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Seroprevalence of HIV, Hepatitis B, Hepatitis C, Infections among Blood Donors at a Rural Teaching Hospital in Chidambaram, Northern Tamil Nadu

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ABSTRACT
A Record based study was carried out at Rajah Muthiah Medical College & Hospital attached with Annamalai University situated at the Southern side of Chennai. Period of the study was from 2009-2015 covering a total of 18,740 blood donors. The study is conducted to demonstrate the transfusion risk potential of TTI's(Transfusion Transmitted Infections) with blood donors &analyze the seroprevalence of HIV, HBV & HCV. To hold back the transmission to a minimum, these studies are very essential. Thus, the study is aimed to eliminate the prevalence of HIV; HBV & HCV among the blood collected from donors and identify the trend of increment or decrement in the prevalence of these diseases.
Keywords: *TTI's, Blood Donors, HIV, HBV, HVC.*

INTRODUCTION

Blood transfusion saves lives and improves health. In some instance, the transfusion of unsafe blood causes risk of TTI's by HIV, HBV and HCV viruses which are fatal[1]. The first documented HIV infection in India was among a cohort of sex workers in the southern part of Tamilnadu in 1986[2]. The major transmission mechanism for HIV has been through heterosexual contact (42%) especially with commercial sex workers (CSWS), with blood transfusion (15%) and intravenous drug users (15%) [3]. The prevalence of Hepatitis B is high in sub –Saharan Africa and East Asia, accounting about 5-10% of the adult population. About 2-5% of the population is chronically infected in the Middle East and in Indian subcontinent[4]. Globally it is estimated that 130-150 Million people have chronic hepatitis C infection. A significant number of those who were chronically infected may develop liver cirrhosis or liver carcinoma[5]. The transfusion of contaminated blood globally causes upto 16 Million new infections with Hepatitis B and 5 Million with Hepatitis C[6]. The transmission of these infectious

diseases through donated blood is an alarming situation. So, screening of TTI'S is a critical part of the blood transfusion process and it ensures that transfusion is as safe as possible.

The objective of the current study was to figure out the incidence of HIV, HBV &HCV in the highly backward zone, Chidambaram, South Arcot District, Cuddalore, Tamil Nadu.

MATERIALS AND METHODS

This is a retrospective study conducted on donors from January 2009 to December 2015 in the Blood Bank, Department of Pathology, Rajah Muthiah Medical College & Hospital, a rural teaching hospital situated at Chidambaram, Tamil Nadu State. Written consent was obtained from all the donors. Blood donors fulfilling the criteria for donor selection as per the guidelines of the gazette of India[7]were considered for the present study. The donors were either voluntary or replacement donors. Voluntary donors were the persons who donate blood at camps, while replacement donors were either relatives or friends of the patient. Data retrieved included the demographic characteristics of donors such as age, sex, residence and contact numbers. All the donor samples were analyzed for antibodies to HIV 1 and HIV2 (Tri-Dot, HIV, 3rd generation J. Mitra and Co., Pvt Ltd., Chennai, India), Hepatitis B surface antigen (Hepa card, Reckon diagnostics, Vadodara, India) and HCV (Make sure HCV rapid card, HLL life care Ltd, Bangalore, India). The reactive sample was retested in duplicate before considering its seropositivity. Seropositive blood bags were discarded. All the data were recorded on the proforma sheet, analyzed and compared with the studies done by the other authors.

OBSERVATION

The study period of 7 years between 2009 and 2015 included a total of 18,740/- Blood Donors who were screened for HIV, HBV & HCV antibodies. Among them, 16,258(87.2%) were Voluntary donors and 2,482 (12.8%) were Replacement Donors, the statistics of which is shown in Table 1

Type wise Distribution of Donors

Table: 1

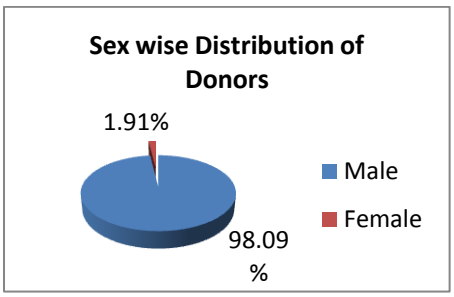
Number of Donors over a period of 7 Years	Voluntary Donors	Replacement Donors
18,740 (100%)	16,258 (87.2%)	2,482 (12.8%)

Among these 18,740 accepted donors, a large part (i.e.) 18,383 (98.09%) were Male and only 357 (1.91%) were Female shown in Table.2 along with portrayed pi-chart.

Sex wise Distribution of Donors

Table: 2

Number of Donors over a period of 7 Years	Male	Female.
18,740	18,383 (98.09%)	357 (1.91%)

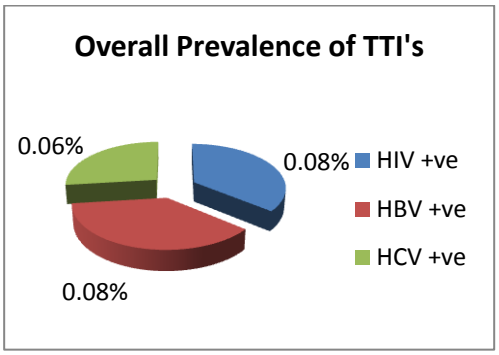


The overall prevalence of HIV, HBV & HCV were 0.08%, 0.083%, and 0.06% respectively which is shown in Table.3 along with pi-chart distribution pattern.

Overall Prevalence of TTI's

Table: 3

Number of Donors over a period of 7 Years	HIV Positive	HBV Positive	HCV Positive
	No.of.Cases & %	No.of.Cases & %	No.of.Cases & %
18,740	15 (0.08%)	156 (0.083%)	12 (0.06%)



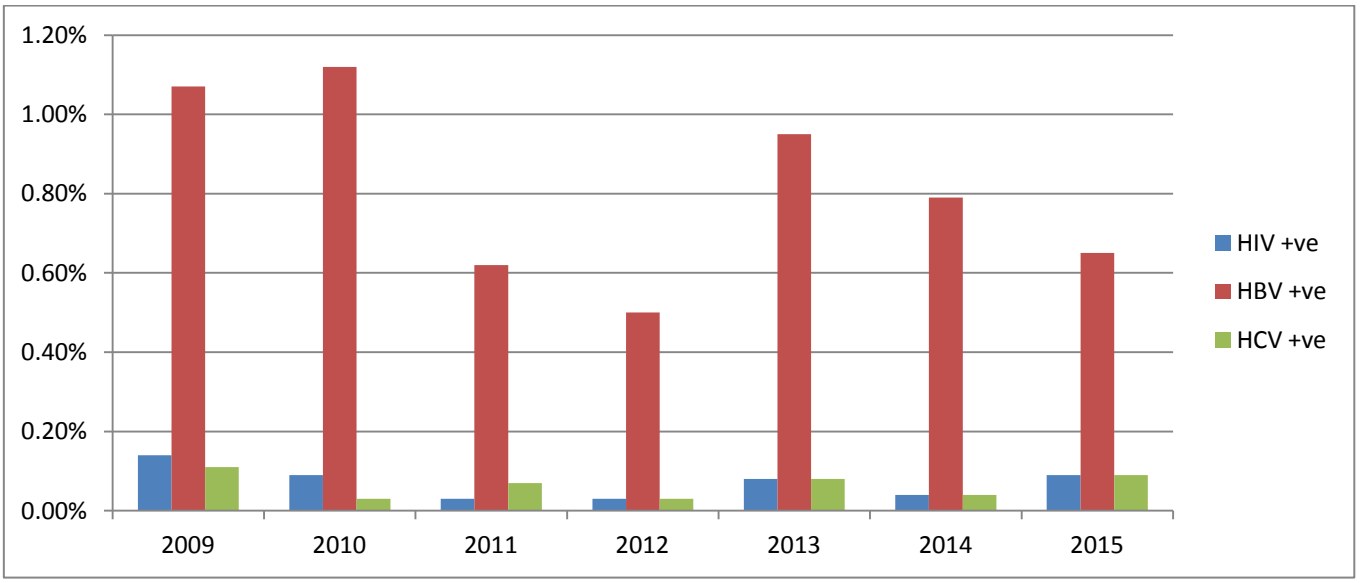
The Highest prevalence was observed for HBV followed by HIV and HCV in descending order. No blood donor showed positivity for syphilis and malarial parasite.

Table 4 shows the year-wise trends of Seroprevalence of TTI's (Transfusion Transmitted Infections).

Year Wise Seroprevalence of TTI's

Table: 4

Year	Total no.of Blood samples	HIV Positive		HBVPositive		HCV Positive	
		No.of .cases	%	No.of .cases	%	No.of .cases	%
2009	3335	5	0.14%	36	1.07%	4	0.11%
2010	3012	3	0.09%	34	1.12%	1	0.03%
2011	2717	1	0.03%	17	0.62%	2	0.07%
2012	2989	1	0.03%	15	0.50%	1	0.03%
2013	2402	2	0.08%	23	0.95%	2	0.08%
2014	2144	1	0.04%	17	0.79%	1	0.04%
2015	2141	2	0.09%	14	0.65%	1	0.09%



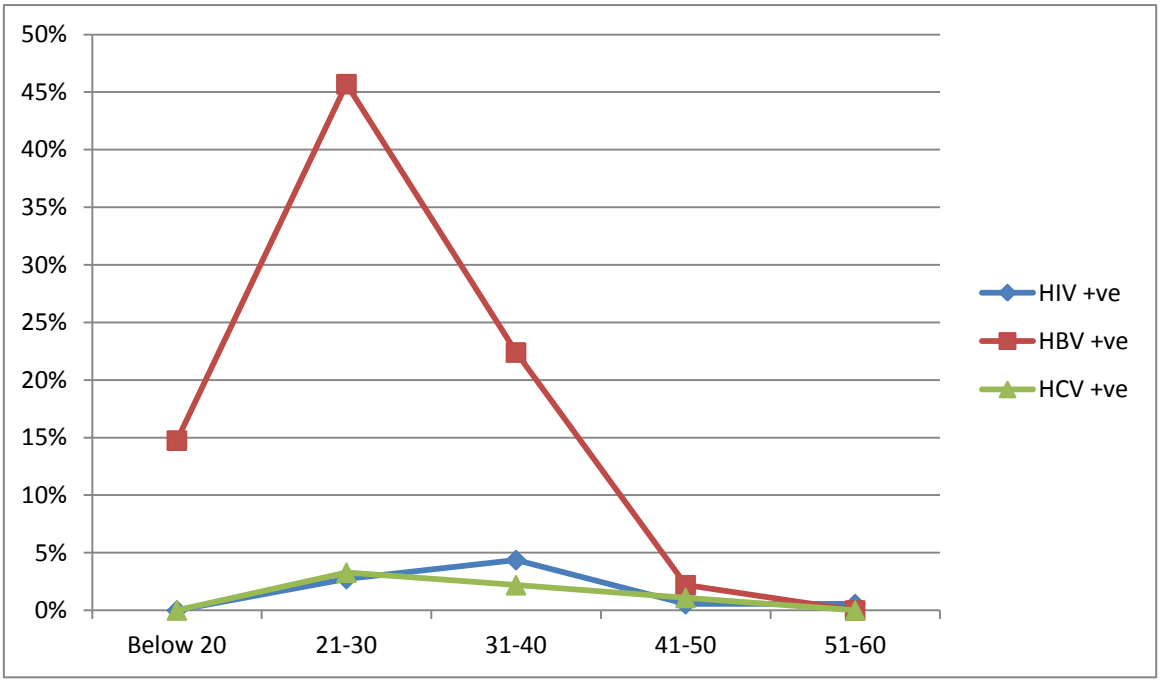
The year wise trends of TTI'S among blood donors from table 4, do not show any wide remarkable variations. However, the prevalence of HIV in RMMC&H donor record show alarming decrement of 64% from the year 2009-2015 in just 7 years.

Out of 18740 screened donors, 183 (0.97%) were seroreactive cases. Age group of reactive donors is described in Table 5.

Age-wise Distribution of Seropositivity

Table – 5

AGE	HIV Positive	HBV Positive	HCV Positive	Total
Below 20	00 (0%)	27 (14.75%)	00 (0%)	27 (14.75%)
21-30	5 (2.73%)	84 (45.70%)	6 (3.28%)	95 (51.91%)
31-40	8 (4.37%)	41 (22.40%)	4 (2.19%)	53 (28.96%)
41-50	1 (0.55%)	04 (2.19%)	2 (1.09%)	7 (3.82%)
51-60	1 (0.55%)	00 (0%)	00 (0%)	1 (0.54%)
TOTAL	15 (8.20%)	156 (85.24%)	12 (6.56%)	183



From the age group based classification in table 5, it can be seen that 15 donors (8.2%) were positive for HIV, 156 donors (85.24%) with HBV and 12 donors (6.56%) with HCV. The HCV-positive donors in the present study are found to be far less which is 6.56% when compared to HBV thatis 85.24%

DISCUSSION

Blood transfusion is an essential life-saving procedure and is associated with acute and delayed complications along with the risk of transfusion of TTI's[8]. In developing countries like India, it is very difficult to prevent the transmission of infectious diseases through blood transfusion. TTI's still occurs in spite of effective policies and strategies and sometimes due to non-availability of resources. Even though more sensitive methods are available to detect TTI's, the prevalence of problem of preconversion (or) window phase, genetic & immunologically variant viruses, immune silent carriers, lack of funds and technical errors persist[9]. Despite stringent donor screening and testing practices, availability of completely safe blood free from TTI's remains the ultimate goal.

In the present study, the majority were voluntary donors (87.2%). Voluntary donors constitute the largest group of blood donors in our study, which is less when compared with Piyush. A Patel et al[10] (95.56%), Santh S.B.et[11] (95.09%). Awareness among the patient's attenders in this place was created by the constant motivational speeches by medical officers, junior residents and social workers, which have resulted in increased number of replacement donors.

Our study shows a predominance of male donors with 98.09% which was similar to the studies done by Asvathi et al (95.04%), Kochhar A.k.et al[12] (96.34%) and Sukurutha Gopal et al[13]

(97.27%). The female donors were less than 2% because a large number of them were of menstrual age group and found to be malnourished and found to be Anemic, hence unfit for blood donation and eliminated by counseling.

Koshy et al[14] noted in their study that seropositive donors were aged between 18 and 30 years followed by 31-40 years. The study conducted by Karmakar et al[15] showed more than two-third seropositive donors belong to 21-40 years of age group.

In the present study, the majority of Seropositivity cases were in the age group of 21-30 years, followed by 31-40 years and only 1 case HIV positive donor was of age group > 50 years. Seroprevalence of TTI's in the present study was as follows: HBV (0.83%) HIV (0.08%) and HCV (0. 06%)

In the present study, incidence of HBV Seropositivity was found to be the highest as compared to other TTI's

COMPARISON OF PREVALENCE OF TTI's WITH VARIOUS STUDIES IN INDIA

S.NO	AUTHORS	PLACE	HIV	HBV	HCV
1.	N.SAWKE et al[16] (2010)	MADHYA PRADESH	0.51%	2.90%	0.57%
2.	PIYUSH.A.PATEL et al[10](2012)	GUJARAT	0.08%	0.30%	0.09%
3.	SHAH.N et al[18] (2013)	GUJARAT	0.16%	0.98%	0.11%
4.	SUKRUTHA GOPAL R et al[13] (2013)	TELANGANA	0.26%	1.28%	0.51%
5.	LATHAMANI et a1[17] (2013)	KARNATAKA	0.08%	0.53%	0.09%
6.	SMITA MAHAPATRA[8] (2015)	ODISHA	0.02%	0.45%	0.11%
7.	PRESENT STUDY (2017)	TAMILNADU	0.08%	0.83%	0.06%

Seroprevalence of HBV shows increased prevalence in the present study with 0.83% which was comparable with the study done by Shah.Net al[18] 0.98% and increased prevalence was noted with a study done by N.Sawke et al[16] 2.90%. TTI's of HIV is the second common in our study with 0.08%. It was similar to other studies done by Piyush et al[10] (0.08%) and Lathamani et al[17] 0.08%.

Our study showed 0.06% of HIV seroprevalence. Piyush A Patel study was comparable with our study and N.Sawke et al[16](0.51%) and Sukrutha Gopal R et al[13] (0.51%) showed increasing prevalence.

The result from the present study along with other studies shows the increasing prevalence of HBV in a healthy population as compared to HIV and HCV.

CONCLUSION

The Present Study documents relatively low seroprevalence (183 out of 18,740) (0.97%) of major TTI's among the blood donors at our blood bank, moreover it is less than 1% which is a welcome sign in screening technique adopted in RMMCH.

Amongst, the seroprevalence of HBV was highest (156 cases -0.083%) followed by HIV (15 cases – 0.08%) and HCV (12 cases -0.06%).

In the present study, the prevalence of HBV is high among the three. This will definitely decline due to the introduction of HBV vaccination in National Immunization Programs in developing countries worldwide which was started on 2011, by WHO.

HCV positive patients (0.06%) were referred for complete evaluation to a higher center. Since vaccination is not available for HCV, this can only be prevented by screening & testing of blood which is primary prevention, followed by secondary preventive measures like multiple measurements of ALT at regular intervals, assessment of progression of chronic liver diseases, antiviral therapy etc and tertiary prevention by educating them not to donate blood or organs and counseling.

SUGGESTIONS

Although TTI's in blood donors are low in our region there is need to fight against transmission of these infections during blood transfusion by educating and vaccinating people, creating awareness and with a mandatory screening of donors by the introduction of nucleic acid amplification testing.

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