

## Prevalence of Hepatitis B among Voluntary Blood Donors in Mumbai

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### Abstract

**Context:** India is the second largest global pool of chronic HBV infection. Despite the institution of mandatory screening for HBsAg, the issue of transfusion-associated HBV is still a major health problem plaguing most third world and resource poor countries. Transfusion medicine, apart from being important for the medical treatment of each patient, also has great public health importance. **Objectives:** The present study was conducted to estimate the prevalence of Hepatitis B infections in voluntary blood donors at a tertiary care teaching hospital in Mumbai. **Materials and Methods:** All voluntary donors reporting to the blood bank were screened for HBsAg by using the appropriate enzyme-linked immunosorbent assay. The study was designed for duration of seven years between January 2008 to December 2014. Medical reports of the donors were accessed from the blood bank records and analyzed. **Results:** A total of 5606 voluntary blood donors were screened, of which 5120 (91.33%) were males and 486 (8.67%) were females. The seroprevalence of Hepatitis B was 3.67%. **Conclusion:** Blood borne transmission of hepatitis B virus continues to occur despite implementation of highly sensitive screening tests for HBsAg, suggesting these assays are still not sensitive enough to prevent all infections.

**Keywords:** Hepatitis B; Blood Donors.

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### Introduction

India is the second largest global pool of chronic HBV infection. Based on the prevalence of hepatitis B carrier state in the general population, countries are classified as having high (8% or more), intermediate (2-7%), or low (less than 2%) HBV endemicity [1]. India is at the intermediate endemic level of hepatitis B, with hepatitis B surface antigen (HBsAg) prevalence between 2% and 10% among the populations studied [2]. Among healthcare workers seroprevalence is two to four times higher than that of the general population [1]. Transfusion therapy is a well-established treatment in various medical and surgical procedures [3]. Blood is one of the major sources of transmission of HIV, hepatitis B, hepatitis C, syphilis,

and many other diseases [4,5]. Hepatitis B remains the most commonly reported viral Transfusion Transmitted Infection. The infectious risk of transmission of hepatitis B through transfusion of a unit of blood declared negative to HBsAg was  $9.89\% \pm 2.25\%$  at a confidence level of 95% [6]. The objective of this study is to estimate the seroprevalence of HBsAg among voluntary blood donors at a tertiary healthcare teaching hospital in Mumbai. This knowledge might give us the idea of disease burden of the society.

### Materials and Methods

A retrospective hospital record-based study was conducted at the blood bank of a tertiary care teaching hospital in Mumbai, India. Data were collected for a period of 7 years from January 2008 to December 2014. Sera of voluntary blood donors from various localities and of different age groups was screened for HBsAg. A total of 5606 blood units were collected and studied.

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All voluntary blood donors were screened as per WHO criteria for blood donor selection. Five milliliter blood each was collected from subjects into plain, sterile tube following informed consent. Blood samples were centrifuged and the sera were separated and analyzed. Two kits were used based on WHO recommendation of two different testing strategies involving enzyme-linked immunosorbent assay (ELISA) and/or simple or rapid assays for surveillance. Samples were analyzed for antibodies to HBsAg, by ELISA. Any serum found reactive by the first assay was retested using a second assay based on different antigen preparations and/or different test principle using the

anti-HBsAg test. The validity of the test is assured as per the given criterion and the results were computed.

## Results

In the present study, out of total 5606 voluntary blood donors, 5120 (91.33%) were males and 486 (8.67%) were females which show predominance of males as compared to females for the seven studied years [Table 1]. The prevalence of Hepatitis B among voluntary blood donors in the study population is showed in [Table 2].

**Table 1:** Distribution of voluntary blood donors in the study population

Year	Total voluntary donors	Male	Female
2014	687	613 (89.2%)	74 (10.77%)
2013	1084	965 (89.035)	119 (10.97%)
2012	1024	934 (91.22%)	90 (8.780%)
2011	754	701 (92.98%)	53 (7.02%)
2010	438	413 (94.3%)	25 (5.70%)
2009	702	645 (91.89%)	57 (8.11%)
2008	917	849 (92.59%)	68 (7.41%)
Total	5606	5120 (91.33%)	486 (8.67%)

**Table 2:** Prevalence of hepatitis B among voluntary blood donors in the study population

Year	Total no.of donors	Reactive for HBsAg	
		Number	Percentage
2014	687	21	3.05%
2013	1084	31	2.86%
2012	1024	44	4.3%
2011	754	33	4.37%
2010	438	08	1.82%
2009	702	14	1.99%
2008	917	55	5.99%
Total	5606	206	3.67%

The highest prevalence of Hepatitis B (42.71%) was noted within the age group 21-30 years, followed by 25.24% within the age group 31-40 years, with the

lowest prevalence observed within the age group of  $\geq 51$  yrs (3.9%) [Table 3].

**Table 3:** Distribution of blood donors with HBsAg according to the age

Age (years)	Reactive for HBsAg	
	Number	Percentage
<20	19	9.22%
21-30	88	42.71%
31-40	52	25.24%
41-50	39	18.93%
51-60	8	3.9%
Total	206	100%

**Table 4:** Distribution of blood donors with HBsAg according to the sex

Sex	Reactive for HBsAg	
	Number	Total Percentage
Males (5120)	202 (3.94%)	98.05%
Females (486)	04 (0.82%)	1.95%
Total (5606)	206 (3.67%)	100%

Sex distribution pattern of voluntary blood donors for Hepatitis B prevalence shown in [Table 4].

Prevalance of Hepatitis B is more in males as compared to females.

## Discussion

With over 93 million donations made every year worldwide, blood transfusion continues to save millions of lives each year and improve the life expectancy and quality of life of patients suffering from life-threatening conditions. At the same time, blood transfusion is an important mode of transmission of infection to the recipient [7]. Hepatitis B virus is a serious risk as a disease that can be spread through blood transfusion. Occult hepatitis B infection is defined in a patient with the presence of HBV-DNA but a lack of HBsAg in the serum and hepatocytes. It can be considered as a high potential risk factor for inducing post transfusion hepatitis, hepatocellular carcinoma, cirrhosis, and reactivation of the HBV [8]. Despite the institution of mandatory screening for HBsAg, the issue of transfusion-associated HBV is still a major health problem plaguing most third world and resource poor countries [9].

In our study, the prevalence of Hepatitis B was found to be 3.67 %, while other studies like Giri et al [10] (2012) 1.09%, Pandit et al [11] (2015) 1.3%, Meena et al [12] (2011) 1.43% noted lower HBsAg prevalence which may be due to geographical variations. Our finding is in accordance with Satoskar et al [13] (1992) 4.7% and Gulia et al [14] (2010) 2.54%. This variation in the prevalence of hepatitis B infection from city to city or in different countries depends upon a complex mix of behavioural, environmental and host factors, incidence and age of primary infection. It is lowest in areas with high standards of living and highest in areas with low socio-economic levels [14].

Prevalence of Hepatitis B was highest in the age group of 21-30yrs (42.7%) followed by 31-40yrs (25.24%) in our study; Raina et al [14] (2014) and Giri et al [10] (2012) also noted highest prevalence in the age group of 21-30yrs. Makroo et al [16] (2012) noted highest prevalence in the age group of 18-30yrs (40.67%) which is well correlated with our study. In India, 89% of the cases occur among sexually active persons aged 20 - 49 years.

In many developing countries, women do not come forward for blood donation or for health camps due to many socio-cultural inhibitions, ignorance and fear for donating blood. Irrespective of the size of sample and type of study population the prevalence of HBsAg in females is significantly lower than males [11]. Similar finding was noted in our study.

In India, mandatory blood screening for HBV is done by serological tests for HBsAg. The screened seronegative donations are still at risk for Hepatitis B and thus, need for a sensitive screening test arises to

decrease this residual risk which has been reduced significantly over the last two to three decades in western countries where NAAT has been implemented. NAAT testing has been started in few centers in India, but it is not a mandatory screening test for TTIs as per Drug and Cosmetics Act, 1940 and the rules therein. Major barriers in implementing routine NAAT testing in India is its high cost and lack of technical expertise in most of the blood centers [17].

The accurate estimation of residual risk of transfusion-transmissible infectious diseases are essential for monitoring the safety of blood supply and the evaluation of the potential effect of screening tests and the risk reduction procedures under implementation [9]. Transfusion safety begins with healthy donors. A fundamental part of preventing transfusion transmitted infections (TTIs) is to notify and counsel reactive donors. Donor notification and counselling protect the health of the donor and prevent secondary transmission of infectious diseases [7].

## Conclusion

Strict donor selection, education of patients about benefit of HBV vaccine and standard serological techniques for screening of blood product such as nucleic acid amplification test (NAAT) and PCR by blood bank might reduce the prevalence of transfusion transmitted hepatitis B and other TTI. At present, the majority of blood banks including ours in this country are not using NAAT due to the cost, which is 5-6 times as compared to ELISA. We think it is a nationwide issue and needs urgent attention. The government should take measures to cut down the cost of NAAT and make it mandatory for all blood banks in this country so that a patient requiring chronic transfusion will have a minimum risk of TTI.

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