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Seroprevalence of Transfusion Transmissible Infections among Blood Donors: A Retrospective Study

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Abstract

Context: Blood transfusion is a life saving measure in various medical and surgical emergencies. Transfusion medicine, apart from being important for the medical treatment of each patient, also has great public health importance. *Aims:* The aim of our study was to know the prevalence of transfusion transmissible infections among blood donors in our college hospital blood bank. *Settings & Design:* Retrospective study conducted for 2 years**.** *Methods & Material:* This was a retrospective study conducted at the blood transfusion centre of a tertiary care hospital.Voluntary donors were evaluated for the prevalence of HIV, HBS Ag, HCV, Syphilis and Malaria. All the samples were screened by third generation ELISA Kits for HIV, HBsAg and HCV, by Rapid Plasma Reagin method for Syphilis, and by Immunochromatographic test for detection of Plasmodium falciparum and Plasmodium vivax antigen. *Results:* Total number of voluntary blood donors in the two year period were 3355. The seroprevalence of HIV, HBsAg, HCV were 0.42%, 1.88% and 0.29% respectively. No blood donors were tested positive for syphilis and malaria. *Conclusions:* Blood is still one of the main sources of transmission of infections. HIV, HBsAg , HCV are still prevalent among voluntary donors.

Keywords: Seroprevalence; Hepatitis B.; Hepatitis C.; Human Immunodeficiency Virus; Donors.

Introduction

Human blood is a major source of diverse medical products that are used for the prevention and treatment of various life-threatening diseases [1]. Transfusion of blood and blood components saves millions of lives worldwide each year and reduce morbidity [2]. But it also carries the risk of transfusion-transmissible infections, including HIV, hepatitis, syphilis, malaria and infrequently toxoplasmosis, brucellosis and some viral infections like CMV, EBV and herpes. With every unit of blood, there is 1% chance of transfusion-associated problems including transfusion transmitted diseases. Among all infections HIV and hepatitis are the most dreadful [3].

An unsafe blood transfusion is very costly from both human and economic points of view. Morbidity and mortality resulting from the transfusion of infected blood have far-reaching consequences, not only for the recipients themselves, but also for their families, their communities and the wider society [4]. Appropriate clinical use of blood and supply of safe blood and blood products can minimize such complications and risks [5].

Preventing the transmission of infectious diseases through blood transfusion in developing countries is difficult given that the resources required are not always available even when policies and strategies are in place. These strategies have been extremely effective but transmission of diseases still occurs, primarily because of the inability of the test to detect the disease in the pre-seroconversion or 'window' phase of their infection, a lack of funds and trained personnel, immunologically variant viruses, non-

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seroconverting chronic or immuno silent carriers and inadvertent laboratory testing errors. Transfusion Transmitted Infections is still a major concern to patients, physicians and policy makers who wish to see a risk free blood supply [6].

Evaluation of data on the prevalence of transfusion transmissible infections namely HIV, HBV, HCV and syphilis among blood and plasma donors permits an assessment of the occurrence of infections in the blood donor population and consequently the safety of the collected donations. It also gives an idea of the prevalence of the transfusion transmitted infections (TTIs) among blood donors, allows for assessment of epidemiology of these infections in the community [4].

Subjects and Methods

A retrospective hospital record-based study was conducted at the blood bank of a tertiary care hospital. Tests are routinely done on every blood unit to exclude HIV, HBV, HCV, syphilis and malaria. Data were collected for a period of 2 years from January 2011 to December 2012. A total of 3355 blood units were collected and studied. Sera of voluntary donors of different age groups and sex, who donated blood were screened for HIV, HBsAg, HCV, Syphilis and Malaria.

Screening of HIV, HBsAg, HCV was carried out by ELISA method using approved commercially available kits. Screening of syphilis was done by Rapid Plasma Reagin method and screening for malaria was done by immunochromatographic method to detect plasmodium vivax and plasmodium falciparum antigens. The ethical clearance committee of the institute approved the study. No professional or honorary donor was bled.

Donors with current history of medication, recent history of having undergone a surgical procedure, serious illness, weight <50 kg, age <18 and >60 years, pregnant and lactating women and previous blood transfusions that was less three months interval of donation were excluded from the study. All the reactive samples were repeat tested before labeling them sero-positive and respective blood units were discarded.

Results

Total number of blood donors in the two year period were 3355. Of these, 2794 (83.28%) were male donors and 561 (16.72%) were female donors which shows predominance of males as compared to females for the two studied years. The donor age ranged from 19 years to 54 years. Table 1 gives the details of age wise distribution of seropositive donors. With all the infections summed together, the age group of 25 – 30 yrs with 23.26% had the highest prevalence followed by 22.09% within the age group of 31-36 yrs. A lowest prevalence of 9.30% was observed within the age group of 49-54 yrs.

The prevalence of transfusion transmitted infections was more in males compared to females as they were the major donor population. Figure 1 gives the details distribution of seropositive donors according to sex. As males were predominant donors, they had a high prevalence.

The seroprevalence of HIV, HBsAg, HCV were 0.42%,1.88% and 0.29% respectively. No blood donors were tested positive for syphilis and malaria. In our study majority of donors were positive for HBsAg compared to HIV and HCV. No blood donors tested showed positive for syphilis and malarial parasite. The rate of coinfection with HIV and HBsAg was 3.49%, HBsAg with HCV was 1.16%, HIV with HCV, HIV with syphilis was nil.

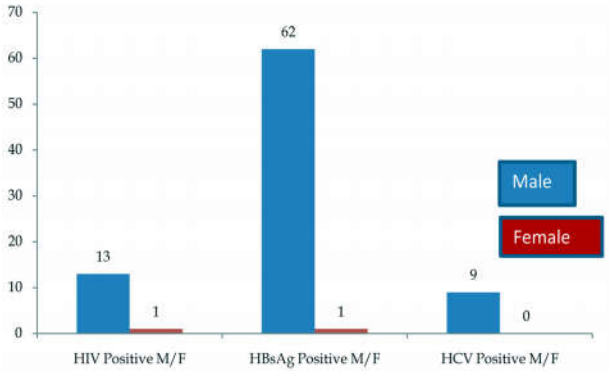

Fig. 1: Distribution of seropositive donors according to sex

Table 1: Distribution of seropositive donors according to age

Sl. No	AGE (Years)	HIV	HBsAg	Anti-HCV	Syphilis	Malaria
1	19-24	02	15	00	00	00
2	25-30	03	14	03	00	00
3	31-36	03	14	02	00	00
4	37-42	03	07	03	00	00
5	43-48	02	06	01	00	00
6	49-54	01	07	00	00	00
Total		14(0.42%)	63(1.88%)	09(0.29%)	00	00

Discussion

With every unit of blood, there is 1% chance of transfusion associated problems including TTI. The risk of TTI has declined dramatically in high income nations over the past two decades, primarily because of extraordinary success in preventing HIV and other established transfusion transmitted viruses from entering the blood supply [7]. This is not same in developing countries like India. Studies in the West have shown that the estimated risk of transfusion transmitted HIV, HCV and to a lesser extent HBV infection via blood products is very low [8].

According to the World Health Organization (WHO) Global Database on blood safety, 20% of the global population residing in the developed countries has access to 80% of safe blood supply whereas 80% of the population residing in the developing countries has access to only 20% of safe blood .TTIs remain a major threat to safe blood transfusion particularly in countries where the prevalence rate is high [7].

The prevalence of TTIs among the Indian blood donors is reported to be ranging as follows; HBV- 0.66% to 12%, HCV - 0.5% to 1.5%, HIV- 0.084% to 3.87%, and syphilis - 0.85% to 3% respectively [9].

HBV is a major source of transfusion- transmitted hepatitis and is associated with a carrier state, acute hepatitis, chronic liver disease, liver cirrhosis and hepatocellular carcinoma [8]. The present study revealed seroprevalence of HBV at 1.88% among the donors which is similar to findings by Chattoraj et al [10], Kaur et al [11], and Singh B et al [12]. Variable results of 0.66% [13], 3.44% [14], 5.86% [15] have also been reported in various other studies**.** In the present study, incidence of HBsAg seropositivity was found to be the highest as compared with other transfusion transmitted infections.

HCV infection is an evolving public health problem globally. HCV is transmitted primarily through blood exposure. About 20 - 40% of HCV cases are acute and majority of them progress to chronic infection. The long term risk of developing cirrhosis and hepatocellular carcinoma is greater in HCV than HBsAg positive patients [8]. Indian studies indicate that seroprevalence of HCV ranges between 0.4 - 1.09% [16,17]. For hepatitis C, the estimated prevalence in this study was 0.29%, similar to that reported by the other studies of 0.28%[14] and 0.50% [12]. Where as a few studies reported much higher level of prevalence such as 0.79% [10], 0.88% [18]and 1.09%[13], 1.57% [19], 2.8% [20], and 6.21%[15]

Acquisition of HIV disease through blood transfusion is a relatively efficient mode of transmission, with rates approaching 100%. A WHO report states that the viral dose in HIV transmission through blood is so large that one HIV positive transfusion leads to death, on an average, after two years in children and after three to five years in adults [3]. In the present study, the prevalence of HIV was found to be 0.42%. Seropositivity of HIV in other studies was observed to be 0.5% [5], 0.3% [3], and 0% [21]. Karnataka state AIDS prevention society data also states 0.5% incidence of HIV in Karnataka[17].

Tiwari et al [22] reported 0.054% prevalence of HIV among blood donors, whereas in other studies seroprevalence of 0.13%[10], 0.19%[23], 0.26%[11], 0.47%[14] have been reported.

Transfusion transmitted syphilis is not a major hazard of modern blood transfusion therapy. Only rare cases of transfusion transmitted syphilis have been documented. The rapid plasma reagin test is commonly used for screening the blood products for syphilis. It is not the transmission of syphilis that is worrisome, being a sexually transmitted disease, it's presence points towards donor's indulgence in "high risk" behavior and consequent higher risk of exposure to infections like HIV and Hepatitis [5].

In the present study no donor was found to be positive for syphilis. A seroprevalence of 0.85%[13] and 1.2% [15] was reported by other studies. Malaria infestation through blood transfusion is particularly relevant in areas where these parasites are non-endemic, particularly the non-tropical countries. In the present study no donor was found positive for malaria.

Conclusion

In the study of 2 years duration, 3355 voluntary donors were tested. Of these, 2794 (83.28%) were male donors and 561 (16.72%) were female donors. The seroprevalence of HIV, HBsAg, HCV were 0.42%,1.88% and 0.29% respectively. No blood donors were tested positive for syphilis and malaria. Blood is still one of the main sources of transmission of Hepatitis B, HIV and Syphils. The majority of donors in our country are voluntary, relatives or friends, who are apparently healthy, but the study found that these diseases are prevalent among them. Hence, Proper predonation screening of blood donor and postdonation testing of blood bag by standard techniques should be done to minimize transfusion transmitted diseases.

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