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Original Research Article

Seroprevalence and Trend of Transfusion Transmitted Infections among blood donors in the eastern part of Bangalore city: A 3 year study

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ABSTRACT

Introduction: For nearly eight decades, the transfusion of blood has been an integral part of medical practice. Though it is a life saving measure, every transfusion still bears the potential risk of Transfusion Transmitted Infections.
Aim: To assess the proportion of voluntary and replacement blood donors and to evaluate the prevalence and trend of various TTIs in a well-established blood bank located in the Eastern part of Bangalore.
Materials and Methods: The data for the current retrospective study was collected over a period of 3 years and 3 months from October 2015 to December 2018. Donors were screened for anti-HIV 1 and 2, HBsAg, and anti-HCV, using commercially available third-generation ELISA test kits, while syphilis and malaria were screened for using card test and rapid malaria test, respectively.
Results: Among 2514 donors, 2411 (95.9%) were voluntary and 103 (4.1%) were replacement donors. 2431(96.7%) were males and 83 (3.3%) were females. Seroprevalence of HIV, HBsAg, anti- HCV, syphilis, and malaria were 0.24%, 0.83%, 0.27%, 0.04%, and 0.12% among all donors, respectively. Among the various TTIs, majority of cases were of HBV (55.3%) followed by HCV (18.4%), HIV (15.8%), Malaria (7.9%) and Syphilis (2.6%).
Conclusion: HBV was the commonest TTI among apparently healthy donors in the present study, followed by HCV and HIV; 1.5% of healthy donors were seropositive for TTIs. This clearly shows the importance of stringent screening measures to avert the potential risk of TTIs.

1. Introduction

For nearly eight decades, the transfusion of blood has been an integral part of medical practice.[1] Though it is a life saving measure, every transfusion still bears the potential risk of Transfusion Transmitted Infections (TTI). Thus, donor screening is of paramount importance and has been in place in India since Independence.[2] Currently, India's blood transfusion scheme mandates the screening of 5 TTIs which are HIV, HBsAg, HCV, malaria and syphilis.[3] It has been noted that the prevalence of these TTIs is lower among the voluntary blood donors (VBD) as compared to the replacement blood donors (RBD).[4–6]

A study of the prevalence of TTIs in India showed that the prevalence of HIV was around 0.26% (0.22-0.32%) in 2015 and the prevalence of HBsAg was around 4.7%.[7] It has been reported that upto 40 million out of a total of 300 million HBsAg carriers worldwide reside in India.[8] Additionally, there are around 12-13 million documented HCV carriers in India.[9]

Despite the fact that there are stringent screening procedures set in place, the achievement of absolute safe blood free from TTIs remains an elusive target. Our study was undertaken to assess the proportion of voluntary and replacement blood donors and also to estimate the prevalence and trend of various TTIs in a well-established blood bank of a medical College in East Bangalore.

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2. Materials and Methods

The data for the current retrospective study was collected over a period of 3 years and 3 months from October 2015 to December 2018, from the registries of a blood bank of a tertiary care medical college in the Eastern part of Bangalore city.

Donors were screened meticulously by trained personnel. Those with haemoglobin levels less than 12.5 gm /dl, sero-positivity for TTIs, low body weight for age and height, tattoos were deferred from the study group. Donors were asked to fill the eligibility questionnaire mandated by NACO. Eligible donors were bled and few ml were taken in an EDTA tube for the purpose of screening for potential TTIs. Donors were screened for anti- HIV 1 and 2, HBsAg, and anti-HCV, using commercially available third-generation ELISA test kits, while syphilis and malaria were screened for using card test (that detects both IgM and IgG antibodies), and rapid malaria test, respectively. All these tests were performed by trained technicians supervised by a medical officer in a well-equipped TTI wing of the blood bank. The standard protocol for each test kit was strictly followed as in accordance to the manufacturer guidelines. For each screening procedure, the controls used were the known positive and negative samples provided in the kit. Any samples that were found reactive were retested before being labelled seropositive. The standard disposal protocol for seropositive blood by autoclave and incineration was observed.[10] The available data was analysed using Microsoft Excel software.

3. Results

A total of 2514 donors donated their blood during the study period. Among them 2411(95.9%) were voluntary donors and 103(4.1%) were replacement donors. 2431(96.7%) were males and 83(3.3%) were females [Table 1].

Majority of cases (73.2%) were in the age group of 18-30 years followed by 31-40 years (21.8%) [Figure 1]. As seen in table 2 below, among the various TTIs, majority of cases were of HBV (55.3%) followed by HCV (18.4%) and HIV (15.8%). Malaria (7.9%) and Syphilis (2.6%) formed the least number of cases. There was increase in the HIV and HBV cases over the years with peak of HBV cases in 2017(10 cases) but the number of HCV cases remained stationary. Overall, TTIs showed trend of increasing prevalence over the years except in 2018 where there were slightly less number of cases encountered. [Figure 2]

The prevalence of HIV, HCV, Syphilis and Malaria among VBD were 0.24%(6 cases), 0.29%(7 cases), 0.04%(1 case) and 0.12%(3 cases) respectively whereas RBD did not show seropositivity for these TTIs. However, prevalence of HBV among VBD was 0.74% (18 cases) and among RBD was 2.91% (3 cases) during the study period. Hence TTIs were more common in voluntary donors compared to replacement donors which could be explained by the fact that there are more number of voluntary donors relative to replacement donors to begin with.

4. Discussion

Like other studies, the majority of blood donors in our study belonged to the male gender (96.7%) while female donors comprised an insignificant fraction.[11–13] This gender disparity can be explained by the higher deference rates seen in females owing to the increased likelihood of them being diagnosed anaemic and/or underweight. Another attributable reason is simply the lack of motivation in females to do a blood donation in the first place. This can be easily remedied by sponsoring more targeted awareness campaigns along gender lines.

There were more HIV positive blood donors in our study in the age group of 31-40 years compared to the study by Yadav et al which had an equal distribution of cases in the age groups 18-30 years and 31-40 years.[12] However, our study was similar to Yadav et al's study in that there were more number of HBV cases in the age group of 18-30 years while Agarwal et al's study had more number of HBV cases in the 31-40 years age group.[12,13] Most of the HCV positive donors in our study were in the 31-40 years age group which was again similar to Agarwal et al's study.[13] But overall, we came across more number of TTIs in the 18-30 years group which is again similar to Yadav et al's study[12]

From table 3, it may be inferred that the prevalence rate of TTIs in our study was 1.5% which is comparable to what was obtained by Vandana WV et al., Bobde V et al., and Shah N et al. but few studies like Chaurasia RK et al. and Swaroop D et al. documented higher rates.[14–18]

Similar HIV seroprevalence rates were obtained in studies done in North India and Western India, however, our findings were found to be higher compared to some of the other studies.[15,19–21] HBV, HCV and syphilis seroprevalence rates were relatively low in our study while that of malaria was on the higher end.[15–24]

Table 1: Distribution of blood donors according to voluntary or replacement blood donation status and gender

Year	Voluntary			Replacement			Grand Total
	Males	Females	Total	Males	Females	Total	
2015 (Oct-Dec)	114(96.6%)	4(3.4%)	118	0	0	0	118 (100%)
2016 (Jan-Dec)	371(80.3%)	30(6.5%)	401	56(12.1%)	5(1.1%)	61	462 (100%)
2017 (Jan-Dec)	1078(97.4%)	24(2.2%)	1102	4(0.4%)	0	4	1106(100%)
2018 (Jan-Dec)	771(93.1%)	19(2.3%)	790	37(4.5%)	1(0.1%)	38	828 (100%)
Total	2334(92.8%)	77(3.1%)	2411	97(3.9%)	6(0.2%)	103	2514(100%)

Table 2: Year-wise distribution of TTIs among blood donors

Year	HIV	HBV	HCV	Syphilis	Malaria	Total
2015	1	0	1	0	1	3
2016	1	4	2	0	2	9
2017	2	10	2	1	0	15
2018	2	7	2	0	0	11
Total	6 (15.8%)	21 (55.3%)	7 (18.4%)	1 (2.6%)	3 (7.9%)	38 (100%)

Table 3: Comparison of prevalence of TTIs among various studies

Authors	Study Place	Duration	Total Donors	TTD (%)	HIV(%)	HBV(%)	HCV(%)	Syphilis(%)	Malaria (%)
Bobde V et al. [14]	Nagpur Maharashtra	2010-14 (4.5yrs)	43190	1.66	0.3	1.18	0.16	-	-
Makroo RN et al. [19]	New Delhi	2005-13 (9 yrs)	180477	2.099	0.24	1.18	0.43	0.23	-
Shah N et al. [15]	Ahmedabad, Gujrat	2006-13 (7.5 yr)	92778	1.48	0.18	0.98	0.108	0.23	-
Dobariya GH et al. [22]	Surat, Gujrat	2011-16 (5 yr)	40971	1.34	0.08	0.98	0.098	0.16	0.02
Vandana WV et al. [16]	Bangalore, Karnataka	2012-15 (4 yr)	4087	1.59	0.2	0.75	0.34	0.3	-
NACO [23]	India	2015 (1 yr)	6828055	1.622	0.136	0.939	0.326	0.182	0.039
Pallavi P et al. [20]	Mysore, Karnataka	2004-8 (5 yrs)	39060	2.22	0.44	1.27	0.23	0.28	-
Mandal R et al. [21]	Darjeeling, West Bengal	2010-12 (3 yrs)	28364	2.93	0.42	1.24	0.62	0.65	0.004
Chaurasia RK et al. [17]	Bhopal, Madhya Pradesh	2011-16 (5 yrs)	15060	4.19	0.14	2.13	0.62	1.30	-
Chaudhary V et al. [23]	Bareilly, Uttar Pradesh	2013 (1 yr)	28,395	3.3	0.27	1.93	1.02	0.16	-
Swaroop D et al. [18]	Meerut, Uttar Pradesh	2011-16 (6 yrs)	34342	3.5	0.11	1.74	1.50	0.09	0.046
Present Study	Bangalore, Karnataka	2015-18 (3yrs 3mon)	2514	1.5	0.24	0.83	0.27	0.04	0.12

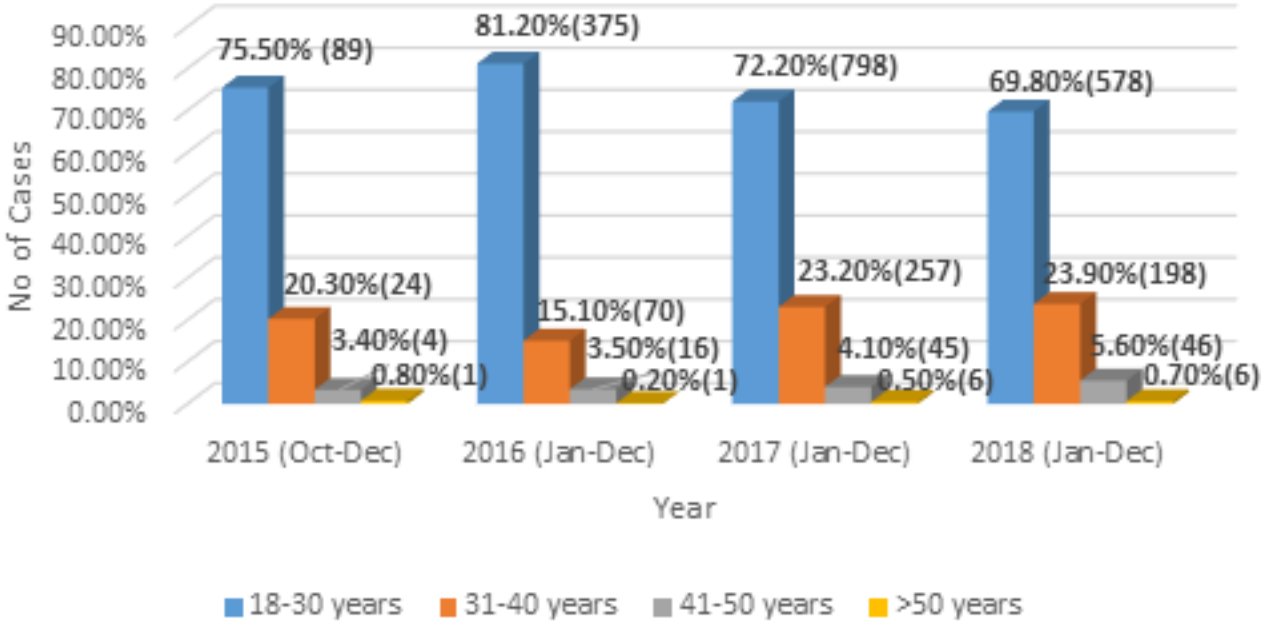

Fig. 1: Age-wise distribution of blood donors

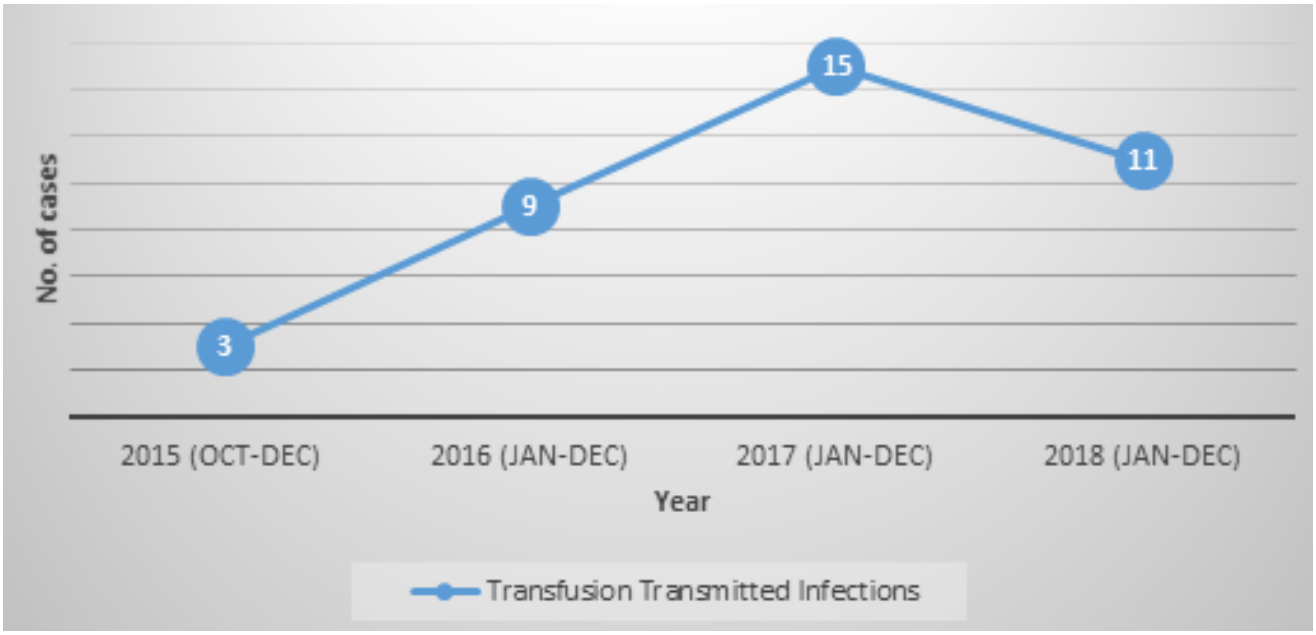

Fig. 2: Trend of Transfusion transmitter infection over the years

5. Conclusion

Thus, to conclude, HBV was the commonest TTI among apparently healthy donors in the present study, followed by HCV and HIV; 1.5% of healthy donors were seropositive for TTIs. This clearly shows the importance of stringent screening measures to avert the potential risk of TTIs. Stern and apt implementation of donor's selection criteria and thorough history taking and examination should be implemented in all cases. Screening using the higher-generation sensitive ELISA kits and circumventing rapid screening methods can help rapidly and accurately identify seropositive bags. This will act as an effective strategy to counter any possibility, however remote, of transfusion of infected whole blood or its various components, particularly in those patients that require transfusions on a routine basis.

6. Source of Funding

None.

7. Conflict of Interest

None.

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