

## REVIEWS

# The Changing Epidemiology of Viral Hepatitis B in Iran

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### Abstract

Hepatitis B virus (HBV) prevalence has decreased dramatically in Iranian population during the last decade, and now it is classified as having low endemicity for hepatitis B infection. Improvement of the people's knowledge about HBV risk factors, national vaccination program since 1993 for all neonates, and vaccination of high risk groups could be the cause of this decrease. The HBV vaccination started in infants in two provinces (Zanjan and Semnan) in 1989, and in 1993 the vaccination was included in the Expanded Program on Immunization (EPI) countrywide. After 13 years of implementation, the coverage has reached an appropriate level from 62% in 1993 to 94% in 2005. Evaluation of risk factors in HBV infected people is important for designing the strategies to control the disease. Intensifying HB vaccination of high risk groups, surveillance of hepatitis B infected subjects, and control on the health status of refugees will further decrease the frequency of the disease in Iran. In addition the consideration of all possible routes of transmission in subjects without risk factors for infection is necessary. Changes in the pattern of transmission of new cases of hepatitis B of the changes in the epidemiology of viral hepatitis B infection.

### Key words

Hepatitis B – epidemiology – Iran - Middle East - hepatitis transmission

### Introduction

HBV infection is a serious global health problem, with 2 billion people infected worldwide, and 350 million suffering

from chronic HBV infection. Of these, 75% are Asians (1,2). Hepatitis B infection is the 10th leading cause of death worldwide, and results in 500,000 to 1.2 million deaths per year caused by chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). HCC accounts for 320 000 deaths per year (3). The prevalence of HBV infection varies widely, with rates ranging from 0.1% to 20% in different parts of the world (3). Overall, 45% of the world population lives in high prevalence regions (hepatitis B surface antigen positivity rates > 8%), resulting in the massive global burden associated with the infection (4). The Middle East, Bahrain, Iran, and Kuwait are areas of low endemicity. Iraq and the United Arab Emirates have intermediate endemicity, and Jordan, Oman, Palestine, Yemen and Saudi Arabia have high endemicity (5). In this paper, the general features of the epidemiology of HBV infection and pathways of infection transmission, including certain occupations, behaviors and environmental risk factors will be reviewed.

### General epidemiology of hepatitis B in Iran

The prevalence of hepatitis B surface antigen (HBsAg) in Iran was reported between 2.5% and 7.2% in 1979 by Farzadegan (6). In the 1980s, almost 3% of the population was affected, differing from a prevalence rate of 1.7% in the Fars Province to 5% in Sistan-Balouchestan Province (7). The most common routes of transmission mentioned are perinatal transmission and intravenous drug abuse (7). Fifty-one to 56% of Iranian cirrhotic patients were HBsAg positive (8, 9), pointing to the importance of this infecting agent and its socio-economic burden in the country. Universal vaccination significantly has decreased the carrier rate among young children. It seems that the average age of the infected individuals has increased. The epidemiology of infection is also changing from a vertical to horizontal route. Two seroepidemiologic surveys were conducted before and after mass vaccination on a representative sample of 1/1000 of the population of Iran. The overall seropositivity rate showed no significant decline between 1991 and 1999 but in the age group 2-14 years the rates decreased significantly (1.3% versus 0.8%,  $P < 0.05$ ) (10).

In a study in 4528 of people of Khorassan Province in 1998, the average age of HBsAg positive cases was 31.67 years; males and females were involved equally (11). Prevalence of HBsAg in blood donors during 11 days after Bam earthquake in Iran in 2003 was 0.45 percent. Compared with seropositivity in blood donors at three consecutive years, HBV infection had a significant descending rate (12).

In a study of 109 Iranian HBsAg-positive patients, HBV genotype D was the only detected type found in all patients (13). Continued efforts for understanding HBV genotypes will reveal further virological differences of the genotypes and their clinical relevance. Another study (14) revealed that the HBV genotype D, sub-genotype D1, subtype ayw2 dominates in the Iranian infected patients.

### **Risk factors for hepatitis B infection transmission in Iran**

The transmission of the hepatitis B virus (HBV) is parenteral, sexual and perinatal. Identifying risk factors for the HBV infection is important for setting up control measures.

Possible risk factors for the spread of hepatitis B infection were evaluated in 500 chronic hepatitis B subjects, and 434 subjects negative for hepatitis B. Age, male sex, marital status (being married), history of contact with hepatitis B infected subject, extramarital sexual activity, intravenous (i.v.) drug use, major surgery, experimental dentist visit and some jobs (police, barber, and driver) were found to be independent risk factors of being chronically infected with hepatitis B virus. It seems to be of great importance to pay more attention to certain jobs, life styles and cultural matters (15).

Different epidemiological studies with alternative methodologies accompanied by meta-analysis of risk factors in each area are required to provide information about routes of transmission of hepatitis B virus. In a study (16), 2447 HBsAg positive blood donors were compared with 2425 HBsAg negative donors in Tehran. Factors predicting HBV infection included family history of hepatitis B infection, history of receiving blood transfusion, hospitalization, unsafe sex, male gender, and living in city area.

The prevalence of HBsAg in 1113 Iranian large vehicle drivers was 5.9% (CI 95%: 4.5–7.3%) and was different from the prevalence in the general population (1.7%) (17). In a study (18) concerning 226 gypsies from Shahr-e-Kord, Southwest of Iran with a mean age of 20.7 years, 35 subjects (18%) were HBsAg positive. Also, 44 persons (23.9%) had positive HBcAb. Tattooing and phlebotomy are common practices among our gypsies. The seroprevalence of HBsAg positive in 1824 subjects of Nahavand of Iran in 2002 was 2.3%. History of surgery and imprisonment were the major risk factors for infection (19). The most frequent relatives of index cases were sons and daughters (32.2% and 23.5%), respectively (20). Among 1500 subjects who attended the laboratory for sexually transmitted diseases in the Northeast of Iran between 1998 and 2000, the seroprevalence of HBsAg

was 10% in women and 14.2% in men (21). In another study, the results of the evaluation of hygiene practices of health workers and compliance with recommended instructions among staff of 30 hospitals in Shiraz of Iran showed that physicians and nurses were less compliant with personal hygiene practices than cleaners (22).

### **General epidemiology of hepatitis B in Middle East countries**

The prevalence of HBsAg among 6,240,130 blood donors was 4.19% between 1989 and 2004 in Turkey (23). In 13,443 blood donors in Eastern Saudi Arabia, there was a steady decrease in the HBsAg (2.58 and 1.67%), and anti-HBc rates (15.32 and 9.15%) between 1998 and 2001, respectively. However, significantly higher rates of anti-HBc (24.73% vs. 13.53%) and anti-HCV (3.30% vs. 0.98%) were seen among non-Saudi versus Saudi donors (24). In a study of 26,874 first-time blood donors in Kuwait in 2002 (25), the difference for prevalence of HBsAg (1.1% and 3.5%) and anti-HBc (17% and 33.3%), respectively among Kuwaiti national and non-Kuwaiti Arab donors was significant. Infected refugees, gypsies and workers travelling abroad are an important source of hepatitis B for other communities; meanwhile they participate in activities that put them at risk of exposure to hepatitis B. Although immunization against hepatitis B started in the mentioned countries, current prevalence of infection is still significant.

Of 301 families with a total of 903 Afghan refugees living in the camps of Balochistan Province, Pakistan in 2003, 8.3% were positive for HBsAg (26). It has been suggested that it is advisable to monitor the changing patterns of HBV infection in countries with large immigrant populations (27).

The prevalence of HBsAg in Yemen ranges from 8% to 20%. In a study of 178 randomly selected subjects, seroprevalence among mothers was 13.2% and 4% for infants aged between 6 and 12 months. There was a significant association of history of birth in hospital, with higher significance of birth by cesarean section and hepatitis B virus infection for infants (28). Hospital-acquired HBV infection is very common in Yemen, and prevention is possible by applying standard policies of sterilization, disinfection and training and ensures refinements in the screening of blood donors. The results of this study are different from those reported from Asia, where perinatal transmission is more common (29).

Seroprevalence of HBsAg in 1,694 pregnant women was 7.1% of the women in Oman, 1% in Qatar and 1.5% in the United Arab Emirates (UAE) in 2000 (30). Risk factors for HBsAg-positive were a younger age, being a national and residing outside the city. According to that study, HBV exposure may take place at younger age by living in an endemic area and outside the city. Prevalence of HBsAg in 2,634 presumably healthy Lebanese individuals evaluated during 1995–1997 was 1.6% (31). Blue-collar employees, smokers and those living in South of Lebanon were significantly more likely to be infected with hepatitis B virus.

In Asia and most of Africa, chronic HBV infection is common and usually acquired perinatally or in childhood (3). The risk ranges from 70 to 90% for infants born to mothers who are positive for both HBsAg and HBeAg, in contrast to the 10–40% risk in infants born to mothers who are positive for HBsAg but negative for HBeAg (32, 33). Comparatively, East Asia has been found to have a higher prevalence of HBeAg positive mothers and a greater risk of perinatal transmission from HBeAg positive mothers than sub-Saharan Africa (34).

In a study of Iraqi children in families attending the Public Health Laboratory of Mosul in 2000-2001(35); 74 children born between 1994-1998 were diagnosed as HBsAg carrier. Parental reluctance was the reason for non-vaccination of 12 children.

Reused syringes have been identified as a major risk factor for hepatitis B and C in Pakistan, a country facing a growing epidemic of these infections (36). In a study among 161 i.v. drug users in Karachi, Pakistan in 2003, the prevalence of hepatitis B was 12 (7.5%). Commercial selling of blood was reported by 44 (28%) of them (37).

## Conclusion

Hepatitis B virus infection is a problem of public health, and a major cause of mortality and morbidity, particularly in developing countries. Most countries in the Middle East region are still considered intermediate to high endemicity for HBV infection. Insufficient coverage of HBV vaccination, injection drug users sharing blood-contaminated equipment, unsafe blood transfusion, and inadequate health precautions are major risk factors for hepatitis B virus infection in this region. Screening HBV infection during pregnancy, and follow-up of infants with HBV infected mothers will reduce rates of perinatal HBV infection in these countries. Implementing local strategies for hepatitis B screening will reduce the infection rate.

The socioeconomic and sanitary changes, expanded program on immunization of infants and of all high risk populations have changed the epidemiologic profile of hepatitis B virus infection in Iran. Universal vaccination has significantly decreased the carrier rate among young children. More studies on the impact of type of vaccines, environment, ethnicity and other contributing factors that can impede an adequate antibody response in our population are necessary. The education of the people regarding infection prevention and transmission, especially of groups at risk of hepatitis exposure and limiting immigration from neighboring countries is the most cost-effective way of infection control.

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