

Transfusion transmissible infection- a 7 years prospective study in RIMS hospital, Manipur

Dr Pratima Khoyumthem¹, Dr. K. Rachandra singh², Dr. Laikangbam
Dayalaxmi³, Dr. Eric Hilton Wanniang⁴, Dr. Eswara Moorthy G⁵,
Dr. A Barindra Sharma⁶

¹Blood Bank Officer, Department of Transfusion Medicine, RIMS, Imphal,

²Assistant Professor, Department of Transfusion Medicine, RIMS, Imphal,

³Senior Resident, Department of Transfusion Medicine, RIMS, Imphal,

⁴PGT, Department of Transfusion Medicine, RIMS, Imphal,

⁵PGT, Department of Transfusion Medicine, RIMS, Imphal,

⁶Professor & H.O.D, Department of Transfusion Medicine, RIMS, Imphal, email

Correspondence & Reprint: - Dr. K. Rachandra singh,

Assistant Professor, Department of Transfusion Medicine, RIMS, Imphal

Abstract

Background: Blood transfusion is not without risks. Among all risks, transmission of infections is a very serious issue. Hence to increase blood safety we need to monitor the trend of transfusion transmissible infections (TTI) in donated blood units.

Aims and objective: To determine the prevalence and trend of TTI.

Methods: A prospective observational study was conducted for a period of 7 years, from 2012 to 2018. Donors were categorized as voluntary blood donors (VBD) and replacement blood donors (RBD). Each donated blood unit was tested for HIV, HBV, HCV, syphilis and malaria.

Results: Out of 83,329 donors, 75997(91.2%) were males and 7332(8.79%) were females. Total RBDs were 51,458(61.75%) and VBDs were 31,871(38.24%). Overall TTI positive rate was 1.70%. Among VBD it was 1.56% and among RBD it was 1.79%. HCV was the commonest TTI, followed by HBV. HIV came in the third. Syphilis came in the fourth. There was no malaria cases.

Conclusion: Strict selection of donors after proper history taking and physical examination should be reinforced. Introduction of advanced technology in TTI testing is needed to enhance blood safety.

Key words: Transfusion transmissible infection, donor, blood safety.

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I. Introduction

Blood is a life saving resource. Nevertheless, every unit of blood carries the risk of transfusion transmissible infection(TTI). Blood transfusion is an integral part of medical treatment and transmission of infectious diseases through donated blood is an alarming situation. The magnitude of TTI varies from country to country and within a country from one region to another, depending on the TTI load in that particular population.

According to the National AIDS Control Organisation (NACO) guidelines all blood samples meant for transfusion must be tested for human immunodeficiency virus(HIV) 1 and 2, hepatitis B, hepatitis C, syphilis and malaria.¹ It is the duty of blood bank to protect patients from acquiring TTIs by doing recommended testing before issuing blood.

The aim of this study was to determine the prevalence of TTIs in blood donors, voluntary as well as replacement and to evaluate trends in TTIs in blood donors.

II. Materials And Method

This study was a prospective observational one. It was conducted at Regional Institute of Medical Sciences, Imphal, for a period of 7 years from 2012 to 2018 after getting ethical clearance from the Institutional ethics committee. Donors were categorized as replacement blood donors (RBD) and voluntary blood donors(VBD). Voluntary donor is a donor who donates his blood without any pressure and monetary benefit. Donors who donated in donation camps were also included in this category. Replacement donors are the

members of family or friend circle who donate their blood in replacement of the blood needs of a particular patient.

Donor selection was based on two important things: medical history and physical examination. Pre-donation counseling by trained staff was done during which information on TTI and high risk behavior, tests carried out on donated blood, need for honest answer in view of window period etc were given. Each donor was required to fill a medical history questionnaire and consent form. This form was evaluated for either accepting or temporary deferral or rejection by medical officer.

Blood from every blood unit was collected in correspondingly labeled pilot tubes. Blood from these pilot tubes were tested for HIV 1 & 2, HBV, HCV, syphilis and malaria as per the NACO guidelines. HIV test, HBV screening and HCV were done using ELISA test/ Rapid test approved by NACO. Syphilis screening was done by I RPR method. Malarial parasite screening was done manually.

III. Results

There was total blood collection of 83,329. Out of this 27,490 were from VBD males, 4381 from VBD females, 48,507 from RBD males and 2951 from RBD females. In total there were 75997 (91.2%) male donors and 7332 (8.79%) female donors. Total RBDs were 51,458(61.75%) and VBDs were 31,871(38.24%).

Table 1 showing the distribution of blood donors

YEAR	VBD-Male	VBD-Female	RBD-Male	RBD-Female	TOTAL
2012	4322	549	6294	448	11,613
2013	4278	738	5795	320	11,131
2014	4171	670	6900	381	12,122
2015	4775	577	6897	183	12,432
2016	4352	742	6810	409	12,313
2017	3236	611	7337	421	11,605
2018	2356	494	8474	789	12,113
	27490	4381	48507	2951	83,329

Table 2 showing the distribution of TTI in the blood donors

TTI	VBD MALE	VBD FEMALE	RBD MALE	RBD FEMALE	TOTAL
HIV	47	6	100	9	162(0.19%)
RPR	14	0	14	1	29(0.03%)
HBV	196	15	349	6	566(0.67%)
HCV	214	8	440	4	666(0.79%)
	471	29	903	20	1423(1.70%)

The number of TTI positive cases among VBD was 500(1.56%) and no. of TTI positive cases among RBD was 923(1.79%). HCV cases recorded maximum number yearwise and as a whole among the TTI(shown in table 3).

Table 3 showing the yearwise distribution of TTI in the blood donors

	HIV	RPR	HBV	HCV	
2012	27	3	100	112	242
2013	23	10	111	111	255
2014	33	4	88	115	240
2015	19	4	71	89	183
2016	5	0	73	80	158
2017	13	4	56	54	127
2018	42	4	67	105	218
TOTAL	162	29	566	666	1423

IV. Discussion

The majority of donors in our study were males(91.20%) which is comparable to other studies done by Malini KP et al²(97.87%), Rao P and Annapurna K³ in Pune, Dolly R et al⁴ in Vellore, Arora D et al⁵ in Southern Haryana, Singh K et al⁶ in Coastal Karnataka, Pahuja S et al⁷ in Delhi and Singh B et al⁸ noting more than 90% of the male donors. In our study females constituted 8.79% of all donors.

In our study replacement blood donors formed 61.75%(51,457) and voluntary blood donors formed 38.24%(31,871). Similar predominance of RBD was noted by Singh B et al⁸ (82.4%), Kakkar N et al⁹(94.7%), Pahuja S et al⁷ (99.48%) and Arora D et al⁵ (68.6%). In contrast predominance of VBD was shown by the studies of Bhattacharya et al¹⁰ and also Malini KP et al².

	HBV	HIV	HCV	VDRL
Present study	0.67%	0.19%	0.79%	0.03%
Secunderabad,Hyderabad ²	0.86%	0.35%	0.22%	0.12%
Indore,MP ¹¹	1.77%	0.14%	0.099%	0.04%
Eastern india ¹²	2.27%	0.64%	1.62%	1.62%

Kolkata ¹³	1.55%	0.32%	0.35%	0.35%
Haryana ⁵	1.7%	0.30%	1.0%	0.9%
Baroda ¹⁴	0.85%	0.30%	0.21%	0.25%
Delhi ⁷	2.33%	0.56%	0.66%	-
Mysore ¹⁵	1.27%	0.49%	0.23%	0.2815%
Ludhiana ¹⁶	0.66%	0.084%	1.0%	
Lucknow ¹⁷	1.96%	0.23%	0.85%	0.01%
Bhopal ¹⁸	2.9%	0.51%	0.57%	0.23%
Mangalore ¹⁹	0.34%	0.06%	0.06%	0.11%
Bareilly ²⁰	1.93%	0.27%	1.02%	0.16%
Central Karnataka ²¹	2.12%		0.1%	

As shown in the above table, the prevalence of HBV among blood donors in different studies conducted across the country ranges from 0.34% to 2.9%. The finding in our study is 0.67% which fits in this range. Worldwide prevalence of HBV is very diverse ranging from 1/270,000 in United States²² to 8.1% in Nigeria²³ and Mongolia²⁴.

Prevalence of HIV infection in our study was 0.19% which is comparable to the findings of other studies across India. Previous studies in India showed prevalence rate ranging from 0.06% to 0.64%. On comparing with global prevalence of HIV, it ranges from 1/2,135,000 in a study conducted in United States²² to 3.1% in Nigeria²³. HIV prevalence in blood donors in a study conducted at Nepal²⁵ was 0.12%.

Prevalence of HCV in our study was 0.79% and its prevalence in different studies in India ranges from 0.21% to 1.62%. Our finding fits in this range. Global prevalence of HCV in different studies ranges from 0.3% to 8.7%.

In our study we got the prevalence rate of syphilis in TTI as 0.03%. In India, the prevalence rate of syphilis as TTI ranges from 0.01% to 1.62%.

We did not find a single case of malaria in a total of 83,328 donors. Similar findings were reported by Pallavi P et al¹⁵ and Yadav BS et al¹¹

A study from Yaounde, Cameroon²⁶, found 16.5% donors positive for Plasmodium species infection. The prevalence of malaria parasitemia in blood donors in a Nigerian teaching hospital was 30.2%²⁷. In Mangalore(India)¹⁹, prevalence of malaria was 0.01%.

V. Conclusion

To sum up, HCV is the commonest TTI in our donor population. This is followed by HBV. Prevalence of HIV came in the third rank. Syphilis is the least prevalent in our donor population.

Overall, the prevalence of TTI in our donor population was found to be 1.7%. There was no significant difference between RBD(1.79%) and VBD(1.56%) in our study.

We should continue with strict selection of donors based on physical examination, strict history taking and confidential counseling. We should introduce advanced technology such as nucleic acid amplification techniques(NAT). NAT decreases the window period to a great deal and hence decrease the incidence of TTI.

To conclude, in order to provide safe blood for transfusion introduction of NAT at our centre is the need of the hour.

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