Research Article

Seroprevalence of Human Immunodeficiency Virus infection among blood donors of central Karnataka

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Abstract

Introduction: Transfusion of blood and blood products is life saving procedure which benefits numerous patients worldwide, as transfusion of blood or its components is an integral part of medical and surgical management. At the same time it is an important route of transmission of infection to the recipients. Seroprevalence of HIV among blood donors is important mode of transmission, which can be reduced by practicing 100% voluntary donation and strict donor screening. Study was conducted to find out the seroprevalence of HIV among blood donors with respect to type of the donor, age, sex and blood group of the donor. **Methodology:** This study was conducted from January 2005 to December 2009 at the blood bank of tertiary care Medical College Hospital, serving people of Central Karnataka. Blood units collected from eligible blood donors were subjected to 4th generation ELISA for screening for IgG antibodies to HIV. Prevalence of HIV infection was noted using SPSS version 13 statistical package in relation to type of donor, age, sex and blood group of donor. Significance of the trend was determined by chi square test. **Result:** Total of 19,413 donors were screened during the study period. Majority (94%) of donors were replacement donors and 46.13% of donors belonged to the age group 18 to 25 years. Overall seroprevalence of HIV was 0.5%. Seroprevalence was more in replacement donors as compared to voluntary donors. **Conclusion:** Seroprevalence detected by immunoassay testing represents only tip of the iceberg. This could be reduced by 100% voluntary blood donation.

Keywords: Blood Transfusion, Blood Donors, HIV, Seroprevalence

Introduction

A new disease was detected in 1981, which was confirmed to be caused by unique retrovirus (1984) and as the cause of acquired immunodeficiency syndrome (AIDS)in1985.HIV infection was first reported in India in a commercial sex worker in Madras, Madurai and Vellore in 1986 [1]. Total number of adults and children estimated to be living with HIV and AIDS is between 1.8 to 3.2 millions in India, according to fact sheet 2008 update. Tamil Nadu, Karnataka, Maharashtra, Andhra Pradesh, Manipur, and Nagaland are the six high prevalence states in India [2]. National AIDS Control Organization (NACO) estimates 86% transmission is due to sexual risk, 2.4% due to intravenous drug users, 2.0% due to blood and blood products, and 3.6% due to perinatal transmission. Commercial sex workers are responsible for the majority of HIV transmission in India [3]. Blood and blood products form the integral part of health care system. At the same time it is an important mode of infection to the recipients. Concealing the medical history by blood donors and limitations of screening tests pose a great threat to safe blood transfusion [4].

This study was undertaken to estimate the seroprevalence of HIV among blood donors and trend was noted with respect to type of donor, age, sex, blood group of donor.

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Materials and Methods

This study was conducted in SS Blood Bank, attached to tertiary level teaching hospital of SS Institute of Medical Sciences and Research Centre Davangere from

January 2005 to December 2009. After obtaining institutional ethical clearance from research and publication committee, blood donors were screened by targeted questionnaire and by medical examination with informed consent. Blood donors were either replacement or voluntary donors. Clinically healthy individuals of 18 to 60 years of age with body weight more than 45 kg and hemoglobin more than 12.5 g/dl were qualified for donation. Sera of these qualified blood donors were screened for IgG antibodies to HIV by using commercially available (J Mitra & Co Pvt Ltd New Delhi) Enzyme Linked Immunosorbent Assay (ELISA) kits of fourth generation and the procedure of test was followed according to manufacturer's instruction. The positive sera and random negative samples were retested by ELISA in Bapuji blood bank Davangere in order to assure the quality of in house by external peer.

Data were entered and analyzed by using SPSS version 13 statistical package. Prevalence of HIV-1 & 2 was noted with respect to age, sex, type of donor, year and the blood group. Significance of the trend was determined by chi square test.

Results

A total number of 19,413 donors were screened during the study period. Of these 19,189 (99%) were males and 224 (1%) were females. 94% of donors were replacement donors (Figure 1) and 46.13% of donors belonged to the age group 18 to 25 years (Figure 2). The commonest blood group was O positive.

Figure 1: Distribution of type of donors.

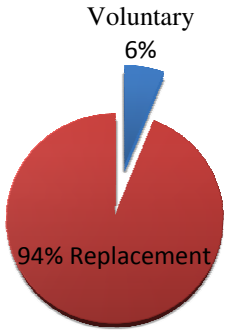
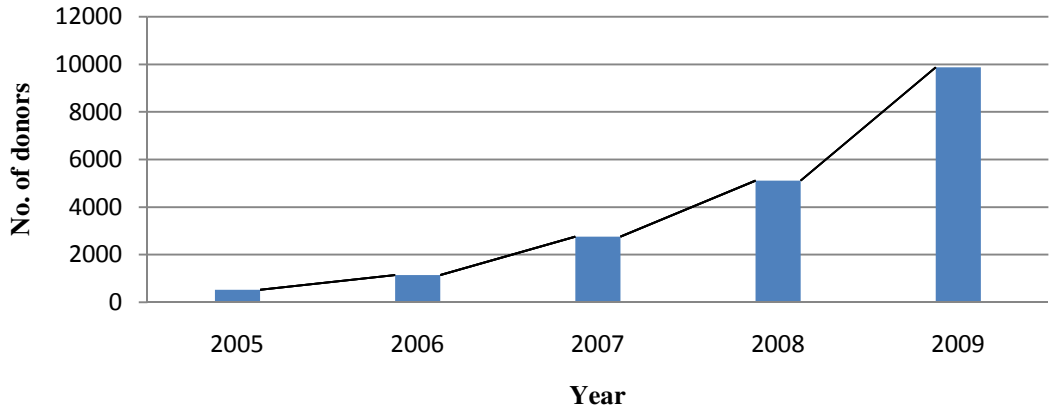


Figure 2: Distribution of donors according to year.

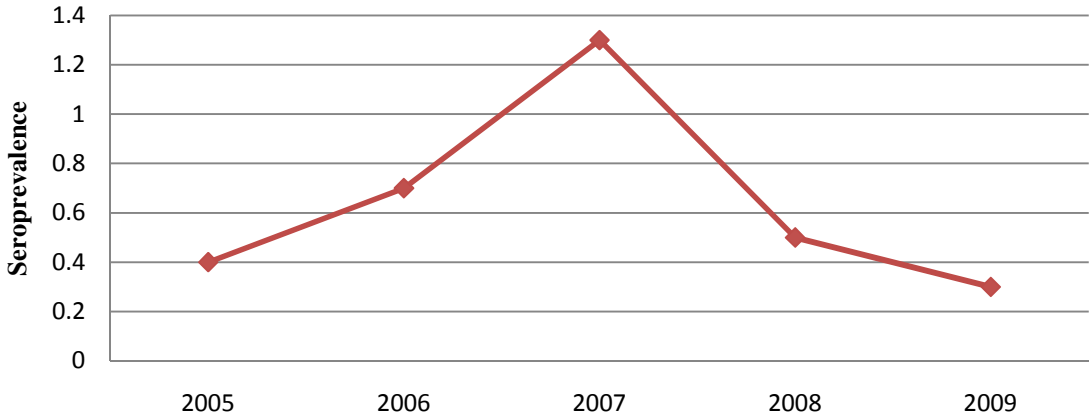


The overall prevalence of HIV-1 was 0.5% in our study. HIV-2 infection was not observed. Seroprevalence of HIV-1 in voluntary donors was 0.3% and in replacement donors is 0.5%. Seroprevalence observed in males was 0.5%. The majority of HIV positive cases were in the age group of 26-35 years (Table 1). The trend of HIV prevalence increased from the year 2005 to 2007 and later decreased till 2009 (Figure 3).

Table 1: Distribution of seroprevalence of HIV according to age of donor.

Age (Years)	Seroprevalence (%)
18 -25	0.4
26- 35	0.68
36- 45	0.35
46- 60	0.46
p value : 0.57 Non significant	

Figure 3: Yearwise trend of seroprevalence of HIV among blood donors.



Co-infection of HIV-1 and Hepatitis B was detected in two donors and co-infection of HIV-1 and Hepatitis C was detected in one donor. All these were replacement donors. The association of HIV infection with the parameters like age group, sex, type of donor, blood group was statistically insignificant.

Discussion

There are two types of HIV infections in humans i.e. HIV-1 and HIV-2. In South Asia, the most common HIV infection observed is HIV-1. However there are significantly less number of confirmed cases of HIV-2 infection reported in India and Nepal. India has the second highest number of people living with HIV and AIDS outside Africa. According to UNAIDS country fact sheet 2008 update, the total number of adults and children estimated to be living with HIV and AIDS in India was 1.8 – 3.2 million with prevalence rates for adults estimated to be within 0.2 - 0.5%. These figures have declined when compared with data of 2003 and 2005, indicating a positive impact of prevention and control programs [2].

Blood transfusion is life-saving procedure and integral part of health care delivery system, but simultaneously it carries the 100% risk of transmitting the transfusion transmissible infections (TTI). Even after screening the blood for TTI like HIV, hepatitis B, hepatitis C, syphilis and malaria serological window period still poses a threat to blood safety because of limitations of screening tests [5].

In our study overall seroprevalence of HIV was 0.5%. The seroprevalence of HIV in blood donors among different parts of India is given in the Table 2 [5-12]. Highest seroprevalence in our study was seen in the age group of 26-35 years. In our study the seroprevalence of HIV infection in replacement donors was comparatively higher than voluntary donors. The similar observation were noted in other studies [6,9,11,12]. In the study by Arora et al [7] none of the voluntary donors were seroreactive for HIV. The reason for higher prevalence of HIV among replacement donors could be the obligatory motto behind the donation, which might hide their disease during pre-donation clinical screening. Hence, 100% voluntary blood donation should be practiced for safe blood.

Table-2: Seroprevalence of HIV in blood donors in various studies

Study	Place	Year	Sample size	Prevalence
Giri et al [5]	Maharashtra	2009-10	5661	0.07
Pahuja et al [6]	New Delhi	2002-05	28,956	0.56
Arora et al [7]	Haryana	2002-06	5849	0.3
Naskar et al [8]	Kolkata	2002-12	128119	0.28
Pallavi et al [9]	Mysore	2004-08	39,060	0.44
Patel et al [10]	Gujarat	2007-13	15,368	0.14
Sastry Jayagowri et al [11]	Pune	2008-13	13,078	0.28
Kumar et al [12]	Central India	2009-11	10,582	0.53
Present study	Central Karnataka	2005- 09	19,413	0.50

Window period infections, which are missed by immunoassay testing, are responsible for TTI. Nucleic acid amplification testing (NAT) shortens this window period from 22 days to 11 days, thereby offering much higher sensitivity for detecting viral infections [13] Therefore, NAT should be routinely followed in all blood banks, along with switching to 100% voluntary blood donations.

Conclusion

Seroprevalence detected by immunoassay testing represents only tip of the iceberg, the real burden may be reduced by newer methodology like NAT.

Ensuring 100% voluntary blood donations, strict and effective screening programs, effective and efficient use of blood and its components are necessary to control spread of infection through transfusion.

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