Avicenna J Clin Microb Infec. 2014 October; 1(3): e22343. DOI: 10.17795/ajcmi-22343

Published online 2014 October 12. **Research Article**

Seroprevalence of Hepatitis E Virus Among Injection Drug Users and Non-Injection Drug Users in Hamadan, West of Iran

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Received: July 27, 2014; **Revised:** August 26, 2014; **Accepted:** September 21, 2014

Background: Hepatitis E virus (HEV) infection is a self-limited hepatitis and the most common cause of acute adult hepatitis in Asia. Young adults and middle-aged populations are more likely to be infected than other age groups.
Objectives: The aim of this study was to determine the seroprevalence of anti-HEV among injection drug users (IDUs) compared to non-IDUs.
Patients and Methods: This was a cross-sectional study performed on 131 IDUs referred to Farshchian Hospital, Hamadan, Iran and 131 non-IDUs selected from healthy visitors between March 2011 and March 2012. Anti-HEV IgG was measured in serum by ELISA method (DiaPro, Milan, Italy). Data including age, gender, education, location and duration of injection drug used were collected using a questionnaire.
Results: In this study, the seroprevalence of hepatitis E virus antibody among IDUs group was 6.1%, and 1.5% among non-IDU group (Odds Ratio = 5.48; CI = 1/069-22/84), indicating that injection drug users were almost five and a half times more than non-IDUs at risk of HEV infection (P = 0.053). There was no significant association between seroprevalence of hepatitis E virus and education level (P = 0.46), duration of injection (P = 0.38) and location (P = 0.19).
Conclusions: Seroprevalence of hepatitis E virus among IDUs group was higher than non-IDU group, which might be due to possible blood transmission of HEV among IDUs.

Keywords: Injection; Drug Users; Hepatitis E Virus; Seroprevalence

1. Background

Hepatitis E virus (HEV) infection is a self-limited hepatitis and the most common cause of acute adult hepatitis in Asia, Africa, the Mediterranean region, Mexico and South America. In these areas, poor individual and public sanitations may lead to fecal-oral transmission of HEV and consequently large outbreaks may occur through contamination of water and foods (1-3). Young adults and middle-aged populations are more likely to be infected than other age groups (4). Several reports from Iran indicated that seroprevalence of HEV was more than 5% in population-based studies (5). Therefore, Iran is classified as an endemic area for HEV infection. The prevalence of HEV infection has been reported about 7% in center and north-west of Iran (Tehran and Tabriz) and 11% in south-west of Iran (Khuzestan) among blood donors (6-8). Hamadan is located in the west of Iran near the epidemic HEV region of Kermanshah province. A previous report in Hamadan province (Nahavand city) showed a rate of 9.3% for the seroprevalence of HEV (9). Other studies reported that percutaneous and blood transfusion transmission should be considered as possible routes of HEV infection (10-13). However, another study did not support this hypothesis (14). In addition, transmission of HEV infection from prenatal transmission was reported in some studies (15-17). Some studies in Iran indicated a higher transmission rate of HEV infection among injection drug users (IDUs) and hemodialysis patients than the general population (18-23).

2. Objectives

The aim of this study was to determine the seroprevalence of anti-HEV among injection drug users compared to non-IDU healthy persons.

3. Patients and Methods

A cross-sectional study was conducted on injection drug users in Farshchian Hospital, Hamadan, Iran between March 2011 and March 2012. In this study, 131 IDUs referred to the Farshchian hospital and 131 non-IDU healthy visi-

tors were selected and enrolled. Prior to enrollment, the purpose of the study was explained to all participants and a writing informed consent was obtained. A total of 262 subjects were enrolled in the study. A 3-mL blood sample was drawn from each subject. Serum was separated by centrifugation and stored at -20°C. Specific IgG antibody for HEV (anti-HEV) was measured using a third generation enzyme immunoassay (EIA, DiaPro, Milan, Italy) in Farshchian Laboratory. In addition, demographic data such as age, gender, education, location and duration of injection drug used (in IDUs group) were collected from each subject using a questionnaire. Data was compared between the two groups by T-test and Chi-square test using SPSS software (SPSS for Windows, Version 16.0. Chicago, SPSS Inc.). P value less than 0.05 was considered as statistically significant.

4. Results

In this study, 131 IDUs referred to the Farshchian Hospital with a mean age of 35.57 ± 8.13 (ranged 22-70) years, 130 males and one female, and 131 non-IDUs with a mean age of 31.57 ± 8.19 (ranged 20-45) years, 130 males and one female were enrolled (Table 1). In this study, the seroprevalence of hepatitis E virus among IDUs was 6.1%, and 1.5% among non-IDUs (Odds Ratio = 5.48; CI = 1/069-22/84), indicating that injection drug users were almost five and a half times more than non-IDUs at risk of HEV infection (Table 2). There was no statistically significant difference between the two groups in different age groups as shown in Table 2 (P = 0.79).

Of the study population, 94 IDUs (71.76%) lived in urban area, as well as 94 (71.76%) of non-IDU subjects. Moreover, 62 (47.33%) IDUs had education lower than high-school diploma, but 54 (41.22%) non-IDU subjects had education lower than high-school diploma; however, there was no statistically significant difference (Table 1). There was no significant association between the seroprevalence of hepatitis E virus and location of the two groups (P = 0.19), and duration of injection among IDUs (P = 0.38).

Table 1. Comparison of Demographic Characteristics of Injection Drug Users (IDUs) and Non-Injection Drug User Groups [a,b]

Variable	Group		P Value
	IDUs (n = 131)	Non-IDU (n = 131)	
Age, y	35.57 ± 8.13	31.57 ± 8.19	< 0.001
Gender			
Male	130	130	
Female	1	1	
Residency			0.19
Urban area	94 (71.76)	94 (71.76)	
Rural area	37 (28.24)	37 (28.24)	
Education			0.46
Illiterate	7 (5.34)	0 (0)	
Less than high-school diploma	62 (47.33)	54 (41.22)	
High-school diploma or more	62 (47.33)	77 (58.78)	

[a] Abbreviations: IDU, Injection Drug User.
[b] Data are presented as Mean ± SD or No. (%).

Table 2. Comparison of Seroprevalence of Anti-HEV Among Injection Drug Users (IDUs) and Non-IDU Groups in different Age Groups [a,b]

	IDUs Group		Non-IDU Group		P Value
	Anti-HEV Serology		Anti-HEV Serology		
	Positive	Negative	Positive	Negative	
Age group, y					0.79
20-29	4 (12)	27 (88)	1 (1.6)	63 (98.4)	
30-39	3 (5)	57 (95)	0	36 (100)	
40-49	1 (3.4)	28 (96.6)	1 (3.3)	30 (96.7)	
50-59	0	10 (100)	0	0	
≥ 60	0	1 (100)	0	0	
Total[c]	8 (6.1)	123 (93.3)	2 (1.52)	129 (98.48)	0.053

[a] Abbreviations: IDU, Injection Drug User; HEV, Hepatitis E virus.
[b] Data are presented as No. (%).
[c] Odds Ratio = 5.48; CI = 1.069- 22.84.

5. Discussion

The seroprevalence of HEV infection has been reported between 10-35% in developing countries and it is the most common cause of acute adult hepatitis in Asia (3-5). In the present study, the seroprevalence of hepatitis E virus among IDUs was 6.1% and 1.5% among non-IDU subjects. The prevalence among IDUs is similar to the prevalence of HEV infection in endemic area such as Iran (5). In this study, there was no statistically significant difference between the two groups in different age groups (P = 0.79), which is similar to Clemente-Casares's study (24). Although, the association between age and anti-HEV seropositivity can reflect the link between duration of exposure and infection. However, in this study, the seroprevalence of HEV was zero in the 50-70 year age groups. In other studies, seroprevalence of HEV in general populations were 3.8% in Isfahan (25), 7.2% in Mazandaran (26) and 9.3% Nahavand (9). In addition, some reports from different provinces of Iran revealed anti-HEV seroprevalence rates of 7.8% in Tabriz (6), 7.8% in Tehran (8), 11.5% in Khozestan (7), and 12.9% in Hamadan (27) among blood donors (Table 3).

In Alavi's study (20), seroprevalence of HEV in IDUs was reported as 22.8% and 7.9% in inhalant drug users, which was higher than the results of our study, in which the seroprevalence of hepatitis E virus among IDUs and non-IDU subjects were 6.1% and 1.5%, respectively. Moreover, other studies reported higher seroprevalence rates of HEV in IDUs group than the present study (13, 20). These differences could be due to sharing syringes, environmental and socioeconomic variations as well as differences in level of hygiene, safe water sources and sewage disposal systems in these studied populations. Seroprevalence rates of HEV among blood donors were 1.2%, 16.8% and 27% in the USA, Germany and the Netherlands, respectively (28-30); however, Iran is in an endemic area with a rate of more than 5% regarding the seroprevalence of HEV (5, 7-9). The most common transmission route of HEV infection is fecal-oral through contaminated foods and water; thus, high sanitation, public health and personal hygiene can prevent transmission of HEV infection in endemic areas (1-3). In the present study, the seroprevalence of hepatitis E virus among IDUs group was 6.1%, and 1.5% among non-IDU group (Odds Ratio = 5.48; CI = 1/069-22/84), indicating that injection drug users were almost five and a half times more than non-IDUs at risk of HEV infection. Moreover, in the first epidemic outbreak of HEV infection in 1991 in Kermanshah, Iran, 18% mortality rate, 4% spontaneous abortions, 11% stillbirths, and 21% preterm labors in pregnant women were reported (5, 17). It seems that blood transmission might be another route of transmission for HEV infection. In conclusion, the seroprevalence of hepatitis E virus among IDUs was higher than non-IDU healthy persons, which might be due to possible percutaneous or blood transmission of HEV among IDUs. Therefore, blood transmission for HEV infection should be considered especially in high-risk groups such as IDUs and hemodialysis patients in endemic areas.

Acknowledgements

The authors would like to thank Mr. Seyyed Hasan Shaterian for taking the blood samples from the subjects. In addition, this article was extracted from a research project supported by Hamadan University of Medical Sciences. We would like to thank the Vice-chancellor of Research and Technology, Hamadan University of Medical Sciences for financial support.

Authors' Contributions

Fariba Keramat, Mojgan Mamani, Mahdi Samadi, Peyman Eini were involved in the study concept and design, drafting of the manuscript, critical revision of the manuscript and the study supervision; Somaieh Mohammadnezhad and Abbas Moradi were in charge of acquisition of data, analysis and interpretation of data and drafting of the manuscript.

Table 3. Comparison of Seroprevalence of HEV Among Iranian Population According to Different Studies in Iran

Studies In Iran	Location	Date	Study Population	Seropositivity Anti-HEV, %
Present study	Hamadan	2011-2012	IDUs and non-IDU persons	6.1 and 1.5
Alavi et al. (20)	Ahvaz	2005-2006	IDUs and Inhalant drug users	22.8 in IDUs and 7.9 in Inhalant DUs
Rezazadeh et al. (27)	Hamadan	2005	Blood donors	12.9
Aminiafshar et al. (8)	Tehran	2004	Blood donors	7.8
Taremi et al. (6)	Tabriz	2007	Blood donors	7.8
Assarezadegan et al. (7)	Khozestan	2008	Blood donors	11.5
Saffar et al. (26)	Mazandaran	2004	General population	1.1 under 10 years old and 7.2 in 20-25 years age group
Ataei et al. (25)	Isfahan	2007	General population	3.8
Taremi et al. (9)	Nahavan	2003	General population	9.3
Taremi et al. (22)	Tabriz	2004	Hemodialysis patients	7.4

Funding/Support

This study was funded by the Vice-Chancellor of Research and Technology, Hamadan University of Medical Sciences.

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