ORIGINAL ARTICLE

SEROPREVALENCE OF HEPATITIS B AND C INFECTION AMONG BLOOD DONORS IN VIJAYPUR DISTRICT KARNATAKA: A COMPARATIVE STUDY

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ABSTRACT: BACKGROUND: Hepatitis B infection has become one of major health problems worldwide. It causes approximately 1-2 million deaths per year worldwide. India has a population of more than 1.2 billion and comprises of 43 million people positive for hepatitis B virus(HBV) and 15 million people positive for hepatitis C virus(HCV). HBV and HCV infections are significant health problems that might be associated with cirrhosis of liver and hepatocellular carcinoma. **AIMS:** The present study was undertaken to know the seroprevalence of HBV and HCV and to compare seroprevalence of HBV and HCV among blood donors of Bijapur district, Karnataka. **MATERIALS AND METHODS**: This retrospective study was conducted over a period of 2 years, 6 months from July 2011 to December 2013. A total 7, 018 blood donors of both sexes were selected. 5ml of blood was collected in a plain, sterile bottle. Sera was separated by centrifugation and analyzed by enzyme-linked immunosorbant assay and alternatively by rapid assays at blood bank of BLDE Shri B. M. Patil Medical College, Hospital and Research Centre Vijaypur. **RESULTS:** We screened total 7, 018 blood donors out of which 5, 936 (84.6%) were males and 1, 082 (15.41%) were females. Hepatitis B was more prevalent 2.2%, 2.6%and 1.5% compared to hepatitis C infection i.e., 00%, 0.37% and 0.37% among blood donors in years 2011, 2012 and 2013 respectively. The seroprevalence of hepatitis B infection (6.3%) was much more higher than hepatitis C (0.74%) among the blood donors. **CONCLUSION:** By this study we concluded that the seroprevalence of hepatitis B infection is more than hepatitis C infection and both HBV and HCV infections are common serious complications of blood transfusion. Appropriate vaccination, motivation and creating awareness among both rural and urban population about transfusion transmissible infection would lead to an effective control of transfusion transmissible infections**.**

KEYWORDS: Seroprevalence, Hepatitis B infection, Hepatitis C infection, Blood Donors, enzyme-linked immunosorbant assay**.**

INTRODUCTION: Hepatitis B infection has become one of major health problems worldwide. Hepatitis B causes an estimated 1-2 million deaths per year worldwide.[1,2] It is estimated that there are 300 million carriers of hepatitis B virus (HBV) in the world. Countries are classified on the basis of endemicity of HBV infection. Highest carriers are in equatorial Africa 8% or more and in South East Asia, China, parts of South America; intermediate (2-7%) in Eastern Europe, middle East, South Asia. Carrier rate is low (<2%) in developed countries.[1] The prevalence of chronic hepatitis B infection in India ranges from 2-10% as shown by different studies. The data

providing a picture of hepatitis B infection burden in India has come from HBsAg seroprevalence studies along with advanced technology such as nucleic acid testing (NAT) for donor screening, other factors such as public awareness, educational and motivational programs, and mass immunization programs that help in decreasing the hepatitis B infection.[2]

The evaluation of data of prevalence of transfusion transmitted infections like hepatitis B, hepatitis C virus(HCV) and HIV infections, among blood donors permits an assessment of the acquisition of the infections in the blood donor population and consequently the safety of the collected donations. It can also give an idea for the epidemiology of these transfusion transmitted infections among community.[3] India has a population of more than 1.2 billion in that 43 million people are positive for HBV and 15 million are HCV-positive people.[4] HCV screening test is mandatory which was started from June 2001 as there was an increasing seroprevalence of HBV about 1.28 to 1.66% and HCV 0.28 –to 0.35% % in blood donors of Kolkata in between 2004 to 2005.[5] HCV continues to be a major disease burden in the world. In 1997, WHO estimated a worldwide prevalence of about 3% with the virus affecting 170 million people worldwide and 3 to 4 million new infections each year.[6]

MATERIALS AND METHODS: The present study was undertaken to know the seroprevalence of hepatitis B and hepatitis C and to compare seroprevalence of HBV and HCV among blood donors. This retrospective study was conducted over a period of 2 years 6 months from July 2011 to December 2013 at Blood Bank of BLDE University, Shri B M Patil Medical College, Hospital and Research Centre Vijaypur**,** Karnataka, India. A total of 7,018 voluntary and replacement blood donors were selected. Voluntaries of both male and female donors from blood donation camps of urban and rural population and also replacement donors of Vijaypur district Karnataka were included in this study.

In this retrospective study we reviewed all 7,018 healthy blood donors over a period of 2 years 6 months and they were carefully selected for donation by trained personnel after a complete physical and vital parameters examination.

Sample collection: 5ml blood was collected from each donor into plain, sterile bottle following informed consent. Blood samples were centrifuged and sera separated analyzed by enzyme-linked immunosorbent assay (ELISA ERBA Chemical kit) and alternatively by simple or rapid assays (Tri dot J. MITRA) samples were used for analyzing antibodies to HIV and HCV by ELISA. Results were computed. For testing VDRL, TRANSASIA Rapid TP Instate TP Card and for Malaria parasite SD Malaccan Card is used.

INCLUSION CRITERIA:

1. Donors weighing more than 50kg free from previous blood donations for a period of three months intervals with normal blood pressure, pulse and afebrile were included.
2. Donors of the age group of 18-60 years were taken.

EXCLUSION CRITERIA:

1. Donors weighing less than 45 kg for males and less than 50 kg for females, previous blood donations period of less than three months interval and recent history of surgery within 6 months and medication within 72hours were excluded.
2. Donors below 18 years and more than 60 years of age were excluded.

Ethical clearance of the study was obtained from Institutional Ethical Committee.

RESULT: In our study we screened total 7,018 blood donors out of which 5,936 (84.6%) were males and 1,082 (15.41%) were females, compared to female donors male donors were predominant (Table 1). The trend in seroprevalence which we observed in this study was that seroprevalence of HBV was higher in male donors i.e. 138 than in female donors (only one female donor positive for HbsAg). HCV was also higher in male donors than in female donors i.e. 22 male donors and only 03 female donors. We also found that hepatitis B was more prevalent i.e. 2.2%, 2.6% and 1.5% compared to hepatitis C infection i.e., 00%, 0.37% and 0.37% in years 2011, 2012, 2013 respectively.

The total seroprevalence of hepatitis B infection (6.3%) was much higher than hepatitis C (0.74%) among blood donors (Table 2 & 3). In that the majority of the seropositive donors were younger than 40 years of age, 112 donors were younger than 35 years of age and 27donors were above 40 years.

DISCUSSION: In our study, female donors were less in number compared to male donors among whom HBsAg was more prevalent than HCV and also noted that maximum number of donors were between age group of 20-40 years.

Alter MJ and Villano SA et al in their study mentioned that among the viral hepatitis, HCV is most dangerous as its morbidity rate is high because it establishes a state of chronic infection in as many as 85% of acutely infected patients whereas about only 15% of acutely infected cases spontaneously clear the infection.[7, 8]

Jutavijittum P et al reported in their study that the seroprevalence of HBsAg positive blood donors was 8.7%, and it was more prevalent among males (9.7%) than in females (6.2%) and the prevalence of anti-HCV positive blood donors was 1.1%, males (1.1%) and females (1.0%). There was no significant difference between male and female donors and they also reported that HBsAg was more prevalent than HCV.[9]

According to study of Jutavijittum P et al, in our study we also observed that seroprevalence of Hepatitis B was much higher than hepatitis C infection (6.3%) and (0.74%) in males than in females respectively.

Karki S et al in their study reported that the seroprevalence of hepatitis B infection was high in male donors as compared to female donors, but in their study the majority of blood donors were males. The statistical analysis shows significant difference in the seroprevalence of hepatitis B infection (p value = 0.024).[10] In our study male donors were predominant i.e. total 5, 936 compared to female donors 1, 082. We also observed a higher seroprevalence rate among male donors than in female blood donors.

According to the study of Long HT et al seroprevalence of hepatitis B and C risk was variable as sex wise, men were having a higher risk of hepatitis B infection than women. They also demonstrated a high prevalence of anti-HBc i.e. 51.7% in the study area.[11] We also observed a higher rate positivity of HBsAg and HCV among male donors than in female blood donors but prevalence of HCV (0.74%) lesser than positivity of HBsAg.

Tiwari B R et al screened total donors of 5, 351 in Morang (Biratnagar) Blood Transfusion Service, in whom 4, 537 were males and 814 were females. Among them 47 donors were found seropositive for HBV giving the seroprevalence of 0.87%. The HBV seroprevalence in male donors was 0.96% and in female donors was 0.36%. The seroprevalence of HCV was found 0.26% all of whom were males. The difference in seroprevalence for HBV and HCV was statistically significant ($P< 0.0001$). [12]

In our study we screened total 7,018 blood donors. 5,936 were males and 1,082 were females. The trend in seroprevalence over 2 years 6 months study we observed that seroprevalence of HBV was higher in male donors i.e. 138 than in female donors. We found only one female donor positive for HbsAg. HCV was also higher in male donors than in female donors, 19 male donors were positive for HCV and only 03 female donors were positive for HCV.

Also we found that hepatitis B was more prevalent (2.2%, 2.6%and 1.5%) than hepatitis C infection (00%, 0.37% and 0.37%) in years 2011, 2012 and 2013 respectively.

Ibrahem A et al in their study included a total of 3,192 donors. They concluded that prevalence of HbsAg was found to be 3.0% and the prevalence of HCV was found to be 18.7%. Blood donors with positive HBV markers showed significant association with increased age, in married subjects, lower educational level, and family history of HBV infection and lack of immunization. However, there was no significant association with history of exposure to high-risk procedures. And they also found HBsAg positivity higher in age groups 30–39 years compared to the youngest age group.

Rodents et al, reported in their study higher prevalence of HBsAg in donors older than 38 years. [13, 14]

In contrast to Ibrahem A et al and Rodents et al in our study we found seroprevalence of HBsAg and HCV higher in younger than 40years of age group (112 donors were younger than 35 years of age or less) and HbsAg was more prevalent than HCV infection.

Acccording to study of Chandrasekaran S et al in our study we also found significantly higher seroprevalence of HBsAg among males compared to female donors.[15]

Bommanahalli B et al screened total of 19,413 blood donors from January 2005 to December 2009. In their study the seroprevalence of hepatitis B was 2.12% and hepatitis C infection was 0.1% respectively.

Das BK et al screened 3, 745 blood donors. Majority (90.95%) were male donors of 18 to 39 years age group. Prevalence of HBV was higher than HCV, and also they noticed higher prevalence of hepatitis B among 40 to 49 years (2.25%) and 18 to 29 years (1.86%) age group accordingly.[16, 17]

According to study of Bommanahalli B et al in our study we screened total 7,018 blood donors (5,936 were males and 1,082 were females) from July 2011 to December 2013 and we reported the seroprevalence of Hepatitis B (6.3%) and Hepatitis C infection (0.7%) respectively.

In contrast Das BK et al, in our study majority of the donors were younger than 40 years of age. 112 donors were younger than 35 years of age or less, and 27donors were above 40 years.

Chattopadhyay S et al mentioned in their study that in India, detection of HBV infection among blood donors is routinely carried out by HBsAg screening, while detection of anti-HBc is rarely done and in contrast to HBV, about 20 to 40% of HCV infection are acute and majority of them progress to chronic infection. Also long term risk of developing cirrhosis and hepatocellular carcinoma is greater in HCV infected individuals compared to infected with HBV in Indian studies. So we undertook this study, to know the seroprevalence of HBsAg and HCV infections among blood donors and as it also helps in effective control of these transfusion transmissible infections among community. [18]

CONCLUSION: By this research finding we concluded that the seroprevalence of hepatitis B infections is more than hepatitis C infection. Both hepatitis B and C virus infections are common serious complications of blood transfusion. Appropriate vaccination, motivation and creating awareness among both in rural and urban population about transfusion transmissible infection would lead to an effective control of these infections**.**

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STATISTICAL ANALYSIS:

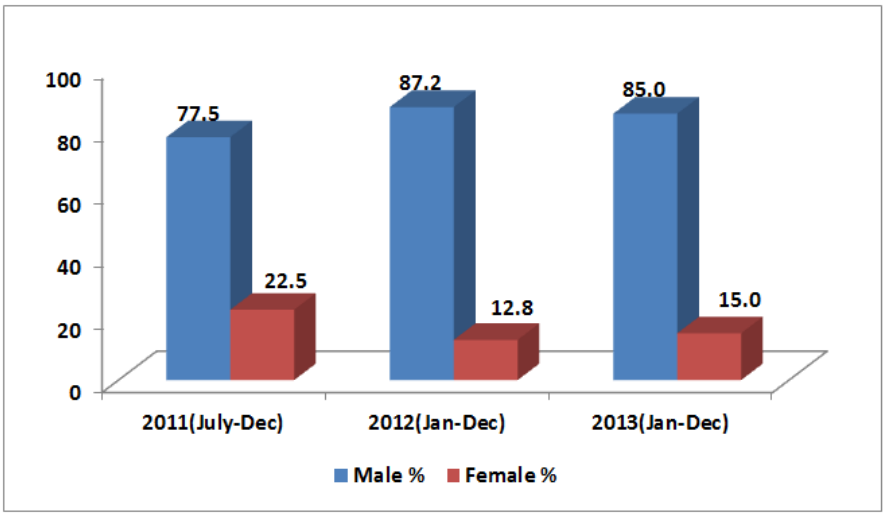

Fig. 1: Percentage of blood donors during 1-7-2011 to 31-12-2013

Above figure shows the distribution of male and female blood donors. It is evident here that proportion of males is three times more than females in 2011 while this rose to more than five times in 2012 and 2013.

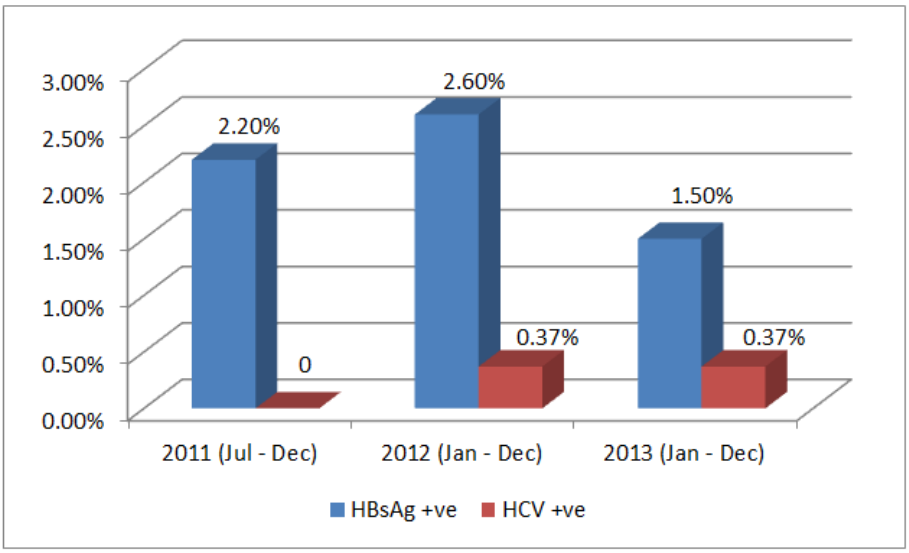

Fig. 2: Percentage of prevalence of HBsAg and HCV during 1-7-2011 to 31-12-2013

Above figure shows the comparison between the incidence of HbsAg positive and HCV positive cases among blood donors. It shows that the incidence of HbsAg positive cases is twice that of HCV positive cases.

Study period	Total donors	Male donors	Female donors
2011(July to Dec)	1113	863	250
2012(Jan to Dec)	2422	2111	311
2013(Jan to Dec)	3483	2962	521
Total: 2 years, 6 months	**7,018**	**5,936**	**1,082**

Table 1: Showing distribution of donors according to sex

Study period	HBsAg positive		Total	Percentage
	Male donors	Female donors		
2011(July to Dec)	24	00	24	2.2%
2012(Jan to Dec)	62	01	63	2.6%
2013(Jan to Dec)	52	00	52	1.5%
Total	**138**	**01**	**139**	**6.3%**

Table 2: Showing seroprevalence of HBsAg infection among male and female donors

Study period	HCV positive		Total	Percentage
	Male donors	Female donors		
2011 (July to Dec)	00	00	00	00%
2012 (Jan to Dec)	07	02	09	0.37%
2013 (Jan to Dec)	12	01	13	0.37%
Total	**19**	**03**	**22**	**0.74%**

Table 3: Showing seroprevalence of HCV infection among male and female donors

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