

HEPATITIS B PREVALENCE AMONG BLOOD DONORS AT A TERTIARY CARE CENTRE IN MYSORE

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ABSTRACT: BACKGROUND: Blood transfusion is an essential element of a health care system. Safety of blood transfusion is of extreme importance in order to avoid any severe morbidity and mortality in the patient. By screening donated blood units, we get a clue of the prevalence of those infections among donor populations and consequently the safety of collected donations. It also gives us an idea of the prevalence of the Transfusion transmissible infections (TTIs) in the community. **OBJECTIVES:** To find out the sero-prevalence of TTIs namely HBV (Hepatitis B) in the blood donor population at MMC&RI, Mysore. To stratify sero prevalence of TTIs based on the age and sex of the donor population. **METHODOLOGY:** The present study was carried out in the Blood Bank, Mysore Medical College and Research Institute, Mysore during the period from November 2012 to May 2014 among 14075 blood donors. All the samples were screened for hepatitis B surface antigen (HBsAg) by ELISA method. **RESULTS:** Out of a total of 14075 blood donors, a total of 103 tested positive for TTIs. 94.08% were males and remaining 5.92% were females. A majority of donors were voluntary donors (85.79%) and a majority of the donors were between the age group of 18-39 years (78.17%). The prevalence rate of HBV in blood donors was 0.73%. The seroprevalence in voluntary donors was 0.57% and in replacement donors was 1.75 % respectively. **CONCLUSION:** Voluntary blood donation is safe, compared to replacement as high prevalence of Hepatitis B is observed in replacement donors.

KEYWORDS: Prevalence; Transfusion transmissible infections (TTI); Voluntary and Replacement blood donors.

INTRODUCTION: Blood transfusion is an essential element of a health care system. Safety of blood transfusion is of extreme importance in order to avoid any severe morbidity and mortality in the patient.

By screening donated blood units, we get a clue of the prevalence of those infections among donor populations and consequently the safety of collected donations. It also gives us an idea of the prevalence of the Transfusion transmissible infections (TTIs) in the community.¹

Despite the dramatic reduction in risk of viral transmission during the past three decades, viral hepatitis remains a serious complication of transfusion worldwide. The discovery in 1968 that the viremic phase of serum hepatitis could be recognized serologically² sparked the hope that all infectious donors could be identified. However, HBV remains a major human pathogen that causes acute and chronic hepatitis, cirrhosis and hepatocellular carcinoma.³

Approximately 30% of the world's population or about 2 billion persons have serological evidence of either current or past infection with hepatitis B virus. Countries are classified based on endemicity of hepatitis B virus (HBV) infection into high (8% or more), intermediate (2-7%) or

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low (less than 2%) incidence countries. The prevalence of chronic HBV infection in India ranges from 2% to 10%, as shown by different studies. India therefore comes under the intermediate to high endemicity category. Hepatitis B infection is one of the transfusion transmissible infections; hence, it is mandatory to test all blood donors for HBsAg.⁴

Screening for HBsAg in blood was initially done by immune-diffusion and Counter immune-electrophoresis. These methods were soon replaced by more sophisticated Immune-radiometric assay (RIA) and the ELISA, which detect less than 0.5 ng of HBsAg/ml of blood. However, taking the molecular weight of HBsAg as 3×10^6 , 0.5 ng is equivalent to 1×10^7 particles. As and when better screening methods become available more studies needs to be conducted to establish revised prevalence rates.⁵

Sero-prevalence of Hepatitis B in Indian donors is 0.4% (0.66% - 12%) in comparison to 0.3% in USA. Annual blood transfusion causes an estimated 16 million HBV infection.⁶

Various studies in Karnataka have shown the prevalence of Hepatitis B in blood donors to be ranging from 0.3% to 3.2%.⁷⁻¹⁰ There is limited literature on recent statistics of Hepatitis B prevalence in blood donors in and around Mysore. Hence the present study to assess the hepatitis B sero Prevalence among blood donors at a tertiary care centre in Mysore.

OBJECTIVES:

- To find out the sero-prevalence of HBV in the blood donor population at MMC & RI, Mysore.
- To stratify sero prevalence of HBsAg based on the age and sex of the donor population.

METHODOLOGY: The present study was carried out in the Blood Bank, Mysore Medical College and Research Institute, Mysore, Karnataka during the period from November 2012 to May 2014 among 14075 blood donors. It is a cross-sectional study.

All the samples were screened for HBsAg using ELISA method. The source of data for the present study were Donors coming for blood donation at Blood Bank, Mysore Medical College & Research Institute, Mysore.

All blood donors during the study period were considered. Inclusion criteria were all voluntary and replacement donors coming for blood donation during study period. Exclusion Criteria were age less than 18 years and more than 60 years, weight less than 45 kilograms, donors who donated blood in last three months, donors who underwent major surgery in last six months and minor surgeries in last three months donors who did not complete one year after tuberculosis treatment, donors who suffered from typhoid, mumps, measles, chicken pox in last six months, those receiving any vaccination in last one month, those who suffered from malaria during last three years or Jaundice in last one year, suffering from any one of the diseases such as hypertension, diabetes mellitus, malignancy, asthma, epilepsy, AIDS, syphilis, bleeding disorders and disease of heart, liver or kidney. Pregnancy, lactation, within one year of postpartum and within six months of miscarriage.

The study was approved by the Ethical and Research Committee of Mysore Medical College & Research Institute, Mysore. During the study period, blood donors at Blood Bank, Mysore Medical College & Research Institute, Mysore fulfilling the inclusion criteria were included in this study and informed consent was obtained. Detailed relevant history was taken.

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After finding the suitability following tests were carried out.

1. Haemoglobin estimation by Automated blood counter (Sysmex).
2. HBsAg by ELISA.

All the reactive samples were repeat tested before labelling them as seropositive. Blood was not collected from seropositive donors.

The seropositive samples were sent for the confirmatory NAT (nucleic acid amplification techniques) testing and findings confirmed. No false positive results were seen.

STATISTICAL METHODS: The data was tabulated in Microsoft excel and prevalence was calculated using rates, ratios and percentages and statistical analysis done to check the significance.

RESULTS: The present study was carried out in the Blood Bank, Mysore Medical College and Research Institute, Mysore during the period from November 2012 to May 2014. The study includes screening tests done on 14075 donors including both voluntary and replacement blood donors. The findings are as follows:

In the present study, 13242 (94.08%) were male blood donors and 833(5.92%) were female blood donors. Therefore the number of male blood donors was more than female blood donors.(Table-1).

Sex	No. of Donors	Percentage
Male	13,242	94.08%
Female	833	5.92%
Total	14,075	100%

Table 1: Gender wise distribution of Blood Donors

33.87% donors belonged to 18 to 29 years age group followed by 44.08% donors between 30 to 39 years, 14.52% donors between 40 to 49 years and 7.53% donors between 50 to 60 years. The minimum age recorded was 18 years and maximum age was 60 years.(Table-2)

Age (Years)	No. of Donors	Percentage
18-29	4,767	33.87%
30-39	6,205	44.08%
40-49	2,043	14.52%
50-60	1,060	7.53%
Total	14,075	100.00%

Table 2: Age Wise Distribution of Blood Donors

In the present study, 12075(85.79%) were voluntary donors and 2000 (14.21%) were replacement donors.(Table-3)

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Type of Donor	Number	Percentage
Voluntary	12,075	85.79%
Replacement	2,000	14.21%
Total	14075	100.00%

Table 3: Distribution according to type of Donor

Out of 14075 blood samples 103 were HBsAg positive samples showing a prevalence of 0.73%. Out of 13242 male donors, 84 were hepatitis B positive (prevalence of 0.64%) and out of 833 female donors 19 were Hepatitis B positive (prevalence 2.28%) (Table-4).

Donor	Males (13,242)		Females (833)		Total	
	No	Percentage	No	Percentage	No	Percentage
Hepatitis B	84	0.64%	19	2.28%	103	0.73%

Table 4: Prevalence of Hepatitis B Infection in donors

In the voluntary donors group 69 (0.57%) blood donors had HBsAg infection and among replacement donors, 34 (1.75%) blood donors had HBsAg infection. (Table-5).

Disease	Voluntary(n=12,075)		Replacement(n=2,000)	
	No of Donors	Percentage	No of Donors	Percentage
Hepatitis B	69	0.57%	34	1.75%

Table 5: Comparison of Hepatitis B infection in Voluntary and Replacement donors

DISCUSSION: India has a population of more than 1.2 billion with 43 million HBV positive cases.¹¹ The prevalence of hepatitis B surface antigen (HBsAg), positivity in Indian blood donors is 0.66-12%.⁴ The risk of transfusion transmissible infections (TTI) has declined dramatically in developed nations over the past two decades, primarily because of extraordinary success in preventing HIV and other established transfusion transmitted viruses from entering the blood supply. But same may not hold good for the developing countries.

The National Policy for Blood Transfusion Services in our country is of recent origin and the transfusion services are hospital based and fragmented.¹² Hence the present study was carried out in the Blood Bank, Mysore Medical College and Research Institute, Mysore.

The study includes screening tests done on donors including both voluntary and replacement blood donors. Out of these donors, youngest donor was of 18 years and the oldest donor was of 60 years. Similar age ranges have been observed in various other studies.

There was a predominance of male donors (94.08%) in our study which is comparable to other studies like those done by Pallavi et al (97.84%)⁷ and Zulfikar Ahmed et al, (91.8%).⁹ The reason for less numbers of female donors could be due to social factors, being underweight and higher incidence of anemia in women forcing a disqualification of them as potential donors. In our

study voluntary donors accounted for a majority of donor type. 85.79% were voluntary donors and remaining 14.21% were replacement donors.

This can be compared with study done by Patel et al¹³ where 95.56% were voluntary donors and 4.44% were replacement donors, Deshpande et al¹⁴ where 79.33% were voluntary blood donors and 20.67% were replacement donors and study by Gupta et al¹² where 61.9% voluntary and 38.1% replacement donors were studied.

In contrast predominance of replacement donors was seen in studies done by Kakkar et al (94.7%)¹⁵, Srikrishna et al (98.5%)¹⁶ and Singh et al (84.5%).⁸

Voluntary blood donors are the cornerstone of a safe and adequate supply of blood and blood products. The safest blood donors are voluntary, non-remunerated blood donors from low-risk populations. For a safe blood service in our country, where comprehensive laboratory tests are neither possible nor pragmatic, it is best to switch over to 100% voluntary donations, as it is now established that only voluntary non-remunerated regular donation is the safest.¹⁷

SEROPREVALENCE OF HEPATITIS B:

- Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus.
- It is a major global health problem and the most serious type of viral hepatitis.
- It can cause chronic liver disease and puts people at high risk of death from cirrhosis of the liver and liver cancer.
- Worldwide, an estimated two billion people have been infected with the hepatitis B virus and more than 240 million have chronic (long-term) liver infections. About 600 000 people die every year due to the acute or consequences of hepatitis B.¹⁸
- India has been placed in the intermediate zone for prevalence of hepatitis B by WHO (2 - 7%).⁴
- In previous Indian studies by Srikrishna et al,¹⁶ Sonawane et al¹⁹ and Singh et al²⁰ the seroprevalence of HBsAg among the blood donors was 1.86%, 4.07% and 1.8% respectively. They concluded that voluntary donors are comparatively safe donors.

Bhattacharya et al, observed a statistically significant increase in seroprevalence of HBsAg over of a 2 years among the blood donors in Kolkata (Eastern India). The observed seroprevalence of HBsAg in 2005 was 1.66%.¹

In our study the seroprevalence for HBsAg was 0.73% in total donors. The seroprevalence in voluntary donors was 0.57% and in replacement donors was 1.75 % respectively which supports the need for voluntary blood donation.

CONCLUSION: Screening of blood samples for various TTI plays an important role in preventing hazards of various infections. It has been observed that voluntary blood donation is safe as compared to replacement as high prevalence of HBsAg is observed in replacement donors. Therefore, voluntary donation should be encouraged.

However, the risk of TTI cannot be eliminated completely even after mandatory testing of blood units because of risk associated with donations during window period. With advent of nucleic acid amplification techniques (NAT) western countries have decreased the risk of TTI to a

major extent. This decrease the window period and hence decrease in incidence of TTI. But the cost effectiveness of the NAT is poor. Its high cost is of concern especially in economically restricted countries.

Hence optimum usage of transfused blood and use of transfused blood if only necessary should be the aim of the treating physician.

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