

Original Article

Study of Hepatitis B and C Virus Seropositivity in Healthy Blood Donors

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Objective: Our study object was to evaluate the seropositivity of Hepatitis B and C in blood donors

Place and Duration: Blood Transfusion Services, Pakistan Institute of Medical Sciences, (PIMS) Islamabad from July 2007 to June 2008.

Study Design: Retrospective Chart Review

Materials and Methods: A total of 18,202 blood donors were studied during the study period. Among these, 99.8% were males and 0.2% were females. During the study period, all the blood donors were screened for Hepatitis B surface antigen (HBsAg) and anti HCV antibodies by 3rd generation ELISA (Enzyme Linked Immunosorbent Assay) system which is a quantitative assay.

Results: 3.31% (n = 603) individuals were positive for anti HCV antibodies while 1.92% (n = 351) individuals showed positivity for HBsAg.

Conclusion: The prevalence of HBV and HCV was in intermediate and low rates. This also shows the importance of screening in general population.

Keywords: Hepatitis B, Hepatitis C, Blood Donors, Blood Transfusion, HBsAg

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Introduction

Hepatitis B and C are highly infectious and pose a major public health problem worldwide. The problem in developing countries has increased by the poor economical status of the patients who are unable to afford the costly therapy. About 3% of world's population or almost 200 million individuals have chronic HCV infection.¹ The global seroprevalence of HCV among blood donors varies from 0.4-19.2%.² Among the viral hepatitis, HCV is especially dangerous in that its morbidity rate is comparatively high.³

HBV infection is a well recognized and major public health problem leading to significantly morbidity and mortality worldwide especially in the developed countries.⁴ Approximately, 2 billion people in the world have been infected by HBV⁵ 350 million of who are chronic carriers representing approximately 7% of total population.⁶ The virus causes acute hepatitis of varied severity.⁷

The transmission of HBV and HCV occurs, mainly, through direct contact with blood, IV injections, blood transfusion and sexual relations, this last, mainly in HBV carriers. The sexual transmission in HCV carriers is controversial.⁸ Over many years, hepatitis was the main cause of transfusion associated chronic disease, liver cirrhosis, hepatocellular carcinoma, and death.⁹ The infection rate of Hepatitis B and C is

increasing day by day in Pakistan. The discovery of these serious hazards has brought a dramatic change in the behavior of patients and physicians about safe transfusion of blood.¹⁰

Various epidemiological studies have been conducted in the past that provide data about the seroprevalence of Hepatitis B and C viruses in different parts of the world. There are also few studies that have been conducted in different regions of Pakistan. In general, blood donors are members of a low risk behavior group.

This study was conducted to evaluate the prevalence of Hepatitis B and C in healthy blood donors.

Materials and Methods

This study was conducted at Blood Transfusion Services, Pakistan Institute of Medical Sciences, Islamabad for a period of one year from 1st July 2007 to 30th June 2008. All the blood donors (replacement/voluntary) who donated blood during the study period were included in the study. The inclusion criteria followed were age 18-60 years, weight more than 50 kg and a haemoglobin concentration above 12 g/dl. A thorough medical history was taken by a medical officer to ensure that the donor is free of all communicable diseases. The exclusion criteria used were history of jaundice, malaria, drug addiction, anaemia, and history of repeated transfusions and any evidence of cardiac, renal, or pulmonary disease.

Blood samples (5 ml) from donors were tested for Hepatitis B surface antigen (HBsAg) and antibodies against HCV. The screening was done on BEST 2000 System and methodology used was 3rd generation ELISA (Enzyme Linked Immuno Sorbent Assay) which is a quantitative assay, having sensitivity ranging from 90-97%. The use of 3rd generation ELISA shortens the pre-seroconversion window period but does not distinguish between acute, chronic or resolved infection¹¹.

Results

A total of 18,202 blood donors were screened for anti HCV antibodies and HBsAg. Among these, 99.8% were males and 0.2% females. 603 individuals (3.31%) were positive for anti HCV antibodies while 351 individuals (1.92%) showed positivity for HBsAg.

Table-I Prevalence of HBV & HCV in donors (n=18,202)

Total donors	HBsAg +ve		Anti HCV +ve	
	n	%	n	%
18168 (Males)	348	1.91	602	3.31
34 (Females)	03	8.8	01	2.94
18202	351	1.92	603	3.31

Discussion

The transfusion of blood is a life saving procedure and benefits thousands of patients worldwide. Serological testing of HBV and HCV is compulsory in blood banks routinely. These tests are must for safe blood transfusion. Blood donors include the adult population in the 18-60 year age group, so the prevalence in other age groups is missed in such studies. But it is generally accepted that the evaluation of donor's blood for seropositivity of HBV and HCV gives an idea for the epidemiology of these infections in the general population³.

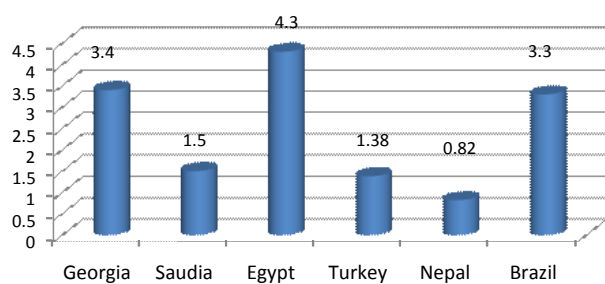
Seroprevalence rate of HBsAg and anti HCV antibodies varies in different regions of Pakistan as shown in Table II.

The seroprevalence of HBV in healthy donors varies from 1.46% (HMC, Peshawar) to 8.4% (DHQ Hospital Skardu) in different parts of our country. In our study it is 1.92%. Similarly the infection rate of HCV in our study is 3.31% and it varies from 0.27% (Nishtar Medical College, Multan) to 8.68% (Isra University Hospital, Hyderabad) in other parts of the country. So our data gives equal or somewhat lower positivity rate as compared to prevalence in various regions of the country.

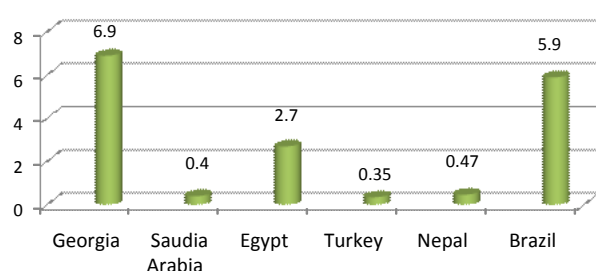
Table-II: Prevalence of Hepatitis B & C among blood donors reported in local literature published during last few Years

Author and Year	Place of Study	Anti-HCV	HBsAg
Mumtaz S et al 2002 ¹²	Islamic International Medical College Rawalpindi	6.21%	5.86%
Khattak MF et al 2002 ¹³	AFIT, Rawalpindi	4.0%	3.3%
Fayyaz KM et al 2002 ¹⁴	Quaid-e-Azam Medical College, Bahawalpur	--	7.53%
Ali N et al 2003 ¹⁵	CMH, Quetta	1.87%	--
Zaidi A et al 2004 ¹⁶	Hayatabad Medical Complex, Peshawar	1.34%	1.46%
Sirhindi GA et al 2005 ¹⁷	Shaikh Zayed Postgraduate Medical Institute Lahore	4.16%	3.36%
Mehmood MA et al 2004 ¹⁸	Nishtar Medical College/Hospital Multan	0.27%	3.37%
Asif N et al 2004 ¹⁹	Shifa International Hospital Islamabad	5.14%	2.51%
Ahmed J et al 2004 ²⁰	Rehman Medical Institute Peshawar	2.2%	1.9%
Chaudhary IA et al 2006 ³	Fauji Foundation Hospital, Rawalpindi	2.52%	2.45%
Ujjan ID et al 2006 ²¹	Isra University Hospital, Hyderabad	8.68%	3.65%
Aziz MS 2006 ²²	DHQ Hospital Skardu	1.1%	8.4%
Ijaz AU et al 2007 ²³	Ghurki Trust Teaching Hospital, Lahore	5.34	1.52
Azam M et al 2007 ²⁴	Baqai Medical University, Karachi	4.36%	4.5%
Present Study 2008	Blood Transfusion Services, PIMS Islamabad	3.31%	1.92%

Seroprevalence rate of HBsAg and anti HCV antibodies varies in different countries (Fig-I & II). Prevalence of HBsAg was found as 3.4% in Georgia, 1.5% in Kingdom of Saudi Arabia, 4.3% in Egypt, 1.38% in Turkey, 0.82% in Nepal and 3.3% in Brazil^{25, 26-29}. On the other hand, the anti HCV antibodies prevalence rate in same countries was found to be 6.9%, 0.4%, 2.7%, 0.35%, 0.47%, and 5.9% respectively²⁵⁻³⁰.

Figure. I: Percentage prevalence of HBV in various countries

Conclusion

Figure. II: Percentage prevalence of HCV in various countries

In present study the prevalence rate of HBV was low as compared to HCV. The reason might be the vaccination programmes and increased public health awareness that lowered this rate. There is no screening method available to completely eradicate the risk of these Transfusion Transmitted Infections (TTIs) but proper screening and selection of donor before collection can minimize these TTIs. Majority of blood donations in our country are replacement or voluntary. Voluntary blood donors are safer source of blood supply and special emphasis must be given to increase this source to higher levels. Regarding modes of HBV and HCV transmission, awareness and education of donors is required. HBV and HCV positive donors should be permanently deferred for future donations and must be informed about their disease and referred to a physician.

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