

# SEROPREVALENCE OF HBsAg AMONG BLOOD DONORS ATTENDING BLOOD BANK OF A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Background:** Hepatitis B virus is a DNA virus, causing acute as well as chronic liver disease including cirrhosis & hepatocellular carcinoma. Carriers of Hepatitis B are asymptomatic individuals without manifest disease harboring infection and capable of transmitting infection. Transmission of infection occurs through blood transfusion, needles, body fluids and sexual intercourse. Clinical recognition of carrier state of HBV is more frequently done by detection of HBsAg in the serum. Hepatitis B infection is a serious global & public health problem. Worldwide over 2 billion people have been infected with HBV. India has been placed into the intermediate zone of prevalence of Hepatitis B. The infection is a leading cause of morbidity & mortality.

**Aims & Objective:** To study the Seroprevalence of HBsAg among blood donors attending blood bank of a tertiary care hospital.

**Material and Methods:** The study was conducted at the Blood Bank of Rohilkhand Medical College and Hospital, Bareilly. In this retrospective study, healthy blood donors, over a period of three years were assessed. The blood donors were categorized as voluntary donors and replacement donors. Blood from donors were subjected to serological test for detection of HBsAg through ELISA based assay of Hepatitis B surface antigen.

**Results:** A total of 5088 blood donors were included in the study, 42 (0.82%) tested positive for hepatitis B surface antigen (HBsAg). Among these 42 cases, 41 (0.86%) were males and 01 (0.30%) was female.

**Conclusion:** The population based data on the prevalence of HBV presented here is likely to improve our understanding in disease transmission. A shift in donor age group pattern was observed, with higher prevalence of HBV in donors. This stresses upon the fact that extensive screening through routine and specialized tests is mandatory and definite criteria are to be given for donor selection so as to minimize the spread of this disease through transmission.

**KEY-WORDS:** Hepatitis B Virus; Seroprevalence; HBsAg

## Introduction

Hepatitis B virus infection (HBV) is a global public health problem. The hepatitis B surface antigen (HBsAg) in the serum is the first seromarker to indicate active HBV infection, either acute or chronic<sup>[1]</sup> Worldwide over two billion people have been infected with HBV and more than 350 million have chronic HBV infection.<sup>[2]</sup> India has been placed into the intermediate zone of prevalence of hepatitis B (2-7% prevalence by WHO)<sup>[3]</sup>, and giving and approximate total of 36 million carriers<sup>[4]</sup>. Among the estimated 400 million Hepatitis B surface antigen (HBsAg) carriers worldwide, India alone contributes 9% of the total.<sup>[5]</sup> There are wide variations in social, economic and health factors in different regions of India, which may explain the difference in HBV carrier rates reported by investigators in different parts of country.<sup>[6-9]</sup>

Transmission of Hepatitis B virus results from exposure to infectious blood or body fluids containing blood. Possible forms of transmission include sexual contact, blood transfusions, reuse of contaminated needles and syringes and vertical transmission from mother to child during birth. Without intervention, a mother who is positive for HBsAg confers a 20% risk of passing the infection to her offspring at the time of birth. HBV can be transmitted between family members within households, possibly by contact of non-intact skin or mucous membrane with secretion or saliva containing HBV.<sup>[10-12]</sup> Compared with the general population, the risk of HBV infection is higher in thalassemia children and among patients on renal dialysis. Carriers of Hepatitis B are asymptomatic individuals who manifest disease harbouring infection and are capable of transmitting infection.

Hepatitis B Virus (HBV) infection is a leading cause of morbidity and mortality. This is not only because of acute illness but also due to its chronic sequel like chronic hepatitis, cirrhosis and hepatocellular carcinoma accounting for more than a million deaths worldwide.

HBV is the second most important cause of acute, subacute and fulminant hepatitis in India.<sup>[13]</sup> Chronic infection with hepatitis B Virus may be either asymptomatic may be associated with a chronic inflammation of the liver, leading to cirrhosis over a period of several years. This type of infection increases the incidence of hepatocellular carcinoma. Hepatitis B virus has been linked to the development of membranous glomerulonephritis.<sup>[14]</sup> Clinical recognition of carrier state of HBV is more frequently done by detection of HBsAg in the serum.

The seroprevalence of HBsAg among blood donors has been a serious global and public health problem. Many studies have been done in different parts of the world to assess the magnitude and dynamics of disease transmission.<sup>[15]</sup> BN Tandon et al analysed the 1991 Consensus Data, and reported the hepatitis B surface antigen positivity rate as 14% in India<sup>[13]</sup>, whereas Sandesh K et al reported the seroprevalence of HBsAg as 0.52% in north Kerala. Smita Sood et al analysed hospital based patients and observed HBsAg prevalence to be highest in comparison to anti HCV and anti HIV Ab.<sup>[15]</sup> Variations among different sexes has also been observed<sup>[16]</sup>, Behal R et al reported a higher prevalence of HBsAg among males (2.28%) than females (1.30%)<sup>[17]</sup>. A study into the magnitude of HBsAg seroprevalence in this part of the country is much sought for.

It has been observed that seropositive blood donors have a low socioeconomic status and live under very poor hygienic conditions.<sup>[18,19]</sup> This increases the threat of transmission many folds.

### **Aims and Objectives**

1. The study was done to assess the magnitude of HBV among the blood donors, both involuntary and replacement donors in the

age group of 18-60 years from the period of January 2008 to December 2010.

2. The study was undertaken to estimate the seroprevalence of hepatitis B surface antigen (HBsAg) among the blood donors attending Blood Bank, Rohilkhand Medical College & Hospital, Bareilly.
3. The study was done to understand the dynamics of HBV transmission.

## **Materials and Methods**

**Place of Study:** This study was carried out in the Blood Bank of Rohilkhand Medical College & Hospital, Bareilly after an approval from Institutional Ethics Committee (IEC).

**Unit of Study:** Blood units collected from replacement and voluntary donors from both sexes in the age group of 18 to 60 years.

**Nature of Study:** Retrospective study of blood units collected from January 2008 to December 2010 was assessed.

**Sample Size:** Total numbers of blood donors in three years (5088) were assessed including both replacement donors (3373) and voluntary donors (1715).

**Data Collection:** The study was conducted at the Blood Bank of Rohilkhand Medical College and Hospital, Bareilly. In this retrospective study, 5088 healthy blood donors, over a period of three years from January 2008 to December 2010 were assessed. The blood donors were categorized as voluntary donors and replacement donors. However, due to nature of study (retrospective study) informed consent could not be obtained from the study subjects. Relevant information about blood donors was taken from donor form filled during blood donation in the Blood Bank. The test for detecting Hepatitis B virus infection involves ELISA based assay of Hepatitis B surface antigen. Sera were checked for the presence of Hepatitis B surface antigen (HBsAg) using ELISA by HEPALISA (J. Mitra & Co. Pvt. Ltd., New Delhi, India) according to manufacturer's instructions. Sensitivity is 100% and specificity is 100 % according to the manufacturer's manual. Data regarding the HbsAg positivity/negativity of the

respective blood donor was taken from records available in the Blood Bank, Rohilkhand Medical College, Bareilly.

## Results

Of the 5088 people included in the study, 42 (0.82%) tested positive for hepatitis B surface antigen (HBsAg). Among these 42 cases, 41 (0.86%) were males and 1 (0.30%) was female.

**Table-1: Donor Distribution with Hepatitis B Seropositivity**

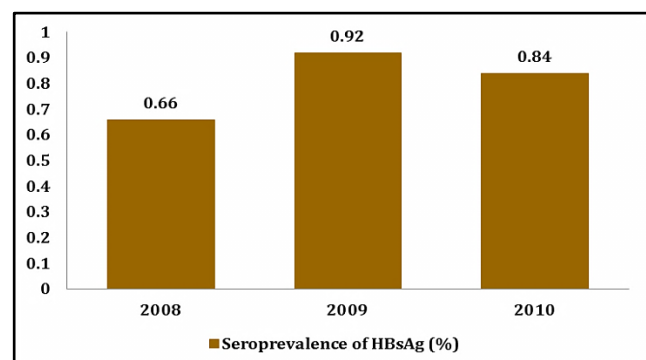
Year	Donation		Total	HBsAg Positive Units
	Voluntary	Replacement		
2008	82	1119	1201	08
2009	633	879	1512	14
2010	1000	1375	2375	20

**Table-2: Sex Distribution of the Hospital Based Population with Hepatitis B Seropositivity**

Year	Donor Tested		Donor with HBsAg Seropositivity	
	Male	Female	Male (%)	Female (%)
2008	1132	69	07 (0.61%)	01 (1.44%)
2009	1419	93	14 (0.98%)	0 (0.00%)
2010	2208	167	20 (0.90%)	0 (0.00%)
Total	4759	329	41 (0.86%)	01 (0.30%)

**Table-3: Age Distribution of the Hospital Based Population with Hepatitis B Seropositivity**

Year	Age (Years)	Number of Donors Tested	HBs Ag Positive (%)
2008	18-30	784	6 (0.76%)
	31-40	318	2 (0.62%)
	41-50	90	0 (0.00%)
	51-60	9	0 (0.00%)
2009	18-30	922	5 (0.54%)
	31-40	461	6 (1.30%)
	41-50	112	3 (2.67%)
	51-60	17	0 (0.00%)
2010	18-30	1331	12 (0.90%)
	31-40	779	8 (1.02%)
	41-50	219	0 (0.00%)
	51-60	46	0 (0.00%)
<b>Total</b>		<b>5088</b>	<b>42 (0.82%)</b>



**Figure-1: Graphical Representation of Seroprevalence of HBsAg**

## Discussion

The seroprevalence of Hepatitis B surface antigen (HBsAg) of 0.82% was noted in our study which correlated well with a similar study done by Smita Sood et al in 2010 which stated that seroprevalence of HBsAg was 0.87%.<sup>[15]</sup> The prevalence rate of Viral Hepatitis was found to be a little lesser by Singh K et al in 2009<sup>[16]</sup>, while the prevalence of HBsAg among general population in Northern India has been reported as 2.25%<sup>[17]</sup>, which was much higher. The prevalence varies in different areas and depends upon a complex mixture of behavioural, environmental and host factors.<sup>[15,18]</sup>

The seroprevalence of Hepatitis B also varies among males and females. In our study, males showed a higher prevalence of 0.56%, while females showed a prevalence of 0.30% respectively. Smita Sood et al in 2010 observed a higher HBsAg positivity of 1.04% in males versus 0.55% in females.<sup>[15]</sup> No plausible explanation has yet been given for the higher prevalence in males in the general population but probably females clear the HBV more efficiently as compared to males.<sup>[3]</sup>

The seroprevalence of Hepatitis B was studied and analyzed in different age groups. In 2008, the highest prevalence was observed in 18 to 30 years age group (0.76%). In 2009, highest prevalence of HBs Ag observed in the age group 41 to 50 years (2.67%). While in 2010, the seroprevalence of Hepatitis B surface antigen was highest in 31 to 40 years (1.02%). In our combined three year study, highest prevalence was found in the age group 31 to 40 years (1.30%).

It was also observed that, there was a gradual rise in seropositivity in blood donors each year in our study. The cause for this rise has yet to be evaluated in further studies.

This did not correlate with earlier studies by Smita Sood et al, who observed highest prevalence in the age group 41 to 50 years (1.04%). This probably indicates a shift in age group pattern of donors in the recent years.

The observed rates in our study largely reflects the blood donor population served by general

population and throws light on the dynamics of viral transmission in the community in this part of country.

## Conclusion

The population based data on the prevalence of HBV presented here is likely to improve our understanding in disease transmission. Our study showed a higher prevalence in males than the females. A shift in donor age group pattern was also observed, with higher prevalence of HBV in donors. This stresses upon the fact that extensive screening through routine and specialized tests is mandatory and definite criteria are to be given for donor selection so as to minimize the spread of this disease through transmission.

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