

Prevalence of Hepatitis B Virus Infection in Isfahan Province

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ABSTRACT

Hepatitis B virus (HBV) is a serious global health problem. It is estimated that 1.5–2.5 million people are suffering from this infection in Iran. A review on HBV infection prevalence in Isfahan, Iran is conducted in this article. It will help researchers for further studies and also will be helpful for control the infection. Medline, Embase, Ovid, Google Scholar, Scientific Information Database, Iranmedex, Magiran and Scientific Journal of Iran Blood Transfusion Organization and also students' thesis and projects of Isfahan and Kashan universities of medical sciences were searched for key words “HBV,” “HBsAg,” “prevalence,” “Isfahan,” “Esfahan,” and “Kashan in titles and/or abstracts. Overall, 24 articles, including 4, 14, 5 and 1 were assessed in Isfahan province, and Isfahan, Kashan, and Foulad-shahr cities, respectively. The highest and lowest participants were 542705 and 73, respectively. The highest prevalence of HBsAg was reported in HIV-infected patients and the lowest one was seen in the thalassemic patients. We collected the articles about the prevalence of HBV in Isfahan to help researchers and determine prevalence HBV in Isfahan province. The similar studies in other province of Iran are necessary for marking decision.

Keywords: Prevalence, epidemiology, hepatitis B virus, Isfahan, Kashan

INTRODUCTION

Hepatitis B virus (HBV) infection is worldwide health problem with more than 2 billion people have been exposed to this infection. Fifty million new cases are being diagnosed annually with 5–10% of adults and up to 90% of infants becoming chronically infected.^[1]

Chronic hepatitis B causes for about 1 million deaths each year^[2] and is the 10th leading cause of death worldwide.^[3]

The prevalence of HBV infection varies extensively, ranged from 0.1% to 20% in different regions of the world.^[3] The prevalence of this infection is the highest in developing countries, such as in Asia, Africa and lowest in the developed countries such as North America, Europe and Australasia.^[1] Overall, 45% of the world population lives in countries where HBV endemicity

is high (hepatitis B surface antigen positivity rates >8%), resulting in the massive global burden associated with the infection.^[4]

Hepatitis B virus prevalence in the general population in the Asian region is various; it is the highest rates in Taiwan (>10%) and Thailand (>8%) and lowest in Japan (0.8%), with the majority of countries having rates <8%.^[1] The Middle East: Iran, Bahrain and Kuwait have low endemicity. Iraq and the United Arab Emirates are regions of intermediate endemicity and Jordan, Oman, Palestine, Yemen, and Saudi Arabia are areas of high endemicity.^[5]

In Iran, the first report about HBV infection was published in 1972.^[6] In later reports the rate of HBV infection was from 1% to 2.1%, respectively.^[7] The prevalence of HBV has decreased in Iranian population during the last decade.^[8,9] The reducing the rate of infection could be achieved by vaccination programs.^[8] In Islamic Republic of Iran (I.R. Iran), the neonatal vaccination program against HBV infection started from 1993 as a national program.^[10]

More recent researches reported the range of HBV infection between 1.2%^[11] and 9.7%^[12] in different areas of the country. It is estimated that about 1.5–2.5 million people in Iran are suffering from HBV infection.^[10] In this paper, the general features of the epidemiology of HBV infection in Isfahan Province will be reviewed to help researchers for further studies and control the infection.

METHODS

The population of interest was people who live in Isfahan province and the interested outcome was the presence of positive HBsAg in blood samples of the study population, based on any blood tests. We searched eight electronic databases of biological sciences and health, including Medline, Embase, Ovid, Google Scholar, Scientific Information Database, Iranmedex, Magiran and Scientific Journal of Iran Blood Transfusion Organization. In addition, manual searches of the Iranian health sciences journals that have not been indexed in electronic databases were performed to identify all pertinent literature. The research projects of Isfahan and Kashan universities of medical sciences were also searched from their internet web sites. Iranian center for scientific

documents and records (IranDoc), Isfahan and Kashan universities of medical sciences were also searched for students' thesis. For finding the gray literature, we reviewed all the national, regional and international scientific congresses and seminars that were held in the study time period with review abstract books. We also consulted with two experts in HBV researches in Isfahan (Dr. Peyman Adibi and Dr. Behrooz Ataei) and seek their personal archives for more additional citations. Finally, backward citation and forward citation of searched citations were managed. The key words were; "HBV," "HBsAg," "prevalence," "Isfahan," "Esfahan" and "Kashan in titles and/or abstracts. All articles/surveys regarding sampling design and demographic adjustments were identified by searching to November 2012.

RESULTS

Our electronic and manual searches identified 27 studies including 21 articles,^[13-33] five students' theses^[34-38] and a research project.^[39] Two students' theses^[37,38] were deleted for methodological reasons. We excluded the research project^[39] because it was running. Finally, we found 24 relevant studies of satisfactory quality for key words of "HBV," "HBV," "HBsAg," "prevalence," "Isfahan," "Esfahan" and "Kashan."

Fourteen studies were from Isfahan city,^[15-17,20,23-25,29-34,36] 5 from Kashan^[13,14,18,28,35] and 1 from Foladshahr.^[19] Other studies were from Isfahan province.^[21,22,26,27] All included studies were cross-sectional studies and the sample size range was between 73 and 542,705.

Prevalence of hepatitis B virus among blood donors

Seven studies^[13-16,31,32,34] were found in the literature review which related to HBV prevalence in Isfahan province. The search results are demonstrated in Table 1. Of these, five studies were conducted in Isfahan^[15,16,31,32,34] and two studies in Khashan.^[13,14] In Masaeli *et al.*^[15] the prevalence of HBsAg was compared among regular, sporadic, and first-time blood donors (F.T.B.D) of Isfahan city. The HBsAg prevalence was less in regular than sporadic and F.T.B.D.

In a similar survey in Isfahan, Frequency of HBsAg in F.T.B.D and regular donors were 1.4%

Table 1: Prevalence HBV in blood donors

Study's first author	Study (ies) target population	Total sample size	Prevalence (%)	Sex		Year	Province/city
				Male	Female		
Afzali	R.B.D*	43,731	0.62	39,358	4373	1996-2001	Kashan
Lenjani	R.B.D*	579	1.73	523	56	1999	Isfahan
Moniri	R.B.D*	600	0.5	548	52	2001-2002	Kashan
Masaeli	R.B.D*	16,620	0.39	15,836	784	2002	Isfahan
	S.B.D**	5742	0.96	5315	427		
	F.T.B.D***	7096	0.59	5988	1108		
Salehi	R.B.D*	2635	0.6	-	-	2002	Isfahan
	R.C.B.D****	2173	0.18	-	-		
Pourazar	R.B.D*	43,456	0.54	41,065	2390	2003	Isfahan
	F.T.B.D***	7997	1.4	6816	1181		
Ebrahimian	R.B.D*	542,705	0.36	-	-	2004	Isfahan
			0.3	-	-	2005	
			0.22	-	-	2006	
			0.14	-	-	2007	
			0.13	-	-	2008	
			0.11	-	-	2009	

*R.B.D=Regular blood donors, **S.B.D=Sporadic blood donors, ***F.T.B.D=First-time blood donors, ****R.C.B.D=Religious ceremony blood donors, HBV=Hepatitis B virus

and 0.5% respectively.^[31] In Salehi *et al.*,^[16] blood samples of two groups of donors, routine donors and the religious ceremony donors, were evaluated for HBsAg. Their results showed HBsAg prevalence in the religious ceremony donors significantly was less than the routine conditions. HBsAg seropositivity was shown a decrease in volunteers who referred to Isfahan blood transfusion organization from 2004 to 2009 in Ebrahimian's study.^[32]

Afzali *et al.*^[13] showed that the prevalence of HBsAg infection among healthy volunteer blood donors referred to the Kashan blood bank was on a significant decline from 0.82% in 2002 to 0.49% in 2007.

Prevalence of hepatitis B virus among injecting drug users

We found five studies^[17-20,29] on prevalence HBV amongst injecting drug users (IDUs) in Isfahan province [Table 2]. Khorvash *et al.*^[20] and Meidani *et al.*^[29] assessed the frequency of hepatitis B among IDUs who admitted at Al-Zahra hospital in Isfahan during 2004–2005 (HBV prevalence: 10.9%) and 2007–2008 (HBV prevalence: 1.3%), respectively. The similar study was performed in Kashan between 2001 and 2006.^[18] In this study, the frequency of positive infection test results for males was 4% and for females was 0.5%.

Taeri *et al.*^[17] evaluated seroprevalence of HBV in HIV positive patients with a history of intravenous drug users (IVDU) and showed HBV prevalence of 1.8%.

Prevalence of hepatitis B virus among others

Eleven studies,^[21-28,30,33,35,36] which related to HBV prevalence in Isfahan province were found in the other population [Table 3]. The lowest and the highest samples size were 73 and 2000 for hemodialysis patients and pregnant women in Kashan, respectively. In a study carried out on 130 HIV-positive patients in this province, co-infection with HBV was 11.5%.^[21] Three studies^[27,30,36] assessed the prevalence HBV among hemophilia, and thalassemia patients. The study by Rahimi on 150 patients with hemophilia demonstrated that 2.7% patients had been infected with HBV.^[36] Kalantari *et al.* had reported 1.62% and 1.1% patients with hemophilia and thalassemia were HBsAg positive respectively.^[30] However, another study by Hariri *et al.* demonstrated that none of the thalassemic patients had been infected with HBV but the prevalence rates of HBV were 1.6% among in hemophilia patients.^[27] A study in Kashan revealed that 1.4% of hemodialysis patients were HBV positive.^[35] In a study from Kashan, HBsAg was traced in the serum of 0.35% of the pregnant

Table 2: Prevalence HBV in IDUs

Study's first author	Total sample size	Province/city	Year	Prevalence (%)	Sex		Age (year) mean±SD
					Male	Female	
Sharif	200	Kashan	2001-2006	4 (male) 0.5 (female)	177	23	36.5±10.2
Taeri	106	Isfahan	2000-2007	1.8	106	-	50.8±8.1
Khorvash	92	Isfahan	2004-2005	10.9	91	1	31.7±2
Zamani	118	Foulad-shahr	2008	0.7	115	3	-
Meidani	150	Isfahan	2007-2008	1.3	148	2	30.7±7.09

HBV=Hepatitis B virus, IDUs=Injecting drug users, SD=Standard deviation

Table 3: Prevalence HBV in other population

Study's first author	Study (ies) target population	Total sample size	Province/city	Year	Prevalence (%)	Sex		Age mean±SD
						Male	Female	
Ataei	HIV infected patients	130	Isfahan province	1998-2007	11.5	128	2	50.23±8.81
Rahimi	Hemophilic patients	150	Isfahan	1999	2.7	131	19	-
Tabasi	Pregnant women	2000	Kashan	2002	0.35	-	2000	24
Hashemi	Hemodialysis patients	73	Kashan	2000	1.4	-	-	-
Hariri	Thalassemic patients	616	Isfahan province	2004	0	344	272	15.5±8
	Hemophilic patients	120			1.6	115	5	22±14
Nokhodian	General population	816	Isfahan province	2006	1.3	388	428	-
Ataei	Street Children	399	Isfahan	2005-2007	3.3	271	128	12.74±3.27
Ataei	Transit Heavy vehicle Driversin	235	Isfahan	2007	0.9	235	-	41.8±9
Ahmadi	Pregnant women	1078	Isfahan province	2009	0.5	-	1078	26.1±4.9
Kassaian	Women with illegal social behavior	100	Isfahan	2009-2010	1.1	-	100	30.84±9.34
Kalantari	Thalassemic patients	545	Isfahan	2008-2010	1.1	312	233	18.7±6
	Hemophilic patients	615			1.62	511	104	27.1±12.8
Nokhodian	Female prisoners	163	Isfahan	2009	1.2	-	163	34.54±11.2

SD=Standard deviation, HBV=Hepatitis B virus

women.^[28] In another study, 1078 of the pregnant women were investigated for HBsAg and the rate of positive serum surface antigen in pregnant women was 0.5%.^[26] In a population – based study, of the 816 participants over 6 years old of Isfahan province, 10 were positive for HBsAg.^[22] Ataei *et al.* have reported the prevalence rates of HBV were 3.3% and 0.9% among street children^[24] and Transit Heavy vehicle Drivers,^[25] respectively. HBsAg was detected in 1 (1.1%) females who engaged in illegal sexual behavior during 2009–2010 in Isfahan.^[23] Of the 163 women incarcerated in the central prison, Isfahan 1.2% of them were HBsAg positive.^[33]

Risk factors for hepatitis B virus

Of 24 studies, only one study showed a statistical significance between positive HBsAg and its risk

factors. Tabasi *et al.*^[28] reported an association between HBsAg, family history of HBV and education level among pregnant women.

DISCUSSION

The HBV infection is considered as a major public health problem in many countries, particularly in developing countries. HBV prevalence has decreased in Iranian population during the last decade, and now it is classified as low endemicity for hepatitis B infection.^[8] The national vaccination program for infants can be one of the causes of this decrease. In Iran the HBV vaccination started for neonates in two provinces (Zanjan and Semnan) in 1989 and then the vaccination was included in the Expanded Program on Immunization countrywide

in 1993. After 13 years of implementation, the mass vaccination program reached 94% coverage in 2005.^[10]

Despite of the reported different results in various populations, Isfahan province is classified as a low endemic region in Iran.^[10] The changing epidemiologic pattern could not be compared before and after the national vaccination program in this province because there is no reported prevalence of HBV infection in Isfahan before 1993.

According to published guideline World Health Organization, serological surveys of 1st time unpaid blood donors generally offer the most useful means of estimating the prevalence of HBV infection among adults in the general population.^[40] The present research shows that the overall prevalence of HBV infection among blood donors in this province has declined regardless of reported prevalence of HBV in subgroups or special periods. Similar declines in HBV infection among blood donors have been reported from other regions in Iran.^[41] In Fars province, a province with low prevalence, prevalence of HBV infection decreased from 0.89% in 1998 to 0.34% in 2007 and in Sistan and Baluchestan province, a province with high prevalence, rate of HBsAg has gone down from 3.74% in 1998 to 1.15% in 2007.^[41] Kafi-abad *et al.*^[41] reported a decline in overall HBsAg prevalence rates from 1.79% to 0.41% during a period of 10 years (1998–2007) in Iran. The centralized blood transfusion system with trained staffs and better equipments, establishment of donor deferral criteria, increasing nonremunerated repeat donors and routine screening for HBV with sensitive method and kit may play important roles in the declined prevalence of HBsAg among blood donors.

According to present research, the prevalence of HBsAg among blood donors was lower than its prevalence in general population in Isfahan province in 2006.^[22] It can be due to high number of repeat donors than other groups. It has been reported that repeat donors might pose a lower risk of infectious donation than F.T.B.D.

In many countries injecting drug use was related as a risk factor for hepatitis B. In Iran, the number of IDUs has increased in recent years. Amin-Esmacili *et al.* have reported the prevalence rates of HBsAg were 24.7% in Tehran.^[42] In a

study from Kohgiluyeh and Boyerahmad province, in southwest of Iran, the prevalence of HBsAg among IDUs was 3.2%.^[43] The prevalence of hepatitis B was 6.0% in intravenous drug users in Shahr-e-Kord in 2004.^[44]

The prevalence of hepatitis B among patients with hemophilia in Isfahan province decreased from 2.7% in 1999^[36] to 1.6% in 2004^[27] and then its prevalence remains constantly till 2008.^[30] Mansour-Ghanaei *et al.* conducted a study on 101 hemophiliacs, 27 (26.7%) were positive for HBsAg.^[45] The HBsAg was positive in 4.9% among hemophiliac patients in Zahedan Hemophilia Center, southeast Iran^[46] All 35 patients with hemophilia who had been registered in Urmia Hemophilia Society demonstrated that none of these patients had been infected with HBV.^[47]

In Isfahan province, the limited studies^[27,30] were performed in thalassemic patients and is difficult that we can conclude about the changing epidemiology of HBV in these patients. However, it seems to be of great importance to pay more attention to assess prevalence of HBV in them. In a multicenter study, 732 patients with beta-thalassemia selected from five provinces of Iran. Only 11 (1.5%) were HBsAg positive.^[48] In another study, the prevalence rate of hepatitis B infection in thalassemic patients of Markazi province were negative.^[49] A cross-sectional study was performed on 38 thalassemic patients in South Khorasan, prevalence of HBV in these patients was zero.^[50]

Two studies^[26,28] performed on pregnant women in Isfahan province. These studies demonstrated, the prevalence of HBsAg among pregnant women was lower than its prevalence in women in the general population in Isfahan province in 2006.^[22] Cheraghali *et al.* have reported the prevalence rates of HBV in pregnant women in Gorgan, Iran, (1%).

This study has some limitations especially in using standard search terms in national databases. Therefore, all synonyms of search terms separately in both Persian and English were used to overcome this problem.

CONCLUSIONS

Implementation program on immunization of all high-risk populations including IVDUs

and high-risk jobs such as hospital jobs and hairdressing occupations will reduce rate of HBV infection. The other effective ways of infection control are follow-up of infants with HBV infected mothers, a centralized and safe blood transfusion system and Screening HBV infection during pregnancy.

The understanding of prevalence rate of HBV in each local high-risk population will be helpful to make decision about appropriate strategies and prevention programs for control hepatitis B. Furthermore, it can help other researchers for further studies.

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