Original article

Prevalence of Hepatitis B virus surface antigen (HBsAg) among indoor patients and blood donors attending a tertiary care hospital of North India

***Dr Noor Jahan[1], Dr Vijay Gupta[2], Amit Kumar[3], Dr Sudhir Mehrotra[4], Dr Razia Khatoon[5]**

1- Associate Professor , Department of Microbiology, Integral Institute of Medical Sciences & Research, Integral University, Lucknow-226026, India.
2- Assistant Professor , Department of Pathology, Integral Institute of Medical Sciences & Research, Integral University, Lucknow-226026, India.
3- Msc Medical Microbiology , 3rd year student , Department of Microbiology, Integral Institute of Medical Sciences & Research, Integral University, Lucknow-226026, India.
4- Professor , Department of Medicine, Integral Institute of Medical Sciences & Research, Integral University, Lucknow-226026, India.
5- Associate Professor , Department of Microbiology, Hind Institute of Medical Sciences, Mau, Ataria, Sitapur-261303, India.

Corresponding author *

Abstract:

Introduction: Hepatitis B virus (HBV) causes silent killer disease of the liver with many carriers not aware of their clinical status, therefore, they act as potential source of infection to others. HBV is highly infectious and can be transmitted by both percutaneous routes and by blood transfusion. Laboratory diagnosis of HBV infection is made by detecting Hepatitis B virus surface antigen (HBsAg), the earliest serological marker of active HBV infection (acute as well as chronic).

Objective: The present study was done to determine the prevalence of HBsAg among indoor patients and blood donors.

Materials & Methods: A hospital based cross-sectional study was done from January to June 2016. A total of 2096 subjects comprising of 1769 indoor patients and 327 blood donors were included in the study whose blood samples were screened for presence of HBsAg using rapid HEPACARD and HEPALISA.

Result: Out of 1769 indoor patients tested, 76 were found to be reactive, and out of 327 blood donors tested, 8 were found to be reactive. Hence, the prevalence of HBsAg was found to be 4.3% & 2.4% among patients and donors respectively. Amongst indoor patients seropositivity was more among males (5.7%) as compared to females (2.9%). Amongst donors seroprevalence was found to be more among replacement donors (2.8%) as compared to voluntary donors (1.3%).

Conclusion: Hepatitis B is an important transfusion transmitted infection, therefore, proper screening of blood for HBsAg should be made mandatory coupled with encouragement of voluntary donation by women as they are relatively less infectious.

Keywords: HBsAg, Indoor Patients, Blood donors.

Introduction

Hepatitis B virus (HBV) infection is a serious global health problem affecting 2 billion people worldwide.[1] HBV infection accounts for 5,00,000 to 1.2 million deaths each year and is the 10th leading cause of death.[2] HBV is one of the major cause of chronic liver disease with around 350 million people suffering from chronic HBV

infection such as chronic hepatitis, cirrhosis and hepatocellular carcinoma (HCC).[3] The prevalence of HBV infection varies markedly in different geographic areas of the world. On the basis of endemicity of HBV infection countries are classified into high (≥ 8%), intermediate (2-7%) or low (≤ 2%) incidence countries. Acc-ording to World Health Organization (WHO), the prevalence of hepatitis B surface antigen (HBsAg) among general population in India ranges from 0.1% to 11.7%, whereas, 1- 4.7% blood donors are reported to be HBsAg positive, therefore, our country comes under the intermediate to higher endemicity category.[4,5] Hepatitis B is a silent killer disease of the liver with many carriers not aware of their clinical status, therefore, they act as potential source of infection to other seronegative people.[6] In India, there are 40 million HBsAg carriers and every year about 1,00,000 people die due to illness related to HBV infection. HBV is highly infe-ctious and can be transmitted covertly by percutaneous routes and overtly by blood transfusion.[3] Definitive diagnosis of HBV infection is made on the basis of the findings of the serological testing. Hepatitis B virus surface antigen (HBsAg) is the earliest serological marker of active HBV infection (acute or chronic) being detectable even before elevation of liver enzymes and onset of clinical illness. Although, screening for HBsAg has been made mandatory, but still transfusion associated HBV infection is a major problem in India, as transmission can still occur during the initial window-period of an acute infection, or during late stages where virus is still present (HBV-DNA positive) although HBsAg is negative, the so-called occult hepatitis B infection (OB-I), false negative results, immunologically variant viruses and laboratory testing errors.[7-10] It has been demonstrated that some HBsAg negative donors who are positive for anti-HBc (antibody to hepatitis B core antigen) may harbour and maintain HBV-DNA sequences in their liver and blood, thus, representing potential sources of HBV transmission.[11] Thus, blood containing anti-HBc with or without detectable presence of HBsAg might be infectious. In many Western countries the presence of anti-HBc excludes blood donation. But, due to limited resources and the potential exclusion of too many blood donors, the anti-HBc screening is seldom practiced in low income countries like India which has high endemicity of HBV infection.[12] Data on burden of HBV infection in India come primarily from studies on HBsAg seroprevalence. Consequently, the assessment helps in determining the safety of the blood and blood products to be used as a life saving measure. Keeping the above facts in mind, the present study was conducted to evaluate the seropositivity of He-patitis B virus surface antigen (HBsAg) among indoor patients who make the bulk of our hospital and the blood donors who represent the general population in order to evaluate the prevalence of Hepatitis B infection in our region and also to compare the prevalence of HBV infection among voluntary and replacement blood donors.

Materials and methods: A hospital based cross-sectional study among indoor patients and blood donors attending a tertiary care hospital of North India was conducted over a period of 6 months from January to June 2016, to determine the prevalence of Hepatitis B virus surface antigen (HBsAg) among them. The study was approved by the Institutional Ethical Committee. An informed consent was taken from all indoor patients and blood donors included in the study prior to sample collection. Blood donors were screened for physical examination by the trained medical staff. A predesigned questionnaire was used to get the

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information regarding the demographic profile (age, sex, educati-onal status, occupation, socio-economic status and residence) of the patients and blood donors included in the study.

Inclusion criteria: Patients of all age group and both sexes who were admitted in various wards of this hospital and were advised to undergo testing for HBsAg either as part of routine pre-operative screening or for diagnostic purposes and all blood donors (both the voluntary and replacement blood donors), who were apparently healthy persons and qualified the donation criteria (age 18 to 60 years and having body weight more than 45 kg) an-d were advised for pre-transfusion screening for HBsAg were included in the study.

Exclusion criteria: Patients whose blood sample was not requested for screening for HBsAg and blood donors as well as patients who refused to give consent were excluded from the study.

Study subjects: A total of 2096 subjects were included in the present study comprising of 1769 indoor patients and 327 blood donors whose blood samples were taken for testing HBsAg.

Methods: Under aseptic precautions from each indoor patient and apparently healthy blood donor around 3 ml of venous blood was withdrawn in a well labeled plain vaccutainer tube. The blood was allowed to clot followed by centrifugation of the tube at 3000 rpm for 15 min to separate serum. The sera were screened for HBsAg by using rapid immunoassay test kit HEPACARD (J. Mitra & Company Private Limited, India) and HEPALISA (3rd generation enzyme linked immunosorbent assay (ELISA) method, manufactured by J. Mitra & Company Private Limited, India). The former was based on antigen capture or sandwich principle. The results were interpreted at 20 mins. Appearance of pink coloured line, in only control "C" region denoted that the sample was non-reactive to HBsAg, whereas, appearance of pink line one each in the test "T" region and control "C" region indicated that the sample was reactive for HBsAg. The HEPALISA is a solid phase ELISA based on direct sandwich principle. The microwells are coated with monoclonal antibodies with high reactivity for HBsAg. Acc-ording to manufacturer's instruction 100 µl negative control, 100 µl positive control and 100 µl samples were added in the respective wells followed by addition of 50 µl working enzyme conjugate and then the plate was covered and incubated in an incubator at 37ºC ± 1ºC for 60 minutes. The plate was then washed with working wash buffer followed by the addition of 100 µl working substrate solution in all the wells and the plate was covered and incubated at room temperature (20-25ºC) for 30 minutes in dark. Finally 100 µl stop solution was added to each well and the absorbance was read at 450 nm in an ELISA reader within 30 minutes. The Cut-off va-lue was calculated by formula: mean absorbance of Negative control (NC) + 0.1. All HBsAg positive blood un-its were immediately discarded.

Statistical analysis: The collected data was transferred to a computer. The SPSS Data Editor Software version 20 was used for analysis of the data. Chi-square test was performed and P value ≤ 0.05 were considered statistically significant.

Results: Out of 2096 subjects included in the study, 1769 were indoor patients and 327 were apparently healthy blood donors. Amongst indoor patients their mean age was 34.4 (± 16.6) years with 904 (51.1%) males and 865 (48-.9%) females. Out of 1769 indoor patients, 76 were found to be reactive and 1693 were non-reactive, hence, the prevalence of HBsAg was found to be 4.3% among indoor patients. The socio-demographic profiles of the ind-oor patients included in our study and their relation to HBsAg reactivity is shown in Tables 1-

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4. As shown in Table 1, majority of HBsAg reactive patients were young and belonged to age group 20-39 years (5.9%). This finding was statistically significant (p = 0.009). The HBsAg reactivity was found more among males (5.6%) as compared to females (2.9%), and seropositivity was more common among unmarried patients (9.7%) as compared to those who were married (4.0%). Both these findings were found to be statistically significant (p = 0.004 and p = 0.007 respectively). Table 2 showed that HBsAg seropositivity was more frequently seen in patients wi-th low level of education, such as, 7.8% among patients having education up to pre-primary, followed by 5.9% among illiterates. This finding was statistically significant (p = 0.002). As shown in Table 3, HBsAg seropositivity was more commonly found among patients who were either unskilled workers (8.1%) or unemployed (8.0%). This finding was statistically significant (p = 0.001). Table 4 showed that HBsAg reactivity was more frequent among patients who were poor and belonged to lower class socio-economically (5.5%), and more freq-uently amongst those who came from rural areas (5.3%) as compared to those who came from urban areas (2.8-%). Both these findings were found to be statistically significant (p = 0.024 and p = 0.014 respectively). Table 5 showed that HBsAg seropositivity was most frequently found among patients referred from TB & Chest ward (8.2%), followed by patients referred from Pediatrics ward (7.0%). However, this difference was found to be statistically insignificant (p = 0.173). Amongst 327 apparently healthy blood donors, with mean age 28.5 (± 8.0) years, 76 (23.2%) were voluntary donors (VD) and 251 (76.8%) were replacement donors (RD). Out of 327 donors, 3 (0.9%) were females and 324 (99.1%) were males. The socio-demographic profile of the donors is shown in Tables 6-8. Table 6 showed that majority of the VD belonged to age group 18-29 years (27.9%), whereas, majority of RD belonged to older age group i.e among 30-39 years (84.4%), and among 40-49 years (89.7%) were RD. This finding was found to be statistically significant (p = 0.038). All the VD were males, whereas, all the females were RD. This finding was statistically insignificant (p = 0.338). Majority of VD were unmarried (29.5%), whereas, RD were mostly mar-ried people (81.0%). This difference was found to be statistically significant (p = 0.026). As shown in Table 7, donors with good educational status were mostly VD (59.3% were educated up to high school and 59.1% were graduate and above), whereas, most of the RD were less educated (100% of illiterate donors and 81.9% of don-ors who were educated up to primary school were RD). Majority of professionals (63.6%) and students (58.3%) were VD, whereas, majority of RD comprised of housewife and unskilled workers (100% each) followed by se-mi skilled workers (80.1%). Both these findings were statistically highly significant (p < 0.001). As shown in Table 8, most of the VD belonged to urban areas (30.7%) as compared to RD who mostly belonged to rural are-as (80.1%). This finding was statistically significant (p = 0.033). It was found that majority of donors belonging to upper class socio-economically were VD (63.6%), whereas, most of the RD belonged to lower and middle cl-ass (100% and 68.7% respectively). This finding was found to be highly significant (p < 0.001). Out of 327 blood donors screened for HBsAg, 8 were found to be reactive and 319 were non-reactive, hence the prevalence of HBsAg among blood donors was found to be 2.4%. As shown in Table 9, the relationship of blood group of donors and HBsAg seropositivity was not found to be statistically significant (p = 0.960).

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Table 10 showed that majority of HBsAg seropositives were replacement donors (2.8%) as compared to voluntary donors (1.3%). How-ever, this difference was not found to be statistically significant (p = 0.466).

Table 1: Age group, sex and marital status of indoor patients and their relation with HBsAg reactivity (N = 1769).

Characteristics		HBsAg screening test			Chi-Square (χ^2) value & *p value
		Reactive N = 76 (4.3%)	Non-Reactive N = 1693 (95.7%)	Total N = 1769 (100%)	
Age group	0-19 years	6 (2.9%)	202 (97.1%)	208 (100%)	χ^2 = 13.435 df = 4 p= 0.009
	20-39 years	54 (5.9%)	869 (94.1%)	923 (100%)	
	40-59 years	14 (3.3%)	407 (96.7%)	421 (100%)	
	60-79 years	2 (1.0%)	202 (99.0%)	204 (100%)	
	80-99 years	0 (0.0%)	13 (100%)	13 (100%)	
Sex	Male	51 (5.6%)	853 (94.4%)	904 (100%)	χ^2 = 8.139 df = 1 , p=0.004
	Female	25 (2.9%)	840 (97.1%)	865 (100%)	
Marital Status	Married	58 (4.0%)	1378 (96.0%)	1436 (100%)	χ^2 = 9.997 df = 2 p = 0.007
	Unmarried	12 (9.7%)	112 (90.3%)	124 (100%)	
	# Not Applicable	06 (2.9%)	203 (97.1%)	209 (100%)	

* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of patients. # Patients with age < 18 years have been assigned as Not Applicable for the category of marital status.

Table 2: Educational status of indoor patients and their relation with HBsAg reactivity (N = 1769).

Educational status	HBsAg screening test			Chi- Square (χ^2) value & *p value
	Reactive N (%)	Non-Reactive N (%)	Total N (%)	
Graduate and above	0 (0.0%)	31 (100%)	31 (100%)	χ^2 = 18.609 df = 5 p = 0.002
High School	11 (2.3%)	472 (97.7%)	483 (100%)	
Primary	7 (2.4%)	286 (97.6%)	293 (100%)	
Pre-Primary	11 (7.8%)	130 (92.2%)	141 (100%)	
Illiterate	47 (5.9%)	755 (94.1%)	802 (100%)	
# Not Applicable	0 (0.0%)	19 (100%)	19 (100%)	
Total	**76 (4.3%)**	**1693 (95.7%)**	**1769 (100%)**	

* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of patients. # Patients with age < 7 years have been assigned as Not Applicable for the category of Educational status.

Table 3: Occupational profiles of indoor patients and their relation with HBsAg reactivity (N = 1769).

Occupational status	HBsAg screening test			Chi-Square (χ^2) value & *p value
	Reactive N (%)	Non-Reactive N (%)	Total N (%)	
Professionals	0 (0.0%)	16 (100%)	16 (100%)	χ^2 = 24.198 df = 7 p = 0.001
Skilled workers	6 (5.6%)	101 (94.4%)	107 (100%)	
Semi skilled workers	29 (6.4%)	424 (93.6%)	453 (100%)	
Unskilled workers	17 (8.1%)	194 (91.9%)	211 (100%)	
Unemployed	2 (8.0%)	23 (92.0%)	25 (100%)	
Student	4 (2.1%)	183 (97.9%)	187 (100%)	
Housewife	18 (2.5%)	699 (97.5%)	717 (100%)	
# Not Applicable	0 (0.0%)	53 (100%)	53 (100%)	
Total	**76 (4.3%)**	**1693 (95.7%)**	**1769 (100%)**	

* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of patients. # Patients with age < 18 years have been assigned as Not Applicable for the category of Occupational status. Those studying have been assigned in the student category.

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Table 4: Socio-economic status and residence of indoor patients and their relation with HBsAg reactivity (N = 1769).					
Characteristics		**HBsAg screening test**			**Chi-Square (χ^2) value & *p value**
		Reactive N = 76 (4.3%)	**Non-Reactive N = 1693 (95.7%)**	**Total N = 1769 (100%)**	
Socio-economic status	Upper Class	2 (2.0%)	96 (98.0%)	98 (100%)	$\chi^2 = 7.466$ df = 2 p = 0.024
	Middle Class	21 (3.0%)	683 (97.0%)	704 (100%)	
	Lower Class	53 (5.5%)	914 (94.5%)	967 (100%)	
Residence	Rural	56 (5.3%)	1008 (94.7%)	1064 (100%)	$\chi^2 = 6.071$ df = 1 p = 0.014
	Urban	20 (2.8%)	685 (97.2%)	705 (100%)	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of patients.					

Table 5: Distribution of indoor patients according to their wards and their relation with HBsAg reactivity (N = 1769).				
Wards	**HBsAg screening test**			**Chi-Square (χ^2) value & *p value**
	Reactive N (%)	**Non-Reactive N (%)**	**Total N (%)**	
Casualty	9 (5.8%)	146 (94.2%)	155 (100%)	$\chi^2 = 10.294$ df = 7 p = 0.173
ENT	6 (4.3%)	132 (95.7%)	138 (100%)	
Medicine	22 (6.1%)	341 (93.9%)	363 (100%)	
OBG	17 (3.4%)	484 (96.6%)	501 (100%)	
Orthopaedics	4 (2.9%)	136 (97.1%)	140 (100%)	
Pediatrics	4 (7.0%)	53 (93.0%)	57 (100%)	
Surgery	10 (2.7%)	356 (97.3%)	366 (100%)	
TB & Chest	4 (8.2%)	45 (91.8%)	49 (100%)	
Total	**76 (4.3%)**	**1693 (95.7%)**	**1769 (100%)**	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of patients. ENT = Ear, Nose & Throat ward. OBG = Obstetrics & Gynaecology ward.				

Table 6: Distribution of blood donors according to their age group, sex and marital status (N = 327).					
Characteristics		**Donor status**			**Chi-Square (χ^2) & *p value**
		Voluntary N = 76 (23.2%)	**Replacement N = 251 (76.8%)**	**Total N = 327 (100%)**	
Age group	18-29 years	61 (27.9%)	158 (72.1%)	219 (100%)	$\chi^2 = 8.451$ df = 3 p = 0.038
	30-39 years	12 (15.6%)	65 (84.4%)	77 (100%)	
	40-49 years	3 (10.3%)	26 (89.7%)	29 (100%)	
	50-59 years	0 (0.0%)	2 (100%)	2 (100%)	
Sex	Male	76 (23.5%)	248 (76.5%)	324 (100%)	$\chi^2 = 0.917$ df= 1 , p = 0.338
	Female	0 (0.0%)	3 (100%)	3 (100%)	
Marital Status	Married	37 (19.0%)	158 (81.0%)	195 (100%)	$\chi^2 = 4.931$ df = 1 p = 0.026
	Unmarried	39 (29.5%)	93 (70.5%)	132 (100%)	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of donors					

Table 7: Distribution of blood donors according to their education and occupational status (N = 327).					
Characteristics		**Donor status**			**Chi-Square (χ^2) & *p value**
		Voluntary N = 76 (23.2%)	**Replacement N = 251 (76.8%)**	**Total N = 327 100%)**	
Educational status	Graduate and above	13 (59.1%)	9 (40.9%)	22 (100%)	$\chi^2 = 1.187$ df = 3 p < 0.001
	High School	48 (59.3%)	33 (40.7%)	81 (100%)	
	Primary School	15 (18.1%)	68 (81.9%)	83 (100%)	
	Illiterate	0 (0.0%)	141 (100%)	141 (100%)	
Occupational Status	Professional	7 (63.6%)	4 (36.4%)	11 (100%)	$\chi^2 = 84.598$ df = 5 p < 0.001
	Skilled worker	33 (55.9%)	26 (44.1%)	59 (100%)	
	Semi skilled worker	29 (19.9%)	117 (80.1%)	146 (100%)	
	Unskilled worker	0 (0.0%)	97 (100%)	97 (100%)	
	Student	7 (58.3%)	5 (41.7%)	12 (100%)	

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	Housewife	0 (0.0%)	2 (100%)	2 (100%)	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of donors					

Table 8: Distribution of blood donors according to their residence and socio-economic status (N = 327).

Characteristics		Donor status			Chi-Square (χ^2) &*p value
		Voluntary N = 76 (23.2%)	Replacement N = 251 (76.8%)	TotalN = 327 (100%)	
Residence	Rural	45 (19.9%)	181 (80.1%)	226 (100%)	χ^2 = 4.548 df = 1 p = 0.033
	Urban	31 (30.7%)	70 (69.3%)	101 (100%)	
Socio-economic status	Upper Class	14 (63.6%)	8 (36.4%)	22 (100%)	χ^2 = 59.752 df = 2 p < 0.001
	Middle Class	62 (31.3%)	136 (68.7%)	198 (100%)	
	Lower Class	0 (0.0%)	107 (100%)	107 (100%)	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of donors					

Table 9: Distribution of blood donors according to their blood group and their relation with HBsAg reactivity (N = 327).

Blood Groups	HBsAg screening test			Chi-Square (χ^2) &*p value
	Reactive N (%)	Non Reactive N (%)	Total N (%)	
O +ve	2 (2.4%)	83 (97.6%)	85 (100%)	χ^2 = 1.491 df = 6 p = 0.960
A +ve	3 (3.8%)	76 (96.2%)	79 (100%)	
B +ve	3 (2.3%)	125 (97.7%)	128 (100%)	
AB +ve	0 (0.0%)	29 (100%)	29 (100%)	
O -ve	0 (0.0%)	3 (100%)	3 (100%)	
A -ve	0 (0.0%)	2 (100%)	2 (100%)	
AB -ve	0 (0.0%)	1 (100%)	1 (100%)	
Total	**8 (2.4%)**	**319 (97.6%)**	**327 (100%)**	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of donors				

Table 10: Distribution of donors according to their status and their relation with HBsAg reactivity (N = 327).

Donor Status	HBsAg screening test			Chi-Square (χ^2) & *p value
	Reactive N (%)	Non Reactive N (%)	Total N (%)	
Voluntary	1 (1.3%)	75 (98.7%)	76 (100%)	χ^2 = 0.530 df = 1 p = 0.466
Replacement	7 (2.8%)	244 (97.2%)	251 (100%)	
Total	**8 (2.4%)**	**319 (97.6%)**	**327 (100%)**	
* p < 0.05 was considered as statistically significant. df = degree of freedom. N = Number of donors				

Discussion

Hepatitis B virus (HBV) is a major cause of chronic liver disease such as cirrhosis of liver and hepatocellular carcinoma. Although the incidence of HBV infection has markedly reduced following mass Hepatitis B vaccination programs, the average prevalence of chronic HBV infection worldwide is still estimated at 6.6% (2.8% in developed countries and 7.6% in developing countries).[13] Since it is an important cause of transfusion transmitted infections (TTIs), hence, in order to provide safe blood and blood products, each blood unit has to be tested for Hepatitis B virus infection according to India's Drugs and Cosmetics Act (1945).[10] The seroprevalence of Hepatitis B virus infection can be estimated by detection of HBsAg in sera. Hence, the present study was done to detect prevalence of HBV in our local area by screening blood of indoor patients and blood donors attending our hospital. In our study, the prevalence of HBsAg among indoor patients was found to be 4.3%, with seropositivity more among males (5.7%) as compared to females (2.9%). This is similar to another study done in Rajasthan which reported prevalence of HBsAg in a hospital based population to be 4.13%, with higher prevalence among males (3.07%) as compared to females (1.06%).[14] One reason for

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this higher seroprevalence of HBsAg in males may be due to their higher exposure to HBV risk factors. Another reason could be that the plasma disappearance rate of HBsAg in males is lower than in females.[15,16]In our study majority of HBsAg seropositive patients belonged to age group 20-39 years (5.9%), with less sero-positivity detected among patients of lower age group of 0-19 years (2.9%) and among older patients belonging to age group 60-79 years (1.0%). This is in agreement to another study which detected lower prevalence of HBV infection among children 0–15 years of age (1.8%), while it significantly increased among the age groups of 25–34 years & 35–44 years (36.2% and 24.2% respectively) and it dropped again in older ages (7.9%).[17]In our study, HBsAg seropositivity was more common among unmarried patients (9.7%) as compared to those who were married (4.0%). This could be due to more involvement of unmarried individuals in risky sexual behaviours. In our study, majority of seropositives were poor and belonged to lower class socio-economically (5.5-%). However, this is in contrast to another study in which majority of seropositives belonged to upper class socio-economically.[18] In our study, majority of seropositive patients were found to have lower level of education and were unskilled workers or unemployed and belonged to rural areas (5.3%) as compared to those who came from urban areas (2.8%). This finding is similar to another study which also reported higher prevalence of HBV infection among illiterates, skilled workers and people belonging to rural areas (1.4%) as compared to urban are-as (1.0%).[18] The possible reason for this could be that amongst the various mode of transmission of this virus, a very important mode is the use of unsafe injection practice which is very prevalent among vast rural areas of the country, where treatment is provided by unqualified medical practitioners who seldom follow proper sterilizat-ion procedures.[19]In our study, 327 blood donors were screened for HBsAg and the seroprevalence amongst donors was found to be 2.4%. This is similar to previous done studies from Kanpur and Delhi which reported prevalence of HBsAg among blood donors to be 2.45% and 2.23% respectively.[20,21] In our study, all the HBsAg reactive donors were males. This is similar to another study from Tamil Nadu, which also reported that all seropositive donors were males.[12] In our study, majority of HBsAg seropositives were replacement donors (2.8%) as compared to volunt-ary donors (1.3%). This is similar to previous done studies which also reported higher seroprevalence of HBsAg among replacement donors (2.69% & 1.2% respectively) as compared to voluntary donors (1.94% & 0.68% respectively).[5,22] This high seroprevalence among replacement donors could be explained on the basis of the findings of our study which showed that the replacement donors were frequently found to be less educated, unskilled workers and belonging to rural areas. The rural population with lower literacy rate and lack of awar-eness about the disease and its mode of prevention may be the reasons for showing more prevalence rate among them.[23] In our study, an attempt was made to find association between blood group of donors and HBsAg sero-positivity. It was found that majority of seropositives belonged to blood group O +ve (2.4%) followed by B +ve (2.3%), the difference though was statistically not significant. Similar results of statistically insignificant association between blood group and HBsAg reactivity was found in previous done studies which showed highest seroprevalence of HBsAg in blood group B +ve (4.8% & 2.39%)

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respectively, and lowest in blood group A +ve (0.0%) & AB +ve (1.90%) respectively.[12,20]

Conclusion:

To conclude, Hepatitis B vaccination is the most efficient method to prevent HBV infection and its implement-tation in Universal immunization programme has resulted in lower prevalence of infection among children as seen in our study. Further reduction in the prevalence can be achieved by an active governmental, educational and media campaign about the risks of HBV infection, routes of transmission and methods of protection. Meth-ods of ensuring safe blood collection and supply should be encouraged. Screening of blood donors for sensitive infectious markers to improve carrier detection rate will further help improve the quality of blood stored in blood banks thus preventing transfusion transmitted infections (TTIs). Further reduction in seroprevalence among voluntary donors requires an effective donor education and high quality selection programme especially during big blood donation camps. Considering the low prevalence in women, they could be encouraged to donate blood voluntarily. Increase in proportion of women in blood donors can minimize transmission of HBV by transfusion.

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