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**Original Research Paper** 



Pathology

# SEROPREVALENCE OF VARIOUS TRANSFUSION TRANSMITTED INFECTIONS IN BLOOD DONORS- A STUDY OF TWO YEARS DONE IN A TERTIARY CARE HOSPITAL

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ABSTRACT Background: Blood transfusion is life saving but carries potential risk for transfusion transmitted infections (TTIs)<sup>1,2</sup>. The risk of infections is more in multiple transfused patients<sup>3</sup>. To prevent such risk, screening tests play an important role for safe blood transfusions. The most common TTI's are HBsAg, HIV, HCV and Syphilis

and Malaria<sup>4</sup>. **Aim:** To study the seroprevalence of various transfusion transmitted infections(TTI's) like HbsAG, HIV, HCV and Syphilis among

**Aim:** To study the seroprevalence of various transfusion transmitted infections(TTI's) like HbsAG, HIV, HCV and Syphilis among blood donors.

**Methods:** A Retrospective observational study was done for a time period of two years from January 2019 to December 2020 in the blood bank affliated to Government General Hospital, Suryapet, Telangana including all blood donors between 18 to 60 years of age. Screening for transfusion transmitted infections were done for HIV, HBsAG, and HCV by using ELISA and for Syphilis using rapid antigen test.

**Results:** A total of 2116 apparently healthy donors were included in the study. The study included both voluntary donors and replacement donors. Seropositivity for Transfusion Transmitted Infections was found in 54 units (2.55%). Seropositivity for HBsAG (2.17%) is predominant among the donors screened followed by HIV (0.23%) and HCV (0.14%). Most common age group to be sero reactive in the present study is 18-30 years of age.

**Conclusions:** The present study concludes that HBsAG positivity was reportedly higher when compared to other TTTs. Voluntary donors are at high risk of transmitting TTI's than replacement donors.

KEYWORDS : Transfusion transmissible infections(TTI's), Seroprevalence, HbsAG, ELISA, RPR.

# INTRODUCTION:

Blood donation is a life saving intervention but also carries the risk of transmitting transfusion related infections(TTI'S) without screening<sup>1</sup>. The most common transfusion transmitted infections are HIV, HBsAg, HCV, Syphilis and Malaria. Other infections which can be transmitted through blood transfusion are cytomegalovirus, Epstein Barr virus, brucellosis etc<sup>23</sup>. Hence it has been made mandatory to screen blood donors for HIV, Hepatitis B, Hepatitis C, Syphilis and Malaria according to the guidelines of Ministry of Health & Family welfare (Government of India) under the Drug & Cosmetic Act, 1945<sup>4</sup>. The risk of TTI's is higher in remunerated blood donors<sup>3</sup>. The aim of this study was to determine the frequency of HBs Ag, HCV, HIV and syphilis among blood donors in one of the tertiary health centers in Telangana.

### MATERIALS AND METHODS:

### Study design and study period:

A retrospective observational study of two years was conducted in a blood bank of teaching hospital in Suryapet from January 2019 to December 2020. Analysis of data related to blood donors and screening tests for transfusion transmitted diseases were obtained from the records of the blood bank.

### Eligibility criteria:

The age criteria was set between 18 to 60 years including both males and females.Both voluntary and replacement donors were included in the study. Voluntary blood donors who donated blood either as walk-in donors in the blood bank or in the blood donation camps conducted in the nearby villages were included in the study. Replacement blood donors donating blood in the blood bank were also included in the study.

The donors are requested to fill out the donor information card which consists of questionnaire about the demographical, occupational and health details. 5 ml of blood is collected from the patient and set aside for screening for TTI'S.

The collected blood was screened for HIV, HBsAG, HCV and Syphilis using immunoassays.

## TTI Screening Methodologies used:

HCV,HBsAG – 3<sup>rd</sup> generation ELISA HIV(1 and 2)- 3<sup>rd</sup> and 4<sup>th</sup> generation ELISA (TRIDOT) Syphilis- Rapid plasma reagin(RPR)method

### **RESULTS:**

In the present study, 2116 donors were registered during the period of January 2019 -December 2020. All were screened for HIV, HBsAg, Hepatitis C and Syphilis. Among them voluntary blood donors comprised of 77.9% (1648) and replacement donors were 22.1% (468) (Chart 1).

Male donors (2096 /2116) were predominant than females (20/2116) as indicated in table 1.

The seropositivity for TTI'S among the 2116 blood donors was observed in 54 donors (2.55%). The prevalence of HBsAg,HIV and HCV was 2.17%, 0.23% and 0.14% respectively. No cases of VDRL positive cases were observed in the present study period. (table 2). The seropositivity of blood donors for TTI s was observed to be more in voluntary blood donors (36/66.7%) than in replacement donors (18/33.3%) as shown in table 3. The most common age group showing seropositivity was 18 to 30 years of age.(table 4)

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Chart 1: Yearly distribution of voluntary and replacement donors



#### Table 1: Sex distribution of blood donors -year wise

Year	Males	Females	Total
2019	1287	14	1301
2020	809	06	815
	Total=2096	Total=20	Total=2116

### Table 2: Year-wise distribution of seropositivity for TTI'S in blood donors

Year	Donors	HBsAG	HIV	HCV	Syphilis	TTI'S
2019	1301	35	03	02	-	40
2020	815	11	02	01	-	14
	Total=2	Total=	Total	Total=03	Total=0	Total=5
	116	46(2.17 %)	=05	(0.14%)		4
	(100%)		(0.23%)			(2.55%)

#### Table 3: Seropositivity in voluntary vs replacement donors

Year	Voluntary	Replacement
2019	22	11
2020	14	07
Total=54(100%)	Total=36(66.7%)	Total=18(33.3%)

#### Table 4: Age distribution of seropositivity for TTI'S

Age(in years)	No.of seropositive donors
18-30	32
31-40	19
41-50	02
51-60	01
	Total=54

#### DISCUSSION:

Transfusion transmitted infections are a subject of growing concern throughout the world. As per WHO studies, approximately 112.5 million blood units are collected over a year throughout the world necessitating the screening of blood donations before administering to the needed<sup>5</sup>. The risks of giving blood during an infectious window period were estimated as follows: for HIV, 1 in 4, 93,000; for HCV, 1 in 1, 03,000; and for HBV, 1 in 63,000<sup>6</sup>. Hepatitis and HIV are most common infections transmitted via blood transfusion<sup>7</sup>. The objective of blood transfusion is to ensure safety, adequacy, accessibility, and efficiency of blood supply<sup>8</sup>.

The aim of this study was to determine the seroprevalence of HIV, HBV, HCV, and syphilis among healthy blood donors.

The seropositivity for HBsAg was highest among the donors when compared to other TTI'S. The Around 46 donors out of 54 positive donors tested positive for HBsAg infection as shown in table 2. The seropositivity for HbsAg was 2.17% (46/2116). This finding is comparable to other studies like Hassan et al<sup>7</sup> (2016), Sushama et al<sup>8</sup> (2017) and Nithi et al<sup>9</sup> (2017)and which showed preponderance in HBsAg seropositivity compared to other TTI's. The prevalence of HBsAg in the present study was 2.17% which showed nearly similar findings in other studies conducted by Jagadeeswari et al<sup>5</sup> ( 2018), Siraj et al<sup>10</sup>(2018), Saritha et al<sup>11</sup>(2019) and Nilima et al<sup>12</sup>(2010). A comparative study of seropositivity for TTI's in various other studies with the present study is tabulated In Table 5 below.

Study	HBsAG%	HIV%	HCV%
Leena et al,2012 <sup>3</sup>	0.71	0.27	0.14
Hassan et al,2016 <sup>7</sup>	1.7	0.33	0.74
Sushama et al,2017 <sup>8</sup>	1.3	0.26	0.25
Nithi et al,2017°	0.75	0.08	0.13
Siraj et al,2018 <sup>10</sup>	2.0	0.3	0.7
Jagadeeswari et al,2018 <sup>5</sup>	2.18	0.29	0.61
Saritha et al,2019 <sup>11</sup>	2.37	0.28	0.34
Nilima et al,2010 <sup>12</sup>	2.90	0.51	0.57
Present study	2.17	0.23	0.14

The prevalence of HBsAg was highest followed by HIV and HCV in our study which is similar to other studies like Leena et al  $2012^{3}$  and Sushama et al  $2017^{8}$ .

The prevalence of HbsAG followed by HCV and HIV was observed in studies conducted by Jagadeeswari et al  $2018^5$ , Hassan et al  $2016^7$ , Nithi et al  $2017^9$  and Naik et al  $2019^{19}$  which is in contrast to our study.

Majority of them were males when compared to females similar to the studies conducted by Balaji et al 2019<sup>4</sup>, Nithi et al 2017<sup>9</sup>, Mittal et al 2019<sup>15</sup>, Motayo et al 2015<sup>17</sup>. The lower donation rates in females can be attributed to cultural habits, inadequate motivation and lack of awareness about blood donation.

The predominance of seropositivity was observed more in voluntary donors than in replacement donors as seen in other studies Nithi et al 2017<sup>9</sup>, Siraj et al 2018<sup>10</sup> and Sundaramuthy et al 2017<sup>14</sup>. This is in contrast to the study conducted by Mohammed et al 2016<sup>20</sup> where the seropositivity for TTI's was predominantly seen in replacement donors than in voluntary donors. The preponderance of TTI's in voluntary donors can be attributed to asymptomatic carriers and donations in the window period. Hence donations from replacement donors should be encouraged only in emergency situations<sup>13</sup>.

The predominant age group showing seropositivity in our study was between 18 to 30 years of age which is similar to other study conducted by Sundaramurthy et al 2017<sup>14</sup> and in contrast to the study conducted by Xie DD et al 2015<sup>18</sup>.

The total number of donors significantly reduced in 2020 when compared to 2019 as shown in tablw 1. This can be attributed to the global pandemic SARS-COV2.

#### CONCLUSION:

The present study concludes that seroprevalence of HBsAg is high among the blood donors followed by HIV and HCV. The seropositivity for TTIs is more in voluntary donors than in replacement donors. This can be minimized by giving predonation counselling, proper screening techniques and detection of asymptomatic carriers in window period using higher sensitive tests.

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