



## Seroprevalence of hepatitis B among blood donors in a tertiary care hospital

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### Abstract

**Background:** Hepatitis B is a major public health problem worldwide. Hepatitis B is a transfusion transmitted disease. The prevalence of hepatitis B varies across different geographical areas. Understanding the seroprevalence of hepatitis B infection assists in development of preventive strategies. The aim of this study was to determine the seroprevalence of Hepatitis B infection and to study its trend among blood donors of our area.

**Method:** This study was conducted at the Blood Bank of MLB Medical College, Jhansi over a period of 3 years from January 2016 to December 2018. All the blood units collected were screened for HBsAg using rapid kit test, reactive samples were further confirmed by Enzyme Linked Immunosorbent Assay. Samples showing repeat positivity on both methods were included for calculation of seroprevalence.

**Results:** A total of 21675 samples were studied. 237 donors were positive for HBsAg with a seroprevalence of 1.09%. There was a decreasing trend of Hepatitis B prevalence among donors. Age-wise seroprevalence was more in the 18-30-year age group. Replacement donors showed more seropositivity than voluntary donors.

**Conclusion:** Reduction in seroprevalence among donors requires effective donor education, high quality donor selection criteria, trained health care personnel and advanced technology. In a developing country like India, cost effectiveness is a concern. Immunization, education and increasing voluntary donation can be effective control measures to enhance safe blood donation.

**Keywords:** blood donors, hepatitis b, seroprevalence, voluntary, replacement

### Introduction

Transfusion of blood and blood products has been saving many lives since years. It is well known that transfusion of blood and blood products is associated with large number of complications. The use of untested blood results in Transfusion Transmitted Infections (TTI) like hepatitis virus B (HBV), hepatitis virus C (HCV), HIV, syphilis, malaria etc [1].

Hepatitis B infection is a global public health problem. Approximately 30% of the world's population or 2 billion people have been infected and more than 350 million have chronic hepatitis B virus infection [2].

Depending on the prevalence of Hepatitis B Surface Antigen (HBsAg), different countries of the world are classified as low (<2%), intermediate (2-7%) and high (≥8%) HBV endemic countries. Countries with low endemicity include United States, Australia and Western Europe. Countries with high endemicity include South East Asia, China, most of Africa and parts of Middle East. Countries with intermediate endemicity include South Asia, parts of Europe, central and south America and Russia. The prevalence of Hepatitis B in India ranges from 2-8%. Therefore, India comes under intermediate to high endemicity category [3, 4].

Wide variations in cultural, social, economic and health factors in different parts of India, explain the difference in HBV carrier rates reported by various studies in different parts of country [5, 7].

Hepatitis B Virus (HBV) infection is a leading cause of morbidity and mortality. Hepatitis B not only causes acute

illness but also leads to chronic illness like chronic hepatitis, cirrhosis and hepatocellular carcinoma accounting for more than a million deaths worldwide. The mode of infection transmission of hepatitis B is mainly by blood or blood products, it also spreads vertically from mother to children and by body secretions [8, 9].

The present study aims to study seroprevalence of hepatitis B among blood donors in a tertiary care institute.

### Methods

This study was a retrospective, cross-sectional study. The study was conducted over a period of three years from January 2016 to December 2018, at blood bank, department of pathology, MLB medical college, Jhansi (U.P.). All the blood donations collected during this period were included in the study population. The donors were either voluntary or replacement donors. Voluntary blood donation was conducted in blood bank and at various blood donation camps. Family members, friends or relatives of the patients were categorized as replacement donor. The donors were screened by the standard criteria for donor fitness after medical examination by trained personnel and a detailed pre-donation questionnaire form was filled for every donor. This form included details about age, gender, address, occupation, any illness, medical treatment, hospitalization, number and date of previous donation.

### Inclusion criteria

Clinically healthy individuals between the age 18 to 65 years, with a body weight of 45kg or above and

haemoglobin more than 12.5 g/dl with no significant medical or surgical history, no history of recent medication or alcohol intake, were included in the study.

**Exclusion criteria**

Individuals belonging to high risk groups such as professional blood donors, drug abusers, persons belonging to sexually transmitted diseases clinics, thalassemia clinics, dialysis patients, pregnant women, sex workers, etc. were excluded from the donation process.

After blood collection, the samples were obtained for serological testing. HBsAg screening was done using rapid test kit based on one step immunoassay principle. All the reactive samples were tested again by commercially available Erba Lisa ELISA kit (Meril Diagnostic pvt. Limited). Samples showing reactivity on both methods were included for seroprevalence calculation.

**Results**

A total of 21,675 donors were recorded during our study period, January 2016 – December 2018.

Out of 21675 cases, 237 cases were found to be HBsAg positive. The overall seroprevalence rate was 1.09% in our study. Replacement donors showed more seropositivity (1.65 %) as compared to voluntary donors (0.62 %). (Table 1)

The seroprevalence was also analysed among different age groups starting from 18-30 to 51-65, as represented in table 2, highest prevalence was found in the age group of 18 years to 30 years age group which is represented by Figure 1.

The seroprevalence of HBsAg during years 2016, 2017 and 2018 was calculated as 1.21, 1.10 and 0.96 respectively (Table 3). Our study showed decreasing trend of hepatitis B prevalence between 2016 to 2018 as shown in Figure 2.

**Table 1:** Distribution of voluntary and replacement donors.

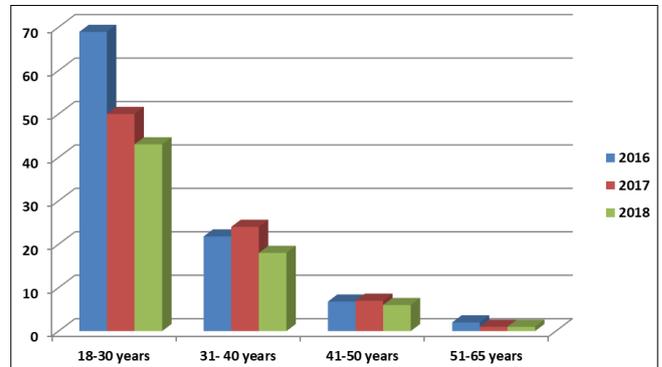
Type of donor	No. of donors	HBsAg positive	Seroprevalence of HBsAg
Voluntary	11700	72	0.615
Replacement	9975	165	1.65

**Table 2:** Age wise distribution of HBsAg positive donors.

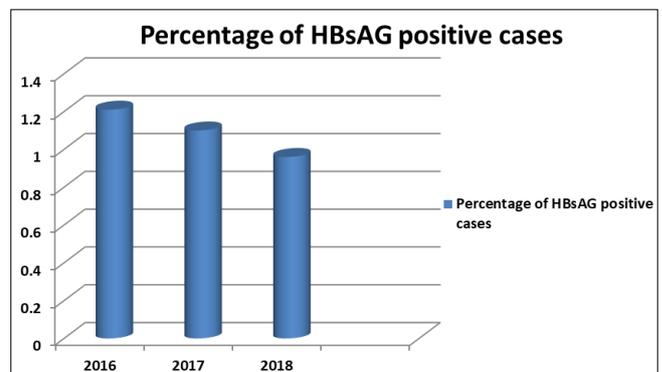
Year	Age (in years)	HBsAg Positive donor (%)	Total HBsAg Positive Donor
2016	18-30	60(68.9%)	87
	31-40	19(21.8%)	
	41-50	6(6.8%)	
	51-60	2(2.3%)	
2017	18-30	50(61.0%)	82
	31-40	24(29.3%)	
	41-50	7(8.5%)	
	51-60	1(1.2%)	
2018	18-30	43(63.2%)	68
	31-40	18(26.5%)	
	41-50	6(8.8%)	
	51-60	1(1.5%)	

**Table 3:** Distribution of donors and seroprevalence – Year wise statistics

Year	Total donors	HBsAg positive donors	Seroprevalence of HBsAg
2016	7178	87	1.21
2017	7444	82	1.10
2018	7053	68	0.96



**Fig 1:** Age wise distribution of HBsAg positive donors.



**Fig 2:** Graphical representation of seroprevalence of HBsAg

**Discussion**

Hepatitis B is a major public health problem in India and has serious life- threatening complications. According to India’s Drugs and cosmetic Act (1943), each blood unit has to be tested for hepatitis B infection. Provision of safe blood is the sole responsibility of blood transfusion department.

In our study 21765 blood donors were screened, and the overall seroprevalence of HBsAg was observed to be 1.09%, which is similar to the study conducted by Sehgal *et al.* [10] (1.13%), Chatteraj *et al.* [11], (0.99%) and Nitesh *et al.* [12] (0.82%).

Our study showed more seropositivity in replacement donors (1.65 %) as compared to voluntary donors (0.61%), which is similar to the study by Suresh *et al.* [13], who also observed higher seropositivity in replacement donors than voluntary donors of 2.69% and 1.94% respectively.

The seroprevalence was also analysed among different age groups, highest prevalence was found in the age group of 18 years to 30 years age group during the study period of 3 years.

Higher prevalence in the age group of 21-30 years was also reported by Arun *et al.* <sup>[14]</sup> (2014), Quadri *et al.* <sup>[15]</sup> (2013) and Tessema *et al.* <sup>[16]</sup> (2008).

It was also observed that, there was gradual decline in seroprevalence in blood donors each year in our study, this is also observed by Sehgal *et al.* <sup>[17]</sup>.

The reasons for variations in the seroprevalence of hepatitis B among studies conducted at different places may be due to use of testing kits with different sensitivities and specificities, proper pre-donation counselling, deferring the donors with high risk behaviour, awareness in blood donors about hepatitis B etc.

The introduction of hepatitis B vaccination in national immunization schedule by Govt. of India and use of 3rd generation sensitive test kits has reduced the incidence of hepatitis B. But, high quality test kits are limited as in a developing country like India, cost effectiveness is a big problem.

Higher prevalence among young population in our study shows that there is need for re-intensification of preventive programs, as this is the most productive and economically viable group of the country.

Public awareness, educational and motivational programs on transfusion transmitted diseases, mass immunization programmes, implementing strict pre-donation counselling, encouraging 100% voluntary donation will be effective in decreasing prevalence of Hepatitis B in population.

### Conclusion

Our study reports a lower seroprevalence of hepatitis B as compared to some studies, which recommends more intensive and comprehensive screening of blood donors. Donor education, high quality selection programme, increasing voluntary donation and ensuring 100% voluntary blood donation and advanced technology for donor screening is required to ensure safe blood donation. Immunization is the most effective and economic means of prevention, this along with education of health care workers and high risk group can also contribute to significant reduction in seroprevalence.

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