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ORIGINAL RESEARCH

Assessing the prevalence of hepatitis B in voluntary blood donors at Indian healthcare center

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ABSTRACT

Background: Nearly one million deaths reported globally are due to HBV (hepatitis B infection). Approximately more than 257 people have chronic hepatitis B infection across the globe which ultimately leads to hepatocellular carcinoma. Also, HBV infection is a major healthcare concern in developing nations such as India. **Aim:** The present study aimed to evaluate the prevalence of hepatitis B in voluntary blood donors at Indian healthcare centers. **Methods:** The present study assessed 10,000 blood donors who fit the inclusion criteria for the study and were accepted for blood donation within the defined study period. The blood samples collected from all the participants were evaluated for Hepatitis B surface antigen and other TTIs (transfusion-transmitted infections). Data gathered were analyzed statistically. **Results:** The results of the present study showed that among 10,000 donors assessed in the study, there was a prevalence of 0.62% for HBsAg-positive donors in all the subjects. HBsAg positivity rate was significantly higher in males with 0.7% compared to females and in the age range of 56-60 years with 1.5%. **Conclusions:** The present study concludes that the prevalence of hepatitis B is decreasing in voluntary blood donors in comparison to the previously reported data. It is vital to generate awareness and education concerning vigorous donor screening, voluntary blood donation encouragement, mass immunization, and blood-borne infections which might help in decreasing the load of hepatitis B and prevent further transfusion-transmitted infections.

Keywords: Blood donor, blood donation, hepatitis B, prevalence, voluntary blood donation

INTRODUCTION

Literature data reports that millions of deaths are caused due to HBV (hepatitis B virus) infection globally. Approximately more than 257 people have chronic hepatitis B infection across the globe which ultimately leads to hepatocellular carcinoma. Also, HBV infection is a major healthcare concern in developing nations such as India. The Hepatitis B virus was found in 1967 it is a DNA virus belonging to the Hepadna Viridae family and is a hepatotropic virus. The disease caused by Hepatitis B infection is comprised of acute and chronic hepatitis, cirrhosis, and hepatocellular carcinoma.[1]

Hepatitis B virus has been a major healthcare concern globally. It represents a blood-borne infection and is found in low concentrations in the saliva and other body fluids of the disease carriers. HBV had an incubation period of 90 days, however, it can fluctuate from six weeks to six months. As the virus shows transmission via blood and blood products, unsafe blood transfusion is still a vital factor causing health apprehension and public health issues in various developing nations such as India.[2]

Existing literature data has reported that there is a high variation in the prevalence rate of HBsAg in Indians within the range of 2% to 8%. Also, there are more than 37 billion Indian HBV carriers in the population higher than 1.25 billion which adds significantly to a huge portion of the global number of HBV carriers. Hence, it is vital to carry out larger research for better assessment of the epidemiology of HBV and for identification of areas with high HBV prevalence and further focus on improvement of public health strategies for prevention of transmission of HBV to further decrease the disease load.[3]

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Thefirst move in disease load confrontation for HBV in India is to attain extra precise and better assessment of disease load in HBV. As blood donors represent the healthy population, a study of blood donors will directly depict the prevalence of the infection in healthy subjects.[4] Considering the background, the present study aimed to assess theprevalence of hepatitis B in voluntary blood donors at Indian healthcare centers.

MATERIALS AND METHODS

The present cross-sectional clinical study aimed to assess the prevalence of hepatitis B in voluntary blood donors at Indian healthcare centers. the study was conducted from January to December of 2024. The Institute's Department of Pathology provided the research participants from Delhi NCR regionVerbal and written informed consent were taken from all the subjects before study participation.

The study assessed 10,000 voluntary blood donors who donated blood in the study within the defined study period. The inclusion criteria for the study were healthy voluntary blood donors within the age range of 18 to 60 years. Before the screening, each blood donor participant was evaluated by routine physical examination for exclusion criteria. Professional donors, paid donors, and replacement donors with a previous history of HIV, HCV, or HIV infections were excluded from the study.

After the final inclusion of the study subjects, donors were comprehensively interviewed and explained concerning TTIs (transfusion-transmitted infections), and laboratory tests were also done for the same. After counseling the subjects, written consent was taken from the participants. Donors were screened for HBsAg using the ELISA (Enzyme Linked Immunosorbent Assay test) test. The data for the participants was kept anonymous.

The data gathered were statistically analyzed. The data gathered were analyzed statistically using SPSS (Statistical Package for the Social Sciences) software version 24.0 (IBM Corp., Armonk. NY, USA) for assessment of descriptive measures, Student t-test, ANOVA (analysis of variance), and Chi-square test. The results were expressed as mean and standard deviation and frequency and percentages. The p-value of <0.05 was considered statistically significant.

RESULTS

The present cross-sectional clinical study aimed to assess the prevalence of hepatitis B in voluntary blood donors at Indian healthcare centers. The present study assessed 10,000 blood donors who fit the inclusion criteria for the study and were accepted for blood donation within the defined study period. The blood samples collected from all the participants were evaluated for Hepatitis B surface antigen and other TTIs (transfusion-transmitted infections).

Among the 10,000 blood donors assessed, 88% (n=8808) of the donors were males, and 12% (n=1192) were females. The prevalence of hepatitis B virus infection in study subjects was 0.62% (n=62) HBsAg positive donors out of 10,000 blood donors. Among 62 HBsAg positive donors, there were 96.7% (n=60) males and 3.2% (n=2) female subjects, and among 8808 male donors 0.6% (n=60) were HBsAg positive, and among 1192 females, there were 0.2% (n=2) HBsAg positive females (Table 1).

It was seen that for the distribution of HBsAg positive and negative study blood donors based on the age group, majority of HBsAg positive subjects were from the age range of 18-25 and 26-35 years of age with 0.2% (n=20) subjects each followed by 36-45 years with 0.14% (n=14), 46-55 years with 0.1% (n=6) subjects, and 0.02% (n=2) subjects from 56-60 years respectively. HBsAg positivity within age group was 0.4%, 0.71%, 1%, 1.3%, and 1.5% in 18-25, 26-35, 36-45, 46-55, and 56-50 years age group respectively and overall HBsAg positivity within age group was 4.91% (Table 2).

Overall blood group status in donors showed that there were 0.3%, 8.8%, 1.7%, 29.7%, 1.1%, 25.5%, 1.7%, and 31.1% AB negative, AB positive, B negative, B positive, A negative, A positive, O negative, and O positive subjects respectively. In the HBsAg positive donors, 97% and 3% of subjects were Rh positive and Rh negative respectively. In HBsAg positive donors, the blood group was AB positive, B negative, B positive, A negative, A positive, O negative, and O positive in 6.45%, 25.8%, 32.3%, 3%, and 32.3% study subjects respectively.

Table 1: Distribution of HBsAg positive and negative study blood donors based on gender

Donors (gender)	HBsAg positive		HBsAg negative		Total		HBsAg positivity within gender group (%)
	n	%	n	%	n	%	
Males	60	0.6	8748	87.4	8808	88	0.7
Females	2	0.2	1190	11.8	1192	12	0.2
Total	62	0.62	9938	99.4	10000	100	0.9

Table 2: Distribution of HBsAg positive and negative study blood donors based on the age group

Donors Age range (years)	HBsAg positive		HBsAg negative		Total		HBsAg positivity within age group (%)
	n	%	n	%	n	%	
18-25	20	0.2	5152	5.15	5172	51.7	0.4
26-35	20	0.2	2812	28.1	2832	28.3	0.71
36-45	14	0.14	1382	13.8	1396	13.9	1.0

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46-55	6	0.1	456	4.5	462	4.6	1.3
56-60	2	0.02	136	1.4	138	1.4	1.5
Total	62	0.62	9938	99.4	10000	100	4.91

DISCUSSION

The present study assessed 10,000 blood donors who fit the inclusion criteria for the study and were accepted for blood donation within the defined study period. The blood samples collected from all the participants were evaluated for Hepatitis B surface antigen and other TTIs (transfusion-transmitted infections). The study design of the present study was similar to the design adopted in the previous studies of Panessa C et al[5] in 2009 and Mohammed Abdullah S[6] in 2013 where authors in their study used a study design similar to the present study.

The study results showed that among the 10,000 blood donors assessed, 88% (n=8808) of the donors were males and 12% (n=1192) females. The prevalence of hepatitis B virus infection in study subjects was 0.62% (n=62) HBsAg positive donors out of 10,000 blood donors. Among 62 HBsAg positive donors, there were 96.7% (n=60) males and 3.2% (n=2) female subjects, and among 8808 male donors 0.6% (n=60) were HBsAg positive, and among 1192 females, there were 0.2% (n=2) HBsAg positive females. These results were consistent with the findings of Chandekar SA et al[7] in 2017 and Chandra T et al[8] in 2009 where a comparable prevalence of HBsAg infection to the present study was also reported by the authors in their respective studies.

Concerning the distribution of HBsAg positive and negative study blood donors based on the age group, majority of HBsAg positive subjects were from the age range of 18-25 and 26-35 years of age with 0.2% (n=20) subjects each followed by 36-45 years with 0.14% (n=14), 46-55 years with 0.1% (n=6) subjects, and 0.02% (n=2) subjects from 56-60 years respectively. HBsAg positivity within age group was 0.4%, 0.71%, 1%, 1.3%, and 1.5% in 18-25, 26-35, 36-45, 46-55, and 56-50 years age group respectively and overall HBsAg positivity within age group was 4.91%. These findings were in agreement with the results of Pahuja S et al[9] in 2007 and Gupta PK et al[10] in 2006 where the distribution of HBsAg positive and negative study blood donors based on the age group reported by the authors in their studies was similar to the results of the present study.

It was seen that overall blood group status in donors showed that there were 0.3%, 8.8%, 1.7%, 29.7%, 1.1%, 25.5%, 1.7%, and 31.1% AB negative, AB positive, B negative, B positive, A negative, A positive, O negative, and O positive subjects respectively. In the HBsAg positive donors, 97% and 3% of subjects were Rh positive and Rh negative respectively. In HBsAg positive donors, the blood group was AB positive, B negative, B positive, A negative, A positive, O negative, and O positive in 6.45%, 25.8%, 32.3%, 3%, and 32.3% study subjects respectively. These results were in line with the previous studies of Nigam JS et al[11] in 2014 and Sinha RTK et al[12] in 2017 where overall blood group status in donors comparable to the present study was reported by the authors in their respective studies.

CONCLUSIONS

Within its limitations, the present study concludes that the prevalence of hepatitis B is decreasing in voluntary blood donors in comparison to the previously reported data. It is vital to generate awareness and education concerning vigorous donor screening, voluntary blood donation encouragement, mass immunization, and blood-borne infections which might help in decreasing the load of hepatitis B and prevent further transfusion-transmitted infections.

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