

## Seroprevalance of infectious diseases among blood donors, a retrospective study in MVJMC&RH in rural Bengaluru

Savita .D<sup>1</sup>, K.R. Uma Bai<sup>2\*</sup>, Sindhu .C<sup>3</sup>, Sumaiya .S<sup>4</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, <sup>3,4</sup>Post Graduate, Dept. of Pathology, MVJMC&RH, Hoskote, Bengaluru, Karnataka, India

**\*Corresponding Author:**

Email: k.umabai2018@gmail.com

### Abstract

**Introduction:** Blood transfusion despite being a lifesaving procedure is still posing greatest threat of transmitting infectious diseases like HIV, HBsAg, HCV, Syphilis and Malaria. Even completely tested unit of blood is hazardous.

**Aim and Objectives:** The aim of the study was to study the trend and prevalence of sero-markers among blood donors in MVJMC&RH in Hoskote Rural Bengaluru.

**Materials and Methods:** A retrospective cross-sectional study was performed from Jan 2011 to Dec 2017 in the blood bank attached to MVJMC&RH. All blood donors who donated in blood bank and outdoor camps during the study period were included and data was analyzed. TTIs testing were done with (ELISA) 4th generation kits for HIV I & II, 3rd generation kits of Hepalisa (HBsAg), and microlisa (HCV) kits for hepatitis C virus. Screening for syphilis was done by RPR and Malaria was detected using (antigen detection kits) Advantage pan malaria cards.

**Results:** There were a total of 9092 blood donors during the study period. out of which 8952 (98.46%) were males and 140 (1.53%) were females. 88 (0.96%) cases were positive for sero-markers for TTIs, Among the 88 seropositive cases, 9 cases of HIV (0.09 %), 48 cases of hepatitis B surface antigen HBsAg (0.52%), 7 cases of hepatitis C virus HCV (0.07%), 23 (0.25%), cases with syphilis reactivity and 1 case of malaria (0.01%) were encountered.

**Conclusions:** Sero-prevalence of TTIs showed a downward trend, probably due to strict donor selection criteria, predonation screening and better education and awareness to donors.

**Keywords:** HBV, HCV, HIV, Prevalence, TTI.

### Introduction

Transfusion of blood and its components is a lifesaving procedure, but it is also a main source of TTI infections, like HIV, HBsAg, HCV, Syphilis, malaria. The Drug and Cosmetic Act, 1945 and its Amendments and guidelines mandates screening of the five major infections: HIV I & II, HBsAg, HCV, syphilis, and malaria in the donated blood units.<sup>1,2</sup> Improvised strategies have been taken by NACO to combat the transmission of TTI. In (2007) NACO recommended 3rd or 4th generation ELISA/HIV I & II test kits with high sensitivity for screening donated blood units at blood banks.<sup>3</sup>

Few factors such as donor concealing their high risk behavior, window period, immunologically variant viruses, silent carriers, are some of the serious treats for safe blood transfusion. Despite all the stringent donor screening and testing methods, 100% safe blood free from transfusion-transmitted infections (TTIs) remain a greatest challenge which most of the blood banks are facing today.

### Aims and Objectives

In our study, we aimed to estimate the seroprevalence of HIV, HBV, HCV, Syphilis and Malaria and also to assess increasing or decreasing trends of Transfusion Transmitted infections among healthy blood donors in this region of rural Bengaluru.

### Materials and Methods

Previous data from blood bank records at the MVJ Medical College and Research Hospital, Rural Bengaluru were reviewed retrospectively from January 2011 to December 2017. The prevalence and trends of TTI's were assessed. A strict donor selection criteria was followed as per NACO guidelines, A written consent was taken, and a detailed pre donation questionnaire was filled by donors before the collection of blood, collected donor blood units were screened for TTI using commercially available Microlisa 4th generation enzyme-linked immunosorbent assay (ELISA) HIV kits for HIV I & II, 3rd generation kits of Hepalisa, J. Mitra for hepatitis B surface antigen (HBsAg), and Microlisa HCV kits for hepatitis C virus. Screening for syphilis was performed with Aggape diagnostics RPR and Malaria was detected using (antigen detection kits) Advantage pan malaria cards. All seropositive cases were retested for further confirmation and all the seropositive cases were referred to IEC counseling centers.

### Results

From total of the 9092 units of blood collected over a 7-year period, 8952 (98.46%) were male and 140 (1.53%) were female donors. Male donors formed the majority 8952 (98.46%). When compared to female donors. There were 88 seroreactive cases (0.96%). These included 9 cases of HIV (0.09%), 48 cases of hepatitis B surface antigen HBsAg (0.52%), 7 cases of

hepatitis C virus HCV (0.07%), 23 cases of (0.25%) with syphilis and 1 case of malaria (0.01%). Majority of Transfusion transmitted infections were found among blood donors of 18–30 (65%) years age group and

followed by 31– 40 (25%) years of age and 1 case of HCV was reported in the 51 – 60 (1.13%) years of age group. (Table 1), (Table 2)

**Table 1: Year wise distribution of seropositive donors**

Year	No of donors	HIV	HBsAg	HCV	Syphilis	Malaria	Percentage
2011	1102	1	9	-	5	-	1.36%
2012	1497	-	9	-	12	-	1.40%
2013	1316	2	9	2	3	-	1.21%
2014	1208	1	4	1	1	-	0.57%
2015	1471	1	11	1	2	-	1.01%
2016	1300	1	6	-	-	-	0.53%
2017	1198	3	1	3	-	1	0.58%
<b>Total</b>	<b>9092</b>	<b>9</b>	<b>48</b>	<b>7</b>	<b>23</b>	<b>1</b>	

**Table 2: Age wise distribution of seropositive donors**

Age group-	HIV	HBsAg	HCV	Syphilis	Malaria	Percentage
18-30yrs	4	32	6	14	1	64%
31-40yrs	5	10	-	8	-	24%
41-50yrs	-	6	-	-	-	6.9%
51-60yrs	-	-	1	-	-	1.13%
<b>Total</b>	<b>9</b> <b>(10.2%)</b>	<b>48</b> <b>(54.54%)</b>	<b>7</b> <b>(7.95%)</b>	<b>23</b> <b>(26.13%)</b>	<b>1</b> <b>(1.13%)</b>	<b>100%</b>

**Table 3: Sex distribution of seropositive donors**

TTI	Male	Female
HIV	9	0
HBSAg	48	0
HCV	7	0
Syphilis	22	1
Malaria	1	0
<b>Total</b>	<b>87</b>	<b>1</b>

**Table 4: Comparison of prevalence rate of TTI from various studies of India**

Studies	Study region	HIV	HBsAg	HCV	Syphilis	Malaria	Total
Leena MS et al 2004-2010	South India	0.27%	0.71%	0.14%	0.10%	0.129%	1.35%
Ahmed. Z et al 2008-2011	Mangalore	0.1%	0.5%	0.08%	0.07%	-	0.82%
Kumar. R et al 2008-2013	Punjab	0.26%	1.03%	1.53%	1.74%	0.006%	4.57%
Om Bodairya et al 2008-2013	Gujarat	0.16%	0.60%	0.10%	0.52%	-	1.32%
Fulzele P P et al 2014-2105	Mumbai	0.6%	1.8%	0.7%	0.22%	0.017%	3.33%
Dobariya GH et al 2011-2016	Gujarat	0.081%	0.98%	0.098%	0.16%	0.024%	1.34%
Prashant K Rayet al 2009-2011	Kolkata	0.60%	1.41%	0.54%	0.23%	-	2.78%
<b>Current study 2011-2017</b>	Bangalore	0.09%	0.52%	0.07%	0.25%	0.01%	0.94%

## Discussion

A well-equipped Blood bank or Transfusion medicine Department screen for TTI infections and also provide fair estimation of the prevalence of these infections in general population.<sup>4</sup> Which help in adapting newer polices to reduce TTI's.

The sero-prevalence of TTIs found in this study was 0.96%. The sero-prevalence was <1% for all TTIs. Out of 9092 donors, Male donors formed the majority 8952 (98.46%) and 140(1.53%) were female donors. when compared to female donors, Male donors constituted the majority of TTI positive infections, this may be due to majority of female donors got deferred due to anemia & underweight which is common in rural population, so newer strategies have to be implemented to increase number of female donors. (Table 3), (Table 4)

The sero-prevalence of TTIs found in this study is 0.96%, is lower compared to other studies Which ranged between 1.32% - 4.57%.<sup>5-7</sup> Majority (64%) of cases were seen in males in the 18–30 years age group, Dobariya GH et al and Leena et al, Ahmed et al showed similar finding,<sup>6,8,9</sup> it is matter of concern as the younger age group are worst hit. Stringent measures have to be taken to reduce the TTI infections and prevent further spread of infection by referring them to IEC.

In this study we reported the highest number of blood donors with Hepatitis B (0.52%) followed by syphilis (0.25%), HIV (0.09%), HCV (0.07%), malaria (0.01%). Among all TTIs Hepatitis B (0.52%) showed the highest prevalence, most of the other studies showed similar findings of HBsAg among blood donors than HIV, HCV and syphilis.<sup>6-8,10</sup>

As per NACO 2015 report the incidence of HIV in blood donors is 0.45%.<sup>11</sup> According to NACO annual report of year 2016-2017 (till sept) around 88.8 lakhs general individuals are tested for HIV and out which 96,648 (1.09%) were diagnosed with HIV. NACO report shows the declining trend over the years from 5% in 2008-09 to 1.09% in 2016 -17.<sup>12</sup>

The overall prevalence of HIV seropositivity is (0.09%) in our study, Dobariya GH et al also showed similar to prevalence of 0.08%.<sup>6</sup> HIV is high in other studies reported by Kumar et al, Leena et al and Prashant et al, which ranged between 0.1% - 0.6%.<sup>7,8,10.</sup>

WHO has estimated that more than two billion people in the world have been infected with HBV and about 257 million people are living with HBV infection (surface antigen positive) with majority in developing countries of Asia and Africa. About 3.9 million of people are affected by HCV with increased risk of cirrhosis of liver.<sup>13</sup>

The prevalence of HBsAg seropositivity (0.52%) and HCV seropositivity (0.07%) Ahmed et al for showed similar prevalence for HBsAg, & HCV,<sup>9</sup> both HBsAg and HCV prevalence is low when compared to

the other studies which ranged between (0.60% -1.8%), and (0.09%-1.53%).<sup>6-8,13,14</sup>

Over all incidence of HBsAg positivity showed a significant downward trend during the study period with a slight spike in 2015.

Syphilis positivity (0.25%) is high when compared to other study, which ranged between (0.07% - 0.23%),<sup>6-10,14</sup> Om Badariya et al, Kumar et al, studies showed higher prevalence of (0.52%, &1.74%).<sup>5,7</sup> The positivity for syphilis showed a significant downward trend over the study period with no cases reported in last 2 consecutive years. Malaria (0.01%) showed low prevalence rate in this study when compared to other studies of Dobariya GH et al & Leena MS et al.<sup>5,8</sup> However (Kumar R et al)<sup>7</sup> showed further lower prevalence compared to our study.

Low prevalence of HIV, HBsAg, HCV, Syphilis, malaria may be due to, variation in population, stringent predonation screening, education and counseling for self deferral of donors. A good number of donors in our study are medical students who come for voluntary donation and are likely to be from a better socioeconomic background than the donor population of local area, this might have contributed for lower prevalence.

Sero-positivity for TTIs decreased from year 2011 (1.36%) to (0.56%) in 2017. The downward trend of all TTI of all HIV, HBsAg, HCV, syphilis, malaria is an encouraging finding in our study. Kurl A et al (1993-2003) in Ludhiana, reported declining trend of sero-markers of HIV, HBsAg, HCV.<sup>15</sup> The lower prevalence of TTI definitely contributes in improving safe blood transfusion.

## Conclusion

Infections pose a definite risk to the recipients of blood components. Risks can be reduced by following the strict donor selection criteria, predonation screening and better education and awareness given to the donor for self deferral, screening of blood units by using more sensitive methods to detect infection early, in window period, like Nucleic acid testing assays for HIV, HBsAg and HCV. This will definitely help in providing safe blood to needy patients, thereby decreasing the incidence of Transfusion Transmitted Infections.

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