**Short Communication**

Prevalence and Trends of Markers of Hepatitis C Virus, Hepatitis B Virus and Human Immunodeficiency Virus in Delhi Blood Donors: A Hospital Based Study

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**SUMMARY:** Transfusion transmitted infections (TTIs) are a major problem associated with blood transfusion practices. A 4-year retrospective study from 2002 to 2005 was conducted at the blood bank of Lady Hardinge Medical College and associated hospitals in New Delhi, India. Donors were evaluated for the prevalence of HCV, HBsAg and HIV. A total of 28,956 healthy blood donors were tested, out of which 28,805 (99.48%) were replacement donors and 151 (0.52%) were voluntary donors. The proportion of voluntary donors was significantly low ($P < 0.001$). Males formed the bulk of the donor population (97.24%). The prevalence of HCV, HIV and HBsAg was 0.66% (ranging from 1.01% in 2002 to 0.29% in 2005), 0.56% (ranging from 0.70% in 2002 to 0.44% in 2005) and 2.23% (ranging from 2.42% in 2002 to 1.97% in 2005), respectively. For all three major TTIs, we found a decreasing trend in the prevalence over the past 4 years. The decreasing trend of HCV prevalence was significant ($P < 0.001$), but the same was not true for HIV and HBsAg. We suggest the need to stress more stringent donor selection criteria with emphasis on non-remunerated voluntary donations to ensure a safer blood supply.

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 technique (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 trends over a 4-year period (2002 - 2005).

In this retrospective study, we reviewed 28,956 healthy blood donors, over a period of 4 years (2002 - 2005), from the records of the blood bank at Lady Hardinge Medical College and associated hospitals. The replacement donors were family members, friends or relatives of the patients concerned. Donors were selected and screened thoroughly, as per the guidelines of the Gazette of India (1). Professional blood donors and those with previous history of jaundice were excluded.

All the 28,956 donor serum samples were screened for HBV, HCV and HIV. Hepatitis B surface antigen (HBsAg) was screened using third-generation ELISA kits (Hepalis; J. Mitra and Co. Pvt. Ltd., New Delhi, India), with reported sensitivity and specificity of 100% each (as per the manufacturer’s manual). HCV was screened using third-generation ELISA kits (HCV microlisa; J. Mitra) with reported sensitivity and specificity of 100% and 97.4%, respectively. HIV was screened by third-generation ELISA kits (HIV microlisa; J. Mitra) with reported sensitivity and specificity of 100% each. Tests were performed according to the manufacturer’s instructions. All reactive samples were repeated in duplicate. Repeat reactive sera were labeled as ELISA positive cases.

Data retrieved was tabulated annually and statistical evaluation was performed using Biostatistic software version 0.13.

Out of the total 28,956 blood donors, 28,156 were males (97.24%) and 800 (2.76%) were females (male:female ratio, 35.2:1) (Table 1). In the evaluation of data, we found that out of the total 28,956 healthy blood donors, 28,805 (99.48%) were replacement donors and 151 (0.52%) were voluntary donors. The total number of blood donations in the blood bank showed a progressive increase from 6,855 donors in 2002 to 7,571 donors in 2005 (Table 1). On statistical analysis, the proportion of voluntary donors was found to be significantly low ($P < 0.001$).

We evaluated the annual prevalence of HCV, HIV and HBsAg in the blood of donors at our tertiary care center. The prevalence of HBsAg was observed to range from 2.42% in 2002 to 1.97% in 2005. Anti-HCV prevalence was 0.101% in 2002 and 0.29% in 2005. HIV prevalence was observed to range from 0.70% in 2002 to 0.44% in 2005. For all three major TTIs, there was a decreasing trend in the prevalence over 4 years (Table 2). The decreasing trend of prevalence

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was significant for HCV (P < 0.001), but not for HIV and HBsAg. The overall prevalence of HCV, HBsAg and HIV in the donor population of our study group was 0.66, 2.23 and 0.56%, respectively (Table 2).

The ideal sample for any seroprevalence 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 prevalences in the children and the elderly.

In the present study, an analysis of the donor profile, and estimations of the prevalence of HCV, HIV and HBV were attempted.

Replacement donors constitute the largest group of blood donors in India (2). In our study, 99.48% of the donors were replacement donors. In a study by Singh et al., 82.4% of their donors were replacement donors (3); 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 the indifferent attitude of the health sector. In the existing Indian set-up, voluntary donations are few. The need to shift the burden to voluntary blood donations cannot be overemphasized. A large-scale multidisciplinary approach towards enhancement of voluntary donations needs to be undertaken by the government of India.

Our study also estimated the seroprevalence of three major TTIs in our blood donor population. The prevalence of HCV in our study was 0.66% (ranging from 1.01% in 2000 to 0.29% in 2005). The wide variations of HCV seroprevalence in different studies in India (6-14) might be due to the use of different generations of ELISA test kits, having different sensitivities and specificities. 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 2.5% in Delhi. Kaur 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 1.57% in New Delhi’s voluntary blood donors. Internationally, various studies (15-17) have reported an HCV prevalence range of 0.42 to 1.2%.

Prevalence of HBsAg in our blood donor population was found to be relatively higher (2.23%). India has been placed in the intermediate zone of prevalence of hepatitis B by the World Health Organization (2-7% prevalence rates) (18). Lodha et al. (19) reported a prevalence rate of 1-2% in India. HBsAg 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% whereas Joshi and Ghimere (22) reported a prevalence of 2.71% in healthy Nepalese males.

On the other hand, the prevalence of HBV infection is lower in the United States and Western Europe (0.1-0.5%) and is reported to be higher, 5-15%, in Southeast Asia and China (20). Our study is in general agreement with studies by Chowdhury et al. (21) and Joshi and Ghimere (22). India is still in the intermediate prevalence zone for HBsAg and has been estimated to be home to over 40 million HBsAg carriers (23). Despite the fact that a safe and effective vaccine has been available since 1982 (24), the HBsAg prevalence in India remains high. This is mainly because hepatitis B vaccination is not a part of our national immunization program.

For HIV, India is second only to South Africa in terms of overall number of people living with HIV. The Indian National AIDS Control Organization (NACO) suggested an overall prevalence of 0.91% (2005) in India and 0.25% in Delhi (25,26). West India has reported an HIV seroprevalence 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 Sub-Saharan Africa, at 7.4%. The present study showed an HIV seroprevalence of 0.56% (ranging from 0.70% in 2002 to 0.44% in 2005).

In conclusion, in our retrospective study (2002-2005) of 28,956 healthy blood donors at a tertiary care center in Delhi, India, we estimated overall prevalences of HCV, HBsAg and HIV to be 0.66, 2.23 and 0.56%, respectively. TTIs have a profound multidimensional impact on the development of countries. Methods to ensure a safe blood supply should be encouraged. There should be centralized blood collection systems having better personnel and equipment, and non-renumerated voluntary blood donations must be strongly encouraged. All this, however, requires strong political commitment and multisectorial engagement.

REFERENCES