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Study of Pattern and Trends of Transfusion Transmitted Infections in Apparent Healthy Voluntary Blood Donors in Tertiary Care Teaching Hospital of Prakasam District - 6 Years Study

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Abstract: ***Blood is a life saving resource and also a potential vector for harmful and sometimes chronic fatal infectious diseases like HIV, HBV, HCV. These transfusions transmitted Infections (TTI) are threat to safe blood transfusion. Objectives: The objectives of the study were. 1). To evaluate the seroprevalence and trends of TTI among apparent healthy, voluntary blood donors. 2). To compare the prevalence of seropositivity with other regions of India and with different regions of Andhra Pradesh. Study was conducted for a period of 6 years from January 2009 to December 2014 at blood bank, Rajiv Gandhi Institute of Medical Sciences (RIMS), Ongole, of Prakasam District which is a Southern coastal region of Andhra Pradesh. MATERIALS and METHODS: All Voluntary donors reporting to the blood bank, RIMS, Ongole over a period of 6 years from 2009 to 2014 were screened for HIV, HBV, HCV, Syphilis and Malaria by using ELISA method and RPR method. Results: Total 12, 533 voluntary blood donors were screened of which 11, 903 were males (94.97%) and 630 were females (5.03%). Overall Seropositivity of HIV, HBV, HCV, Syphilis were 0.23%, 3.16 %, 0.39%, 0.06 % respectively. No blood donor tested showed positivity for Malarial parasite. Conclusion: With the implementation of strict donor selection criteria, use of sensitive screening tests and with promotion of non remunerated, repeat voluntary blood donor services, it may be possible to reduce the incidence of TTI's.***

Keywords: Seroprevalence, transfusion transmitted infections, Voluntary blood donors, ELISA method

1. Introduction

Blood is a life saving resource. Transfusion of blood and it components are life saving as well as it has life threatening hazards. TTI remain a major threat to safe blood transfusion particularly in high prevalent countries. With every unit of blood there is 1 % chance of transfusion associated problems including TTI [I]**.** The primary objective of blood banking community is the provision of safe and adequate blood supply. According to the WHO Global Database on blood safety, 20 % of the global population residing in the developed countries has access to 80 % of safe blood supply, whereas 80 % of the population residing in the developing countries has access only 20% of safe blood (www.Searo.who.Int/en/section10/section17/section58/ section225.htm)[2].

Globally, in 39 countries, blood donations are still not routinely tested for TTI.47 % donations in Low income countries are tested in laboratories without quality assurance [3].

Indian subcontinent is classified as an intermediate Hepatitis B Virus endemic (HBsAg carriage 2.7 %) zone, and has the second largest global pool of chronic HBV infection [4]. India has a population of more than 1.2 billion with 5.7 (Reduced to 2.5) million HIV positive, 43 million HBV positive and 15 million HCV positive persons. As Blood is one of the major source of transmission of all these infections, it is mandatory to test each donor's blood for HIV, HBV, HCV, Syphilis and Malaria. In July 1989, consequent to the reports of high seroprevalence in commercial blood donors, mandatory screening of blood and blood products for HIV antibodies was initiated by National AIDS control Organisation (NACO) in India [5].

In our study, we aimed to estimate the seroprevalence of TTI among voluntary blood donors. Accurate estimate of risk of TTI's are essential for monitoring safety of blood. This might give an idea of disease burden and epidemiology in the society.

2. Materials and Methods

Present study was conducted at blood bank, RIMS, Ongole, for a period of 6 years from Jan 2009 to Dec 2014. Voluntary donations primarily were obtained from walk in donors, Students, Employees and from outdoor blood donation camps. Care was taken to eliminate professional and paid donors by careful screening by trained personnel and after satisfactorily answering the donor's questionnaire. The questionnaire contains basic information regarding age, sex, occupation, number of previous donations, previous history of Jaundice, fever and risky sex behavior along with written consent.

All samples were screened for HIV, HBV, HCV, with 3rd generation (SD & J.Mitra) company manufactured kits supplied by APSACS. Tests were performed according to the instruction manual supplied in the kits, by ELISA reader. All the reactive samples were repeated before labeling them as seropositive and blood units were discarded. Test for Syphilis was done by VDRL (Tulip diagnostics).

Ethical clearance was obtained from institutional Ethics Committee.

3. Results

A total of 12, 533 apparent healthy voluntary donors were screened during the study period (2009 to 2014).

1. Among them 11, 903 (94.97%) were males and 630 (5.03%) were females (Table 1).
2. The overall prevalence of HIV, HBV, HCV and Syphilis were 0.23%, 3.16%, 0.39% and 0.06% respectively (Table 2).

The highest prevalence was observed for HBV followed by HCV, HIV and Syphilis in descending order. No blood donor tested showed positivity for Malarial parasite.

3) **Table 3** shows the year wise trends of seroprevalence of TTI.

Table I: Sex wise distribution of healthy donors

Total number of Blood donors tested over a period of 6 years	*Male Donors*	*Female Donors*
12, 533	11, 903 94.97%	630 5.03%

Table 2: Overall prevalence of HIV, HBV, HCV Syphilis

Total donors tested over a period of 6 years	*HIV Positive*	*HBV positive*	*HCV positive*	*Syphilis*
	No of cases %	No of cases %	No of cases %	No of cases %
12, 533	29 **0.23%**	397 **3.16%**	50 **0.39%**	8 **0.06%**

Table 3 : Year wise trend of seroprevalence of TTI

Year	Total number of blood samples	HIV Positive		HBsAg Positive		HCV Positive		Syphilis	
		No of cases	%	No of cases	%	No of cases	%	No of cases	%
2009	1777	5	0.28%	121	6.80%	7	0.39%	Nil	--
2010	2000	1	0.05%	88	4.40%	Nil	--	Nil	--
2011	2566	6	0.23%	63	2.45%	3	0.11%	3	0.11%
2012	2230	5	0.22%	43	1.92%	6	0.26%	5	0.22%
2013	1560	9	0.57%	43	2.75%	18	1.15%	Nil	---
2014	2400	3	0.12%	39	1.62%	16	0.66%	Nil	---

4. Discussion

Acquisition of HIV disease through blood transfusion is a relatively efficient mode of transfusion, with rates over 95 % [6]. WHO report states that the viral dose in HIV transmission through blood is so large that one HIV positive transmission leads to death on an average after 2 years in children and after 3 to 5 years in adults [1]. The road to efficient, safe and uncomplicated transfusion technique has been rather difficult, but great progress has been made. Transmission of TTI during window period still poses threat to blood safety in environments where there is high rate of TTI [7].

In the present study majority of the donors (94.97%) were males, which was comparable to the studies done by Giri PA et al in Maharashtra [7], Pallavi P et al in Mysore [8], Bhawani et al in Vikarabad [9] and Sukrutha Gopal R et al in Secunderabad [10] noting more than 90 % of the male donors.

Seroprevalence of TTI in the present study was as follows. HIV (0.23 %), HBV (3.16 %), HCV (0.39 %), Syphilis (0.06 %). No blood donor tested showed positivity for Malarial parasite. In the present study overall prevalence of HIV Seropositivity was 0.23 % which was comparable to findings of Sukrutha Gopal R et al (0.26 %) from Secunderabad [10], Arora et al (0.3 %) from Haryana [11], Das BK et al (0.32 %) from Kolkata [12], Patel SV et al (0.3 %) [13]**.** Variable results of 0.07 % by Giri PA et al [7]), 0.01 % by Radhiga ST et al [14] 0.44 % by Pallavi P et al [8] has been reported in various other studies.

Present study revealed Seroprevalence of HBV at 3.16% and it was found to be highest as compared to other TTI, Which was comparable to findings of N. Sawke et al 2.9 % from Bhopal [15], Garg et al (3.4%) from Rajasthan [16]. S. Gulia et al reported the prevalence of 2.48 % from Vizianagaram of AP [17]. Low prevalence was reported by Giri PA et al [7], Pallavi P et al [8], Sukrutha Gopal R et al [10]. In India highest prevalence has been reported among the aborigines of Andaman as well as from Arunachal Pradesh [18].

Between 2009 – 2014 a decreasing trend was observed in the frequency of HBsAg. This may be because of implementation of measures such as donor education, strict standards for donor selection criteria and improved serological screening protocol.HBsAg infection still continues to be a menace to the society, because inspite of

decreasing trend, incidence of disease is still very high in general population [19].

Maximum units of HBV positivity belongs to student community between 18 – 25 years. Same age was reported by Sethi et al [20]. This observation is worrisome since the most productive age group is affected, emphasizing the need to intensify preventive programs aimed at high risk behavioural change.

HCV infection is an evolving public health problem globally. Transmission of HCV is primarily through blood exposure. Majority of the infected person's progress to chronic infection and chance of Cirrhosis and HCC are more when compared to HBV. Hence donor selection is of paramount importance. The prevalence of HCV in this study was 0.39 %, similar to the study of Das BK et al (0.35 %) [12]. My findings are little lower than the studies of Giri PA et al (0.74 %) [7], Sukruth Gopal R et al (0.51 %) [10], and N Sawke et al (0.57 %) [15].

Syphilis positivity was 0.06 % in this study .Bhawani Y et al also reported the same prevalence (0.08 %) [9] from vikarabad, AP. Being a STD, its presence points towards donor's indulgence in high risk behavior and consequent higher risk of exposure to infections like HIV, HBV[21]

Table 4: Comparison of sex wise distribution in different parts of India

	Pallavi P et al [8] (Mysore) 2004 – 2008	Giri PA et al [7] (Maharashtra) 2009-2010	Sukrutha Gopal R et al [10] Telangana (Previously, part of united AP) 2009-2013	Present study 2009-2014 AP
Male	97.87 %	95.28 %	97.27 %	94.97 %
Female	2.13 %	4.72 %	2.73 %	5.03 %

Table 5: Comparison of TTI prevalence in different parts of India

	Gupta N et al [22] 2001 – 2003 Ludhiana	*Pallavi P et al [8] 2004-2008 Mysore*	*N.Sawke et al [15] 2006-2010 Bhopal, MP*	*Giri PA et al [7] 2009 - 2010 Maharashtra*	*Present study 2009-2014 AP*
HIV	0.08 %	0.44 %	0.51 %	0.07 %	0.23 %
HBV	0.66 %	1.27 %	2.90 %	1.09 %	3.16 %
HCV	1.09%	0.23 %	0.57 %	0.74 %	0.39 %
Syphilis	0.85%	0.28 %	0.23 %	0.07%	0.06%

Table 6: Comparison of TTI prevalence in different parts of Andhra Pradesh

	Bhawani et al [9] 2004-2009 Vikarabad, AP	Sukrutha Gopal R et al [10] 2009-2013 Secunderabad, Telangana (Previously, part of united AP)	Basavarju A et al [23] 2013-2014 Khammam, AP	Present study 2009 – 2014 AP
HIV	0.39 %	0.26 %	0.004 %	0.23 %
HBV	1.41 %	1.28 %	0.64 %	3.16 %
HCV	0.84 %	0.51 %	---	0.39 %
Syphilis	0.08 %	0.03 %	---	0.06 %

5. Conclusion

Availability of safe blood for transfusion is a prerequisite for the recipients and for the community as well. Even with the implementation of effective preventive strategies including latest laboratory tests, there is a significant risk of transmission of infectious agents, through blood transfusion in India.

Therefore strict selection criteria of donors, vigorous screening of donated blood, implementation of uniform laboratory services and reduction of unnecessary transfusions will aid in curbing the prevalence of these infections and increases blood safety locally, regionally, globally.

Enormous efforts should be made to increase non remunerated, repeat voluntary blood donor services. Voluntary blood donation has to be made a part of life style, enlightening the general public and bring about awareness of benefits of voluntary blood donation.

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