

## Seroprevalence of Hepatitis B infection among apparently clinically healthy blood donors in Northern mid-Karnataka

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### Abstract

**Aim:** To determine the seroprevalence of hepatitis B infection among healthy blood donors in the blood banks of Gadag.

**Materials and Methods:** The study included blood donors over a period of 3 years from August 2015 to July 2018 in two blood banks of Gadag i.e. Gadag Institute of Medical Sciences (GIMS) blood bank and Indian Medical Association (IMA) blood bank. A total of 20,144 donors were included in the study. It included both replacement donors and voluntary donors. Donors were screened using donor questionnaire and general physical examination was done for medical and surgical illness. Eligible blood donors donated blood and their blood samples were subjected to a test that detected the presence of HBsAg antigen by using commercially available Qualisa 3<sup>rd</sup> generation ELISA kit.

**Result:** In the present study, out of 20,144 donors, 19,676 (97.67%) were males and 468 (2.33%) were females. Total number of seropositive cases was 388. The overall seroprevalence was 1.93%. Out of 388 seropositive cases, 385 cases were males and 3 were females. Seroprevalence was highest among males accounting for 1.96% and that among females was 0.64%. The prevalence of seropositive cases among voluntary donors was 0.77% and among replacement donors was 7.19%.

**Conclusion:** Seroprevalence of hepatitis B in the region of Gadag is 1.93%.

### Introduction

Blood transfusion has become a very important modality of treatment in hospitals these days. With many advantages, there comes many complications as well. Some of them minor and some of them major life threatening. One of the significant complications is the transmission of Hepatitis B, Hepatitis C, Retroviral disease, Syphilis and Malaria. The need of the hour is to take essential measures to curb the transmission of infections.<sup>1</sup> The study on seroprevalence helps in identifying the magnitude of the problem and also in identifying the various risk groups.<sup>2</sup> Hence, this study is aimed at studying the seroprevalence of hepatitis B among blood donors.

Hepatitis B (HBV) is one of the major health issues in the world causing significant morbidity and mortality among the patients. One third of the world population has been infected with hepatitis B virus and 400 million have chronic infection.<sup>3</sup>

Hepatitis B is caused by a ssDNA virus. Mode of transmission could be through blood and may be acquired by transfusion, needle prick or occupational injury. It can also be transmitted from mother to fetus.<sup>4</sup> The incidence of spread by blood transfusion has increased very much in the recent decades. Certain types of behaviours increase the risk

of acquiring hepatitis B infection such as use of contaminated needle stick during acupuncture, intravenous drug abuse, tattooing, sex workers, patients undergoing repeated transfusions and patients on hemodialysis.<sup>5</sup> HBV has a prolonged incubation period ranging from 2-26 weeks. Over 5-10% of infected individuals go in for chronic infection and 0.1-0.5% of acutely infected individuals can go for fulminant hepatitis.<sup>3</sup>

It was previously elucidated that hepatitis B virus is present in all body excretions and secretions. Now it is proven that only blood, vaginal & menstrual fluid, and semen are infectious. Hepatitis B virus remains viable in environment for about a week. Hence, there are chances of transmission of infection by objects contaminated with the virus.<sup>5</sup>

An infection by HBV can cause acute hepatitis, fulminant hepatitis, cirrhosis of liver and hepatocellular carcinoma.

Diagnosis of HBV infection using serological markers varies depending on whether the infection is acute or chronic. Hepatitis B surface antigen (HBsAg) appears 1-7 weeks before biochemical markers of liver disease or jaundice become evident and remains in almost half of them even after 3 weeks after the onset of disease.<sup>2</sup> Despite of

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apparent resolution of infection, HBV DNA persists even after the production of antibodies to core and envelope antigens. Diagnosis of chronic infection is based on the presence of HBsAg, hepatitis envelope antigen or HBV DNA and absence of anti-HBc IgM antibodies.<sup>4</sup>

Occult hepatitis B infection (OBI) is one of the challenging entities in the field of viral hepatitis. OBI is defined by the presence of HBV DNA in the liver (with detectable or undetectable HBV DNA in the serum) in patients with serological markers of previous infection (anti HBc and/or anti HBs positive) or in patients without serological markers. OBI is considered as a potential threat to the safety of blood supply for transfusion to the recipients.<sup>6</sup>

**Materials and Methods**

The study included blood donors over a period of 3 years from August 2015 to July 2018 in two blood banks attached to Gadag Institute of Medical Sciences (GIMS) and Indian Medical Association (IMA). A total of 20,144 donors were included in the study. It included both replacement donors and voluntary donors. Family members, relatives or friends of the patients were grouped as replacement donors. People who donated either in blood bank or blood camps voluntarily without any favour in return were grouped as voluntary donors. Donors were given a questionnaire form that comprised of donor register form which included donor’s name, gender, address, occupation, date of previous donation, pregnancy status and risk factors such as surgery, hospitalisation, hypertension, diabetes, blood transfusion. General physical examination and haemoglobin screening was performed

**Inclusion Criteria**

Clinically healthy individuals between 18 to 65 years of age with the body weight of above 45 kg and haemoglobin >12.5g/dl, with no apparent medical or surgical illness, were included in the study.

**Exclusion Criteria**

Individuals having chronic diseases, drug abusers, pregnant women, patients with sexually transmitted diseases, sex workers were excluded from blood donation.

After blood donation, the samples were obtained for serological testing. HBsAg screening was done by Enzyme linked immunosorbent assay (ELISA) using the commercially available Qualisa 3<sup>rd</sup> generation ELISA kit as per the procedure given by the manufacturer. Donor samples were processed for the detection of hepatitis B surface antigen (HBsAg).

**Statistics**

Data was entered in Microsoft Excel sheet and the prevalence was calculated with respect to age, type of donor and gender. The statistical significance was determined by calculating p value using chi-square test.

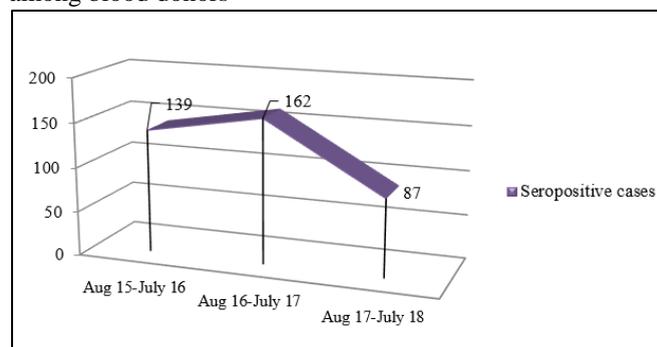
**Results**

The overall prevalence of HBV seropositive cases was 1.93%. Seroprevalence was higher among replacement donors when compared to voluntary donors, accounting for about 7.19%, which was statistically significant (p value - 0.0001). Prevalence was high among male donors accounting for about 1.96% and in females it was 0.64%. The difference of seroprevalence among gender was statistically insignificant (p value - 0.60). The seroprevalence was high in the age group 46-50 years accounting 2.87%. (Table 1). Seroprevalence of hepatitis B among donors showed a decreasing trend from 2015 to 2018. (Graph 1)

**Table 1:** Seroprevalence of hepatitis B among blood donors by demographic characteristics

Variable	No. of Donors	Seropositive cases	Seroprevalence (%)
Type			
Voluntary	16541	126	0.77
Replacement	3603	262	7.19
Gender			
Male	19676	385	1.96
Female	468	3	0.64
Age			
18-25	7753	95	1.23
26-30	5283	125	2.36
31-35	3287	91	2.76
36-40	1788	36	2.01
41-45	1088	21	1.93
46-50	523	15	2.87
>50	422	5	1.2
Total	20144	388	1.93

**Graph 1:** Year wise trend of seroprevalence of Hepatitis B among blood donors



**Discussion**

Transfusion transmitted diseases are on rise these days. WHO has classified various countries based on the seroprevalence of HbsAg into low i.e <2%, intermediate (2-7%) and high (≥8%) endemic areas. India comes under intermediate endemic area.<sup>7</sup>

Our study shows an overall seroprevalence of 1.93% which is in concordance with a study done by Chandre et al<sup>8</sup> and Srikrishna et al.<sup>9</sup>

**Table 2:** Seroprevalence of Hepatitis B infection in various regions of India

Place	Seroprevalence (%)	Reference
Ludhiana	0.66	Gupta et al (2004) <sup>10</sup>
Delhi	2.23	Pahuja et al (2007) <sup>11</sup>
Lucknow	1.96	Chandre et al (2009) <sup>8</sup>
South Haryana	1.7	Arora et al (2010) <sup>12</sup>
West Bengal	1.46	Bhattacharya et al (2007) <sup>12</sup>
Bengaluru	1.86	Srikrishna et al (1999) <sup>9</sup>
Thiruchirappalli	0.58	Bagiyalakshmi et al (2016) <sup>1</sup>
Present study (Gadag)	1.93	2018

The variation in seroprevalence could be attributed to many reasons-the type of test kit (different test kits have different sensitivity and specificity), awareness among blood donors, deferring blood donors with high risk behaviours, encouraging voluntary blood donation and post donation counselling of seroreactive donors.<sup>13</sup>

In our study, highest seroprevalence was seen in the age group 45-50years. A study done by Osei et al in Ghana showed highest prevalence of seropositivity among donors aged more than 30 years.<sup>14</sup> In a study done by Bagiyalakshmi et al,<sup>1</sup> highest seroprevalence was seen in the age group 18-30 years.

In the present study, highest prevalence of seropositivity was seen among males. This is in concordance with many other studies like Chandrasekhar et al<sup>15</sup> in 2000 at Madurai and Remya et al.<sup>12</sup> The reason could be attributed to socio-cultural norms prevalent here like males were more preferred for blood donation than females.

In our study, replacement donors showed more seroprevalence (7.19%) when compared to voluntary donors (0.77%) and the difference was statistically significant. In a study done by Sonth et al,<sup>7</sup> prevalence among voluntary donors was 1.94% and that among replacement donors was 2.45%. Voluntary donors donate blood of their own free will without any pressure and with no any medical risk factors. Hence the prevalence of transfusion transmitted diseases is much lower when compared to replacement donors.

It is observed that voluntary donation is the best method of blood donation and it is therefore recommended that every blood donation should be on voluntary intension. Some of the studies show that in India there is about 55% of voluntary blood donation and the rest of it is replacement donation.<sup>13</sup> In our study, voluntary donors accounted for 83.5% where as only 16.5% were replacement donors.

Blood transfusion is an indispensable mode of treatment. Safe blood transfusion is a very important step to prevent transmission of diseases like Hepatitis B. A few other measures include bringing awareness of the disease among individuals of the society, ensuring higher rates of vaccination among people, discouraging reuse of needles

and syringes, ensuring blood safety measures and encouraging 100% voluntary donation.

### Conclusion

In this study, we observed the prevalence of hepatitis B infection is low. This gives an idea about the prevalence of hepatitis B in our area. Also the prevalence is high among the economically productive age group. So, it is very much essential to enhance the awareness programs, immunisation, compulsory donor blood screening and 100% voluntary donation.

**Conflict of Interest:** None.

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