

Risk factors of HBs Ag positive in blood donors of Hamedan, Iran

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Abstract

Background: Viral hepatitis B is a common community acquired infection. It damages the liver tissue and can be a risk factor for cirrhosis and liver cancer. In the present study, we investigated the major risk factors for being HBs Ag positive among blood donors of Hamedan, Iran.

Methods: A cross-sectional study was carried out in Hamedan city. All of the blood donors in Blood Transfusion Organization Center of the city were asked to fill out a questionnaire between September 2011 and February 2012. Logistic regression was used to calculate Odds Ratios (OR) for risk factors of being HBs Ag positive using IBM SPSS Statistics for Windows, Version 22.0.

Results: Among 571 participants 119 (20.8%) were HBs Ag positive. Of all patients, 158 (27.6%) were female, 506 (88.6%) were living in urban areas. Also, 375 (65.7%) were married. Among the potential risk factors of HBs Ag positivity studied, "History of Surgery" ranked first (OR=3.11 $P=0.003$) and "Familial History of Liver Disease" was the second significant risk factor (OR=2.90 $P=0.013$). Human bite, dental filling, and needle stick had odds ratios less than one. However, they were not found to be statistically significant ($P>0.05$).

Conclusion: Of all risk factors investigated in the present study, "History of Surgery" suggests a risk of infection transmission through surgical team. More studies on different populations are needed due to regional characteristics of hepatitis transmission.

Keywords: Blood Donors; Hepatitis B; Needlestick Injuries; Risk Factors

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Introduction

Hepatitis B is a common community acquired infection. It is estimated that about 245 million people are chronically infected with hepatitis B virus (HBV) globally. A majority of these people are living in Asian or African countries. More than 680 thousands of deaths are due to Hepatitis B complications in the world. HBV carriers are typically asymptomatic,

frequently non-icteric with mild symptoms (1). This could be a reason why many chronic HBV carriers have no history of acute phase symptoms.

It is believed that HBV infection is one of the main causes of liver cell carcinoma, liver cirrhosis, and a significant indication for liver transplantation (2–4).

Complications of HBV infection are not limited to liver diseases. a meta-analysis showed that HBV infection is associated with the risk of decline in glomerular filtration rate and increased risk of chronic kidney disease (5).

In spite of extensive negative effects of hepatitis B on body, its risk factors are not still recognized clearly. Exposure to blood or blood products, such as blood transfusion, needle stick, having unsterile injections, and having unprotected sexual contact are considered as the major risk factors of hepatitis B. Hepatitis B and C are two important concerns after needle stick (6). Exposure to potentially infective secretions, such as saliva, can also be another risk factor (7). HBV infection risk factors are believed to be different in various regions (8). In endemic regions, such as Sub-Saharan Africa and Southeast Asia, people mostly get infected in childhood through sharing personal items, such as tooth brush, and kissing (9). Mother-to-child vertical spreading is also common in HBV (10) and different factors such as the history of abortion, addiction or having addicted spouse or unprotected sexual contact with IV drug abusers, tattooing, illiteracy, and history of dental treatment are under investigation as other potential risk factors (11–15).

Blood transfusions and blood products injection are considered as the main routes of transmission in countries with weak systems of monitoring blood and blood products for HBs Ag. Medical staff are also at high risk. Needle stick or contamination of open cutaneous ulcers are major routes of exposure in medical staff. Surgeons and dentists are highly at risk of infection in comparison with other physicians and their operations, such as surgical operations, are reported to be important in HBV transfer (16).

In Hamedan province, several studies have already investigated the prevalence of HBs Ag positive blood donors. The mean prevalence was reported to be 3% in the province. Nahavand city was reported as

the city with highest prevalence of infection in the province ranging from 8% to 31% (19). The prevalence of HBs Ag positive state is also reported between 3% to 48% in Hamedan city in different studies (14, 20). The aim of the current study was to determine the Risk Factors of HBs Ag positive in blood donors of Hamedan, Iran.

Methods

A cross-sectional study was carried out in Hamedan city. All of the blood donors in Blood Transfusion Organization Center of the city were asked to fill out a questionnaire between September 2011 and February 2012. Physicians working in the center were instructed to help participants filling the forms. All blood donors were asked to fill out the questionnaire at their entrance and then it was attached to their records. Most of the HBs Ag positive patients were aware of their condition.

Variables including age, sex, literacy, area of residence, marital status, history of travel to tropical regions, ear piercing in women, history of surgery, living in confinement, history of sexual intercourse during menstruation, sexual contact with a hepatitis B patient, history of liver disease in the family, human bite leading to ulcer, history of acupuncture, dental visits, and blood transfusion history were assessed in questionnaire. Two questions were excluded from analysis due to participants' reluctance to answer. These questions were about the history of IV drug abuse and sexual contact with IV drug abusers. Persistence of HBs Ag was also assessed in transfusion center. The study was approved by the Transfusion Organizations Center of Hamedan province and the Health and Welfare Department of Hamedan University of Medical Sciences.

IBM SPSS Statistics for Windows, Version 22.0. was used for data analysis. logistic regression was used to calculate the odds ratios for each independent variable. P values of lower than 0.05 was considered as statistically significant.

Table 1. Odds ratios for probable risk factors of being HBsAg positive in Hamedan blood donors attending Hamedan Blood Transfusion Organization

Variables	N (%)		β coefficient	Odds Ratio (95% CI)	P
	HBsAg+	HBsAg-			
Marital status (Married)	97 (81)	278 (61.5)	0.41	1.51 (1.64-4.47)	0.313
Level of education (Illiteracy)	18 (15.5)	24 (5.3)	-0.275	0.76 (0.40-1.45)	0.089
History of travel to tropical region	67 (55.9)	270 (59.7)	-0.29	0.74 (0.49-1.11)	0.33
Positive history of ear piercing in women	10 ^a (30.7)	13 ^a (10.1)	0.277	1.32 (0.52-3.37)	0.651
Positive history of surgery	49 (41.2)	115 (25.5)	1.136	3.11 (2.04-4.74)	0.003
Living in confinement	13 (10.9)	21 (4.7)	0.927	2.53 (1.23-5.22)	0.086
History of sexual intercourse during menstruation	35 (7.7)	4 (3.6)	0.807	2.24 (0.76-6.47)	0.202
Sexual contact with a hepatitis B patient	6 (5)	6 (1.4)	0.712	2.04 (0.23-2.25)	0.31
Familial history of liver disease	20 (16.8)	27 (5.9)	1.085	2.96 (1.60-5.49)	0.013
Human bite leading to ulcer	3 (2.6)	23 (5.2)	-1.835	0.44 (0.13-1.49)	0.37
Acupuncture	0 (0)	5 (1.1)	-6.552	0.12 (N/A)	0.09
Dental procedures	100 (84)	366 (81)	-0.369	0.69 (0.40-1.12)	0.388
Blood transfusion history	13 (10.9)	28 (6.2)	-0.04	0.96 (0.48- 1.92)	0.957

^a From 33 HBsAg positive and 125 HBsAg negative female participants.

Results

Among 571 participants 119 (20.8%) were HBs Ag positive. Out of all cases, 158 (27.6%) were female. 506 (88.6%) were living in urban areas and 375 (65.7%) of the participants were married. The mean (SD) ages were 32.8 (7.1) and 30.1 (6.52) years for positive and negative HBs Ag groups, respectively.

Distribution of risk factors for being HBs Ag positive are illustrated in Figure 1. frequency of HBs Ag positive decreases with the increase in educational level. Around 44% of illiterate participants were HBs Ag positive versus 14.5% in participants with higher education level. However, the odds ratio of educational level was 0.75 ($P=0.08$).

Although the frequency of having dental procedures was a bit higher in positive group, its difference was not observed to be statistically significant ($P=0.38$). Detailed investigation in dental treatment showed that filling teeth were even more frequent in the negative group as extraction and other dental surgical therapies were more frequent in the positive group but the differences were not statistically significant ($P>0.05$). For most of the variables, the frequency rate in positive group was higher than that in the negative group but for teeth filling, ear piercing, and travel to tropical areas, the negative group had a higher frequency.

The most prominent risk factors obtained are illustrated in Table 1. "History of

Surgery" and "Familial History of Liver Disease" had the strongest association with OR of 3.11 and 2.96, respectively. Other factors with high ORs were "History of Living in Confinement" such as the history of imprisonment (OR=2.52) and "Intercourse in Menstrual Period" (OR=2.24).

Discussion

It is a common belief that dental procedures are associated with substantial risk of infective diseases such as hepatitis B (12, 21), but dental procedure was not a significant risk for our cases in the present study. However, more investigations should be carried out since not all dentists are aware of universal precautions for patient safety. Among the factors studied, "history of surgery" had the highest odds ratio for hepatitis B. Despite cross-sectional nature of our study, which does not clearly show the causality of surgery and HBsAg positive state, considering Beier et al. study, transmission of the disease by surgical team members remains an issue that should be studied more using retrospective or cohort studies (16).

In our study, blood transfusion and blood products, dental filling, ear piercing, travel to tropical regions, ulcer of human bite, and acupuncture were not statistically significant. Further studies with careful controls are needed.

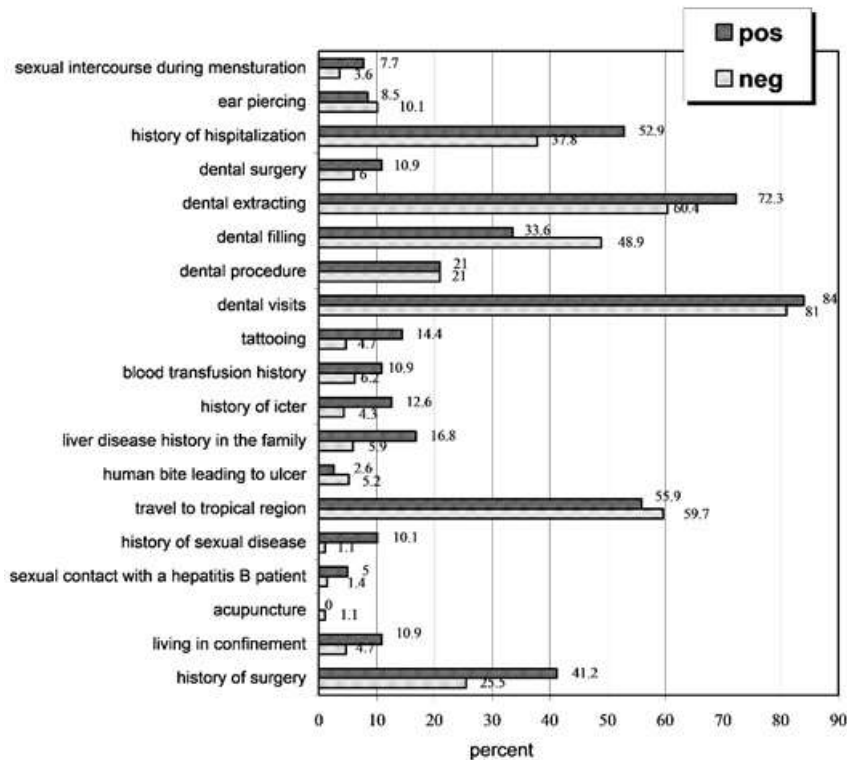


Figure 1. Distribution of risk factors for being HBs Ag positive

“Level of Education” and “Marital Status”, two factors that were not considered in other studies carried out in Hamedan, had also no significant association with the condition. Other major risk factors found were familial liver disease, living in confinement, and intercourse with HBs Ag positive patients, which are consistent with findings reported in other studies (14,15).

According to the high prevalence of hepatitis B and its burden, it seems crucial to take actions in order to control this disease. In order to take rational and effective actions for controlling HBV infection, the first step will be identifying appropriate risks factors. Korea experience in controlling the disease clearly shows the importance of detecting the underlying causes of infection (11). Detecting the importance of vertical transmission triggered the prescription of hepatitis B immunoglobulin for children being born from HBV carriers. This action reduced the rate of possible HBV infection about 93% in Korea.

One major problem in hepatitis risk factor studies is that the data on some intimidating

behaviors such as those concerning sexual issues or drug abuse do not yield to accurate results since the respondents prefer not to answer these questions. In the current study, we had included questions asking about IV drug abuse and sexual contact with IV drug abusers. However, our participants did not agree to complete them and thus these questions were excluded from the analysis. Concerning this avoidance, we did not include questions asking about having unprotected sex at all so as to increase the probability of participation.

One important aspect, which should be considered in risk factor evaluation is the state of immunization. Dozens of studies are now investigating the effect of HBV vaccination on different conditions. HBV vaccination is reported as one of the key elements of hepatitis B elimination in China (22). Its effects and efficacy is also investigated in India (23). The effect of different types of HBV vaccine on special people such as pregnant women, immunocompromised patients, and those under dialysis are recently being

investigated more deeply (24–27); therefore, in future studies, state of HBV immunization should be considered in the analyses.

According to the findings obtained in the present study, a considerable risk factor of HBs Ag positive is the role of surgical team in transmitting hepatitis B and checking for their vaccination and their HBs Ag presence. Familial history of liver disease was another significant risk factor in our study, which could be noted in risk evaluation for hepatitis B.

History of living in confinement in HBs Ag positive participants makes IV drug abuse and sexual contact with IV drug abusers as important public health issues.

Conflict of interest

Authors declare no conflict of interests.

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