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Research Article

The Trend of Transfusion Transmitted Infections among the Blood Donors in Five Years; With Special Focus on Reducing the HIV Transmission

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Abstract

Though transfusion of blood and blood products has become an important and specialized modality of patient management to reduce morbidity, it is also associated with many life threatening complications, demanding meticulous pre-transfusion testing and screening of Transfusion transmitted infections (TTIs). The priority of blood transfusion service is to ensure safe and adequate blood supply. The objective of the study is to assess the prevalence and trend of five TTIs like Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Human Immunodeficiency Virus (HIV), Malaria Parasites (MP) and Syphilis among the healthy blood donors in the department of Transfusion Medicine, Sriram Chandra Bhanja (SCB) Medical College and Hospital, Cuttack in Odisha state of India. Out of 1,06,467 units of blood tested from January 2010 to August 2015, incidences of HBV, HCV, HIV, MP, Syphilis were found to be 428, 107, 29, 02 & 04 in number respectively by ELISA & Rapid kit tests. The trend of seroprevalence is seen to have increased from 0.04% (2010) to 1.35% (2015) over the five-year period, is a matter of concern. It is therefore very important to continue proper pre-donation counselling along with screening of donated blood units with highly sensitive test methods and to counsel the donors who are found to be sero positive for the prevention of further transmission risks.

Keywords: *Transfusion transmitted Infection; Human Immunodeficiency Virus; Hepatitis B Virus; Hepatitis C Virus; Seroprevalence*

Introduction

Judicious transfusion of blood and blood products in patients with clear indications of such requirements is life saving but is always accompanied by the risk of transfusion transmitted infections (TTIs).The agents responsible for TTIs share certain common factors like prolonged incubation period and stability of survival in the stored blood [1]. Among TTIs, the most common and dreaded infections are Hepatitis B virus and the Hepatitis C Virus which are responsible for post transfusion Hepatitis. Next to Hepatitis, HIV is considered to be a common risk. Syphilis is a less commonly transmitted disease and has low prevalence in most studies [2]. Though the risk of transmission of Malaria is low, it cannot be overlooked. In the process of safe transfusion practice, TTIs are a continuous threat. The purpose of the present study is to determine the seroprevalance and the trend of HBV, HCV, HIV, Syphilis, Malaria and co-existence of diseases like HIV & HBV for a period of five years. This gives the information and analysis of safety associated with blood transfusion and thus, we can weigh the risks vis-a-vis the benefits of blood transfusion [3].

Materials and Methods

The study was conducted in the Department of Transfusion Medicine, Sriram Chandra Bhanja (SCB) Medical College and Hospital, Cuttack, Odisha state , India from January 2010 to August 2015 over 1,06,467 healthy donors- voluntary and replacement donors. Prior to the blood collection, the donors were requested to fill up the donor questionnaires, to determine whether they are eligible to donate as per the guidelines of World Health Organization (WHO). Three millilitre of blood sample was collected in a clean and dry test tube for the TTI screening. The samples were centrifuged for serum and then tested for HBsAg (by ERBA LISA PICO HBsAg) and anti-HCV antibody (by

ERBA LISA HCV), anti-HIV 1+2 (by ERBA LISA HIV 1+2 By TRANSASIA Bio-Medicare Pvt Ltd). Rapid kit tests were performed for Syphilis (by Carbogen TULIP Diagnostic Pvt Ltd) and Malaria antigen to Plasmodium Falciparum (HRP-2, LDH MyTest By Bio-footprints Health Care Pvt Ltd). Along with the quality control of the reagents before hand, appropriate negative control was incorporated in all procedures. All the data was stored for future reference.

Result

The study was conducted on 1, 06,467 donors, constituting 78,351 (73.6%) number of voluntary donors and 28,116 (26.4%) number of replacement donors. There were 1, 00,260 (94.18%) numbers of male donors and 6,207 (5.82%) female donors (Table 1). Out of 1, 06,467 donors, 570 (0.53%) cases were seropositive of which 39 cases (0.49%) were found in voluntary donors and 180 cases (0.64%) were seen in replacement donors (Table 2). Seroprevalance of TTIs was found to be 51 (0.35%) in 2010, 37 (0.23%) in 2011, 68 (0.40%) in 2012, 93(0.43%) in 2013, 112 (0.52%) in 2014 and 209 (1.34%) in 2015 (January to August) depicting a slight increase in the trend of seroprevalence. The seroprevalance of HBV, HCV, HIV, Syphilis and Malaria for this five-year period were found to be 428 (0.40%), 107(0.10%), 29(0.027%), 04 (0.003%), 02(0.001%) respectively. (Tables 3 & 4)

year	Voluntary Donor		Replacement donor		Total Male	Total Female	Total donor
	Male	Female	Male	Female			
2010	10,963	756	2,427	92	13,390	848	14,238
2011	11,275	812	3583	78	14,858	890	15,748
2012	12,336	915	4,299	112	16,635	1,027	17,662
2013	14,050	1,314	6,269	441	20,319	1,755	22,074
2014	13,958	1,039	6,108	92	20,066	1,131	21,197
2015 (JAN-AUG)	10,445	488	4,547	68	14,992	556	15,548

Table 1: *Number of voluntary and replacement blood donors.*

Year	Voluntary Donor/sero+ve	Replacement Donor/sero+ve	%Seroprevalence Voluntary: Replacement
2015	10,933 / 139	4,615 / 70	1.33% : 1.51%
2014	14,997 / 68	6,200 / 44	0.45% : 0.71%
2013	15,364 / 62	6,710 / 31	0.40% : 0.46%
2012	13,251 / 51	4,411 / 17	0.38% : 0.38%
2011	12,087 / 27	3661 / 10	0.22% : 0.27%
2010	11,719 / 43	2,519 / 8	0.35% : 0.35%

Table 2: *Comparison of seroprevalence of TTIs in voluntary & replacement donors.*

Year	HBV Male	HBV Female	HCV Male	HCV Female	HIV MALE	HIV FEMALE	MALARIA MALE	MALARIA FEMALE	SYPHILIS MALE	SYPHILIS FEMALE	Total
2010 VR	24	10	5	2	1	0	0	0	0	0	51 (0.35%)
	6	1	2	0	0	0	0	0	0	0	
2011 VR	17	4	3	2	1	0	0	0	0	0	37 (0.23%)
	7	2	1	0	0	0	0	0	0	0	
2012 VR	49	0	1	0	1	0	0	0	0	0	68 (0.38%)
	17	0	0	0	0	0	0	0	0	0	
2013 VR	58	1	0	0	3	0	0	0	0	0	93 (0.42%)
	28	0	0	0	3	0	0	0	0	0	
2014 VR	50	0	12	0	3	0	0	0	3	0	112 (0.53%)
	34	0	8	0	2	0	0	0	0	0	
2015 VR	79	0	50	0	9	0	1	0	0	0	209 (1.34%)
	41	0	21	0	6	0	1	0	1	0	
TOTAL	428		107		29		2		4		570

Table 3: *Seropositive cases in voluntary and replacement donors (male and female).*

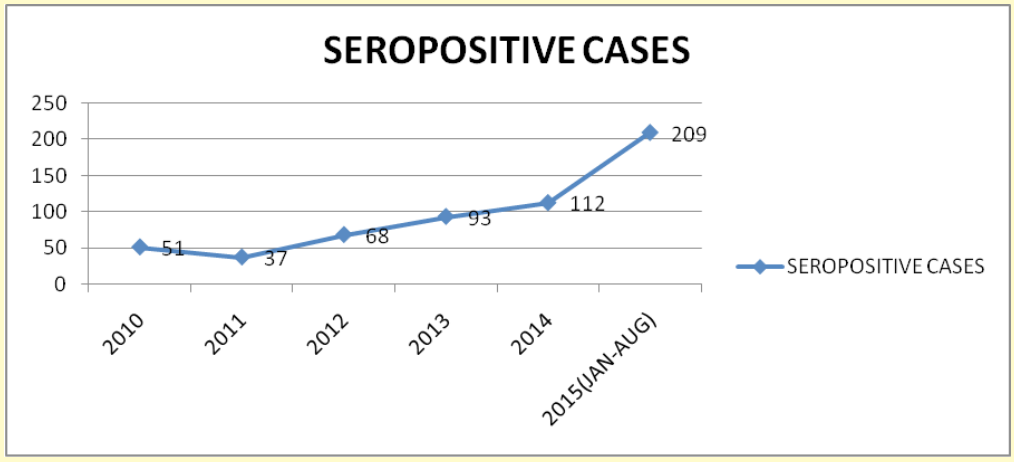

Table 4: *Trend of seroprevalence of TTIs in five years.*

In the month of August in 2015, the HIV prevalence was 3 out of 450 donors in a specific blood-collection camp pointing to the fact that the conducted camp area is having high prevalence of HIV than other parts of Odisha state.

Discussion

Though blood transfusion is a life saving procedure, it should be practiced with stringent donor screening and testing practices to achieve the goal of safe blood transfusion free from TTIs [4]. In the present study, out 1,06,467 donors, 1,00,260(94.2%) were male and 6,267 (5.8%) were female. Females, particularly in rural settings, in outdoor voluntary blood donation camp belong to a lower socio-economic status with less percentage of literacy, predominantly lacking awareness and information. They are subjected to more cases of rejection at the time of collection due to various reasons like malnutrition, underweight, anaemia etc attributable to the less number of female blood donors .

Among TTIs, Hepatitis B virus and C virus have become more important globally as these are highly infectious and the commonest cause of chronic liver diseases [1]. The present study shows higher prevalence of HBV & HCV among the blood donors contributing 428 and 107 in number respectively. Infections by HBV & HCV cause serious mortality & morbidity [5]. One case of dual infection of HIV & HBV was seen in our study like that in a few other studies [4,6]. Seroprevalence of HBV in various Indian studies has ranged from 1.86% to 4% [7-9].

Seroprevelance of HBV is low, 0.1 % to 0.5%, in United States and Western Europe. Still higher ranging from 5 to 20% in far Eastern & some tropical countries [10]. Our study shows low incidence of HBV (0.40 %) may be due to proper pre-donation screening & counselling.

There is gradual increase in trend of prevalence of TTIs from 0.4% (January 2010) to 1.35% (2015 August). This may be due to increase in number of donors and use of third generation ELISA kit for screening of HIV & HCV & fourth generation ELISA kit for HBV testing instead of second generation kits used previously.

There were more seropositive cases in replacement donors (0.64%) in comparison to voluntary donors (0.49%) in five years as also found in few other studies [10]. This encourages one to be focussed on promoting more voluntary blood donation camps which will decrease the incidences of seroprevalence and enhance the transfusion of safe blood and blood products.

In the month of August 2015, in a voluntary blood donation camp in Ganjam district of Odisha , out of 450 donors, three cases of HIV, 23 cases of HBV and 10 cases of HCV were detected , which is pretty high in comparison to the frequency of TTIs in the rest of the years. It may possibly be due to high prevalence of HIV & Hepatitis in this area. These donors were previously not aware of their TTI status. In this area, we need to be more focused on pre-donation counselling. Basing on this data, the focus of the Blood Bank should be to reduce the transmission of the dreaded infections like HBV & HCV which can cause cirrhosis and hepatocellular carcinoma if timely intervention is not undertaken. The most important aspect is to handle the HIV transmission leading to social stigma along with many fatal complications by highlighting proper pre-counselling questionnaires, with deferring the donors after getting the slightest hint regarding their medical history, and referring the seropositive HIV cases to Integrated Counselling and Testing Centre (ICTC) for counselling and treatment after the repeat test.

It is clear from our study that there is increase in the prevalence of TTIs, including HIV, among the healthy donors who may not even be aware of their status as silent carriers. This is said to be more dangerous for the risk of transmission of diseases. To improve this scenario, various measures like strict donor selection criteria ,with donor counselling in a closed room to give him more privacy , dissuading donors with high-risk lifestyles and advice for TTIs screening , use of sensitive tests like Nucleic acid Amplification Test (NAT) with judicious use of blood and its components, should be implemented. Besides, certain other measures need to be taken in this direction, like increasing the public awareness through enhancement of Information Education Communication (IEC), identification of high- risk subjects along with formulation of preventive strategies at state and national levels to reduce the seroprevalance and to provide the needy with adequate and safe blood and blood products. In future, basing on the increasing trend of seroprevalance of the TTIs, the research work can be focused on the follow up of the seropositive donors for proper counselling and complete treatment and also comparision of NAT positive cases with ELISA sero-negative cases, to propagate the use of these advance techniques for the screening

of TTIs in the window period. Ultimate goal should be to achieve supply of adequate number of safe blood to the patients to avoid any further transmission of transfusion related dreaded infections.

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