Seroprevalence of Transfusion Transmitted Infections among Healthy Blood Donors: A 5-Year Tertiary Care Hospital Experience

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Abstract: Transfusion-transmitted infections (TTIs) hamper blood safety and cause a serious public health problem. Aim of the present study is to estimate the seroprevalence of transfusion transmitted infections among voluntary blood donors at a tertiary healthcare teaching hospital. It was a hospital based retrospective study. Donor samples were tested over a period of five years. 8110 blood donors of both sexes attended the blood bank during this period which was screened for Hepatitis B, Hepatitis C, HIV and syphilis, malaria. The overall seroprevalence of TTI is 56 (0.68%)/8110. The seroprevalence of HIV, HBsAg, HCV, syphilis and malaria was 0.04%, 0.5%, 0.05%, 0.09% and nil respectively in total donors. All blood should be tested for compatibility and TTI’s with reduction in unnecessary blood transfusion. Thus ensuring safe blood supply to the recipients

Keywords: Healthy blood donors, Seroprevalence, Transfusion transmissible infections.

INTRODUCTION
Blood transfusion service is an integral and indispensable part of the healthcare system. It is one of the treatment modality that saves millions of lives everywhere in health care services. It is well known fact that blood transfusion is associated with a large number of complications, some are only trivial while others are potentially life threatening, demanding for meticulous pre-transfusion testing and screening. Transfusion-transmitted infections (TTIs) hamper blood safety and cause a serious public health problem [1].

A person can transmit an infection during its asymptomatic phase and so transfusion can contribute to an increase of infection in the population. Screening TTI is also essential for blood transfusion safety and for protecting human life.

Transfusion-transmissible infections which are more frequent includes Hepatitis B and C, HIV and Syphilis, malaria and very rare cases of toxoplasmosis, brucellosis and viral infections like CMV, Epstein Barr Virus and Herpes.4 Measuring their severity, WHO has recommended pre-transfusion blood test for HIV, HBV, HCV and Syphilis as mandatory[2,3]. All these diseases are capable of causing significant mortality, morbidity along with a financial burden for both the affected person and the country.5 Government of India published in the year 2002 the National Blood Policy. The objective of the policy is to provide safe, adequate quantity of blood, blood components and products. Each blood unit shall be tested for presence of HIV 1&2 antibodies, Hepatitis B surface antigen, and Anti-hepatitis C virus antibody, syphilis and malaria parasite and results of such testing shall be recorded on the label of the container [4].

The objective of the present study is to estimate the seroprevalence of transfusion transmitted infections among voluntary blood donors at a tertiary healthcare teaching hospital.

MATERIALS & METHODS
Setting of the study & Study design
This study was conducted in a Tertiary Care Hospital. It was a hospital based retrospective study.

Study location
The data was collected from the blood bank of Tertiary health care teaching hospital. Donor samples were tested over a period of five years. The screening of

blood for TTIs is mandatory for blood safety in the source hospital.

**Study population**

8110 blood donors of both sexes attended the blood bank during this period which was screened for Hepatitis B, Hepatitis C, HIV and syphilis, malaria.

**METHODOLOGY**

Records were collected from blood bank of all donors coming to blood bank of hospital from 1st January 2013 to 31st December 2017. Name, age (18-60 years), Sex, date of birth, address and contact number were recorded for each donor, while giving them a unique identification number. Detailed history of immunization was taken. A written informed consent was taken from each patient before the blood donation. Weight, pulse, blood pressure and temperature were recorded for each donor. Screening for anemia was done clinically along with copper sulfate specific gravity method. Any donors with previous history of HBV, HCV, HIV, syphilis & malaria infections were excluded. Inspection was made for any marks of drug abuse or any skin lesions/ infections at the venepuncture site.

All samples were screened for HIV, HBsAg, and HCV by ELISA method using the kit developed by M/S J. Mitra & Company Ltd., New Delhi, India, RPR Test by Carbogen diagnostics kit, Malaria card by

**STATISTICS**

Simple descriptive statistics was used in this study.

**RESULTS**

In the present study, out of 8110 healthy voluntary donors, 7950 were males and 160 were females, the table shows predominance of males as compared to females which spanned over a period of five years. (Table 1) Sixty percent of the donors were in the age group of 21-30 years.

**Table-1: Gender wise distribution of the study participants**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Total donors</th>
<th>Male N (%)</th>
<th>Females N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1048</td>
<td>1012 (96.6)</td>
<td>36 (3.4)</td>
</tr>
<tr>
<td>2014</td>
<td>1535</td>
<td>1520 (99)</td>
<td>15 (1)</td>
</tr>
<tr>
<td>2015</td>
<td>1948</td>
<td>1907(97.9)</td>
<td>41(2.1)</td>
</tr>
<tr>
<td>2016</td>
<td>1539</td>
<td>1503(97.6)</td>
<td>36(2.4)</td>
</tr>
<tr>
<td>2017</td>
<td>2040</td>
<td>2008(98.4)</td>
<td>32(1.6)</td>
</tr>
<tr>
<td>Total</td>
<td>8110</td>
<td>7950(98)</td>
<td>160(2)</td>
</tr>
</tbody>
</table>

**Table-2: Seroprevalence of HIV, HBsAg, HCV, RPR and malaria among healthy donors**

<table>
<thead>
<tr>
<th>Year</th>
<th>Blood donors</th>
<th>HIV positive</th>
<th>HBsAg positive</th>
<th>HCV positive</th>
<th>RPR positive</th>
<th>Malaria positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1048</td>
<td>Nil</td>
<td>9</td>
<td>nil</td>
<td>7</td>
<td>Nil</td>
</tr>
<tr>
<td>2014</td>
<td>1535</td>
<td>1</td>
<td>7</td>
<td>nil</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td>2015</td>
<td>1948</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>2016</td>
<td>1539</td>
<td>Nil</td>
<td>8</td>
<td>2</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>2017</td>
<td>2040</td>
<td>Nil</td>
<td>10</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Total</td>
<td>8110</td>
<td>3 (0.04%)</td>
<td>41(0.5%)</td>
<td>4 (0.05%)</td>
<td>8(0.09%)</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Total number of positives 56 (0.68%)/8110

**DISCUSSION**

Blood transfusion is a life-saving integral remedy in current medical practices, but also carries contemporary risk of transmitting dreadful TTIs like HIV, hepatitis B and C. With every unit of blood, there is 1% chance of transfusion associated problems including TTI.

The prevalence of TTIs among blood donors in well-structured health care system with a well-organized blood establishment can be used as a reliable tool for statistical estimations of those infectious agents that can be transmitted through blood products and can contribute to statistical estimation of these viruses in the general population “as discussed by Gharehbaghian [5].”

In the present study, the total number of donors being 8110 with the seroprevalence of TTI being (0.68%). The other studies have reported considerably a higher prevalence where Mathai et al. [6] (3.1%), Karmakar et al. [7] (2.79%) and Koshy et al. [8] (2.9%). This was probably achieved by proper counseling of the donors, vigorous screening of donors and donated blood.

Majority of the donors were males (98%) which is comparable to the studies done by Rajvir Singh et al. [1], Rao et al. [90 and Arora et al. [10]. The sero-prevalence of HIV in the present study is (0.04%) which is very low when compared with the whole Indian scenario (0.3%) [11], Gupta et al. [12] (0.08%), Agrawal et al. [13] (0.1%) and Giri et al [14] (0.07%) identified much less number of HIV-infected donors
None of the donors were positive for malaria by RDT from 2013-2017 in the present study. This indicates stringent counseling and proper screening of donors are done so as to prevent transfusion related malaria.

In conclusion, the latest study highlights that blood transfusion is one of the major modes to contact HIV, HBV, HCV, syphilis and malaria. Males as much as the voluntary donors overwhelmingly predominate the donor subpopulation in modern world. HBsAg positivity is more and malaria positivity is least common TTI from the present study. All blood should be tested for compatibility and TTI’s with reduction in unnecessary blood transfusion. Thus ensuring safe blood supply to the recipients. With the implementation of strict donor selection criteria, use of sensitive screening tests and establishment of strict guidelines for blood transfusion the incidence of TTI must be reached to zero levels.

REFERENCES


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