

Prevalence of Hepatitis B Surface Antigen and Hepatitis C Virus Antibody and Their Risk Factors among Guilan's Volunteer Blood Donors (1998-2003)

Fariborz Mansour-Ghanaei *, Mohammad-Sadegh Fallah, Reyhaneh Jafarshad, Farahnaz Joukar, Afshin Salari, Ramin Tavafzadeh

Gastrointestinal and Liver Diseases Research Center (GLDRC), Medical Sciences/University of Guilan, Rasht, Iran

Background and Aims: Millions of lives are saved each year through blood transfusion. Although blood is a life-saving element, it can occasionally cause some severe diseases. This study was performed to assess the prevalence of hepatitis B and C virus infections and their known risk factors among Guilan's volunteer blood donors from 1998 till 2003.

Methods: The study population consisted of 221,508 blood donors referring to the Blood Transfusion Organization, Guilan, Iran. Enzyme-linked immunosorbent assay (ELISA) was performed for hepatitis B surface antigen (HBsAg) and hepatitis C virus antibody (HCV-Ab) detection. Positive cases were confirmed by neutralization and Recombinant Immunoblot Assay (RIBA), respectively. Known risk factors including histories of surgery, icterus, blood transfusion, endoscopy, unsafe sexual contact, etc. were extracted from available files and evaluated.

Results: 997 individuals were positive for HBsAg and 3,603 individuals for HCV-Ab. After confirmation tests, the prevalence of HBsAg and HCV-Ab was 0.45% and 1.62%, respectively. The most common risk factors were history of surgery followed by icterus in cases or their family.

Conclusions: The prevalence of HBsAg and HCV-Ab is less than that of normal population due to careful screening carried out by staff of Blood Transfusion Organization. Regarding the high frequency of surgery history in positive cases, attending to hospital and operation room hygiene seems to be very important.

Keywords: Hepatitis B, Hepatitis C, Blood Donors, Transfusion, Surgery, Guilan

Millions of lives are saved each year through blood transfusions. Today we have made strides in making our blood supply safer. Significant efforts have gone towards educating potential donors and the public about risky behaviors which might impact the safety of the blood supply (1, 2, 3). The prevalence of hepatitis B virus in healthy carriers varies, being as low as 0.1-1% in UK and US and as high as 15% in Southeast Asia and the Far East (4). The prevalence of HCV antibody in random blood donors is between 0.2% and 2% in the US, Europe, Japan, and Great Britain (4, 5). They are responsible for considerable morbidity and mortality worldwide (6-8).

A cross-sectional study on 221,508 volunteer blood donors admitted to Guilan's Blood Transfusion Center, Iran was carried out from March 2000 to March 2005. HBsAg was determined using commercially available enzyme-

linked immunosorbent assay (ELISA) kits (Bio-Rad). Positive samples were rechecked by confirmation tests. HCV-Ab was detected using a third-generation ELISA kit (ETI HCV k-3, Dias Sorin, Spain). Positive results of HCV-Ab were confirmed with the recombinant immunoblot assay

* Correspondence:

Fariborz Mansour-Ghanaei MD, Gastrointestinal and Liver Diseases Research Center (GLDRC), Guilan University of Medical Sciences, Razi Hospital, Sardar-e-Jangle Avenue, P.O.Box: 41448-95655 Rasht, Iran.

Tel: +98 131 5535116

Fax: +98 131 5534951

E-mail: ghanaei@gums.ac.ir

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(RIBA-3 Chiron, New Jersey, USA). All cases were then referred for a structured confidential interview.

Of 221,508 blood donors, 997 (0.45%) cases had positive HBsAg and 3,603 (1.62%) had positive HCV-Ab test, out of whom 709 (0.32%) individuals were HCV-Ab positive after RIBA. The mean age in HBsAg positive cases was 37.2 ± 11.6 years and in HCV-Ab positive cases was 36.5 ± 10.9 years. Males had been more affected than females in both hepatitis B and C groups [0.53% vs. 0.17% ($P=0.032$) and 1.74% vs. 1.20 ($P=0.024$), respectively]. The most common known risk factor was history of previous surgery in both hepatitis B and C cases. The frequencies of each known risk factors are shown in Table 1.

Table 1. The frequency of known risk factors in hepatitis B and C positive blood donors.

Risk factor	HCV-Ab+ (%)	HBsAg+ (%)
History of previous surgery	545 (76.8)	682 (68.4)
History of jaundice in person or in their family	180 (25.4)	342 (34.3)
History of transfusion	46 (6.5)	52 (5.2)
Needle-stick	64 (1.8)	27 (2.7)
History of phlebotomy	21 (3)	34 (3.4)
IV drug abuse	11 (1.6)	13 (1.3)
Unsafe sexual activities	42 (6)	0 (0)
History of tattooing	56 (7.9)	45 (4.5)
History of undergoing endoscopy	29 (4.2)	30 (2)
Being wounded at war	29 (4.2)	31 (3.1)
History of traveling abroad	41 (5.8)	34 (3.4)

In 1979, the prevalence of HBsAg in Iran ranged between 2.5% and 7.2% (9). However, it decreased to 1.7% in blood donors in 1987 (10). Previous studies showed that HBV prevalence was 1.07% in blood donors in Shiraz in 2000 (11), 1.08% in Ghazvin in 2000 (8), while it is 0.45% in the present study. Therefore, HBV prevalence has decreased dramatically in Iranian population during the last 2 decades. The prevalence of HCV-Ab in our study was 0.32, while in Alavian *et al.* study; it was reported 0-12% (12).

Regarding the frequency of known risk factors, history of major surgery topped the list in hepatitis B and C; Alavian *et al.* also found that 50% of HCV-Ab positive cases had a history of a major surgery (12). Another study showed a history of a surgical procedure seemed to be associated with hepatitis B infection (13). The researchers declared that history of dental procedures had a 2-fold higher

risk for hepatitis B infection. It seems that observing the hygienic principles and primary precaution in operation rooms and dentistry is really necessary.

In the present study, only 5.2% of HBsAg positive cases and 6.5% of HCV-Ab positive cases had transfusion history, while in the similar study 32.5% of HCV positive cases had transfusion history (12). It implies that blood volunteer screening by interview and history taking can prevent high risk people from donating. In the current study, 6% of cases had unsafe sexual activities, while in Alavian *et al.* study (12); 16% of HCV-Ab positive cases and in a Brazilian study; 12% of HBsAg positive cases had reported unsafe sexual activities (14). This low percentage in our study can be attributed to the cultural difference and perhaps people's uncertainty in answering this kind of questions.

In the current study, a history of jaundice is the second common risk factor among HBsAg and HCV-Ab positive cases (34.3% vs. 25.4%, respectively), which is lower than that in a similar study (12). In our study, 7.9% of HCV-Ab positive cases had tattooing, 3.4% of HBsAg positive and 3% of HCV-Ab positive cases had a history of phlebotomy, while in a similar study; 13% of HCV-Ab positive cases had a history of phlebotomy (12).

In conclusion, screening processes (history taking, interview, physical exam, etc.) for selecting blood donors are simple ways to detect high risk persons and prevent them from donation; by these easy and cheap methods, expensive and difficult processes can be stopped.

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