

*Original Article***Prevalence of HBsAg and high-risk behaviors in pregnant women referring to Urban Health Centers in Isfahan province**

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Abstract

BACKGROUND: About 5% of the world population are carriers of the hepatitis B virus which is not the same in different areas of the world. Iran, with a rate of 2-3%, is among the countries with average prevalence. The aim of this study was to determine the prevalence of HBsAg and its associated factors in pregnant women who referred to urban health centers in Isfahan Province.

METHODS: This was a descriptive study conducted on 1078 pregnant women who had referred to the urban health centers of Isfahan, Borkhar, Meymeh, Khomeini Shahr, Lenjan and Najaf Abad in 2009 in order to register their physical condition and receive pregnancy care. Random sampling method by quota was done. First, a questionnaire including demographic characteristics and history of high-risk behaviors in mothers and their husbands was completed. Then, a blood sample was taken and evaluated for the HB virus surface antigen. Finally, the data was analyzed using SPSS software, Chi-square, Fisher and Logistic Regression tests.

RESULTS: HB virus surface antigen was traced in the serum of 0.5% of the participants. The average age of subjects was 26.1 ± 4.9 (mean \pm sd) years old and the average pregnancy number was $1.79 + 1.0$ (mean \pm sd). Using Fisher's test as well as logistic regression test and based on the previous history of high-risk sexual behaviors and tattooing, a significant difference was observed between the two groups with positive and negative HBsAg ($p \leq 0.05$).

CONCLUSIONS: Instructing the target groups and close monitoring of the high-risk centers such as beauty shops, tattooing centers and etc, and also staff training on how to use disposable and sterilized equipments have to be accomplished at the right time.

KEY WORDS: Prevalence, hepatitis B, serum surface antigen, pregnancy.

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Hepatitis is a common inflammatory liver disease which has two types: acute and chronic. Viral hepatitis may be caused by type A, B, C, D, E and G hepatitis viruses but the main type is type B. The importance of this type is due to its high prevalence and its association with acute liver complications.¹ In other words, this infection is the major health problem all over the world.²

More than two billion of the world's populations are infected with hepatitis B virus and approximately 305 to 400 million (about 5%) are carriers of this virus.³

Prevalence of the carriers in different areas of the world is various according to which, the regions of the world were divided into three separate groups; the first group includes the United States, Canada, Western Europe, Australia and

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New Zealand which are among the regions with low prevalence (0.1% to 2%). The second group includes Mediterranean countries, Japan, central Asia, Middle East and South America which are among the regions with moderate prevalence (2% to 8%) and finally the high prevalence regions (8% to 20%) including South Asia, China and Africa.² Iran is among the countries with moderate prevalence and almost 2 to 3% of its population are HB virus carriers.¹ It is shown that the percentage of carriers vary in various regions of Iran. For instance, the prevalence rate in Fars Province was 1.7%, while this rate was 5% in Sistan-Baluchestan Province.⁴

Serological characteristic for diagnosis of acute infection is the serum surface antigen (HBs). It would appear in patient's serum usually 2 to 10 weeks after being infected with hepatitis virus, before liver enzymes are increased and clinical symptoms show up. If the virus surface antigen remains high for 6 months, consequently, it can be a sign for the infection of chronic Hepatitis.⁸ The transmission ways of Hepatitis B virus include sexual contact, blood transfusion and its products, intravenous injection of narcotic drugs, transmission from mother to fetus (probability of transmission from mother to fetus during and after delivery is about 90%), nosocomial infections, organ transplantation, tattooing and high-risk jobs such as hospital jobs and hairdressing occupations.¹ Researches showed that the influence of related factors on the prevalence of HBs Ag has obtained different results.

The results of a study by Munoz et al on 455 HIV+ women in the United States showed that alcohol consumption and drug injections had a direct relation with the rate of infection.⁹ In a research conducted by Sharifi et al high-risk jobs in positive HBsAg group showed a significant statistical difference in comparison with negative HBsAg group.

The aim of preventing and controlling of Hepatitis B in Iran is to determine the burden of this disease, screening high-risk groups including pregnant mothers and newborns from HBsAg positive mothers, as well as determining

people in need of vaccination, and to do the necessary interventions and measurements (education, counseling and etc.).¹

If infection in mother is diagnosed before delivery and the necessary preventive methods such as administration of immunoglobulin during the first 12 hours after delivery along with vaccination during the first 24 hours are done, the baby would be protected against Hepatitis virus infection in 85 to 95% of the cases.^{1,4}

We have to consider the fact that the infection pattern in various regions of Iran and the world is different.¹⁰ The current Health Ministry executive director has limited the determination of serum surface antigen in pregnancy; it's only for pregnant women who were not vaccinated.¹ On the other hand, researches carried out worldwide show that the tests for determining the level of serum surface antigen have to be performed routinely in all the pregnant women as well as in every pregnancy.¹¹ The aim of the present study was to investigate the prevalence of HBsAg and related factors in pregnant women referred to health centers in Isfahan province, IRAN in 2009.

Methods

This is a descriptive study on 1078 patients and pregnant women referred to health centers in Isfahan. The research environment was health care centers in different regions of Isfahan province including health centers No.1 and 2, Borkhar-Meymeh, Khomeini Shahr, Lenjan and Najaf Abad. The reason for selecting the mentioned cities was the similarity of cultural, social and economical structures.

Random sampling method by quota was performed, so that at the first stage we provided the list of all the health centers from different cities and randomly selected at least 50% of the urban health centers in that area. At the second stage, we determined the share of each center in terms of pregnant mothers using sharing ratio method. Then, using maternal care register book, the study samples were selected randomly. All pregnant women in any age who were under care of health centers at the time of referring entered in this study.

Data was collected by questionnaires. First, we went to all the cities and did necessary coordinations, regarding the importance and methods of carrying out the project, with the help of health care assistants, manager of family health, laboratory manager and other experts. Then pregnant mothers referred to health centers, filled in a questionnaire and signed a consent form. At this stage, the mothers were referred to a selected laboratory. We took 4 cc of their blood. To determine the result of HBs antigen, the samples along with the questionnaires were sent to the province laboratory (the reference laboratory) at the end of the administrative time. The test results of each city were sent separately in order to inform mothers and to take subsequent actions. Carrying out the project, all the questionnaires that were completed in the related health centers were checked to identify the mothers who had filled in the questionnaire, but have not referred to the laboratory.

If HBsAg in a pregnant woman was positive, she was referred to centers for disease control and following measurements, including counseling, liver function status, determining those in need of treatment and etc.

To determine the validity of the questionnaire, content validity method was used as well as obtaining the expertise of 10 professors among the faculty members.

In this study, radium HBs Ag kit designed by Bahrazma Co. was used as well as Elisa Reader Stat Fax 2100 designed by Parsian Azteb Co. A laboratory specialist calibrated Elisa System at least once every three months and in this research, it was calibrated once to determine the instrument's reliability.

At the present study, descriptive-analytical statistics was used to analyze the data. Information collected from the questionnaires was analyzed using SPSS software (Version 15), and then was analyzed through descriptive statistics, Chi square and Fisher's test.

Results

Age of participants was between 15 to 49 years old with a mean of 26.1 ± 4.9 (mean \pm SD). The highest frequency of positive cases (36.9%) was

in women with 20-24 years old. In terms of Education, 43.6% of the subjects had diploma or had a university degree and 91.1% of them were housewives and 57.3% of their husbands were self-employed (driver, tradesman, welder and etc).

One hundred and thirty five participants (12.5%) had received hepatitis B vaccine.

The average number of pregnancies among the studied pregnant women was 1.79 ± 1.0 (mean \pm SD). The majority of mothers were in the third trimester of the pregnancy (39%). The majority of high-risk behaviors in the studied samples related to ear and nose piercing (84.6%) and the majority of high-risk behaviors in the participant's husbands were related to dentistry (72.5%). In order to implement project objectives, results showed that from 1078 samples, five pregnant mothers (0.5%) had positive HBsAg. In addition, the previous history of high-risk behavior in pregnant women of two groups with positive and negative serum surface antigen was assessed using Fisher's test and logistic regression model. The results showed that a previous history of high-risk sexual behavior had a significant correlation with positive serum surface antigen. ($p = 0.009$), so that 50.0% of the pregnant women with a history of unsafe sexual behavior have had the positive serum surface antigen.

The previous history of tattooing also showed similar results. 2.8% of the mothers with a history of tattooing had positive serum surface antigen. ($p = 0.038$)

In other high-risk behaviors such as arrest record, transfusion, travel or long-term housing, dentistry, ear piercing, and inpatient surgeries, endoscopy and phlebotomy, no significant relationship was observed between the two groups with positive and negative serum surface antigen (Table 1 and 2).

Previous history of high-risk behavior in spouses (sexual risk behavior, imprisonment, transfusion, travel or long-term housing, tattooing, dentistry, ear piercing, and inpatient surgery, endoscopy, dialysis and phlebotomy) in two groups of pregnant women with positive and negative serum surface antigen were

Table 1: Frequency distribution of the participants in terms of previous history of high-risk behavior in pregnant women referred to urban health centers in the Isfahan province in two groups with positive and negative serum surface antigen

Serum Surface Antigen		Positive (%)	Negative (%)	P-value
High-risk Behavior				
Imprisonment	Yes	0	100	NS
	No	0.5	99.5	
Sexual High-risk Behavior	Yes	50	50	0.01
	No	0.4	99.6	
Blood Transfusion and its Products	Yes	4.3	95.7	NS
	No	0.4	99.6	
Traveling or Long-term Housing In High-risk Regions	Yes	0	100	NS
	No	0.5	99.5	
Tattooing	Yes	2.8	97.2	0.038
	No	0.3	99.7	
Dental Affairs	Yes	0.5	99.5	NS
	No	0.5	99.5	
Ear or Nose Piercing	Yes	0.4	99.6	NS
	No	0.6	99.4	
Surgery and Hospitalization	Yes	0.5	99.5	NS
	No	0.4	99.6	
Endoscopy	Yes	0	100	NS
	No	0.5	99.5	
Phlebotomy (Bloodletting)	Yes	0	100	NS
	No	0.5	99.5	
Drug injection	Yes	0	100	NS
	No	0.5	99.5	
Other High-risk Behavior (Hospitalization, Family History)	Yes	0	100	NS
	No	0.5	99.5	

examined. In this analysis, Fisher's statistical test was used and the results did not show any significant relationship with any of the cases. (Table 1 and 2)

Discussion

In this study, 1078 of the pregnant women were investigated for HBsAg and the rate of positive serum surface antigen in pregnant women was 0.5%. Researches in other parts of Iran showed different results. The results of studies conducted by Yadegari and Doaei in Zanjan included the frequency of 0.2%⁸ while Tabasi et al reported the frequency of 0.3% in Kashan.⁹ These results were nearly in accordance with the present study.

However, results from other studies are as following: 1.3% in Rafsanjan¹⁰, 7.1% in Ahwaz¹¹, 6.5% in Zahedan⁴, 6.5% in Sudan¹², 6.4% in Nigeria¹³. The above-mentioned results were not in accordance with the present study.

Probably, one of the reasons for the difference between the mentioned results and the present study findings was due to differences in the number of samples, sampling type, extent and geographical region. Results from other studies have also shown a different spectrum in divided regions. For example, in studies conducted in areas with high prevalence such as China, Congo, Cameroon, Senegal and Indonesia, the rate has been calculated about 4% to 13.8%. In low prevalence countries such as Canada, Switzerland, France and Germany the

Table 2: Frequency distribution of the participants in terms of previous history of high-risk behavior in pregnant women spouses referred to urban health centers in the province of Isfahan in the two groups with positive and negative serum surface antigen

Serum Surface Antigen		Positive (%)	Negative (%)	P-value
High-risk Behavior				
Imprisonment	Yes	0	100	NS
	No	0.5	99.5	
Sexual High-risk Behavior	Yes	0	100	NS
	No	0.5	99.5	
Blood Transfusion and its Products	Yes	0	100	NS
	No	0.5	99.5	
Traveling or Long-term Housing In High-risk Regions	Yes	0	100	NS
	No	0.5	99.5	
Tattooing	Yes	0.9	99.1	NS
	No	0.4	99.6	
Dental Affairs	Yes	0.6	99.4	NS
	No	0	100	
Ear or Nose Piercing	Yes	0	100	NS
	No	0.5	99.5	
Surgery and Hospitalization	Yes	1.3	98.7	NS
	No	0.2	99.8	
Endoscopy	Yes	0	100	NS
	No	0.5	99.5	
Dialysis	Yes	0	100	NS
	No	0.5	99.5	
Drug injection	Yes	0	100	NS
	No	0.5	99.5	
Phlebotomy (Bloodletting)	Yes	0	100	NS
	No	0.5	99.5	
Other High-risk Behavior (Hospitalization, Wounding Oneself with a Poniard)	Yes	0	100	NS
	No	0.5	99.5	

prevalence rate was 0.12% to 1.1% .¹²

This should also be mentioned that in a study conducted by Mohammad et al among the prisoners of seven provinces of Iran, the results showed that the prevalence rate among Zanjan and Isfahan province prisoners was 15% and 1% respectively.¹⁴ Considering the frequency of 1% among the prisoners of this province who were considered as the high-risk group, the frequency rate (0.5%) obtained in this study was expected. On the other hand, considering the implementation of national plan of vaccina-

tion for newborns from 1992, our country was in transitional stage from moderate prevalence to low prevalence. The new cases mostly occurred in adolescents and adults and the implementation of national plan for the vaccination of people born in 1989, 1990 and 1991, individuals with high-risk jobs, repeatedly blood recipients, hemodialysis patients and prisoners with a history of unsafe behavior probably has been influential in prevalence rate.¹

The relation between previous history of high-risk behaviors in pregnant mothers and

their spouses in two groups with positive and negative serum surface antigen were examined. Fisher's Test revealed that there was a significant relationship between positive serum surface antigen and a history of high-risk sexual behavior in pregnant mothers.

In a study conducted by Teo and Lok the results showed that transmission through sexual contact was one of the important ways of hepatitis transmission, especially in developed countries.³ It also revealed the fact that 39% of hepatitis cases in America have been due to transmission through illegitimate sexual contact between men and women. The results of another study conducted by the World Health Organization in 2007 showed that 500,000 prostitutes suffer from acute and chronic hepatitis annually all over the world.¹

The studies performed by Obi et al in Nigeria, Mohammad et al in seven provinces, Azarkar et al in Birjand, Mohammad et al in Isfahan indicates that being exposed to an infected partner increases the relative risk of hepatitis infection to 200% which is compatible with the present study. In addition, the results of another study in Pakistan were well matched with the present research.¹³⁻¹⁶

In addition, a quote from Mohammed et al revealed that according to the results of a research conducted among Korean men and women, starting sexual activity would cause a significant increase in the prevalence of positive HBsAg rate (8.1%). Moreover, it should also be mentioned that our country is in the transitional period from average to low prevalence and in areas with low prevalence, the most transmittal agent is unsafe sexual behaviors.^{1, 17}

In the present study, a significant differences was observed between positive serum surface antigen and previous history of tattooing in pregnant mothers ($p = 0.038$). another study performed in Rafsanjan has also shown similar results.¹⁰ Moreover, in a study conducted by in China, 13.3% of staff of tattooing centers had positive serum surface antigen.¹⁸ Furthermore, a research conducted in Australia proved the fact that 69.9% of prisoners have had a history of tattooing.¹⁹ But in studies conducted in Sudan¹²,

in Zanjan⁸, in Birjand¹⁵ and in Nigeria¹³, the results showed no significant difference.

tattooing is not an operation (like dialysis, dentistry, surgery or blood transfusion which are inevitable) and cultural conditions of the region, religious beliefs, age and many other factors are effective on applying a tattoo. This may be the reason for different outcomes of this study compared to other researches.

Moreover, the number of samples, the extent and number of population in the region, urban and rural cases of study were also other reasons for the difference in the present study and other studies. For example, in the Yadegari and Doaei report, 40% of the studied cases were villagers⁸, while in our study, 100% of the participants were in urban areas, In the researches done by Mohammad et al and Azarkar et al the practice of tattooing was not significant, since, on one hand, prisoners were the research community, and possibly other high-risk behaviors such as unsafe sexual behavior, drug addiction and non-intravenous injection were more prevalent among the prisoners, and on the other hand the studied group included both men and women¹⁴⁻¹⁵.

Moreover, it is important to note that non-skilled people in a non-secure location do the skin tattooing which use shared needles and equipment without sterilization. Therefore, it is considered as the most important and risky factors for transmission of Hepatitis.¹⁹

Other high-risk behaviors in the studied subjects with positive serum surface antigen did not show any significant results. The results of previous histories of 12 cases of high-risk behaviors in subjects' spouses indicated that there was no significant difference between positive serum surface antigen in pregnant women and previous history of high-risk behavior in their spouses.

Previous history of surgery and hospitalization in the spouses of two groups of studied subjects with positive and negative serum surface antigen did not show significant relation between the two groups, but the P-value was close to being significant ($p = 0.09$). Considering the importance of identifying pregnant women carrying the virus, determining the epidemi-

ologic studies in different regions of Iran with the aim of specifying the burden of disease and determining high-risk areas could be helpful in planning the future health policies.

Most of participants with positive serum surface antigen were between 15 to 19 years old which indicates that it is necessary to plan some programs in order to increase awareness and education of high school students.

Also, considering the fact that other related factors such as doing dentistry, surgery, blood transfusion, etc..., can affect Hepatitis infection but due to the low number of positive cases in this study, the results showed no significant difference.

Besides, some planning such as training the target groups, observing sterilizing processes in tattooing centers have to be done. On the other hand, increasing the number of tattoo centers and inadequate community awareness regarding tattoos and hepatitis infection requires ex-

tensive reports to the population. In the meantime, the tattooing centers should be identified, and close monitoring and staff training about sterilized and disposable equipments have to be performed.

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