

Seroprevalence and Trends of Transfusion Transmitted Infections among Blood Donors at a Tertiary Care Teaching Hospital in Tamil Nadu.

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I. Introduction

Transfusion of blood has saved millions of lives, improves the quality of life of multi transfused patients like thalassemia, hemophilia etc. Blood transfusion reduces morbidity and mortality in clinical conditions which cannot be prevented or managed otherwise. Even though blood saves lives, unsafe transfusion practices can put many people at risk of transfusion-transmissible infections (TTIs). 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 most prior objective of Blood transfusion services(BTS) is to ensure safety(elimination of TTIs), adequacy, accessibility and efficiency of blood supply at all levels.

Strict donor selection criteria, sensitive screening tests, restriction of donation by professional donors, reduction of unnecessary transfusion and effective inactivation procedures can ensure the elimination, or at least reduction in TTIs. As per Drug and Cosmetic Act, 1945, it is mandatory to screen blood for presence of HIV I & II, HBsAg, HCV, and Syphilis infections before transfusion. The Indian subcontinent is classified as an intermediate zone of prevalence for Hepatitis B Virus(HBV) with a rate of 2-7% by World Health Organization and has second largest global pool of chronic HBV infections with 43 million HBV positive(1). India has second highest pool of HIV in the world with 2.5 million HIV seropositive ⁽²⁾⁽³⁾⁽¹⁾ cases.. In India there are 15 million Hepatitis C Virus positive persons ⁽¹⁾. With the advancement of screening tests, Country has shown decline in the risk of TTI. Our retrospective study was aimed to evaluate the prevalence of transfusion transmissible infections among healthy donors over a period of 7 years, so as to heighten the awareness of the infectious complications of blood transfusion. It also gives us the idea of disease burden of the society and the basic epidemiology of these diseases in the community.

II. Materials And Methods

Our retrospective study was carried out over a period of 7 years ,at Blood bank,SRM Medical College Hospital and Research Centre , tertiary care teaching hospital from January 2012 to December 2018. Blood donors who were selected for the study were either replacement donors or voluntary donors. Only selected donors, with stringent donor selection criteria, were bleed who fulfilled blood donor selection criteria as per drug and cosmetic act. This screening procedure was very helpful to exclude the professional donors.

Two ml of blood sample was collected in labeled pilot tube at the time of collection of blood from donor from tubing of blood bag. The serum sample was then subjected to sensitive serological screening tests. The screening for HIV 1&2 antibody, was done by 4 th generation, HBsAg antigen and HCV antibody by 3rd generation Enhanced Chemiluminiscence(CLIA). Test for Syphilis was done by Rapid test (Modified TPHA). Seropositive blood bags were discarded. The data were properly recorded , tabulated, analyzed and compared with the similar studies by other authors.

III. Result

During our study period of 7 years, Out of 27375 blood donors ,27124 were males and 251 were females (M:F ratio 99.08: 0.91). Voluntary donation outnumbered the replacement donation as shown in Table 1. 94.10% were voluntary donors and 5.89% were replacement donors. 500(1.82%) donors had serological evidence of infection with at least one pathogen, either of HIV, HBV, HCV or Syphilis. These included 35(0.13%) with HIV, 282(1.03%) with HBV, 119 (0.43%) with HCV and 64 (0.23%) with Syphilis. The highest percentage of prevalence was observed for HBsAg followed by HCV , Syphilis, and the least prevalent was HIV. (Table 2). Prevalence of TTI's were more in replacement donors than voluntary donors. Prevalence of infections HBsAg, HIV,HCV and Syphilis among replacement donors were 0.72, 0.10, 0.29, 0.22 while in that

of voluntary donors were 0.28,0.02,0.13,0.01 respectively. (Table 3).Fig 1-4 shows the changing trends in seroprevalence of HBsAg, HIV, HCV and syphilis during our study period.

IV. Discussion

Transfusion Transmissible Infections (TTI's) continue to be a major threat to safe transfusion practice. Despite our vigilance towards transfusion transmitted infections and vigorous screening of donors and donated blood units, there are potential chances of transmission of these infections through blood. With every unit of blood there is 1% chance of transfusion associated problem including TTI's^[4]. Therefore it is necessary to ensure the safety of blood and blood products before transfusion.

In the present study TTI were more prevalent in Replacement Donors . Similar observations are reported by most of the studies done in India^{[4][6][7][8][3][9][10]}. This is in contrast to study done by Bhattacharya et al⁽²⁾, Pallavi et al⁽⁵⁾ who found a predominance of Voluntary Donors.Females made a smaller section of the study as they were found to be anaemic and did not fulfill the required donor fitness criteria. The detailed analysis and comparison of TTIs with the studies by different authors within India is described in table 4. In the present study, the overall prevalence of TTI's was found to be 1.82%, which is very less when compared to all other studies. In our study, overall prevalence of TTI's has shown a declining trend during the study period of 8 years. This is mainly because of advancement in screening techniques and newer generation kits and also because of the increasing knowledge of the people regarding the transmission of the various diseases and increasing public awareness through mass media and various social organization.

In the present study we found that HBV is the commonest TTI, which is again similar to the most of the other studies Chandra et al^[7], Nilima Sawke et al^[8], Bhawani et al^[3], Jasani et al^[9] and Dayal et al^[10]. However, Gupta et al^[6] reported HCV as the most common(1.09%) and Preeti et al⁽¹²⁾ reported Syphilis(1.29%) as the most common TTI.The major route of HBV transmission is parenteral and it is the most infective agent among blood-borne viruses. Individuals with chronic HBV infection have a high risk of developing liver cirrhosis and hepatocellular carcinoma. HCV was found to be the second most common TTI found among blood donors by most of the workers, which is similar finding in our study, with seroprevalence of 0.43%. Majority of the HCV infected persons progress to chronic infection and chances of cirrhosis and hepatocellular carcinoma are more as compared to chronic HBV infection. Blood is one of the main sources of transmission of Hepatitis B and C; hence, donor selection criteria and proper TTI screening is of paramount importance. The prevalence of HIV in various parts of India is different with higher rate in western and southern parts⁽¹¹⁾. In the present study the seroprevalence of Syphilis was found to be 0.23% which is third most common as reported by other studies, Gupta et al⁽⁶⁾ Bhattacharya P et al^[2], Jasani et al^[9]. In the present study, HIV was the fourth most common TTI with prevalence of 0.13%, a similar low prevalence of 0.19% of HIV was observed by Dayal et al^[10];in North India, 0.08% by Gupta et al⁽⁶⁾.

V. Conclusion

Overall seroprevalence of TTIs in our study is 1.82% with HBV being most commonTTI, which has shown a declining trend over period of 7 years.This is mainly because of advancement in screening techniques , newer generation kits and awareness programmes TTIs were more common in replacement donors than in voluntary donors, hence nonrenumerated and repeat voluntary blood donor services are needed.There should be an establishment of a nationally coordinated blood transfusion services. Thus with stringent donor selection criteria, high sensitivity tests like Nucleic acid amplification testing(NAT), establishment of strict guidelines for blood transfusion, it is possible to reduce the number of TTI's in the Indian scenario.

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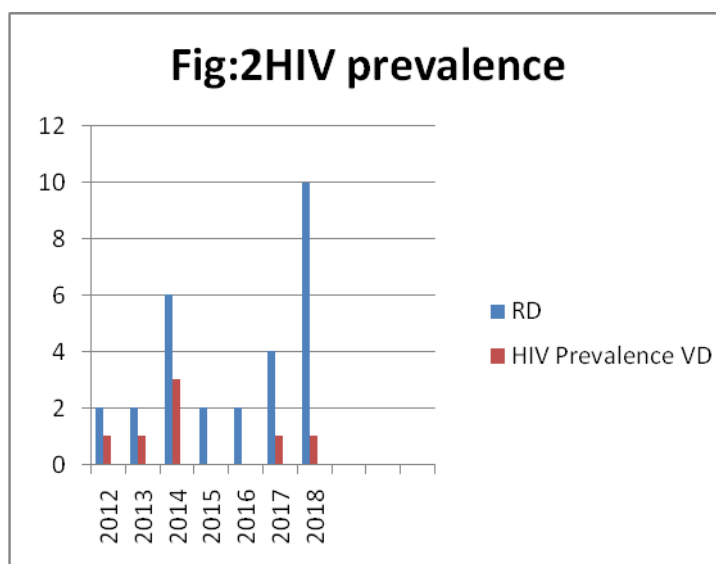
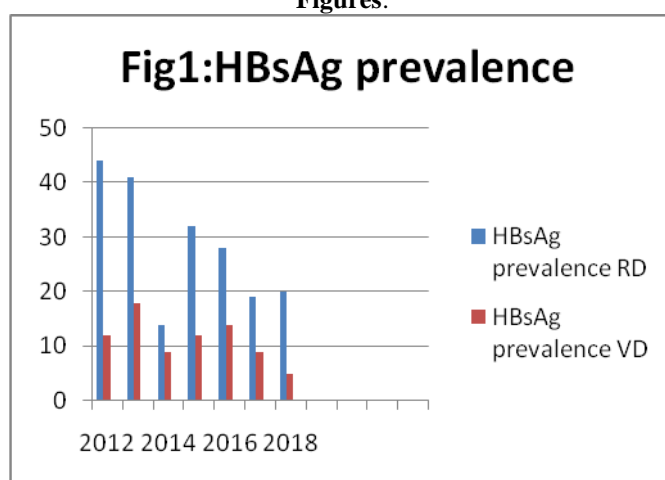
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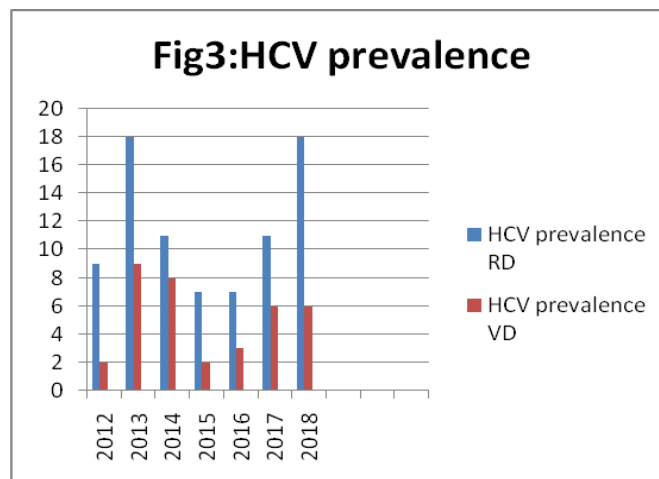
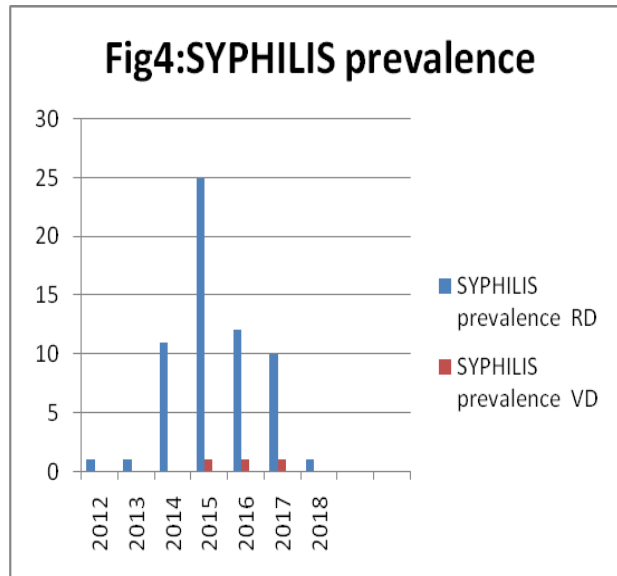
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Figures:





TABLES

TABLE1: Total Blood Collection and Sex distribution of donors in present study

YEAR	TD	VD	RD	M	F
2012	3782	3542	240	3735	47
2013	4145	3951	194	4107	38
2014	3827	3613	214	3800	27
2015	3869	3617	252	3844	25
2016	4364	4062	302	4306	58
2017	3813	3626	187	3791	22
2018	3575	3350	225	3541	34
TOTAL	27375	25761 (94.10)	1614 (5.89)	27124 (99.08)	251(0.91)

TABLE2: Seroprevalence of HIV, HBsAg, HCV and Syphilis in Blood donors

YEAR	TOTAL	T.IN	HIV	HBsAg	HCV	SYPHILIS
2012	3782	69	3	54	11	1
2013	4145	90	3	59	27	1
2014	3827	66	9	27	19	11
2015	3869	81	2	44	9	26
2016	4364	67	2	42	10	13
2017	3813	61	5	28	17	11
2018	3575	66	11	28	26	1
TOTAL	27375	500 (1.82)	35(0.13)	282 (1.03)	119 (0.43)	64 (0.23)

TABLE : 3 Prevalance of TTISamong replacement (RD)& Voluntery (VD) donors

YEAR	HBS Ag		HIV		HCV		VDRL	
	RD	VD	RD	VD	RD	VD	RD	VD
2012	44(1.6)	12(0.1)	2(0.0)	1(.026)	9(0.23)	2(.052)	1(0.026)	0(0)
2013	41(0.98)	18(0.43)	2(.048)	1(.024)	18(0.43)	9(0.21)	1(0.024)	0 (0)
2014	14 (0.36)	9(0.2)	6(0.15)	3(0.07)	11(0.2)	8(0.209)	11(0.28)	0(0)
2015	32(0.82)	12(0.31)	2(0.05)	0(0)	7(0.18)	2(0.05)	25(0.646)	1(0.025)
2016	28(0.64)	14(0.32)	2(0.04)	0 (0)	7(0.16)	3(0.068)	12(0.27)	1(.022)
2017	19(0.49)	9(0.23)	4 (0.10)	1(.02)	11(0.28)	6(0.15)	10(0.26)	1(0.02)
2018	20(0.55)	5(0.13)	10 (0.27)	1(0.02)	18(0.50)	6(0.16)	1(0.02)	0(0)
TOTAL	198 (0.72)	79 (0.28)	28 (0.10)	7 (0.02)	81 (0.29)	36 (0.13)	61 (0.22)	3 (0.01)

Note : Numbers in parenthesis indicates percentage

TABLE : 4 . Comparison of prevalence of TTIs with various studies in India

Author and year	Place	Total	HBsAg	HIV	HCV	Syphilis
Gupta et al (2004)	Ludhiana	2.68%	0.66%	0.08%	1.09%	0.85%
Chandra et al (2009)	Lucknow, U.P	2.54%	1.96%	0.23%	0.34%	0.01%
Nilima Sawke et al (2010)	Bhanpur,M.P	4.21%	2.90%	0.51%	0.57%	0.23%
Bhawani et al (2010)	Vikarabad,AP	2.72%	1.41%	0.39%	0.84%	0.08%
Jasani et al (2012)	Piparia Gujarat	3.35%	1.35%	0.25%	0.85%	0.90%
Dayal et al (2011)	Etawah,UP	3.16%	2.63%	0.19%	0.34%	Not done
Bhattacharya et al (2007)	Kolkata West Bangal	2.80%	1.46%	0.28%	0.31%	0.72%
Preeti et al(2017)	Udaipur, Rajasthan	2.38%	0.89%	0.14%	0	1.29%
Our study (2019)	potheri Tamilnadu	1.82%	1.03%	0.13%	0.43%	0.23%

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