

Epidemiological features of hepatitis B and C infection in a high risk population: results of screening programs

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ABSTRACT

Aim: The aim of this study was to report the epidemiological features of HBV & HCV infection in an Iranian high risk population.

Background: Hepatitis B and hepatitis C infections are worldwide serious public health problems. Iran has an intermediate prevalence of infection and a screening program was started in 2010 among high risk individuals.

Patients and methods: This cross-sectional study was conducted on 4455 new patients during two past years. Demographic information, age, gender, occupational status, medical history, history of vaccination against HBV, high risk exposure and laboratory findings were collected for each patient. Then distribution of demographic and risk factors was evaluated in each type of hepatitis.

Results: The mean age of patients was 45.6 ± 17.3 years. More than two-thirds of the diagnosed cases were infected with HBV. 74% of patients were carriers of hepatitis virus. 60% of patients had no symptoms at diagnosis. Illicit intravenous drug use was most common high risk exposure in patients under study ($n=366$, 8.2%). High risk behaviors including illicit intravenous drug use and unprotected sex were relatively higher in patients infected with hepatitis C compared to patients with hepatitis B infection.

Conclusion: Findings of this study suggest that illicit intravenous drug use, contact with an infected household member and unprotected sex are the most common high risk exposure in Iranian patients infected with viral hepatitis. Therefore, preventive strategies such as health education, vaccination and screening programs should be directed to these groups. The results also show that a majority of patients have no symptoms at the time of diagnosis, therefore periodic screening tests in high risk groups is required.

Keywords: Hepatitis B, Hepatitis C, Epidemiology, Risk factor.

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Introduction

Infection with hepatitis B (HBV) and hepatitis C (HCV) are the serious worldwide public health problems (1, 2). It is estimated that about 350 to 400 million people suffer from hepatitis infection throughout the world and each year one million

people die due to complications of this infection, including cirrhosis and hepatocellular carcinoma (1).

The prevalence of hepatitis infection varies markedly according to geographical areas. In the United States, Canada, western Europe, Australia, and New Zealand, the prevalence of hepatitis B is 0.1% to 2%; and are known as low prevalence areas (3-5). Mediterranean countries, Japan, central Asia, the Middle East, and Latin and South America (2-8%), and southern Asia, China, and

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sub-Saharan Africa (8-20%) are considered as intermediate and high prevalence area, respectively (5). The prevalence of Hepatitis C infection has been reported from different regions (2). While HCV prevalence in Western Europe has been reported from 0.4 to 3% of populations, a prevalence of up to 15% has been reported in Mediterranean and East European countries (3).

In developing countries, there is no access to adequate and reliable information on the prevalence, risk factors and burden of viral hepatitis (6, 7). Iran also is not except from this problem. Alavian et al. (8) estimated that the prevalence of HBV infection varies 2.1% - 2.6% and 2.1% among Iranian males and females, respectively. Some studies show that the prevalence of HBV is rising in Iran (9). But despite this, the majority of studies (10-15) that conducted in Iran focused on specific groups such as blood donors, drug abusers and is not based on population.

Screening program for hepatitis infection in high risk group was implemented since 1984 in Iran. According to instruction of Ministry of Health of Iran, hepatitis screening tests are mandatory in the following groups: blood donors, health care provider, patients with history of hemodialysis, pregnant women, infants born to HBsAg+ mothers, patients with jaundice or other symptoms of acute hepatitis, first degree relatives of chronic HBV patients, cirrhosis patients, illicit intravenous (IV) drug users, HIV patients, prisoners and immigrants from countries with high prevalence of hepatitis. But a comprehensive report of screening programs in general population is not published yet. For this reason, the current study was designed to report the epidemiologic features of HBV and HCV in Iranian peoples with positive hepatitis screening test.

Patients and Methods

The present study was designed as cross-sectional study that conducted from March 2010 to March 2012. In this study, we investigated the epidemiological features of all patients were diagnosed with hepatitis during screening programs in Shahid Beheshti University of Medical Sciences coverage area (more than 80% of Tehran's population).

Demographic information such as age, gender and occupational status, and also medical histories including history of vaccination against HBV, having high risk exposure and laboratory findings were gathered for each patient. Patients were categorized into six groups according to their occupation: work without pay (including householders, students, disable persons and unemployed), militaries, government servants, self-employed and high risk occupations (including health care provider, barbers, prisoners and sweepers), other jobs that were not in mentioned categories were classified as other occupations. The high-risk exposures in this study were accidental needle pricks, blood transfusion, blood donation, hemodialysis, IV drug use, high risk sexual practice and intra-family transmission. Patients, who did not report any risk factors, were categorized as unknown group. After obtaining necessary information, the most common risk factors was evaluated for each type of hepatitis.

Continuous variables are presented as mean \pm standard deviation, and other parameters as frequency and percentage. Differences between groups were determined by Chi-square test and differences between means of groups were compared by independent samples T test. Statistical analysis was performed using SPSS software (version 13.0). A p-value of 0.05 or less was considered statistically significant and all reported p-values were two sided.

Table 1. Demographic and clinical characteristics of patient under study

	Number	Percent
Sex		
Male	2835	63.6
Female	1620	36.4
Age(n=4391)		
<20	132	3
20-45	2173	48.8
45-60	1115	25
>60	971	21.8
Marital status (n=4153)		
Married	3553	79.8
Single	538	12.1
Widowed	27	0.6
Divorced	35	0.8
Occupation (n=4429)		
Occupation without	1871	42
Military	34	0.8
High risk occupation	44	1
Government servants	948	21.3
Self employed	1354	30.4
Other	178	4
History of vaccination		
No	4216	94.6
Incomplete	51	1.2
Complete	188	4.2
Type of hepatitis		
HBV	3156	70.8
HCV	1220	27.4
HBV & HCV	79	1.8
Clinical status		
Acute	198	4.4
Chronic	277	6.2
Carriers	3303	74.1
Unknown	677	15.3
Serologic markers		
Anti HBc	18	0.4
Anti HCV	1220	27.4
HBe Ag	6	0.1
HBs Ag	3072	69
HBs Ag & anti HCV	79	1.8
HBs Ag & HBe Ag	60	1.3

Results

In total, 4455 patients with positive HBV screening test were reviewed. 2835 of cases (63.6%) were male. The mean age of patients was 45.6 ± 17.3 . The mean age of male patients at diagnosis was significantly higher than female (47.2 ± 16.9 vs. 42.8 ± 16.7 , $P < 0.0001$). About 80% of subjects under study were married. 3.3% of cases ($n=146$) was diagnosed in rural areas. 42% of patients had no income-jobs and only one percent of them were employed in high risk occupations.

More than two-thirds of the diagnosed cases were infected with HBV. 74% of patients were carriers of hepatitis virus. Icterus was most common symptom in patients under study ($n=145$, 3.2%) followed by nausea and vomiting ($n=115$, 2.5%), abdominal pain ($n=93$, 2%) and fever ($n=78$, 1.8%). 30.5% of cases reported other symptoms and 60% of patients had no symptoms at diagnosis that 11% of whom were diagnosed during routine pregnancy tests. Demographic and clinical features of patients under study are shown in table 1.

In more than three-quarters of the cases, transmission of the disease was unknown. A history of IV drug use was reported in 366 cases (8.2%). 87 cases (2.0%) had at least one HBV infected in first degree relatives that 7 of whom were infants born from infected mother. Unsafe sex was reported in 70 patients (1.6%). 1.2% ($n=55$) of patients had a history of blood transfusion. A history of dialysis was identified as another common high risk exposure. 85 patients (1.9%) had more than one high risk exposure.

Mean age of HCV patients was lower than HBV infected patients (43.8 ± 15.7 vs. 46.4 ± 17.9 , $P < 0.0001$). The sex ratio (male: female) in HCV infection was significantly different from HBV infection (5.26:1 vs. 1.23:1, $p < 0.0001$). Table 2 demonstrates some of the observed differences between patients with HBV and HCV infection.

Table 2. Distribution of high risk exposure according to type of hepatitis infection

	HBV n(%)	HCV n(%)	P-value
Sex			<0.0001
Male	1741(55.2)	1025(84)	
Female	1415(44.8)	195(16)	
History of IV drug use			<0.0001
Yes	110(3.5)	230(18.9)	
No	3046(96.5)	990(81.1)	
History of unsafe sex			<0.0001
Yes	17(0.5)	45(3.7)	
No	3139(99.5)	1175(96.3)	
History of blood transfusion			0.217
Yes	3111(98.6)	1198(98.2)	
No	45(1.4)	22(1.8)	
Infected family member			0.003
Yes	74(2.3)	13(1.1)	
No	3082(97.7)	1207(98.9)	

Discussion

In this cross-sectional study we have investigated the epidemiological and clinical profile of hepatitis infection in patients diagnosed by a screening program. A total of 4455 new patients during two past years were reviewed that about two-third of whom were infected with HBV. History of IV drug use was most common high risk exposure and in 95% of cases there were no history of HBV vaccination.

Our findings show a high proportion of men among hepatitis patients. This result confirmed a finding reported in similar previous studies (1, 9). The causes may be due to higher exposure of men to risk factors for hepatitis infection.

Despite the availability of an effective HBV vaccine, only 4% of patients had a history of complete HBV vaccination. The lowest prevalence of HBV infection was observed in patients less than 20 years old. This may indicate a successful vaccination program in infants that have been implemented since 1993 in Iran. If correct, this observation confirms reveals the importance and success of HBV vaccination in high risk groups.

As mentioned in various studies, in intermediate prevalence rate areas such as Iran, horizontal transmission is a major path of disease(5). But in this study IV drug use was the most common high risk exposure, similar to the pattern observed in low prevalence areas. The rate of IV drug use in HCV patients was significantly higher than HBV patients, comparable to the results of similar studies (16, 17). It should be mentioned that because of this fact that IV drug use and unsafe sex is taboo in Iran, there is an underestimation in the reported rate of these high risk exposures by patients.

In the interpretation of findings of this study, some limitations should be kept in mind. First, we did not know the total number of people screened and only we had access to information of individuals with positive screening test. This means that we did not have population denominator for calculation of the rate of disease. Second, design of study was as a cross sectional and there was a lack of healthy control group, for this reason, causal inference is not possible.

In conclusion, findings of present study indicates that IV drug use, contact with infected family member and unsafe sex are the most common high risk exposures in Iranian infected with hepatitis. For this reason, these groups should be considered as priority in health education, vaccination and screening programs. Also, the results of this study showed that most of patients had no symptoms at diagnosis therefore periodic screening tests in high risk groups seem to be necessary. Further studies are suggested for evaluation of trend of disease and changes in mode of transmission after implementation of vaccination programs.

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