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The Epidemiology of HBsAg Positive Cases Babol, Iran

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Abstract

Background: Hepatitis B is a risk factor for cirrhosis and hepatocellular carcinoma. Epidemiological study of patients with hepatitis B can provide valuable information for thoughtful healthcare planning. This study was made to evaluate the epidemiology of the hepatitis B virus infection in Babol Iran.
Methods: This was a cross-sectional descriptive study. The study sample consisted of all individuals who had been diagnosed with hepatitis B in 2010 - 2016 and their hepatitis-related information were available from the hepatitis B assessment forms in the Health Administration of Babol University of Medical Sciences, Babol, Iran. Study data were retrieved from the already completed forms.
Results: A total of 567 hepatitis B forms had been completed in 2010 - 2016. Among 567 individuals, 373 cases (65.8%) were male and 194 (34.2%) were female. Individuals were mostly married and rural dwellers. The age group with the highest frequency was 25 - 35. Most men were self-employed, while most women were housewives. The most important reasons behind the hepatitis B surface antigen testing among women and men were pregnancy and the availability of hepatitis B risk factors, respectively. Around 91.5% of participants had not received a hepatitis B vaccine at all, 3.2% had received it incompletely, and 5.3% completely.
Conclusion: Hepatitis B is more common among married, middle-aged, males, as well as rural dwellers. Continuous follow-up assessment, lifestyle education, and complete hepatitis B vaccination are essential for effective hepatitis B prevention.

Keywords: Hepatitis B, Epidemiology, Babol

1. Background

Hepatitis is referred to the inflammation of the liver (1). Hepatitis B virus (HBV) can invade the liver and cause acute and chronic diseases (2). HBV infectivity is 100 times greater than that of the human immunodeficiency virus (3). HBV can survive outside of the human body for 1 week. During this 1-week period, if it enters a non-immunebody, it can cause an infection. HVB is transmitted through blood and other body fluids (3). The individuals' age, at the time of affliction, has a determining role in the long-term consequences of the infection the younger the age, the greater the chance of chronicity. Accordingly, the chance of chronicity for an infected infant and an infected adult is about 90% and 2% - 6%, respectively (4-6).

Hepatitis B is among the most prevalent diseases in the world (7). Estimates show that around 1/3 of the world's population have positive serologic evidence concerning the previous HBV infection (2). About 15% - 30% of hepatitis B cases become chronic (6). Based on HBV prevalence, the world is divided into 3 regions, namely the region of low prevalence (less than 2%), the region of moderate prevalence (2% - 8%), and the region of high prevalence (more than 8%). Around 60% of the world's population lives in high prevalence areas (5). The degree of endemicity is related to the dominant HBV transmission route. In high prevalence areas, mother-to-child transmission is the most dominant transmission route and 70% - 90% of adults have positive serologic evidence of previous HBV infection (8, 9). On the other hand, in low prevalence areas, most HBV infections happen in adolescence and youth and through the sexual route, blood transfusion, or needle sharing during drug injection (8, 9). Iran is located in the moderate prevalence region. The prevalence rate of chronic hepatitis in the Iranian general population is 2.2%, while among Iranian men and women is 3% and 1.7%, respectively (10).

Hepatitis B is a major risk factor for cirrhosis and hepatocellular carcinoma (11, 12); so much so that 1/4 - 1/2 of the patients with chronic hepatitis are expected to develop se-

rious hepatic complications such as cirrhosis and hepatocellular carcinoma (7). Moreover, 60% - 80% of hepatocellular carcinoma is related to chronic hepatitis (13-15). The results of a case-control study illustrated that the lifetime relative risk of hepatocellular carcinoma among patients with chronic hepatitis B is 15 - 20 times more than healthy individuals (13). Liver cancer is the 5th cause of cancer-induced death among men and the 7th among women (13).

In 1991, the World Health Organization recommended routine hepatitis B vaccination in order to prevent the hepatitis B infection (16). Subsequently, hepatitis B vaccination was included in 1993 in the National Immunization Program in Iran (17). The incidence of hepatitis B, in countries with the hepatitis B vaccination program, is gradually reducing among vaccinated individuals (5).

Understanding the epidemiologic characteristics of hepatitis B can help evaluate the effectiveness of immunization programs and national efforts for hepatitis B prevention. Moreover, any effort for assessing the burden of the disease necessitates the evaluation of its prevalence and spread. On the other hand, population shifts and immunization programs can change the epidemiologic pattern of HBV (18). This study was made to evaluate the epidemiology of HBV infection in Babol Iran.

2. Methods

This was a cross-sectional descriptive study. Study sample consisted of all cases with hepatitis B surface antigen (HBsAg) sero-positivityin Babol, Iran, whose hepatitis-related information were available from already-completed hepatitis B assessment forms. Developed by the Iranian Ministry of Health, this form is routinely completed by disease control staff in healthcare centers and laboratories in Iran for all HBsAg-positive individuals. The items of this form are on demographic characteristics (such as age, gender, employment status, marital status, and place of residence) as well as hepatitis-related characteristics (such as reasons behind HBsAg testing, risk factors, and vaccination history). Completed forms are kept in the database of the Health Administrations of local medical sciences universities. Therefore, we referred to the Health Administration of Babol University of Medical Sciences, Babol, Iran, and retrieved the necessary data from the forms, which had been completed from 2010 - 2016.

The SPSS software (v. 22) was used for data analysis. The data were described using measures such as mean and frequency. Moreover, the Chi-square and the independent-sample t tests or their non-parametric equivalents were used for data analysis.

This study was approved by the Ethics Committee of Babol University of Medical Sciences, Babol, Iran, with the approval code of MUBABOL.HRI.REC.1396.30. The hepatitis B assessment forms included no identity-related data and therefore, individuals' anonymity had been already protected.

3. Results

In total, 567 hepatitis B assessment forms had been completed in 2010 - 2016. Among 567 HBsAg-positive individuals, 373 (65.8%) were male and 194 (34.2%) were female. The youngest and the oldest individuals were aged 3 and 81 years, respectively. The mean of participants' age was 39.3 $\pm$ 14.3, while the means of male and female participants' age were 40.3$\pm$14.6 and 37.1$\pm$13.9, respectively. No significant difference was found between the age of male and female participants (P = 0.07).

Table 1 shows the frequency of HBV infection based on participants' demographic characteristics. Most participants were rural dwellers (58.9%) and married (87.2%). Moreover, the age group with the highest frequency was 25 - 35 (26.5%). Respecting employment status, 176 (90.7%) female participants were housewives, 10 (5.1%) were self-employed, and 6 (3.1%) were university students, while 206 (55.3%) male participants were self-employed, 61 (16.3%) were farmers, 40 (10.7%) were drivers, and 34 (9.0%) were white-collar workers.

The most common hepatitis B risk factors were positive family history of hepatitis (117 cases; 20.6%), surgery (16 cases; 2.8%), dental visit (14 cases; 2.4%), history of blood transfusion (12 cases; 2.1%), injection drug abuse, high-risk sexual behaviors, and direct contact with blood (each with 3 cases; 0.5%). However hepatitis B risk factors had not been documented for 399 cases (70.3%).

The most important reasons behind HBsAg testing were the availability of risk factors (151 cases; 26.6%), personal request (109 cases; 19.2%), and pregnancy (72 cases; 12.7%). Besides, the most important reasons behind HBsAg testing among male and female participants were respectively the availability of risk factors (110 cases; 29.5%) and pregnancy (72 cases; 37.1%). The majority of participants (462 cases; 81.4%) had no clinical manifestation of hepatitis B, while the most common clinical manifestations among other participants were jaundice (30 cases; 5.3%) and abdominal pain (15 cases; 2.6%). Male participants did not differ significantly from their female counterparts respecting clinical manifestations (P = 0.41).

Among participants, 211 cases (37.2%) had chronic hepatitis, 51 (9%) had acute hepatitis, and 305 (53.8%) had inactive hepatitis or needed further follow-up assessments. Again, male and female participants did not significantly

differ from each other respecting hepatitis state (P = 0.25). The most common clinical manifestation among participants with acute hepatitis was jaundice (21%).

Respecting the history of Hepatitis B vaccination, 519 cases (91.5%) had not received hepatitis B vaccine at all, 18 (3.2%) had received it incompletely, and 30 (5.3%) had received it completely. Vaccination history was not significantly correlated with the place of residence (P = 0.08).

Table 1. The Frequency of HBV Infection Based on Participants' Demographic Characteristics

Characteristics	Frequency	%	P Value
Place of residence			P < 0.001
Urban areas	233	41.1	
Rural areas	334	58.9	
Marital status			P < 0.001
Single	67	11.8	
Married	496	87.2	
Divorced	4	1	
Age			P < 0.001
Less than 25	79	13.9	
25 - 35	150	26.5	
35 - 45	140	24.8	
45 - 55	113	19.8	
More than 55	85	15.0	

4. Discussion

This study aimed to evaluate the epidemiology of hepatitis B virus infection in Babol, Iran. Findings showed that participants aged 39.3 ± 14.3, on average. Similarly, studies in different areas of Iran reported that HBsAg-positive individuals aged 37 - 42, on average (19-22). The age group with the highest frequency in the present study was 25 - 35 (with a relative frequency of 26.5%), while the age groups with lowest frequencies were less than 25 and more than 55 (with the relative frequencies of 13.9 and 15.0, respectively). A review study on the prevalence of chronic hepatitis in Iran also indicated that hepatitis B was more common among individuals who aged more than 30 (23). Other studies in Iran also showed that hepatitis B mostly afflicted individuals who aged 25 - 34 (19), 30 - 39 (21), 45 - 60 (22), and 21 - 30 (24). The higher frequency of HBsAg positivity, among patients with an age of 25 - 35, in the present study, may be due to the implementation of HBV vaccination programs and greater immunity of younger individuals against HBV. Two earlier sero-epidemiological studies also showed that HBV vaccination significantly lowered the prevalence of HBsAg positivity among individuals aged 2 - 14 (25, 26). Moreover, we found higher HBsAg positivity among male individuals. Previous studies also reported the same finding (10, 19-21, 23, 27, 28). This finding can be attributed to male individuals' greater exposure to the Hepatitis B risk factors or their greater engagement in high-risk behaviors.

Most HBsAg-positive individuals, in the present study, were rural dwellers (58.9%). However, in 2 earlier studies in Iran, HBsAg-positive individuals were mostly city dwellers (20, 22). Moreover, 87.2% of our participants were married. Three earlier studies in Iran also reported the same finding, while another study showed that HBsAg positivity was more common among single people (29). Greater prevalence of HBsAg positivity among married people may be due to their sexual relationships with their infected spouses and their older ages; therefore, they have a greater exposure to HBV risk factors and lower likelihood of receiving HBV vaccine.

Most male participants were self-employed, while most female participants were housewives. The higher prevalence of these 2 employment statuses may be due to their higher frequencies in the Iranian general population. This is in line with the findings of previous studies (19, 22). Another study also showed that employment status was significantly correlated with the prevalence of HBsAg positivity (20). Due to their lifestyle habits and work conditions, some certain occupational groups (such as drivers and students) are more exposed to and more at risk for HBV infection (28).

Study findings also revealed that positive family history of hepatitis B was the most common risk factor for HBV infection. A sero-epidemiological study in Zahedan, Iran, also revealed that 19.3% of the family members, particularly the mothers, of HBsAg-positive chronic carriers were also infected with HBV (24). Intrafamily transmission is among the main routes for HBV transmission (27). Given the greater prevalence of horizontal HBV transmission (30), identifying at-risk individuals, providing them with lifestyle educations, and vaccinating them against HBV are essential for effective HBV infection prevention and management (28).

In the present study, pregnancy was the most common reason behind female participants' request for HBV testing. Previous studies reported that the prevalence of HBV infection among pregnant women in different areas of Iran was 0.8% (31), 1.6% (32), and 0.4% (33). Moreover, the findings of the present study revealed that most participants (53.7%) had inactive hepatitis B or needed further follow-up assessments. In a study on the epidemiological patterns of hepatitis B in the northwest of Iran, 74% of par-

ticipants suffered from chronic and 19.8% from acute hepatitis (19). Another study in the northeast of Iran showed that 70% of participants had chronic hepatitis (21).

Our findings also showed that 91.5% of participants had not received the hepatitis B vaccine at all. This value, in several studies in Iran, was 87.9% (19), 92.5% (21), and 99.1% (22). Three-dose hepatitis B vaccination was reported to produce strong immunity among 95% of children and 90% of adults (34). Another study in Iran showed that the 3-dose vaccination program increased HBsAg antibody to optimum levels among 90% of vaccinated individuals (35). However, immunity response to vaccination decreases with age (17).

4.1. Conclusion

HBV infection is more common among married, middle-aged, males, as well as rural dwellers. Given the greater risk for horizontal HBV transmission among these groups of individuals, continuous follow-up assessment, lifestyle education, and complete HBV vaccination for them and their family members are essential for effective hepatitis B prevention.

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