

## Original Article

## HIGH PREVALENCE OF HBV, HCV, AND HIV INFECTIONS IN GYPSY POPULATION RESIDING IN SHAHR-E-KORD

Seyyed Kazem Hosseini Asl,<sup>1</sup> MD; Majid Avijgan,<sup>\*2</sup> MD; and Mehdi Mohamadnejad,<sup>3</sup> MD

<sup>1</sup>Department of Internal Medicine, Shahr-e-Kord University of Medical Sciences, Shahr-e-Kord, Iran,

<sup>2</sup>Department of Infectious and Tropical Diseases, Shahr-e-Kord University of Medical Sciences, Shahr-e-Kord, Iran

<sup>3</sup>Gastrointestinal and Liver Disease Research Center, Iran University of Medical Sciences, Tehran, Iran

### INTRODUCTION

**BACKGROUND**—Gypsies are the groups of people who are not dependent on any special location. Because of permanent immigration, poor socioeconomic status and the special life style, gypsies might be exposed to multiple sexual partners, addiction and various kinds of infections, like hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). The aim of this study was to estimate the prevalence of these infections in gypsies of South-West of Iran (Shahr-e-Kord).

**MATERIALS AND METHODS**—This study was done in Sureshjan Pass near Shahr-e-Kord. Out of 250 gypsies, 226 of them were recruited into the study. Laboratory tests for hepatitis B surface antigen (HBsAg), hepatitis B core antibody (HBcAb), hepatitis C virus antibody (HCVAb), and human immunodeficiency virus antibody (HIVAb) were performed in the study population. All sera with positive results of HBsAg or HBcAb were tested again for these markers together with HBsAb, HBeAg, and HBeAb. Also sera with positive HIV Ab were retested with immunoblot assay.

**RESULTS**—A total of 226 persons (103 males, 123 females) with a mean age of 20.7 years (range: 9 months to 78 years) were recruited. Thirty-five subjects (18, or 15.5 % male) had positive HBsAg. Fifty-four persons (23.9%) had positive HBcAb. Seven (4, or 3.1% male), had positive HCVAb and 4 persons (2, or 1.8% male) were HIV positive.

**CONCLUSION**—Gypsies in Iran should be considered a high risk group for HBV, HCV and HIV infections. Vaccination against HBV should be considered for all noninfected subjects, and health promotional activity should be planned in order to prevent further spread of these blood born infections among them.

**Keywords:** hepatitis C virus; hepatitis B virus; acquired immunodeficiency syndrome; gypsy; prevalence; Iran.

*Arch Iranian Med.* 7(1): 20 – 22; 2004

\*Corresponding author:  
Majid Avijgan, MD  
P.O. Box: 88155-155,  
Shahr-e-Kord, Iran  
Tel: +98-913-1818085  
E-mail: avijgan@yahoo.com

Viral hepatitis B, C, and HIV infection have been common diseases during recent decades. Co-infection between these three different diseases takes place via similar routes of transmission, and population affected, are intravenous drug users (IVDU), hemophilia, dialysis patients, and health care workers.<sup>1</sup>

Gypsies are groups of people who do not take up permanent residence in any area. Their communities are characterized by pervasive social health problems, widespread poverty, and limited educational opportunities. Because of permanent immigration and different life style, they might be exposed to multiple sexual partners, addiction and various kinds of infections. There has been limited studies dealing with their health status, across the world.

Some studies in Spain have shown that HBV infection rate is as high as 29% among Spanish gypsy population.<sup>2</sup> Similarly, a few studies in Spain have shown that the prevalence of HCV and HIV infection are higher in gypsies than in the general population.<sup>3,4</sup>

In previous studies it had been estimated that HBsAg carrier rate was about 3% in Iran.<sup>5</sup> However, universal neonatal vaccination against HBV, started in Iran in 1993 led to decrement of HBV prevalence among Iranian children.<sup>6</sup> According to the recent Iranian national health survey<sup>7</sup> the prevalence of HBV infection is 1.7% in the country. Also, world prevalence of HCV infection is 1%. Earlier studies in Iran put HCV prevalence rate at about 0.3 %.<sup>5</sup> However, it seems that its prevalence is increasing in the country; and in a recent study, 0.46% of Iranian blood donors were HCV positive.<sup>8</sup> Additionally, the prevalence of HIV positivity in Iran is about 0.0086 %, according

to the recent Iranian national health survey.<sup>7</sup>

Epidemiologic studies of HBV, HCV, and HIV infections among gypsy population are very important, as they can become a potential source of communicable diseases. The aim of this study was to determine the prevalence of HBV, HCV, and HIV infections in Iranian gypsy population.

## MATERIALS AND METHODS

This study was done in Soureshjan Pass, located at a distance of 3 kilometers from Shahr-e-Kord, (South-West of Iran). Having secured the prior consent of 226 out of the of total 250 gypsies, the age, gender history of multiple sexual partnership, intravenous drug use, blood transfusion, tattooing, and phlebotomy of these subjects were recorded. Then, 10 mL of venous blood was taken from each person. Blood samples were centrifuged and underwent tests for HBsAg, HBcAb, HCVAb, and HIVAb. The kits used were based on third generation of enzyme immunoassay for HBV markers and HIVAb. Second generation enzyme immunoassay was used for HCV Ab testing. All positive sera for HBsAg or HBcAb were tested again for these markers and also for HBeAg, HBeAb, and HBsAb. Also, sera with positive HIV Ab underwent testing with confirmatory immunoblot assay. For all kits used, quality control was done simultaneously with measurement of samples. Negative and positive control numbers and the mean were in acceptable range.

The prevalence of HBV, HCV, and HIV infections in gypsies was calculated. Then, these values were compared with the estimated prevalence of HBV, HCV, and HIV infections in the normal population of Iran (1.7 % for HBV, 0.46 % for HCV, and 0.0086 % for HIV infection).<sup>7,8</sup>

Statistical analysis was performed using the SPSS, version 10.1, software package (SPSS, Inc., Chicago, IL). Statistical analysis was also performed using  $\chi^2$  for categorical variables. *P* values less than 0.05 were considered statistically significant.

## RESULTS

Among 226 participating (out of 250) gypsies, there were 103 males and 123 females, with a mean age of 20.7 years (range: 9 months to 78 years). HBsAg was positive in 35 (15.5 %) subjects (18 men, 17 women) and was about ten times more frequent than in the general population (RR: 10.59;  $p < 0.001$ ). Seven (20 %) persons out of 35 HBsAg

positive patients were HBeAg positive. Also, 41 persons (18.1% of the study population) had positive HBcAb. Interestingly, 13 persons had positive HBsAg but negative HBcAb. Among 226 gypsies, 7 (3.1%) persons (4 males, 3 females) had positive HCVAb. This prevalence was nearly ten times more frequent than that in the general population (RR: 10.06;  $p < 0.001$ ). Ten persons had positive HIVAb with enzyme immunoassay. In 4 (1.8 %) of them (2 males, 2 females) positive HIV Ab was confirmed with immunoblot assay. Thus, the prevalence of HIV infection among gypsies was 210 times more frequent than that in the general population (RR: 210;  $p < 0.001$ ). Coinfection for HBsAg-HCVAb ( $n = 2$ ) was found in 0.9 % of the subjects. Triple infection (positive HBsAg, HCVAb, and HIV Ab) was found in one person.

### Risk factors

When asked about the risk factors concerning the viral infections, none of the study subjects reported the history of intravenous drug use or multiple sexual partnership. Also, none of the HCV infected patients reported the history of blood transfusion, while all the seven HCV infected patients had a history of tattooing, and 6 (85.7 %) of them had a history of phlebotomy.

## DISCUSSION

This is the first study to show the prevalence rate of HBV, HCV, and HIV infection among Iranian gypsies which is clearly more frequent than that in the general population. For example, in the recent Iranian national health survey, only 4 of the 46,631 subjects examined for HIV were found to be positive<sup>7</sup>; however, we found 4 out of 226 subjects to be HIV positive. This is in accordance with the results of some of the earlier studies performed in European gypsies. For example, in Spanish studies HBV infection was found in 29% of the gypsies,<sup>2</sup> and also HCV infection in 54%<sup>3</sup> of imprisoned gypsies.

The very low level of socioeconomic status of this population, together with profound health problems renders them to acquire transmissible viruses such as HBV, HCV, and HIV infection. In our survey, none of the study subjects reported the history of intravenous drug use or having multiple sexual partners; and their response to questions was unreliable. However, tattooing and phlebotomy are very common practices among our gypsies.

In a study of Iranian HCV infected patients, history of blood transfusion, illegal drug use, and

extramarital sexual activities were the major risk factors for HCV infection in Iran.<sup>9</sup> The above issues are also the main risk factors for HIV infection.<sup>10</sup>

The prevalence rate of HCV infection in Iranian population is about 0.46 %, <sup>8</sup> which is lower than the near 1.5% prevalence in the United States.<sup>11,12</sup> This may be due to the religious beliefs and the laws practiced in Iran.<sup>9</sup> However, Iranian gypsies live in isolated communities having low level socioeconomic status and profound health problems. The very high rate of HBV, HCV, and HIV infection among the gypsies suggest that they might be exposed to the major risk factors of these infections. Other routes of viral transmission (e.g., vertical transmission, phlebotomy) and unidentifiable factors may also be the cause of the infections.

The alarming high rate of HBV, HCV, and HIV infections among the gypsies, not only puts these infected patients at greater risk for complications such as end stage liver disease and AIDS, but it also makes them a potential source of transmission of these viruses to the general population. The governmental law enforcement should be focused on reducing the rate of infections among gypsies. In addition to the universal neonatal HBV vaccination, HBV vaccination of all uninfected gypsies is important. In Taiwan, universal neonatal HBV vaccination led to the reduction of HBV carrier rate and childhood hepatocellular carcinoma.<sup>13</sup> The benefit of universal neonatal HBV vaccination has also been observed in Iran.<sup>6</sup> Educative efforts to reduce HCV, and HIV infection (e.g., avoidance of needle sharing among intravenous drug users, and protected sexual activities) should also be implemented in the gypsy population.

Interestingly, we found an unusual serologic pattern of HBV infection in some study patients. Thirteen of 35 HBsAg positive patients had negative HBcAb. Although, this may be due to laboratory error, but it may also represent a subgroup of HBV carriers. Certainly, further studies are needed to clarify virologic, biochemical, and liver histologic characteristics of these patients. In conclusion, the high rate of HBV, HCV, and HIV infections among gypsies is an important health concern in our country. Future studies should be directed to better identifying of the major routes of transmission of the infections among the population and finding the best ways to reducing transmission of the diseases.

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