



## Transfusion Transmitted Diseases Among Blood Donors in Tertiary Care Teaching Hospital of Central India

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### ABSTRACT

**Introduction:** Transmission of infectious diseases through donated blood is of concern to blood safety as transfusion forms an integral part of medical and surgical therapy. Among all infections HIV and hepatitis are the most dreadful.

**Aims & Objectives:** To find out the Seroprevalence of transfusion-transmissible infections in blood donors, to find the incidence of spectrum of diseases in blood bank donation, to find the age distribution of the cases studied.

**Material & Methods:** The present study is being undertaken in the Department of Pathology MGM Medical College Indore. This is a retrospective study that was conducted, during the period 2001 –2016. Tests are routinely done on every blood unit to exclude HIV, HBV, HCV, syphilis and malaria. The screening for HIV was done by ELISA using kits. HBS Ag was detected by ELISA. Anti-HCV test was done by ELISA & Syphilis by VDRL.

**Results;** In the present study, 241571 blood donors were observed in the year 2001-16, majority of donors are voluntary donors 68.13 % as compared to replacement/relative donors 31.86 %. Majority of donors are male donors 96.25 % as compared to female donors 3.74%. Seroprevalence of HBV, HCV, HIV & SYPHILIS are 1.80 %, 0.098%, 0.20% and 0.26 % respectively. Seroprevalence is higher in the age group 26-35 years. Overall seropositivity of TTI's (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.12 % as compared to voluntary donors 2.01 %. Overall Seroprevalence of transfusion transmitted disease in all donations in the year 2001-16 is 2.36 %. Conclusion -Voluntary blood donation should be encouraged for prevention of transfusion-transmissible diseases.

**Keywords:** Hepatitis B, Hepatitis C, Transfusion Transmitted Diseases, Voluntary Donors, Syphilis, Replacement Donors

### Introduction

Transmission of infectious diseases through donated blood is of concern to blood safety as transfusion forms an integral part of medical and surgical therapy. Blood transfusion 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. By this study, we intend to find out the seroprevalence of Transfusion transmitted diseases amongst blood donors & age distribution of Transfusion transmitted diseases amongst blood donors.

**Infectious Agents<sup>1</sup>** There are four main groups of micro-organisms known to cause infections namely viruses, bacteria, protozoa and fungi. Only first three groups of microbes - viruses, bacteria and protozoa - have been reported to be transmitted by blood transfusion.

**Viruses** Viruses are the simplest forms of life. Following are some of the viruses which are known to be transmitted through blood<sup>2,3</sup>:

1. Human immunodeficiency virus (HIV)
2. Hepatitis B virus
3. Hepatitis C virus
4. Hepatitis A virus
5. Hepatitis G virus
6. Non - A, Non - B Hepatitis
7. Epstein Barr Virus
8. Cytomegalo virus (CMV)
9. Human T Lymphocytic virus (HTLV - 1 & HTLV - 2)

**Syphilis** Syphilis, an ancient disease is caused by Spirochete *Treponema pallidum*. According to The World Health organization estimates<sup>4</sup>, there are approximate 12 million new cases diagnosed each year. Syphilis has acquired new potential for morbidity with the advent of HIV & AIDS.

Syphilis is a chronic disease caused by *Treponema pallidum*. Treponemes (trepos – to turn & nema - thread)<sup>6</sup> are relatively short, slender spirochetes with fine spirals & pointed or round ends. Transfusion transmitted Syphilis – The first case of Transfusion transmitted syphilis was reported in 1915<sup>5</sup>. 138 cases were reported in the literature by 1941<sup>7</sup>. Cases were mostly discovered in donors with

primary or secondary stage of disease<sup>8</sup>. Treponemes are sensitive to cold; hence risk of transmission through stored blood at 4-8°C is very low<sup>9-10</sup>.

In India, most blood donors are first-time donors<sup>5</sup>. The prevalence of syphilis among blood donors in India was reported to be 0.7%<sup>11</sup>. The global incidence of syphilis in blood donors is variable ranging from 0.75% in Pakistan<sup>12</sup> to 12.7% in Tanzania<sup>13</sup>.

**Aims and Objectives:** The study was conducted in the department of pathology, M.G.M.M.C, Indore.

1. To find out the seroprevalence of Transfusion transmitted diseases (HBV, HCV, HIV & syphilis) in blood donors.
2. To find the incidence of spectrum of diseases in blood bank donation.
3. To find the age distribution of the cases studied.

### Material and Methods

The present study is being undertaken in the Department of Pathology MGM Medical College Indore. This is a retrospective study that was conducted, during the period 2001 –2016. Tests are routinely done on every blood unit to exclude HIV, HBV, HCV, syphilis and malaria. Donors were selected by the standard criteria for donor fitness. The screening for HIV was done by ELISA using kits. HBS Ag was detected by ELISA. Anti-HCV test was done by ELISA.

ABO and Rhesus (Rh) blood groups were determined using blood grouping antisera: anti-A, anti-B, anti-AB, and anti-D. Selection of cases for the study included the donors of MYH Blood Bank.

### Results and Observation

The present study is conducted in the Department of Pathology MGM Medical College Indore and

M. Y. Hospital blood bank. This is a retrospective study that was conducted, during the period 2001 –2016. In the present study, 241571 blood donors are observed in the year 2001-16 in the M. Y. Blood Bank. The data collected from donor register record book, donors form, master record book, HIV, HBV and HCV positive beg number records. The results and observations studies are presented below:

**Table 1: Seropositivity of transfusion transmitted diseases.**

S.No	Total No of Voluntary donors (2001-16)	Total No of Voluntary donors found seropositive for TTI (2001-16)	Total No of Replacement/relative donors (2001-16)	Total No of Replacement/relative found seropositive for TTI (2001-16)
Number	164586	3319	76985	2406
%age	68.33 %	2.01 %	31.85 %	3.12 %

**Graph 1:** Number of blood units collected during the year 2001-16.

Out of total 241571 blood donations, majority of donors are voluntary donors 68.13 % as compared to replacement/relative donors 31.86 %

**Graph 2:** Number of male and female donors during the year 2001-16. Out of total 241571 blood donations, majority of donors are male donors 96.25 % as compared to female donors 3.74%

**Graph 3:** Seropositive donors for HBV, HCV, HIV & SYPHILIS in 2001-16

Seroprevalence of HBV, HCV, HIV & SYPHILIS are 1.80 %, 0.098%, 0.20% and 0.26 % respectively.

**Graph 4:** Age wise distribution of HBV, HCV, HIV & SYPHILIS in 2001-16

Seroprevalence is higher in the age group 26-35 years

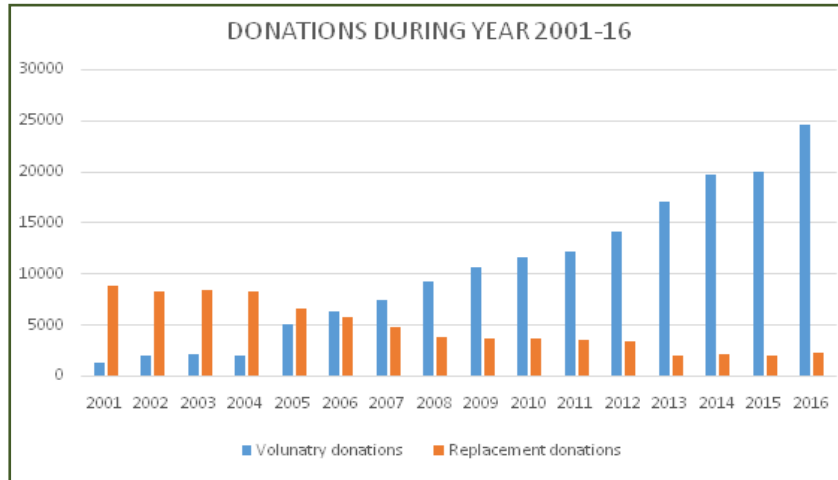
**Table 1:** Seropositivity of transfusion transmitted diseases (HIV, HBV, HCV, Syphilis & Malaria) in 2001-16. Among Voluntary & replacement/relative donors. Overall seropositivity of TTI's (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.12 % as compared to voluntary donors 2.01 %. Over all Seroprevalence of transfusion transmitted disease in all donations in the year 2001-16 is 2.36 %.

### Discussion

**Voluntary or Replacement/Relative Donor -** In our study, Out of total 241571 blood donations, majority of donors are voluntary donors 68.13 % as compared to replacement/relative donors 31.86 %

Similarly majority of donors are voluntary in another study out of 19135 blood donors, 11165 (58%) were voluntary and 7970 (42%) were replacement/relative donors by Nagarekha Kulkarni<sup>14</sup> Associate Professor, Department of Pathology, Vijayanagara Institute of Medical Sciences, Bellary - 583104, Karnataka, India.

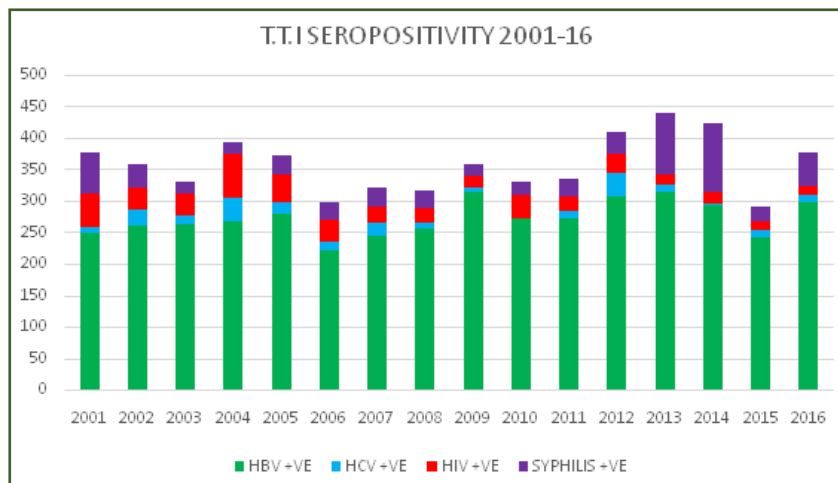
**Male or Female Donor:** In our study, . Out of total 241571 blood donations, majority of donors are male donors 96.25 % as compared to female donors 3.74%. Similarly another study is comparable for majority of donors are male 96.22



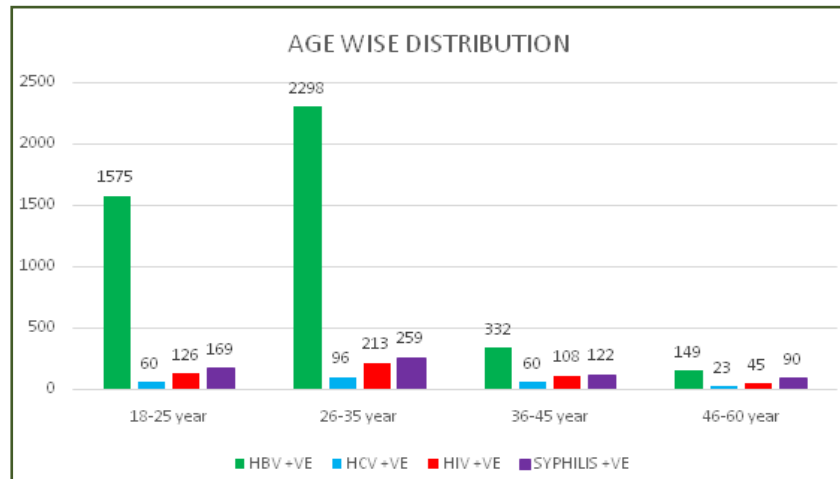
**Graph 1: Number of blood units collected during the year 2001-16. Out of total 241571 blood donations, majority of donors are voluntary donors 68.13 % as compared to replacement/relative donors 31.86 %.**



**Graph 2: Number of male and female donors during the year 2001-16. Out of total 241571 blood donations, majority of donors are male donors 96.25 % as compared to female donors 3.74%.**



**Graph 3: Seropositive donors for HBV , HCV ,HIV & SYPHILIS in 2001-16 Seroprevalence of HBV , HCV , HIV & SYPHILIS are 1.80 % , 0.098% , 0.20% and 0.26 % respectively.**



**Graph 4: Age wise distribution of HBV , HCV ,HIV & SYPHILIS in 2001-16 Seroprevalence is higher in the age group 26-35 years.**

% by Arora Det al<sup>15</sup> in Haryana. In the another study, the percentage of male patients was 73% (860/1178) as compared with 27% (318/1178) for female patients by Jain et al<sup>16</sup> conducted in New Delhi.

**Seroprevalence of HBV:** In our study, the seroprevalence of HBV is 1.80 %in total blood donations in the year 2001-16. Seroprevalence of HBV is comparable to another study with seroprevalence of HBS Ag was 1.7 % by AroraD et al<sup>15</sup> conducted in Haryana. The Seroprevalence of hepatitis B surface antigen was 0.87% noted in hospital-based population by Sood et al<sup>17</sup>conducted in Rajasthan. In another study conducted among donors of interior Sindh (Pakistan) by Mujeeb et al<sup>18</sup>, the Seroprevalence of HBV was 6.2% .

**Seroprevalence of HCV;** In our study, the seroprevalence of HCV is 0.098%in total blood donations in the year 2001-16. This seroprevalence is much lower than the 0.4-5.2% seroprevalence reported in an earlier study conducted in various European countries by Hahneet al<sup>19</sup>. Another study by Viet Le at al<sup>20</sup> found HCV prevalence to be 0.17%.

**Seroprevalence of HIV:** In our study, the Seroprevalence of HIV is 0.20 % in total blood donations in the year 2001-16. Seroprevalence of HIV is low as compared to another study 0.3% in total donors by AroraD et al<sup>15</sup>conducted in Haryana. In another study, the Seroprevalence of antibodies to HIV in hospital population was 0.35% by Sood et al<sup>17</sup>conducted in Rajasthan. This is in accordance with the 2006 estimates of NACO (National AIDS Control Organization), NIHWF (National Institute of Health and Family Welfare), and NMS (National Medical Statistics) which suggest that the national adult HIV prevalence in India is 0.36%. Our Seroprevalence of HIV is very low as compared with another study, the overall Seroprevalence of

HIV was 2.21% by Nagaloet al<sup>21</sup> conducted in Koudougou. Seroprevalence of HIV is low as in another study seroprevalence of HIV was 0.91% Nagarekha Kulkarni<sup>14</sup> in Karnataka. In our study Seroprevalence is low as compared to overall Seroprevalence of HIV (3.8%) by Tessema et al<sup>22</sup>conducted in University of Gondar, Ethiopia

**Seroprevalence of Syphilis; Anti TP (Anti *Treponema pallidum*)** - In our study, the Seroprevalence of Anti TP is 0.26 % . in total blood donations in the year 2008-15 (Graph 3). Seroprevalence of Syphilis is comparable to another study with Seroprevalence of Anti TP was 0.91 % by Sultan S, Irfanm et al<sup>23</sup>conducted in Pakistan. In another study by Elyamany G et al<sup>24</sup>Seroprevalence was found to be 0.044%. In a study conducted at Mangalore, India by Zulfikar A et al <sup>25</sup>seropositivity of syphilis was found to be 0.07%.

**Age Wise Distribution:** In our study, Seroprevalence is higher in the age group 26-35 years. . The seroprevalence of HBV was significantly higher donors in the group aged 20-29 years old than in the group 30-40 years old by Nagalo and Sanou et al<sup>21</sup> conducted in Koudougou. The highest seroprevalence for anti-HIV was found in the age group 31-40 years by Sood et al<sup>19</sup>conducted in Rajasthan. Seroprevalence of Anti TP (2008-15) is higher in the age group 26-35 years for anti TP (0.09 %). In a study conducted at Mangalore, India by Zulfikar A et al <sup>25</sup> incidence of seropositivity was found to be more in donors in the group aged 18-35 years old than in the group 36-55 years old. In a study by Tessema et al<sup>22</sup>, seropositivity of syphilis was found to be 0.9% & 1.7% in age groups 17-25 & 26-35 yrs respectively. In another study by Elyamany G et al<sup>24</sup>seropositivity was found to be highest in age group 21-30 yrs.

### Seropositivity in Voluntary/replacement Donors:

Among Voluntary & replacement/relative donors, overall seropositivity of TTI's (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.12 % as compared to voluntary donors 2.01 %. Over all Seroprevalence of transfusion transmitted disease in all donations in the year 2001-16 is 2.36 %. (Table 1). In study by Nagarekha Kulkarni<sup>14</sup>, the seroprevalence was more in relative/replacement donors as compared to voluntary donors.

### Conclusion

The present study was conducted in the Department of Pathology MGM Medical College Indore and M. Y. Hospital blood bank. This is a retrospective study that was conducted, during the period 2001–2016. Seroprevalence of HBV, HCV, HIV & SYPHILIS are 1.80 %, 0.098%, 0.20% and 0.26 % respectively. Seroprevalence is higher in the age group 26-35 years. Overall seropositivity of TTI's (HIV, HBV, HCV, Syphilis & Malaria) is higher in replacement donors 3.12 % as compared to voluntary donors 2.01 %. Over all Seroprevalence of transfusion transmitted disease in all donations in the year 2001-16 is 2.36 %. HBV, Syphilis & HIV are the most prevalent transfusion-transmissible diseases among blood donors in Indore. Screening and better selection of donors are necessary to improve blood safety in the regional blood transfusion centre of M. Y. Hospital. Therefore, it is concluded that voluntary blood donation should be encouraged for prevention of transfusion-transmissible diseases. The time and cost involved in screening donated blood can be reduced by an effective donor education and selection program that promotes self-exclusion by donors at risk of transfusion-transmissible infections.

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