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Seroprevalence of transfusion transmitted infections in healthy blood donors in a tertiary care hospital in Puducherry

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Abstract
Introduction: Blood transfusion is both a life saving measure in many medical and surgical emergencies and a source of transfusion transmitted infections. So a provision for strict criteria in recruitment and deferral of blood donors may improve safe transfusion practice. The aim of the study was to estimate the trend in seroprevalence of TTI s among blood donors of both voluntary and replacement donors at a tertiary care teaching hospital in Puducherry, India.
Material and Methods: A retrospective study was performed from January 2010 to December 2019 in a blood bank of a tertiary care hospital. A total of 21147 blood units which were collected from both voluntary and replacement donors during the study period were included. Data was analyzed from blood bank records, pertaining to all donors who were screened for HBs Ag, Hepatitis C virus and HIV by using appropriate methods.
Results: Out of 21147 blood donors, 514 were positive for TTI s. The overall prevalence of HIV, HBV, HCV and Syphilis was found to be 0.04%, 1.88%, 0.06% and 0.42% respectively. The highest percentage of prevalence was observed for HBV, followed by syphilis, HCV and HIV.
Conclusion: Adhering the strict donor eligibility criteria and high sensitive screening methods with effective counselling can decrease the prevalence of TTI's and help in preventing further transmission of infections in the community.

Keywords: transfusion transmitted infections, HIV, syphilis, HBV, HCV

Introduction
A well organized Blood Transfusion Service (BTS) is a vital component of any health care delivery system. An integrated strategy for Blood Safety is required for elimination of TTIs and for provision of safe and adequate blood transfusion services to the people. The main component of an integrate strategy include collection of blood only from voluntary, non-renumerated blood donors, screening for all TTIs and reduction of unnecessary transfusion [1]. Thus the evaluation of the prevalence of transfusion transmitted infections (TTI) such as Hepatitis B, Hepatitis C, HIV, syphilis and malaria among blood donors permits an assessment of the transmission of the infections in the blood donor population and consequently the safety of the collected blood. It also gives an idea about epidemiology of these infections in the community. The laboratory screening remains the key step in identifying donations from infected individuals. Hence the screening of donated blood for a minimum set of TTI are mandatory [1, 2].

Aims and Objectives
The aim of the study was to estimate the trend in seroprevalence of TTI s among blood donors in our hospital over the study period and this would allow the comparison of seroprevalence over the course of time. The findings could also be used to update intervention programmes which focus on the prevention and control of TTIs.

Materials and Methods
This is a retrospective study carried out at SMVMCH blood bank from January 2010 to December 2019. Data was retrieved from records of the blood bank. All blood donors who donated at the blood bank during the study period were included in the study. The sero positivity was diagnosed using 3rd generation ELISA for Hepatitis B, Hepatitis C and HIV.

Malarial parasite was diagnosed by Rapid visual antigen test. Syphilis was diagnosed by using antibody detection by Rapid Immunochromatographic test and by RPR card test.

Statistical analysis

After data collection, data entry was done in Excel. Data analysis was done with the help of Statistical Package for Social Science version 15 (IBM SPSS Version 15). Qualitative data were analyzed with the help of frequency and percentage table. The association among various study parameters was assessed with the help of Chi-square test. $P < 0.05$ consider as statistically significant.

Results

A total of 21147 blood donors were screened for the presence of TTI s over a period of 10 years. Out of 21147 donors, 514 were positive for TTI s. Out of this 514 donors, 119 are voluntary donors and 395 are replacement donors. Of these 1.88% were positive for hepatitis B, 0.06% were positive for hepatitis C, 0.42% were positive for syphilis, 0.04% was positive for HIV and 0.02% were positive for malaria. Seropositivity was more prevalent among the blood donors in the age group of 18 to 30(61.7%) followed by 31 to 40(28.5%) and above 40(9.8%).

Table 1: Yearly distribution of Sero reactive transfusion transmitted infection cases

Years	Donors	HIV	HBs Ag	HCV	VDRL	MP/MF	Total
2010	1055	1	29	1	3	0	34
2011	1033	0	21	0	0	0	21
2012	2055	0	55	3	6	1	65
2013	1977	1	54	2	4	2	63
2014	2126	2	38	2	13	1	56
2015	1978	3	40	3	13	0	59
2016	2243	1	23	1	11	0	38
2017	3120	0	56	0	14	1	69
2018	2988	0	53	1	18	0	72
2019	2572	1	29	0	7	0	37
Total	21147	9	398	13	89	5	514

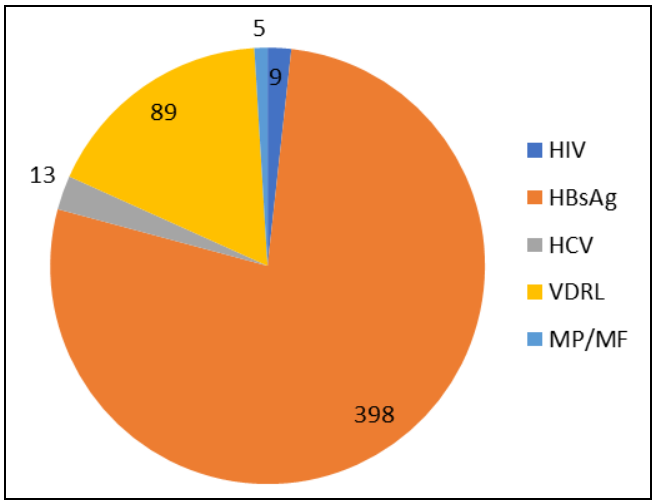

Fig 1: Distribution of various Transfusion transmitted infections

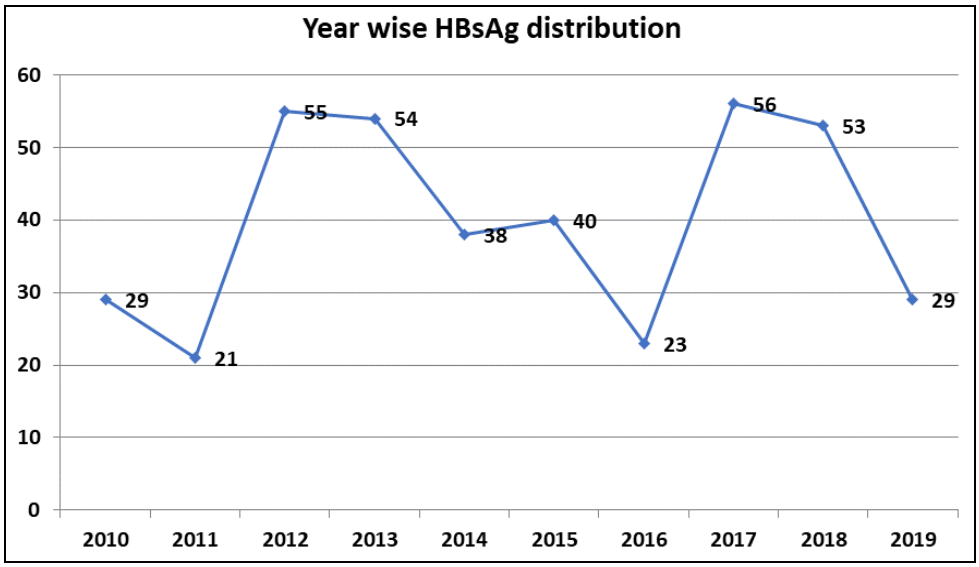

Fig 2: Trends in the seroprevalence of TTI's over the 10-year period

Discussion

From our study we infer that HBV seroprevalance is comparatively high than other TTI s among blood donors in our hospital. The present study revealed that HBV infection was more prevalent among replacement donors than voluntary donors. Voluntary donors (VD) are motivated blood donors who donates blood at regular intervals and replacement donors (RD) are usually one time blood donors who donates blood only when a relative is in need of blood. A predominance of RD was noted by Singh *et al*. (82.4%), Kakkar *et al*. (94.7%), Pahuja *et al*. (99.48%). It is shown that RD constitute the largest group of blood donors in India reflecting the lack of awareness amongst the general population. Studies have showed high seropositivity rate in RD compared to VD, a similar findings was noted in our study [1, 2, 3].

The trend of sero-positivity of HBV was more compared to other transfusion transmitted infections. Jasani *et al*. 2004-2011 and Dayal S 2006-2011, who have also found HBV to be the commonest TTI [4]. This is because of higher prevalence of hepatitis B in the community compared to other infections. Since a person can transmit an infection during its asymptomatic phase (window period), transfusions can contribute to an ever widening pool of infection in the population.

While looking at age-group wise classification it can be seen that majority of the donors (94.98 %) were from the age group of 21-40 years and the majority of the reactive donors (90.2% of total reactive donors) were also from the same age group i.e. 21-40 years. Piyush A. Patel *et al*. Study also shows majority of reactive donors are from 21-40 years [4].

Conclusion

So non renumerated voluntary blood donors should be encouraged and steps should be taken to promote voluntary blood donations. Public health education programs on HBV infection, adult hepatitis B immunization programs, and raising socioeconomic standards should be initiated in order to target the high-risk groups found in this study. With the implementation of strict donor selection criteria, use of sensitive screening tests and establishment of strict guidelines for blood transfusion it may be possible to reduce the incidence of TTI in the Indian scenario.

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