

**Original Research Article****Prevalence of transfusion transmissible infections among blood donors in a tertiary healthcare centre – A five year study**

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**Abstract**

Blood transfusion is an important mode of transmission of infections to recipients. This retrospective research over a period of five years is conducted to provide a baseline data on the prevalence of hepatitis B virus (HBV), human immunodeficiency Virus (HIV), hepatitis C virus (HCV), syphilis and malaria among blood donors referred to a tertiary healthcare centre and teaching hospital in Southern Karnataka, India. Out of 14,257 donors the prevalence of HIV, HBV, HCV and syphilis was 0.098%, 0.10%, 0.32% and 0.147% respectively. No donors were found to be positive for malaria. In conclusion, this study emphasizes the need for promoting voluntary blood donations to ensure that the donors are free from transfusion transmissible infections.

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**Keywords:** Blood transfusion; Blood donor; Human immunodeficiency virus; Hepatitis B Virus; Hepatitis C Virus

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**1. Introduction**

Epidemiological studies world-wide show wide variations in the prevalence patterns of hepatitis B, human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infection.<sup>1</sup> Globally a total of 39.5 million were living with HIV in 2006, of whom approximately 5.7 million were in India.<sup>2</sup> In India, approximately 1.8% to 2.5% of the population is presently infected by HCV and about 20 million people are already infected with HCV.<sup>3,4</sup> Routine surveillance, screening of

blood donors, strengthening the services for treatment of sexually transmitted diseases, preventing mother to child transmission of blood borne pathogens has been put forward by the National AIDS Control Organization (NACO) guidelines to be strictly implemented.<sup>5,6</sup>

The basic aim of blood transfusion services is to provide zero risk blood for transfusion. Recently, center for disease control (CDC) has revised the guidelines for HIV testing and introduced expanded screening in healthcare

setting with streamlined procedures for pretest information and consent.<sup>7</sup> Plasmodium falciparum can remain viable for two to three weeks.<sup>6</sup> Several studies document that seropositive patients visit healthcare centre, but are not tested for infection with hepatitis B, HIV and hepatitis C, until late in the course of their disease; hence deprive them from the benefit of antiviral therapy.<sup>8,9</sup>

Blood transfusion has been the transmission mechanism in 15% of all the HIV infections. In India, the HIV-2 epidemic occurs along with HIV-1. A study from Bagalkot showed that among all the blood donors screened from 2005 to 2009 in a tertiary care hospital, 0.81% were positive for HIV infection out of which 0.704% were positive for HIV-1 and 0.106% were positive for the HIV-2 infection.<sup>5</sup> This retrospective research is conducted to provide a baseline data on the prevalence of hepatitis B virus (HBV), human immunodeficiency virus (HIV), hepatitis C virus (HCV), syphilis and malaria among blood donors referred to a tertiary healthcare centre and teaching hospital of Southern Karnataka, India.

## 2. Materials and methods

A record based retrospective study was conducted to provide a baseline data on the prevalence of hepatitis B, HIV and hepatitis C among blood donors at A. J. Hospital & Research Centre, Mangalore, Southern Karnataka. This is a retrospective study carried out in our hospital, over a period of five years (January 2006 – December 2010). The blood samples were collected from voluntary blood donors and referred to blood bank. All sera were initially tested for Hepatitis B Surface antigen (HBsAg), anti-HIV antibody and anti-HCV antibody by enzyme linked immuno-sorbent assay (ELISA) test using a commercial kit by J. Mitra diagnostics Microlisa-HIV ELISA, J. Mitra diagnostic Microlisa-HCV ELISA, J. Mitra diagnostic Hepalisa-HBsAg ELISA,

Eliscan HIV 1/2 third generation ELISA kit, Eliscan HCV third generation ELISA kit, HBsAg third generation ELISA kit. Internal positive and negative controls along with external control which is known positive sample is tested while performing the ELISA. This is a qualitative assay, each micro-well being coated with recombinant HCV antigen, HBV antibody and HIV antigen respectively. Positive sera were confirmed by repeat ELISA. Immunodiagnostic assays are available commercially as kits for detection of plasmodium vivax and plasmodium falciparum. Malarial parasite card test was employed to screen for malaria along with peripheral smear examination with Leishman stain. Screening for syphilis was carried out with rapid plasma reagin (RPR) test. It is a macroscopic non-treponemal flocculation test for screening of syphilis.

## 3. Results

A total of 14,257 donors were tested, out of which the sero-prevalence of HIV, HBV, HCV and syphilis was 0.098 %, 0.10 %, 0.32 % and 0.147% respectively, among the total donors as shown in Table 1. No donor was found to be positive for malaria. The results of the screening test are only presumptive and hence, before reporting it has to be validated with a supplemental test. If the donor is positive, the donor is then referred to the Integrated Counseling and Testing Centre (ICTC) for counseling and testing for confirmation of the results. For making a diagnosis of HIV infection recommended strategies are followed as per the NACO guidelines.

## 4. Discussion

Decreasing trends in the prevalence of hepatitis B infection is probably because the donors were screened only for hepatitis B surface antigen (HBsAg). The low seropositivity among donors is attributed to pre-donation counseling in donor selection as seen in other studies too.<sup>10</sup>

Table 1: Prevalence of transfusion transmitted infections

Year	Total number screened	HIV positive (n, %)	HBsAg positive (n, %)	HCV positive (n, %)	RPR / VDRL positive (n, %)	Malaria positive (n, %)
2005	1051	2 (0.19)	3 (0.29)	4 (0.38)	0	0
2006	2102	8 (0.38)	3 (0.14)	6 (0.29)	0	0
2007	2452	1 (0.04)	4 (0.16)	10 (0.41)	1 (0.04)	0
2008	2181	1 (0.05)	1 (0.05)	2 (0.09)	4 (0.18)	0
2009	2963	1 (0.03)	1 (0.03)	9 (0.30)	8 (0.27)	0
2010	3508	2 (0.06)	2 (0.12)	15 (0.43)	8 (0.29)	0

The findings of this study underscore the significantly increasing endemicity of hepatitis virus, syphilis and HIV among voluntary blood donors of our community. The pilot study indicates a high prevalence of HBV DNA among HBsAg negative or anti-HBc positive donors. This study further emphasizes on the need for a more sensitive and stringent screening algorithm for blood donations.<sup>11</sup>

India has indeterminate HBV endemicity, with a carrier frequency of 2% to 4%. HBV is the major cause of chronic liver disease and hepatocellular carcinoma (HCC). Chronic HBV infection in India is acquired by the age of five years through horizontal transmission. HBsAg negative units have been found to transmit HBV infections.<sup>12</sup> Occult HBV infection can exist in the absence of HBsAg and can be detected by determining HBV DNA.<sup>13</sup> Vertical transmission in India is found to be infrequent with genotypes A and D. HCV infection is a major cause of post-transfusion hepatitis in India with a prevalence of around 1% in the population.<sup>14</sup>

The importance of promoting voluntary blood donations is to ensure that the donors are free from transfusion transmissible infections like HBV, HCV, HIV-1, HIV-2 and Syphilis. The findings of this study underscore the significantly increasing endemicity of hepatitis viruses, syphilis and HIV among the voluntary blood donors of our community.<sup>15</sup>

In conclusion, this study emphasizes the need for highly sensitive donor screening techniques to enable the detection of transfusion transmitted infections. HCV is clearly on the rise. Stringent measures need to be taken on an urgent basis including dissemination of information, strict screening of blood, inclusion of antibody to hepatitis B core antigen and other sensitive markers to the screening protocol, and better donor recruitment. Transfusion transmitted infections pose a definite risk to the recipients. Voluntary donors are comparatively safer than replacement donors and need to be encouraged. The basic aim of blood transfusion services is to provide zero risk blood for transfusion however

this is not achievable due to lack of a test which is 100% sensitive or failure to detect in early incubation period and expensive molecular

methods which are highly sensitive like (polymerase chain reaction) PCR to detect infection at an early stage.

## References

1. Koop CE. Hepatitis C: An epidemic for any one, worldwide prevalence. DHMC. 2008. <http://www.epidemic.org/theFacts/theEpidemic/worldprevalence.php/> (Accessed on 19<sup>th</sup> November, 2011).
2. UNAIDS / WHO 2006 Report on the Global AIDS epidemic.
3. Chandra M, Khaja MN, Farees N, Poduri CD, Hussain MM, Aejaz Habeeb M, et al. Prevalence, risk factors and genotype distribution of HCV and HBV infection in the tribal population: a community based study in South India. *Trop Gastroenterol* 2003;24:193-195.
4. Khaja MN, Madhavi C, Thippavazzula R, Nafeesa F, Habib AM, Habibullah CM, et al. High prevalence of hepatitis C virus infection and genotype distribution among general population, blood donors and risk groups. *Infect Genet Evol* 2006;6:198-204.
5. Sonath SB, Solabannavar SS, Baragundi MC, Patil CS. The prevalence of HIV-2 seropositivity in blood donors. *J Clin Dia Res* 2010;4:3091-3094.
6. HIV/ AIDS epidemiological surveillance and estimation report for the year 2005, NACO; April 2006. Available from: <http://www.nacoonline.org/fnlapil06rprt.pdf> (Accessed on 25th October, 2011).
7. Branson BM, Handsfield HH, Lampe MA, Janssen RS, Taylor AW, Lyss SB, et al. Centers for Disease Control and Prevention (CDC). Revised recommendations for HIV testing in adults, adolescents and pregnant women in health care settings. *MMWR Recomm Rep* 2006; 22-55(RR-14):1-17.
8. Beckwith CG, Flanigan TP, del Rio C, Simmons E, Wing EJ, Carpenter CC, et al. It is time to implement routine, not risk-based, HIV testing. *Clin Infect Dis* 2005;40:1037-1040.
9. Bayer R, Fairchild AL. Changing the paradigm for HIV testing--the end of exceptionalism. *N Engl J Med* 2006;355:647-649
10. Panda M, Kar K. HIV, hepatitis B and C infection status of the blood donors in a blood bank of a tertiary health care centre of Orissa. *Indian J Public Health*. 2008;52:43-44.
11. Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. *Indian J Pathol Microbiol* 2010;53:308-309.
12. Bhattacharya P, Chandra PK, Datta S, Banerjee A, Chakraborty S, Rajendran K, et al. Significant increase in HBV, HCV, HIV and syphilis infections among blood donors in West Bengal, Eastern India 2004-2005: exploratory screening reveals high frequency of occult HBV infection. *World J Gastroenterol* 2007;13:3730-3733.
13. Duseja A, Sharma S, Subramanian PG, Agnihotri SK, Chakraborti A, Chawla Y. Occult hepatitis B virus (HBV) infection in healthy blood donors. *Indian J Pathol Microbiol*. 2003;46:690-692.
14. Acharya SK, Madan K, Dattagupta S, Panda SK. Viral hepatitis in India. *Natl Med J India* 2006;19:203-217.
15. Meena M, Jindal T, Hazarika A. Prevalence of hepatitis B virus and hepatitis C virus among blood donors at a tertiary care hospital in India: a five-year study. *Transfusion* 2011;51:198-202.

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