

The Study of Seropositivity for Transfusion Transmitted Infections in Blood Donors at the Blood Centre in a Tertiary Care Hospital

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Abstract:

Introduction: Blood is an invaluable resource and is life-saving in critical health conditions like severe anaemia, excessive blood loss such as in trauma and major surgeries. However, the blood may be unsafe and optimum utilization of blood from blood donors may not be possible due to the detection of transfusion transmitted infections (TTIs).

Objective: To estimate the seropositivity for transfusion transmitted diseases in blood donors at the blood centre.

Method: A retrospective study was conducted from July 2021 to June 2023 in the Blood Centre at ARMCH & RC, Kumbhari, Solapur, Maharashtra. Data of results of blood screening of all voluntary blood donors was collected and studied for the different TTIs with respect to age and gender.

Results: A total of 13,817 blood units were collected from voluntary blood donors between 18-65 years in a 2-year period from July 2021 to June 2023 with 98.13% being male donors and 1.85% of female donors. Out of 13,817 blood donors, 246 (1.78%) were seropositive, with male predominance (98.39%) and females (1.61%). Highest seropositivity was in the age group 18- 31 years. HBV seropositivity was the most common, with 2.41%, followed by HCV with 0.46%, Syphilis (0.19%), HIV (0.14%) and Malaria (0%). No case of co-infection was detected.

Conclusion: The screening of TTIs in blood donors serves not only to ensure safety, but also gives an estimate of the seroprevalence in the general population.

Keywords: Transfusion transmitted infections, Voluntary donors, Hepatitis B, Hepatitis C, HIV.

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Introduction

Blood is an invaluable resource which serves to save life in various medical, surgical and obstetric conditions besides critical trauma management. James Blundell, an Obstetrician, performed the first successful blood transfusion of human blood to treat postpartum hemorrhage in 1818.[1] While blood can be life -saving, transfusion of unsafe blood and blood products may become detrimental to the recipient, either soon thereafter or in due course of time, if the blood harbours any transmissible infections. In the early 1980s, several countries were confronted with the tragedy of HIV disease in tens of thousands of recipients of blood transfusion, who had received HIV -contaminated blood transfusions, resulting in a loss of confidence in the blood system's ability to protect the public from this and other risks.[2] Every

unit of blood carries a 1% chance of transfusion transmitted diseases.[3] Hence the need for accurately assessing the presence of transfusion transmitted infections assumes great importance.

The Stanford Blood Centre, conducted the first HIV blood test in 1983 and thereafter screening for TTIs began with test for HIV being licensed and implemented by blood banks in 1985.[4] The practice of screening blood for the five major TTIs such as Hepatitis B, Hepatitis C, HIV, Syphilis, and Malaria is followed by all blood centres, in keeping with the principles of 'Safety in blood transfusion' as mandated by WHO guidelines.[5]

However, despite the best efforts and techniques, the window period of infection as in HIV, inadvertent

technical errors, high cost of screening and differences in testing methods may preclude an accurate detection in some cases. Hence, use of more sensitive methods such as NAT (Nucleic acid test) is beneficial for the early detection of HIV, even in the absence of antibodies in the blood.

Objective

To estimate the positivity of transfusion transmitted infections in blood donors in the blood centre at a tertiary care hospital in Maharashtra.

Methods

A retrospective study was conducted in the blood centre of a tertiary care hospital over 2 years from July 2021 to June 2023, to include a total of 13,817 blood donors. All were voluntary blood donors. Donor screening and blood collection was done using WHO guidelines.[6] Standard guidelines and strict adherence to methodology was observed in the testing, as per FDA policy. Screening of all blood bags was carried out for HIV, using 3rd generation Enzyme linked immunosorbent assay (ELISA) for detection of antibodies to HIV1 and 2.

ELISA test was also used for detection of Hepatitis B surface antigen (HBsAg) and antibodies to Hepatitis C. Screening for Syphilis was done using Rapid Plasma Reagin test kit and Malarial parasite

detection was done by examining peripheral smears of donor's blood.

Data for seropositivity of donor samples for the different TTIs was categorized according to age and gender of the donors.

Results

A total of 13,817 blood units were collected between July 2021 to June 2023 of which 13,560 (98.13%) were male donors and 256 (1.85%) female donors. All were voluntary blood donors. Out of 13,817 blood units collected 246 (1.78%) units were seropositive. Out of 246 seropositive cases, HBV seropositivity was the most common, seen in 179 cases and syphilis was least common seen in 8 cases. However no malaria case was reported (Table1). The study age group was between 18-65 years. Youngest was 18 years male and oldest was 60 years old male. Majority of cases were in the age group of 18-30 years with 98 cases and least were in the age group of >50 years with 13 cases (Table2).

Out of 246 cases, 243 were males and only 3 females were seropositive. Male to female ratio was 81:1. In males, HBV was the commonest TTI with 177 cases followed by HCV with 48 cases. Of the 3 seropositive females, 2 were HBV seropositive and 1 was positive for HCV infection (Table 3).

Table 1: Distribution of seropositive cases

Type of Infection	No. of Cases	Percentage Of Cases
HBV	179	1.30
HCV	49	0.35
HIV	10	0.07
SYPHILIS	08	0.06
MALARIA	00	00
TOTAL	246	1.78

Table 2: Distribution of seropositive cases according to age.

Type of Infection	18-30 Years n, (%)	31-40 Years n, (%)	41-50 Years n, (%)	>50 Years n, (%)	Total n, (%)
HBV	71 (39.66%)	76 (42.46%)	24 (13.41%)	08 (4.47%)	179
HCV	16 (32.65%)	12 (24.50%)	16 (32.65%)	05 (10.20%)	49
HIV	06 (60%)	03 (30%)	01 (10%)	00 (00%)	10
SYPHILIS	05 (62.5%)	02 (25%)	01 (12.5%)	00 (00%)	08
MALARIA	00 (00%)	00 (00%)	00 (00%)	00 (00%)	00
TOTAL	98	93	42	13	246

Table 3: Distribution of seropositive cases according to gender

Type of Infection	Males n, (%)	Females n, (%)	Total n (%)
HBV	177 (98.88%)	02 (1.12%)	179
HCV	48 (97.95%)	01 (2.05%)	49
HIV	10 (100%)	00 (00%)	10
SYPHILIS	08 (100%)	00 (00%)	08
MALARIA	00 (00%)	00 (00%)	00
TOTAL	243 (98.78%)	03 (1.21%)	246 (100%)

Discussion

Every health care organization should practice safe blood transfusion services to avoid transfusion transmitted infections (TTIs) since they carry long term consequences for the recipients. Hence it is important to create awareness & educate people about voluntary blood donation.[7]. TTIs include Hepatitis B & C, HIV I & II, Syphilis, Malaria.

Our study comprised of 13,817 voluntary blood donations out of which 246 (1.78%) donors were seropositive. This is similar to the study done by Milind V Patil et al [8] which showed 1423 (1.74%) seropositive donors.

In our study, HBV seropositivity in 179 donors (1.30%) was the prominent finding which is similar to the study of Makroo et al (1.18%),[9] and Kaur et al (1.7%) [10].

Seropositivity for HCV was seen in 49 donors (0.35%) which is comparable to the 2015 Preliminary report of NACO, as referenced in the study of Milind et al [8], where they reported HCV seropositivity (0.36%) in blood banks with component facility and is lesser in comparison to the study done by Zulfekar et al (0.08%) [7].

HIV seropositivity in our study was seen in 10 donors (0.07%) which is slightly lesser compared to Agarwal et al (0.1%) [11]

Seropositivity for Syphilis in our study (0.06%) is similar to the study by Milind V Patil et al [8] (0.05%) and Zulfekar et al7 (0.07%).

Malaria cases were not found in our study. Studies by Sawke et al [12] and Chandra et al [13] also showed no cases of malaria.

The most common age group affected by TTIs was 18 to 30 years (39.83%) followed by age group of 31 to 40 years (37.80%). Similar findings were obtained by Natasha Mittal et al [14] and Yadav et al [15]. Increased sexual activity and high-risk behaviour during the age group of 18-30 years could be the reason for higher occurrence in this age group.

Percentage of male donors (98.78%) far exceeded that of female donors (1.21%) in our study. Similar trend was noted in the study by Natasha Mittal et al [14] and Mhetre et al .[16]

The extremely lower number of female donors in India could be linked to the social beliefs associated with taboos of blood donation and fear due to repercussions of blood loss from blood donation. Also prevalence of anemia and low weight among Indian female population becomes the major cause for deferral. As the risk of TTIs is much lesser among the female donors, appropriate measures taken at the community level to improve nutrition and general health of female population, will contribute to increase the number of female donors.

In our study sex wise distribution of HIV, HBV, HCV, Syphilis & malaria in blood donors was similar to the study done by Natasha Mittal et al [14] and Mhetre et al [16].

In our study none of the donors showed presence of co-infections, similar to the findings of Zulfekar et al [7]

Creating community awareness about TTIs and safe transfusion practices through education programmes on television, radio or street plays, skits, etc. will help to reduce the seropositivity among voluntary blood donors.

Conclusion

The screening of TTIs in voluntary and relative donors serves not only to ensure safety, but also gives an estimate of the seroprevalence in the general population. This estimate may be used to conduct epidemiological studies to formulate appropriate health guidelines, create community awareness and develop prophylactic vaccination programmes.

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