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Prevalence And Trends of Markers of Hepatitis B Virus, Hepatitis C Virus And Human Immunodeficiency Virus in Jamshedpur Blood Donors : A Hospital Based Study.

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Abstract: *Transfusion transmitted infections (TTIs) are a major problem associated with blood transfusion practices. A 3 years retrospective study from 2014 to 2016 was conducted at the blood bank of M.G.M. Medical College Hospital, Jamshedpur, India. Donors were evaluated for the prevalence of HBS Ag. HCV and HIV. A total of 12783 healthy blood donors were tested, out of which 12643 (98.90) were replacement donors and 134 (1.04) were voluntary donors. The proportion of voluntary donors was significantly low. Male formed the bulk of the donor population (97.08%). The prevalence of HBS Ag, HCV and HIV was 1.00% (ranging from 1.33 in 2014 to 0.70% in 2016) 0.28% (ranging from 0.38% in 2014 to 0.21% in 2016), 0.34% (ranging from 0.44% in 2014 to 0.26% in 2016) respectively. For all three major TTIs, we found a decreasing trend in the prevalence of HBS Ag, HCV and HIV. We suggest the need to stress more stringent donor selection criteria with emphasis on non-remunerated voluntary donation to ensure a safer blood supply.*

Keywords: *Transfusion transmitted infection (TTIs), HCV, HIV and HBS Ag.*

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I. Introduction

Hepatitis C Virus (HCV), human immunodeficiency virus (HIV) and Hepatitis B Virus (HBV) are the three most important agents responsible for transfusion transmitted infections (TTIS). The past several decades have witnessed great advances in techniques of detecting these TTIS with the advent of nucleic acid amplification techniques (NAT), Western countries have decreased the risk of TTIs to a major extent. Despite this dramatic progress, India is far from achieving a "zero risk" blood supply. The safety of the blood supply is compromised as the country depends heavily on replacement donors and the escalating costs of medical care make the desired result still more difficult to obtain. In the present study we attempted to assess the prevalence of markers of HCV, HIV and HBV in our donor population and their trend over a 3 year period (2014-2016).

II. Materials and method

In this retrospective study, we reviewed 12783 healthy blood donors, over a period of 3 Years (2014-2016) from the record of the blood bank of Mahatma Gandhi Memorial Medical College and Hospital, Jamshedpur, Jharkhand. The replacement donors were family members, friends and relatives of the patients concerned. Donors were selected and screened thoroughly, as per the guidelines of the Gazette of India. Professional blood donors and those with previous history of jaundice were excluded.

All the 12783 donors serum samples were screened for HBV, HCV and HIV. Hepatitis B Surface antigen (HBS Ag) was screened using third-generation ELISA Kits, with reported sensitivity and specificity of 100% each. HCV was screened using third generation ELISA Kits with reported sensitivity and specificity of 100% and 97.4% respectively. HIV was screened by third generation ELISA kits with reported sensitivity and specificity of 100% each. Tests were performed according to the manufactures instructions. All reactive samples were repeated in duplicate. Repeat reactive seras were labeled as ELISA positive case. Out of total 12783 blood donors 12410 were male (97.08%) and 373 (2.91%) were female. In the evaluation of data, we found that out of the 12783 healthy blood donors, 12643 (98.90%) were replacement donors and 134 (1.04%) were voluntary donors. The total number of blood donations in the blood bank showed a progressive increase from 3852 donors in 2014 to 4563 donors in 2016. On statistical analysis, the proportion of voluntary donors was found to be significantly low.

III. Results

We evaluated the annual prevalence of HCV, HIV and HBS Ag in the blood donors at our tertiary care center. The prevalence of HBS Ag was observed to range from 1.33 in 2014 to 0.70 in 2016, and HCV

prevalence was 0.38 in 2014 and 0.21 in 2016. HIV prevalence was 0.44 in 2014 and 0.34 in 2016. For all major TTIs there was a decreasing trend in the prevalence over 3 years. The decreasing trend of prevalence was significant for HCV, but not for HIV and HBS Ag. The Overall prevalence of HCV, HBS Ag and HIV in the donor population of our study group was 0.28, 1.00 and 0.34, respectively.

Table 1 : Total Blood Collection and Sex Distribution of Donor.

Years	Total Donors	Replacement No. (%)	Volunteer No. (%)	Males No. (%)	Females No (%).
2014	3852	3822 (99.22)	30 (0.77)	3740 (97.09)	112 (2.90)
2015	4368	4318 (98.85)	44 (1.00)	4245 (97.18)	123 (2.81)
2016	4563	4503 (98.68)	60 (1.31)	4425 (96.97)	138 (3.02)
Total	12783	12643 (98.90)	134 (1.04)	12410 (97.08)	373 (2.91)

Table 2 : Prevalence of HBSAG, HCV and HIV in Blood Donors.

Years	Total Donors	HIV Positive No. (%)	HBS Ag No. (%)	HCV Positive No. (%)
2014	3852	17 (0.44)	61 (1.33)	15 (0.38)
2015	4368	15 (0.35)	40 (0.91)	12 (0.27)
2016	4563	12 (0.26)	27 (0.70)	10 (0.21)
Total	12783	44 (0.34)	128 (1.00)	37 (0.28)

IV. Discussion

The ideal sample for any sero prevalence study is a sample from the general population. However, this being not always feasible, prevalence among healthy blood donors is often used. As the blood donor population is usually made up of young adults, such a study is not able to estimate prevalence in the children and the elderly. Replacement donors constitute the largest group of blood donors. In our study 98.90% of donors were replacement donors (2). In a study by singh et al, 82.4% of their donors were replacement donors (3), and in Kakkar et al (4) 94.7% of donors were replacement donors. This probably reflects a basic lack of awareness in the general population, the presence of misconceptions and fears associated with donating blood, the lack of health education and indifferent attitude of health sector. In the existing set-up, voluntary donations are very few. The need to shift the burden to voluntary blood donation cannot be overemphasized. A large scale multidisciplinary approach towards enhancement of voluntary donations needs to be undertaken by the government.

Our study also estimated the seroprevalence of three Major TTIs in our blood donor population. In our study seroprevalence of HCV was 0.28 (ranging from 0.38 in 2014 to 0.28 in 21016). The wide variations of HCV seroprevalence in different studies might be due to the use of different generation of ELISA test kits, having different sensitivities and specificities (6-14). Garg et al (6) reported an HCV prevalence of 0.28% in blood donors in Western India. Sood et al (8) reported a prevalence as high as 2.4% in Delhi. Kour et al (11) reported an HCV prevalence of 0.78%. Singh et al (13) documented 0.5%. HCV seroprevalence while Jain et al (12) reported a prevalence of 1.5% in New Delhi's voluntary blood donor. Prevalence of HBS Ag in our blood donor population was found to be relatively higher (1.00%). India has been placed in the intermediate zone of prevalence of hepatitis B by the World Health Organization (2-7% Prevalence rate)(18). Lodla et al (19). reported a prevalence rate of 1.2%. HBS Ag prevalence in Punjab blood donors was reported to be 1.7% (11) while that in Rajasthan was 3.44% (6) Singh et al (13) reported a prevalence of 1.8% where as Joshi and Ghimere (22) reported a prevalence of 2.71% in healthy Nepalese Males.

Our study is in general agreement with studies by Choudhary et al (21) and Joshi and Ghimere(22). India is still in the intermediate prevalence zone for HBS Ag Carriers. For HIV, India is second only to South Africa in terms of overall number of people living with HIV. The Indian National AIDS Control Organisation (NACO) suggested an overall prevalence of 0.91% in India. West Indian has reported an HIV sero prevalence of 0.47% (5). While that in Punjab is 0.26 (11). Sonwane et al (7) reported a prevalence of 1.83% in rural population. Globally, the highest prevalence of HIV has been reported in Subsaharan Africa, at 7.4%. The present study showed an HIV seroprevalence of 0.34% (ranging from 0.44% in 2014 to 0.26% in 2016)

V. Conclusion

In our retrospective study (2014 to 2016) of 12783 healthy blood donors at a tertiary care centre in Jamshedpur, Jharkhand, we estimated overall prevalence of HCV, HBS Ag and HIV to be 0.28, 1.00 and 0.34% respectively. Methods to ensure a safe blood supply should be encouraged. There should be centralized blood collection systems having better personnel and equipment, and non-remunerated voluntary blood donations must be strongly encouraged. All this, however, requires strong political commitment and multi sectional engagement.

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