

**Original article****A study on risk factors of chronic hepatitis B carriers**

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**Abstract**

**Introduction and objective:** Hepatitis B is a disease of public health importance in Iran. The aim of this study was to evaluate some possible risk factors for the spread of hepatitis B infection from the hepatitis B virus (HBV) carriers.

**Materials and methods:** A cross-sectional study was conducted among chronic HBV individuals who referred to gastrointestinal department, Imam Khomeini hospital, Ahvaz Jundishapur University of medical sciences from October 2009 to June 2010. All subjects were evaluated using a face-to-face questionnaire about demographic aspects. The analysis included data on past medical history, physical examination and periodic evaluation clinically and serologically. The control group consisted of the patients referred to the gastrointestinal clinics with negative HBV serologic markers of HBV infection. The risk factors among infected subjects (HBV-positive) were compared to those of subjects never exposed (HBV-negative) to HBV.

**Results:** A total of 560 subjects were studied for HBV, of which 272 were HBV-positive and 288 HBV negative cases comprised the control group. Mean age of the patients was 35±9 years. HBV-positive subjects were more likely to be of female gender (61.39% versus 41.31%, P<0.0001). Endoscopy 54.77%, major surgery 44.48%, and tattooing history 8.45% were found to be independent risk factors of being chronically infected with hepatitis B virus.

**Conclusion:** Our data indicate that a history of endoscopy, major surgery and tattooing are important risk factors for spreading of HBV infection.

**Significance and impact of the study:** Improvements in certain lifestyle patterns and customs in this area may be essential to prevent transmission of the infection.

**Keywords:** Hepatitis B virus; Risk factors; Seroprevalence

## Introduction

Hepatitis B virus (HBV) infection is a health problem worldwide, with approximately 400 million chronically infected people. HBV is an important agent of acute and chronic hepatitis and the endemicity of a given population is determined by detecting hepatitis B surface antigen (HBsAg) in serum and is classified as low, intermediate, and high endemicity according to the percentage of infection (2%, 2-7.9%, and >10%, respectively) [1,2]. HBV has a circular and partially double stranded DNA genome of 3.2Kb containing four overlapping open reading frames.

HBV strains isolated worldwide have been classified into six genomic groups deduced from genome comparisons and designated genotypes A to F [3,4,]. Chronic, persistent HBV infection develops at the end-stage of liver disease, such as liver cirrhosis and hepatocellular carcinoma [5,6]. Although safe and effective HBV vaccine is available but new cases of HBV infection are still reported throughout the world [7]. Recently occult HBV infections were also reported on which the serological HBsAg is negative in the patient sera but the HBV DNA could be detected by PCR [8].

One of the important priorities for elimination and control of HBV is to know the factors involved in HBV transmission especially in the endemic regions. Iran is the intermediate for the HBV infection [9]. The prevalence of HBV infection among the blood donors have been reported in Iran [10]. It is evident that 70-84% of cirrhotic patients and 72% of individuals with hepatocellular carcinoma in Iran have evidence of exposure to HBV [11]. The prevalence of HBV among the injecting drug user in Ahvaz was 44.3% [12].

The prevalence of HBV infection among the hemodialysis patients in Ahvaz was reported to be 5.1% [13]. Thus

important measures should be implemented to the risk factors causing spread of HBV infection. The aim of this study was to evaluate some possible risk factors for the spread of hepatitis B infection by HBV carriers.

## Materials and methods

A cross-sectional study was conducted among 272 HBV carriers including 167(61.39%) female and 105(38.6%) male who referred to gastrointestinal department, Imam Khomeini hospital, Ahvaz Jundishapur University of medical sciences from October 2009 to June 2010. The evidence of HBV infection among the HBV carriers was tested for HBsAg by ELISA test (Behring, Germany).

All the HBV carriers having the following inclusion criteria: documented case of HBsAg positive for more than six months, HBV carriers without clinical acute symptoms, and the HBV carriers with normal liver function test of alanine transaminase and aspartate transaminase. The excluding criteria were individual with acute HBV symptoms, individual with abnormal normal liver function test of alanine transaminase and aspartate transaminase, and individual refusing to answer the questions. While 288 subjects including 119(41.31%) female and 169(58.68%) male as a control group were found negative for HBsAg.

All the HBV patients and control group were registered at the department of gastroenterology of the Imam Khomeini. The HBV positive carriers; age was between 14 to 70 years old with the mean age of  $35\pm 9$  years while the age of the control group was between 19-65 years with the mean age of  $39\pm 8$  years. The independent risk factors including tattooing, history endoscopy, major surgery, phlebotomy (Hejamat), intravenous drug users, dentist visiting, were determined by

using a questionnaire. The questioners were general practitioners, blinded to the HBsAg test results of the subjects before and during the interview. The results were analyzed

Chi-squared analysis performed to determine whether significance of risk factor and/or also presented to indicate the chance of risk factor on HBsAg positive in contrast to HBsAg negative. The P value below 0.05 was considered to be significant.

## Results

The results of this study revealed that the ratio of female HBV carriers 167(61.39%)

to the control group 119(41.31%) was found to be significant ( $P < 0.0001$ ). The independent risk factors among the HBV carriers included; tattooing history, 23(8.45%), endoscopy 149(54.77%), major surgery 121(44.48%) and high risk job 14 (5.14%). Therefore, among the control group the risk factors included tattooing history 1(0.34%), endoscopy 4(1.4%) and major surgery 2(0.7%). Regarding the above data, most of independent risk factors were found to be significant (table 1).

**Table 1:** The odds ratio for each independent variable among the HBV carriers and control group (the p value in the majority of the variable found significant)

Risk factor	HBsAg positive (n=272)	HBsAg negative (n=288)	Odds ration (95% CI)	P value
Sex female	167(61.39%)	119(41.31%)	2.26(1.6-3.177)	0.0001
Tattooing history,	23(8.45%)	1(0.34%)	26.5 (3.55-197.7)	0.0001
Endoscopy	149(54.77%)	4(1.38%)	86(31.16-237.4)	0.0001
Major surgery	121(44.48%)	2(0.69%)	114.6(27.944-469.8)	0.0001
Phlebotomy	1(0.36%)	0	2.12(.07-63.6)	0.65
IDU©	3(1.1%)	1(0.34%)	3.2(.3-30.95 )	0.28
High risk job®	14(5.14%)	0	31.25(1.85-527.46)	0.0001
Dentist visit	205(75.36%)	200(69.44%)	1.35(0.92-1.95)	0.12

©IDU, Intravenous Drug Use, ®High risk job included nurse and barber

## Discussion

Persistent or chronic HBV infection is one of the most common persistent viral infections in human. The results of this study revealed that the ratio of female HBV carriers 167 (61.39%) to male carriers 119 (41%). was found to be significant ( $P < 0.0001$ ).

The horizontal transmission of HBV infection occurred mainly by exposure to blood transfusion [14], sexual depravity [15], tattooing [16], endoscopy [17], surgical procedure [18], needle sticks [19], hemodialysis [20], dental procedure [21], intravenous drug use (IDU) [22], history of sexually transmitted disease (STD) [23]. The prevalence of carriers HBsAg carriers

in Iran varied from 1.07% in Fars province [24] to over 6% in the Balouchestan province [25]. Although sexual transmission of the HBV is the important key and has been reported [13,26], in Iranian culture due to social values which is strongly noticeable and might reduce the rout of sexual transmission. Thus the role of STD in Iran is not predictable.

Sex especially among the married couple may play a significant role in the transmission of HBV infection [27]. The transmission of HBV infection from the infected mother to newborn infant has been reported [28]. In our study about 61.39% of HBV positive were married female which may have crucial role in spreading of HBV

infection. The health care workers (HCW) are at a higher risk of HBV infection than general population because they are more frequently exposed to infected patients [29,30]. In the present study 5.14% of positive HBV carriers were nurses, whose jobs were highly risky.

There are some reports on infected physicians, dentists and oral surgeons which have been implicated in transmission of HBV infection due to multiple contacts with patients [31,32]. Tattooing is another risk factor for the HBV infection. It has been found that the tattooing could be a significant factor to be considered in relation to the transmission of hepatitis B and tattooing [33]. In our data 8.45% of the patients had history of tattooing. Vaccination against hepatitis B is an important factor for the prevention of HBV infection [34].

It has been revealed that there are more than 30 independent risk factors including tooth brushes, baby bottles, toys, eating utensils, razors, blood feeding insects, hemodialysis, breast feeding, acupuncture which are implicated in the transmission of HBV infection [35] but these risk factors were not considered in the present study.

### Conclusion

Our data indicate that a history of endoscopy and major surgery, tattooing are important risk factors for HBV infection in our area and that more careful screening of blood for anti-HBV must be introduced in our clinical practice. Improvements in certain lifestyle patterns and customs in this area may be essential to prevent transmission of the infection.

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