

ORIGINAL RESEARCH ARTICLE**A Retrospective Study of Screening of Common Transfusion Transmitted Infections in the Blood Bank of a Tertiary Care Centre**

*Syed Sarfaraz Ali¹, Rangrao Deshpande², Saroj Deoghare³,
Vijay Dombale⁴ and Prajakta Chandrakant⁵*

Senior resident, Department of Pathology, Shree Swami Samarth Blood Bank, B.K.L Walawalkar Hospital, Sawarde¹, Professor and Head, Department of Pathology, B.K.L Walawalkar Rural Medical College, Sawarde², Senior resident, Department of Pathology, Shree Swami Samarth Blood Bank, B.K.L Walawalkar Hospital, Sawarde³, Principle, B.K.L Walawalkar Rural Medical College, Sawarde⁴, DMLT student⁵

Abstract:**Background:**

Blood is one of the essential components of body. The Blood Transfusion saves millions of lives each year globally. However, there are adverse consequences associated with it.

Aim:

To study the seroprevalence of Transfusion Transmissible Infections in blood bags donated in blood bank.

Materials and methods:

A retrospective review of donors record covering the period between 2013 to 2017 was analysed and all blood bags were screened for HIV, HBsAg, HCV, syphilis and malaria.

Results:

The overall prevalence of HIV, HbsAg, HCV, syphilis and malaria were 0.03%, 0.80%, 0.07%, 0.05% and 0.01% respectively.

Conclusion:

All blood bags must be screened for TTI's, thus ensuring safe blood supply to the recipients. The strict donor selection criteria by applying FDA approved IIIrd generation screening tests along with strict guidelines for blood transfusion to reduce the incidence of TTI in recipient of blood.

Keywords:

Blood donors; Blood transfusion; Transfusion transmissible infection

How to cite this article: Syed Sarfaraz Ali, Rangrao H. Deshpande, Saroj B. Deoghare, Vijay Dombale, and Prajakta Chandrakant. A Retrospective Study of Screening of Common Transfusion Transmitted Infections in the Blood Bank of a Tertiary Care Centre. Walawalkar International Medical Journal 2017; 4(2):07-16.

<http://www.wimjournal.com>

Address for correspondence:

Dr. Syed Sarfaraz Ali, Department of Pathology, Shree Swami Samarth Blood Bank, B.K.L Walawalkar Hospital, Sawarde-415606, Tal. Chiplun, Dist. Ratnagiri, Maharashtra, India,

E-mail: sarfarazhayaz@gmail.com, Mobile No.:918147756719

Received date: 12/12/2017

Revised date: 16/12/2017

Accepted date: 23/12/2017

DOI Link: <http://doi-ds.org/doi/10.2017-67884449/>

Introduction:

Blood Transfusion is a life saving intervention and millions of lives are saved each year globally through this procedure.⁽¹⁾ However, blood transfusions are also associated with certain risks which can lead to adverse consequences. It may cause acute or delayed complications and carries the risk of the transmission of infections.⁽²⁾

Globally, more than 81 million units of blood are donated each year.⁽³⁾ More than 18 million units of blood are not screened for transfusion-transmissible infections. Unsafe blood remains a major threat for the global spread of transfusion transmissible infections.

(1)

According to WHO, safe blood is a universal right, which means blood that will not cause any harm to the recipient & that has

been fully screened & is not contaminated by any blood-borne disease such as HIV, Hepatitis B & Hepatitis C, Malaria, Syphilis.^(3,4) A crucial requirement in the procurement of safe blood is to have a National program for donor selection, recruitment, retention, and education; this will minimize donations from donors who might transmit diseases to the recipients.

An unsafe blood transfusion is very costly both from human and economic point of view. Morbidity and mortality resulting from the transfusion of infected blood have far reaching consequences, not only for the recipients themselves but also for their families, their communities and the wider society. The economic cost of the failure to control the transmission of infection includes increase requirement for medical care, higher

level of dependency, loss of productive labour force and placing heavy burden on already overstretched health and social services on national economy⁽³⁾

The improved screening and testing of the donors have significantly reduced transfusion transmitted diseases in most of the developed countries. However, the scenario in developing countries is not so. Many studies have also shown that seroprevalence of these diseases is very low or negligible in case of voluntary donors as compared to replacement donors.⁽⁵⁾

The aim of present study was to know the status of Transfusion Transmissible infection in blood samples donated from 2013 to 2017 and to compare the seroprevalence in the donors in remote areas of Ratnagiri District.

Material and Methods:

Study design:

This is blood bank based retrospective study conducted in Swami Samarth blood bank of B.K.L. Walawalkar Hospital, Dervan. The records of blood bags that were donated to blood bank from 2013 to 2017 were analyzed. The permission from head of the Institution and B.T.O. (Blood Transfusion Officer) was obtained.

Study population:

Total **7939** blood bags were collected through voluntary blood donations in blood bank as well as in the camps organized by hospital. The male and female donors between the age group of 19 to 50 years having weight more than 45 kg were included while persons having history or in treatment of TTI's, hypertension, diabetes, epilepsy were excluded. Lactating and pregnant females were also excluded.

Methods:

The blood from voluntary donors were collected according to WHO guidelines⁽³⁾ and detailed past history of immunization was taken. In the blood bank sera were separated and all the units were screened for HIV, HBV, and HCV by NACO approved IIIrd generation ELSA kits using immunochromatographic sandwich assay principle; while for testing of syphilis Rapid plasma Reagin method and for Malaria Rapid Malarial Antigen Card Test was used.

All the reactive/positive blood bags were analyzed within 7 days of collection. All the bags in grey zone were discarded as per the WHO guidelines. Validity of test was assured as per given criterion.

Statistical analysis:

The data entry was carried out using Microsoft Office Excel 2007 worksheet and

percentage and proportions for each variable was calculated.

Results:

A total of 7939 records were reviewed and it is found that maximum blood bags were received in year 2013 (i.e. 2205 blood bags) and minimum in 2017 (i.e. 1148 blood bags) (Table 1). The age and sex wise contribution was elaborated by table 2 while the reactive/

positive blood bags for TTI's were displayed in table 3. The age wise seroprevalence of HIV, HBV, HCV, Malaria and syphilis were summarized in (Table 4) and the sex wise distribution of TTI was explained in (Table 3). The Taluka wise distribution of blood bags received is depicted in Table 5.

Table 1. Year wise distribution of Blood Bags received.

Year	No. of Blood Bags received
2013	2205
2014	1587
2015	1452
2016	1547
2017	1148

Table 2. The age and sex wise contribution of donors

Sr. No	Age group	Total blood bags	Male	Female
1	19 – 20	1118	1029 [12.96%]	89 [1.12%]
2	21 – 30	3449	3291 [41.45%]	158 [1.99%]
3	31 – 40	2096	2008 [25.29%]	88 [1.10%]
4	41 – 50	1019	971 [12.23%]	48 [0.60%]
5	51 – 60	254	243 [3.06%]	11 [0.13%]
6	61 – 70	3	3 [0.03%]	0 [0.00%]
Total		7939(100%)	7545 [95.03]	394 [4.96%]

The majority of donation was done by male 7545 (95.03%) followed by females 394 (4.96%) with maximum donors (3449) were in the age group of 21 – 30 years (Table 2)

Table 3. Distribution of reactive/ positive and safe blood bags.

Total no. of blood bags collected	Total no. of Reactive/Positive blood bags	Total no. of Safe blood bags
7939	78 [0.98%]	7862 [99.03%]

Out of total **7939** blood bags 78(0.98%) bags were found to be reactive/ positive for Transfusion transmissible infections (Table 3).

Table 4. The age wise seroprevalence of TTI's

Age Group	Total blood bags	HIV	HBsAg	HCV	VDRL	M.P
19 - 20	1118	0	4[0.05%]	1[0.08]	0	0
21 - 30	4349	2[0.02%]	29[0.36%]	3[0.03%]	2 [0.02%]	1[0.01%]
31 - 40	2096	0	22[0.27%]	2[0.02%]	2 [0.02%]	0
41 - 50	1019	1[0.01%]	8[0.1%]	0	0	0
51 - 60	254	0	1[0.01%]	0	0	0
61 - 70	3	0	0	0	0	0
Total	7939	3[0.03%]	64[0.80%]	6[0.07%]	4[0.05%]	1[0.01]

Among **78** TTIs reactive/ positive bags the majority were of HBsAg reactive/positive (64 bags (0.80%)) and the maximum donors are within the age group of 21 to 40 years. Whereas HCV, VDRL, Malaria and HIV blood bags were reactive/positive within the age group ranging from 21 to 30 years (Table 4)

Out of **7939** blood bags maximum donation was done in Chiplun Taluka (3238 bags) followed by Dapoli, Ratnagiri, Ghuhagar, Khed and Sangmeshwar (Table 5). The others include Sindhudurga, Malvan, Raigadh etc. which contributes 7.9% of total blood bags.

Table 5. Taluka wise distribution of donors

Sr. No.	Region	Total blood bags.	HIV	HBsAg	HCV	VDRL	MP
1	Chiplun	3238[40.78%]	0	28[0.35 %]	2[0.02%]	3[0.03%]	1[0.01%]
2	Khed	670[8.43%]	0	4[0.05%]	0	0	0
3	Dapoli	981 [0.10%]	1[0.01%]	7[0.08%]	1[0.01%]	0	0
4	Guhagar	738 [9.29%]	1[0.01%]	8[0.1%]	1[0.01%]	0	0
5	Sangmeshwar	619 [7.79%]	0	5 [0.06%]	0	0	0
6	Ratnagiri	740 [9.32%]	0	5 [0.06%]	0	0	0
7	Lanja	211 [2.65%]	0	0	0	0	0
8	Rajapur	110 [1%]	1[0.01%]	1[0.01%]	1[0.01%]	1[0.01%]	0
9	Others	632 [7.96%]	0	5[0.0%]	0	1[0.01%]	0
	Total	[7939]	3[0.03%]	64[0.80%]	6[0.07%]	4[0.05%]	1[0.01%]

Discussion:

Transfusion of blood and blood components is a life saving measure and help the patient worldwide. At the same time however blood transfusion is an important mode of transmission of infections to the

recipient. In developing countries the prevalence of TTIs is much higher and quite far from attending a zero risk level at the present moment.⁶

This study showed that 7939 blood bags donated from the year 2013 to 2017. Out of total, 78 blood bags had serological

evidence of TTI's; most frequently being Hepatitis B. The results of this study when compared with the studies conducted by P. Pallavi et.al⁽⁸⁾, R .H. Deshpande et al⁽⁵⁾,

Kirana Pailoor et.al⁽⁹⁾ and Varsha G Sul et.al⁽¹¹⁾, they also found higher prevalence of HBsAg followed by HCV, Syphilis, HIV and Malaria in there respected area.(Table 6)

Table 6. Comparison of our study with others.

	Sangeet a Puhuja et.al Delhi (2002 - 2005)⁽⁷⁾	P. Pallavi et.al Mysore (2004 - 2008)⁽⁸⁾	R. H Deshpande et.al Latur (2007 - 2011)⁽⁵⁾	Kirana Pailoor et Karnataka al.(2008 - 2012)⁽⁹⁾	Dharmesh Sharma Gwalior et.al (2009 2013)⁽¹⁰⁾	Varsha G Sul et al Solapur (2012 - 2014)⁽¹¹⁾	Our Study Dervan (2013 - 2017)
years	4	5	5	5	5	3	5
cases	28,956	39060	83,245	27,990	6,7123	33,783	7939
positive cases	1000	4273	3088	160	2747	922	78
HIV	646	170	329	17	91	227	03
HBsAg	163	497	2368	87		601	64
HCV	191	90	193	18	161	145	06
VDRL		111	198	35	114	49	04
MP				03	21		01

In this study the Total 7939 blood bags were donated out of which 78 bags are reactive/ positive for TTIs. The prevalence of TTIs among Indian blood donors are reported to be ranging as follows; HBV 0. 66% to 12%,

HCV 0.5 to 1.5%, HIV 0.08% to 3.87% and Syphilis 0.85% to 3.0% .The data providing a picture of TTIs burden from the different parts of India has also come from various seroprevalence studies (**Table 7**)

Table No.7: Comparison of transfusion transmitted infections: Prevalence rate in different parts of India.

Place	Bags tested	HIV reactive	HbsAg reactive	HCV reactive	VDRL reactive	MP positive
Mangalore ⁽⁶⁾	9599	6	33	6	11	1
Dehradun ⁽¹²⁾	6751	9	67	13	42	0
Ahmednagar ⁽¹³⁾	5661	4	62	42	4	
Bhopal ⁽¹⁴⁾	5008	26	149	29	12	
Lucknow ⁽¹⁵⁾	39060	170	497	9	111	
New Delhi ⁽⁷⁾	28966	163	646	192		
Ludhiyana ⁽¹⁶⁾	44064	37	290	483	373	
Gwalior ⁽¹⁰⁾	67132	91	2360	161	114	
Ratnagiri (Our study)	7939	03	64	6	04	21

Conclusion:

Thus the present concluded that Hepatitis B infection still continues to be a menace to the society because, the incidence of the disease is still very high in the general population. The implementation of strict selection criteria of donors as per guidelines laid down for blood banks in gazette notification of Government of India should be followed strictly.⁽¹⁷⁾ The methods to ensure a safe blood supply should be encouraged. There should be centralized blood collection systems having better personnel and equipment, and non remunerated voluntary blood donations must be strongly encouraged.

Conflict of interest: None to declare

Source of funding: Nil

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