Thrita. 2014 March; 3(1): e15376. DOI: 10.5812/thrita.15376

Published online 2014 February 1. **Review Article**

Epidemiologic Studies on Viral Hepatitis: A Short Review

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Received: October 11, 2013**; Accepted:** October 27, 2013

Context: Viral hepatitis is still considered as a major health concern. Defining the extent of the burden of this condition is the mainstay in choosing better strategies for its prevention and management. The aim of this study was to review the current knowledge on the worldwide prevalence of viral hepatitis, including Iran.
Evidence Acquisition: A MEDLINE search spanning January 2000 to January 2012 was performed to identify the published literature addressing viral hepatitis. Viral hepatitis, prevalence, hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), and hepatitis E virus (HEV) were the keywords used for this search. Original research, review articles, and some selected references of those articles were reviewed.
Results: Prevalence of viral hepatitis is widely different throughout the world. Overall prevalence of viral hepatitis is declining due to the improvements in preventive measures and immunization strategies.
Conclusions: There are few studies on the prevalence of viral hepatitis in the general population of Iran. Most of the reports are from specific groups of patients. Further epidemiologic studies on the general population of Iran are recommended to discover the real burden of viral hepatitis.

Keywords: Viral Hepatitis; Prevalence; Population; Iran

1. Context

Viral hepatitis is a systemic infection predominantly affecting the liver. Most of the studies evaluating prevalence of viral hepatitis in Iran were carried out on specific groups such as blood donors, hemophiliacs, and hospitalized patients. Since there are few studies on viral hepatitis prevalence in the general population of Iran, determining the real prevalence of hepatitis is the mainstay in choosing better strategies for preventing this disease.

2. Evidence Acquisition

A MEDLINE search was performed to identify the published literature addressing viral hepatitis. Viral hepatitis, prevalence, hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), and hepatitis E virus (HEV) were the keywords used for this search. Original research, review articles, and some selected references of those articles from January 2000 to January 2012 were reviewed.

3. Results

Hepatitis A virus (HAV) infection occurs worldwide (1) with different epidemiology patterns. In the developing countries with low socioeconomic status and poor hygiene, most people are infected at an early age. For example, In India, up to 100% of the population acquires anti-HAV antibody (HAV Ab) and becomes immune by the adolescence (2). In industrialized countries, prevalence of HAV infection is low in children and young adults.

In the recent decades, a marked decline in the prevalence of HAV infection in Asian populations, especially in children, has been observed. This is attributable to general improvements in socioeconomic status and hygiene, which in turn, have made a large population of young adults susceptible to the disease (3).

There are few studies on HAV prevalence in the general population of Iran. Merat et al. reported the average seroprevalence of HAV to be 86% in this population (4). One study on 204 patients with chronic liver disease in Shiraz showed 98% seropositivity for HAV Ab (5). Another study on 1018 children (6 months to 14.9 years) seeking medical care in Tehran pediatrics hospitals showed 22.3% HAV seropositivity. The prevalence did not differ significantly between males and females and increased significantly with age (6). As this study showed, most of the Iranian young adults are seropositive for HAV infection and thus immune; hence, it seems that checking HAV Ab titer or vaccination are not still cost-effective for preventing HAV infection in Iran. Prevalence of HAV Ab in different countries is summarized in Table 1. In India, HAV seroprevalence ranges from 26.2% to 85.5% in adults in various cities, which shows a declining pattern in recent years due to improvement of water hygiene (7).

Implication for health policy/practice/research/medical education:
This study reviewed the epidemiologic studies on viral hepatitis in Iran and compared the epidemiology of viral hepatitis in different parts of the world.

Table 1. Prevalence of Viral Hepatitis Markers in General Populations of Different Countries

	Country	Time of Study	Age, y	Number of Participants	Prevalence, %	Reference Number
HAV Ab-positive	India	1998	1 - 60	1612	65.9	(7)
	Taiwan	1999	≥ 1	1013	25.2	(8)
	Belgium	2003	≥ 0	1830	20.2	(9)
	England	2001 - 2002	0 - 44	5500	9.2	(10)
	Spain	1992 - 93	5 - 59	2744	55	(11)
	Czech	2003 - 2004	≥ 40	972	61.6	(12)
	USA	1988 - 1994	≥ 6	21260	31.3	(13)
	Alaska	1993	2 - 30	1832	49	(14)
	Brazil	1999	0 - 60	699	87	(15)
HBs Ag-positive	Pakistan	2003 - 2004	1 - 15	3533	1.8	(16)
	Pakistan	1998 - 2002	- [a]	47,538	2.56	(17)
	India	2001 - 2002	-	7653	2.97	(18)
	Taiwan	1996 - 2005	≥ 18	157,720	17.3	(19)
	Philippines	2002 - 2004	-	144624	4.2	(20)
	Belgium	2003	≥ 0	1830	0.66	(9)
	Italy	2002 - 2003	12 - 95	1645	0.8	(21)
	Brazil	2002	0 - 92	2656	3.3	(22)
HCV Ab-positive	Pakistan	2003 - 2004	1 - 15	3533	1.6	(16)
	Pakistan	1998 - 2002	-	47,538	5.31	(17)
	Taiwan	1996 - 2005	≥ 18	157,720	4.4	(19)
	Philippines	2002 - 2004	-	74180	0.4	(20)
	Italy	2002 - 2003	12 - 95	1645	6.5	(21)
	Belgium	2003	≥ 0	1830	0.12	(9)
	Bulgaria	1999 - 2001	10 - 69	2211	1.08	(23)
	India	1999	≥ 0	2973	0.87	(24)
HEV Ab positive	Saudi Arabia	-	10 - 78	400	10.8	(25)
	Indonesia	1994	≥ 0	341	23	(26)
	Hong Kong	2001	≥ 18	934	18.8	(27)
	Turkey	2001 - 2002	1 - 18	210	5.7	(28)
	England	1988 - 1989	≥ 15	1002	5.3	(29)
	Cuba	-	5 - 55	209	5.3	(30)

[a] no information available.

HBV infection is currently one of the main causes of chronic liver disease and hepatocellular carcinoma in the world. Despite the availability of an effective vaccine, HBV continues to be a significant health problem. HBV carriers are estimated to be more than 350 million worldwide, of whom roughly one million die annually from the HBV related liver disease (31). Prevalence of HBV is widely different throughout the world: 0.1% - 0.2% in countries with low prevalence (the United States, Canada, Western Europe, Australia, and New Zealand), 3% - 5% in intermediate-prevalence areas (Mediterranean countries, Japan, Central Asia, Middle East, Latin and South America), and up to 10% - 20% in areas with high prevalence (southeast Asia, China, sub-Saharan Africa) (32, 33). In the Asian Pacific region, HBV infection is the most common cause of chronic liver disease (34). Iran is considered to be an intermediate-risk area for HBV infection with lifetime risk of 20% - 60%. Infection occurs early in life in highly-endemic areas because of the high incidence of both vertical and horizontal transmissions (35). In the areas with low prevalence, it is mostly transmitted via intravenous drug injection and sexual contact (31, 33, 36-38).

Neonatal HBV vaccination project in Iran has started since ten years ago, and in the recent years, Iran has been categorized as one of the countries with moderate-to-low HBV prevalence (39). This study showed that HBV prevalence in some parts of Iran, especially in individuals older than 30 was high and should be considered as an important health concern. Results of previous studies on the Hbs Ag seropositivity prevalence in different populations of Iran are summarized in Table 2. These reports show that HBs Ag seropositivity is high in the general population of Northeast of Iran; however, there is no previous report evaluating the pattern of seropositivity, especially

after the Expanded Program of Immunization. It seems reasonable that strategies for controlling and preventing HBV infection should be modified in different populations. Previous Iranian studies show no significant differences in HBs Ag prevalence between males and females (40-42). In another study performed in Iran, prevalence of HBs Ag in the children of HBV infected individuals was 20%. Therefore, possibly, HBV is transmitted horizontally in Iran. Prevalence of HBs Ag seropositivity in different countries is shown in Table 1. As the data in this Table shows, prevalence of HBs Ag seropositivity in Iran is higher than some other countries in the region (Pakistan and India) as well as European countries, but it is lower than southeast Asian countries (43).

HCV is also a global health problem with an estimated 170 million infected people worldwide and three to four million people newly-infected individuals each year. It is the most common blood-borne pathogen in the United States and an important cause of patients' morbidity and mortality. The prevalence rate of HCV antibody (HCV Ab) in the United States ranges from 1.4% (early blood donor studies) to 1.8% (national health and nutrition examination survey, NHANES III) (53).

HEV was first identified in India, and has since been recognized in the Middle and Far East, northern and western Africa, the central Asian Republics of the former Soviet Union, China and Hong Kong Special Administrative Region (54). Epidemic and sporadic cases have been reported from southeast and central Asia, the Middle East, northern and western Africa, and North America (Mexico) (55, 56).

Prevalence of HCV Ab in different populations of different parts of Iran is summarized in Table 3. Prevalence of HCV in the general population of various countries is shown in Table 1. Prevalence of HCV Ab seropositivity in Iran is lower than Pakistan and Taiwan, but higher than Belgium and India. Parenteral exposure is the main risk factor for the transmission of HCV infection in India and Mediterranean area (2, 57).

Table 2. Prevalence of Hbs Ag Seropositivity in Different Population Groups in Iran

Region	Study Population	Number of Participants	Age, y	Prevalence, %	Reference Number
Hamadan	General population	4930	- [a]	2.49	(40)
Nahavand	General population	1824	> 5	2.3	(41)
Mashhad	General population	3198	15 - 65	1	(44)
Tehran	Healthy subjects	1959	> 18	0.51	(45)
Shiraz	Hemophiliac patients	285	-	0.71	(46)
17 Provinces	Heavy vehicle drivers	1113	18 - 70	5.9	(47)
Tehran	Street children	102	< 15	2.9	(48)
Golestan	General population	1850	25 - 65	9.7	(42)
Northeast of Iran	Referral patients to Standard laboratories	1500	16 - 62	13.1	(49)
Shiraz	Healthy blood donors	7897	> 18	1.07	(50)
Guilan	Hemophilia patients	101	3 - 71	26.7	(51)
Shiraz	Thalassemia patients	755	11.7 ± 5	0.53	(52)

[a] no information available.

Table 3. Prevalence of HCV Seropositivity in Different Populations of Iran

Region	Study Population	Number of Participants	Age, y	Prevalence, %	Reference Number
Tehran	Healthy blood donors	1959	> 18	0.45	(45)
Shiraz	Healthy blood donors	7897	> 18	0.6	(50)
Rasht	Healthy blood donors	5976	> 18	0.5	(58)
Tehran	Kidney transplanted patients	1006	7 - 68	4.5	(59)
Tehran	Chronic hemodialysis patients	838	11 - 89	13.2	(60)
Rasht	Chronic hemodialysis patients	93	- [a]	55.9	(58)
Guilan	Chronic hemodialysis patients	298	13 - 85	24.8	(61)
Hamedan	Drug abuser prisoners	427	15 - 77	30	(62)
Rasht	Hemophilia patients	105	≥ 2	63.8	(58)
Guilan	Hemophilia patients	101	3 - 71	71.3	(51)
Tehran	Street children	102	< 15	0	(48)
Multicenter	Thalassemia patients	732	1 - 56	19.3	(63)
Shiraz	Thalassemia patients	755	11.7 ± 5	15.7	(52)

[a] no information available.

HEV is an important enterically-transmitted human pathogen with a worldwide distribution. It can cause sporadic cases as well as large epidemics of acute hepatitis. Epidemics are primarily waterborne in the areas where water supplies are contaminated with HEV of human origin. One study among 324 hemodialysis patients in Tabriz, northwestern Iran, showed a prevalence rate of 7.4% for anti-HEV Ab (64). Another study on 399 volunteer male blood donors in Tabriz showed a prevalence rate of 7.8% for HEV. Risk factors for infection included age and low educational level. The seroprevalence increased significantly with age, from 3.3% in subjects younger than 30 to 37.5% in individuals of 50 years and older (65). According to unpublished data, the prevalence rate of IgG anti-HEV in general population of Nahavand was 9.6% (66). The observation that anti-HEV prevalence rate in hemodialysis patients (7.4%) and blood donors (7.8%) was lower than the general-population-based studies (9.6%), might be due to the differences in the population, studied sample size, or quality of public health services. In Iran, large cities have better public health services such as clinics, municipal water and sewage systems, possibly explaining the reduced risk of infection. These factors need to be further evaluated. Our results indicated that HEV was endemic in Iran. Similar findings have been reported from Saudi Arabia (25). Seroprevalence rates of HEV in general population in some Asian, European, and African countries are summarized in Table 2 showing that the pattern of HEV Ab seropositivity in our study was similar to Saudi Aria which was lower than southeast Asian countries and higher than European countries.

4. Conclusions

There are few studies on the prevalence of viral hepatitis in the general population of Iran. Most of the reports are from specific groups of patients. Further epidemiologic studies on the general population of Iran are recommended to discover the real burden of viral hepatitis.

Acknowledgements

I extend my gratitude to Professor Neda Moslemi from Tehran University of Medical Sciences for reviewing the manuscript.

Financial Disclosure

No benefits in any form were received or will be received from a commercial source related directly or indirectly to the subject of this study.

Funding/Support

This study was supported by the discretional research funds of Tehran University of Medical Sciences.

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