yes	130	6 (4.6)		2 (1.5%)		0 (0)	
No	697	22 (3.2)		4 (0.6%)		2 (0.3%)	

positive patients and -negative subjects (Table). Of 28 anti-HBc-positive patients, 6 (0.7%) were positive for HBsAg; this difference was not significant between urban and rural populations.

Of 827 pregnant women, 2 samples (0.2%) were anti-HCV-positive. These patients were also HBsAg-positive and from urban areas, and none had a history of miscarriage (Table). No anti-HBc-, HBsAg-, or anti-HCV-positive subject had a history of tattooing or being in prison or was an IV drug user. There were no significant differences in age, history of miscarriage, occupation, education level, income, or other general socioeconomic parameters between HBsAg positive and negative as well as anti-HCV positive and negative ($P > 0.05$).

5. Discussion

Chronic liver diseases are an important health challenge worldwide, wherein HBV or HCV infection is the main cause of liver insufficiency with different verities in all over the world (13). The seroprevalence of HBsAg in our study (0.7%) was lower than the rate of HBsAg positivity in pregnant women in different parts of Iran, including Zahedan (6.5%) (14), Qazvin (3.4%) (15), Bonab (3.2%) (16), Kerman (2.3%) (17), Ahwaz (1.7%) (18), Rafsanjan (1.3%) (19), and Yazd (0.84%) (20), but was higher than in Kashan (0.35%) (21). Our rates are also lower than those for North Africa and Middle Eastern countries, in which the prevalence of HBsAg among pregnant women is 1.4% to 20% (14). HBsAg positivity among pregnant women in urban areas in the US is 0.1% in Hispanics to 1% in non-Hispanic blacks; notably, HBsAg positivity is more prevalent among Asians (5.8%) (22).

Our study shows that the seroprevalence of anti-HCV is 0.2%, which is lower than a survey by Motlagh ME et al. in Ahwaz (6.25%) (23), while our study result was compatible with those of Brazilian (0.2%) and Canadian studies (0.5%) (24, 25). The limitations of our study are that we did not investigate a similar population of nonpregnant women to compare the findings and surveyed a single city in this province.

In conclusion, HBV and HCV are not prevalent among pregnant women in Lorestan province compared with the rest of the country. However, this low prevalence justifies the establishment of a national program for regular screening of all pregnant women. Because most pregnant women are asymptomatic and clinically disease-free, they might not be aware that they are infected and can transmit their infection to newborns.

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References

- McMahon BJ. Epidemiology and natural history of hepatitis B. *Semin Liver Dis.* 2005;25(Suppl 1):3-8.
- Wasley A, Alter MJ. Epidemiology of hepatitis C: geographic differences and temporal trends. *Semin Liver Dis.* 2000;20(1):1-16.
- Alavian SM. Hepatitis C virus infection: Epidemiology, risk factors and prevention strategies in public health in I.R. IRAN. *Gastroenterol Hepatol Bed Bench.* 2010;3(1):5-14.
- Zali MR, Mohammad K, Farhadi A, Masjedi MR, Zargar A, Nowroozi A. Epidemiology of hepatitis B in the Islamic Republic of Iran. *East Mediterr Health J.* 1996;2(2):290-8.
- Abdolahi N, Keshtkar A, Semnani S, Roshandel G, Beshrat S, Joshaghani H, et al. HBV Seroprevalence among Golestan adults. *Iranian J Epidemi.* 2006;1(4): 35-40.
- Elefsiniotis IS, Glynou I, Zorou I, Magaziotou I, Brokalaki H, Apostolopoulou E, et al. Surveillance for hepatitis B virus infection in pregnant women in Greece shows high rates of chronic infection among immigrants and low vaccination-induced protection rates: preliminary results of a single center study. *Euro Surveill.* 2009;14(9):5-7.
- Zali MR, Moghadam Shalmani H. The changing epidemiology of hepatitis B in Iran. *Gastroenterol Hepatol Bed Bench.* 2010;3(1):1-4.
- El-Magrahe H, Furarah AR, El-Figih K, El-Urshfany S, Ghenghesh KS. Maternal and neonatal seroprevalence of Hepatitis B surface antigen (HBsAg) in Tripoli, Libya. *J Infect Dev Ctries.* 2010;4(3):168-70.
- Alrowaily MA, Abolfotouh MA, Ferwanah MS. Hepatitis B virus sero-prevalence among pregnant females in Saudi Arabia. *Saudi J Gastroenterol.* 2008;14(2):70-2.
- Kassem AS, el-Nawawy AA, Massoud MN, el-Nazar SY, Sobhi EM. Prevalence of hepatitis C virus (HCV) infection and its vertical transmission in Egyptian pregnant women and their newborns. *J Trop Pediatr.* 2000;46(4):231-3.
- Petrova M, Kamburov V. Breastfeeding and chronic HBV infection: clinical and social implications. *World J Gastroenterol.* 2010;16(40):5042-6.
- Arshad M, El Kamary S, Jhaveri R. Hepatitis C virus infection during pregnancy and the newborn period—are they opportunities for treatment? *J Viral Hepat.* 2011;18(4):229-36.
- Alavian SM. Networking for Overcoming on Viral Hepatitis in Middle East and Central Asia: Asian Hepatitis Network. *Hepat Mon.* 2007;7(4):181-2.
- Mood BS, Keykha F, Moghadam ES, Salehi M, Kohpayeh HR, Nayini RA, et al. Prevalence of Hepatitis B Surface Antigen in Pregnant Women in Zahedan, Iran. *Hepat Mon.* 2004;4(8):161-3.
- Sharifi M, Asefzadeh M, Lalouha F, Alipour Heydari M, Eshtiagh B. [Prevalence of HBsAg carriers in pregnant women in Qazvin (2000-2001)]. *JQUMS.* 2006;10(1):72-8.
- Mirghaforvand M, Montazam S. Study of prevalence and contributing factors of hepatitis B among pregnant women referred to laboratory of health center of Bonab. *J Urmia Nurs Mid Fac.* 2007;3(5):122-7.
- Aali BS. [The prevalence of HBsAg among pregnant women referred to Kerman maternity hospitals in 1997]. *J Kerman Univ Med Sci.* 1999;2(6):89-96.
- Mohammad Jaffari R, Saadati N, Vaziri Esfarjani S, Soorani Yan Cheshmeh A. [A survey of the frequency of HBsAg+ status in pregnant women attending health centers in Ahwaz, Payesh]. *J Iranian Inst Health Sci Res.* 2004;3(3):237- 43
- Aminzadeh Z, Shabani Shahrabaki Z, Gachkar L, Sayyadi AAR. [Frequency of HBsAg Positive in Pregnant Women Rafsanjan in the Year 2003]. *J Rafsanjan Univ Med Sci Health Serv.* 2004;3(2):126-33.

20. Mojibian M, Sharifi M, Behjati Ardakani R. [The prevalence rate of Hepatitis B surface antigen (HBsAg) carrier in pregnant women referred to prenatal care centers in Yazd]. *J SHAHID SADO-GHI UNIV MED SCI health serv.* 2001;**2**(9):34-7.
21. Tabasi Z, Mir Hosseini F, Mousavi GA, Ghafouri L. [HBsAg in parturients referring to gynecologic clinics in Kashan, 2002]. *Kashan Univ Med Sci J (Feyz)*; 2003;**7**(3):35-41.
22. Sinha S, Kumar M. Pregnancy and chronic hepatitis B virus infection. *Hepatol Res.* 2010;**40**(1):31-48.
23. Motlagh ME, Makvandi M, Jalali M. [Prevalence of anti-HCV among pregnant women]. *J Qazvin Univ Med Sci.* 2001;**5**(2):59-63.
24. Gardenal RVC, Figueiró-Filho EA, Luft JL, Paula GLSA, Vidal FG, Turine Neto P, et al. Hepatitis C and pregnancy: an analysis of factors associated with vertical transmission. *Rev Soc Bras Med Trop.* 2011;**44**(1):43-7.
25. McDermott CD, Moravac CC, Yudin MH. The Effectiveness of Screening for Hepatitis C in Pregnancy. *J Obstet Gynaecol Can.* 2010;**32**(11):1035-41.