

Original Research Article

## **Seroprevalence of Hepatitis B and C among blood donors attending a State of the Art Model Blood Bank of North East India**

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**Abstract:** Hepatitis B and C viruses though distinct share a common mode of transmission, primarily through unscreened and contaminated blood and blood products due to contact or through transfusion. This study was undertaken in the blood bank of a tertiary care centre in north east India to estimate the seroprevalence of Hepatitis B and C infections among blood donors in this region and also to see their changing trends in recent times. A three year study was carried out from 2012 to 2014 in which donor blood was tested for Hepatitis B Ag and Hepatitis C by ELISA and seroprevalence was calculated. A seroprevalence of 0.39% for Hepatitis B and 0.1% for Hepatitis C was noted which is much lower than most of the studies in India. While Hepatitis B showed a fluctuating trend, a rising trend was seen in Hepatitis C infections. Overall, male donors showed greater seropositivity than female donors. Also, a higher prevalence was noted among replacement donors as compared to voluntary blood donors. A higher prevalence was noted among replacement donors which was found to be statistically significant for Hepatitis B, thereby emphasising the fact that voluntary blood donation need to be encouraged by motivating our population as it is a much safer alternative than replacement donors.

**Keywords:** seroprevalence, hepatitis B, hepatitis C

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### **INTRODUCTION**

The discovery of transfusion-transmissible infections (TTIs) led to a new era in blood transfusion practice all over the world with renewed emphasis on safety and protection of human life as the two fundamental objectives of transfusion [1]. Although blood transfusion system has been pivotal in saving millions of lives every year, transfusion transmitted infections are major hazards associated with transfusion as the recipients run the risk of blood borne infections like human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV), through transfusion of infected blood and blood products. Meticulous pretransfusion testing and screening particularly for transfusion transmissible infections (TTI) is therefore becoming the need of the hour [2]. Hepatitis B and C viruses along with HIV though distinct share a common mode of transmission, primarily through unscreened and contaminated blood

and blood products due to contact or through transfusion. Other routes include sexual intercourse and vertical transmission from mother to foetus in the immediate pre-natal period.

WHO classifies countries on the basis of endemicity of hepatitis B virus (HBV) infection into high (8% or more), intermediate (2-7%) or low (less than 2%) incidence countries. Different studies have shown that prevalence of chronic HBV infection in India ranges from 2% to 10%; India therefore comes under the intermediate to high endemicity category [3]. Seroprevalence of HCV in blood donors is different in various countries. In the Asian scenario, the prevalence of HCV in the blood donors has been reported to be 5.1% from India and 1.5% from Saudi Arabia [4].

The present study was undertaken in the blood bank of a tertiary care centre in north east India to

estimate the seroprevalence of Hepatitis B and C infections among blood donors in this region and also to see their changing trends in recent times.

**MATERIALS AND METHODS**

**Study design**

Cross sectional study.

**Statistical analysis**

Prevalence estimation and chi square test.

A three year retrospective study was carried out among all blood donors attending the state of the art model blood bank at a tertiary care centre in North east India. The donors were selected after careful screening by physical examination and donor questionnaire. The collected blood samples were tested for Hepatitis B Ag and Hepatitis C by ELISA. All positive tests were re tested. The seroprevalence was calculated and the changing trends over a period of 3 years were noted. The difference in positivity among voluntary and replacement donors was noted and chi square test was done to determine significance.

Study was carried out in accordance with institutional ethical guidelines.

**RESULT**

Out of a total of 61,321 blood donors studied over a period of three years (2012-2014), the seroprevalence of Hepatitis B was found to be 0.39% while that of Hepatitis C was 0.3%. In 2012, the prevalence of Hepatitis B was 0.34% which increased

to 0.41% in 2013 and was almost unchanged at 0.4% in 2014. Similarly, the prevalence of Hepatitis C in 2012 was 0.016% which increased to 0.105% in 2013 and 0.157% in 2014 [Table1]. The percentage positivity for Hepatitis B among voluntary donors for the years 2012, 2013 and 2014 was 0.23%, 0.25% and 0.31% respectively ( overall 0.29 %) while among replacement donors, it was 0.42%,0.56% and 1.75%(overall 0.56%).

In case of Hepatitis C, the percentage positivity among voluntary blood donors for the years 2012, 2013 and 2014 were 0%, 0.05% and 0.14% respectively (overall 0.09%) while among replacement donors, it was 0.03%,0.15%and 0.51% respectively (overall 0.11%).[Table 2]

The seroprevalence of Hepatitis B among female donors for the years 2012, 2013, 2014 were 0%, 0.36 % and 0.24% respectively while in males, it was 0.36%, 0.42% and 0.41% respectively.

The seroprevalence of Hepatitis C among female donors for the years 2012, 2013, 2014 were 0%, 0% and 0.24% respectively while for males, it was 0.02%, 0.11%and 0.16% respectively. Overall, the seroprevalence for male donors was 0.4% in Hepatitis B and 0.1% for Hepatitis C while in case of females; it was 0.15% and 0.05% respectively. [Table 3] This difference was not statistically significant on Chi square test.

The three year prevalence rate of Hepatitis B was 0.39% while that of Hepatitis C was 0.1%.

**Table-1: Showing positivity for Hepatitis B & C among blood donors in 2012, 2013, 2014**

	2012		2013		2014	
	No. of cases	Percent(%)	No. of cases	Percent(%)	No. of cases	Percent(%)
Hep B positive	66	0.34	87	0.41	85	0.4
Hep C positive	3	0.016	22	0.12	34	0.16
Total donors	19,278		20,992		21,051	

**Table-2: Showing seropositivity of Hepatitis B & C among voluntary and replacement donors**

	Hepatitis B			Hepatitis C		
	No. of cases(%)	Total donors	p value = 0.0001 (Highly significant)	No. of cases(%)	Total donors	p value = 0.2977 (Not significant)
Voluntary donors	104(0.29)	37,315			32(0.09)	
Replacement donors	134(0.56)	24,006		27(0.11)	24,006	

**Table-3: Showing seropositivity of Hepatitis B & C among male and female donors**

	Hepatitis B		p value = 0.1105 (not significant)	Hepatitis C		p value = 0.7386 (not significant)
	No. of cases(%)	Total donors		No. of cases(%)	Total donors	
Male donors	235(0.4)	59,285		58(0.1)	59,285	
Female donors	3(0.15)	2036		1(.05)	2036	

**DISCUSSION**

HBV and HCV infections occurrence among blood donors was determined by serological methods and the results were compared to assess the trends in three consecutive years, 2012, 2013 and 2014. Blood transfusion associated hepatitis B viral infection continues to be a major problem in India even after adoption of mandatory screening of hepatitis B surface antigen (HBsAg) by enzyme-linked immuno-sorbent assay (ELISA) [5]. In our study, the seroprevalence of Hepatitis B was 0.39% which is much lower than those observed by Bhattacharya *et al.* (1.66%) in 2006 [6], Manzoor *et al.* (1.70%) in 2009 [7], Patil *et al.* (2.99%) in 2011 [8].

The seroprevalence was much higher in male donors than in female donors. Similar results were noted by Singh *et al.* [9] in Karnataka and by Jain *et al.* in Maharashtra [10]. The prevalence was also higher among replacement donors as compared to voluntary donors, which reflect the findings of Shah *et al.* [11], Singh *et al.* [9] and Kocchar *et al.* [12]. While this difference was found to be statistically significant for Hepatitis B, it was insignificant in case of Hepatitis C infections.

The overall seroprevalence of Hepatitis C was found to be 0.1%. Meena *et al.* [13] reported a seroprevalence of 0.57%. Various studies in India about the seroprevalence of HCV have shown data ranging from 0.31% in the study by Bhattacharya *et al.* in 2007 [6] to 1.09% in the study by Gupta *et al.* [14]. Our study showed a much lower prevalence similar to that seen by Shah *et al.* (0.11%) [11]. Moreover, a rising trend of HCV seroprevalence was seen during the three years of our study.

While in the first two years of our study, the seroprevalence of Hepatitis C was higher in male donors, in 2014, the female donors showed greater seroprevalence of Hepatitis C. As in case of Hepatitis B, seroprevalence of Hepatitis C was greater in replacement donors as compared to voluntary donors.

Similar findings were reported in several other studies [11,13]. This is to be expected as replacement donors carry a relatively higher risk of transfusion transmitted infections due to chances of missing professional donors during donor screening procedures [15].

**CONCLUSION**

Our study showed a seroprevalence of 0.39% for Hepatitis B and 0.1% for Hepatitis C which is much lower than most of the studies in India. While Hepatitis B showed a fluctuating trend, a rising trend was seen in Hepatitis C infections. Overall, male donors showed greater seropositivity than female donors. Also, a higher prevalence was noted among replacement donors which was found to be statistically significant for Hepatitis B, thereby emphasising the fact that voluntary blood donation need to be encouraged by motivating our population as it is a much safer alternative than replacement donors.

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