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RESEARCH ARTICLE

SEROPREVALENCE OF HIV, HBV, HCV AND SYPHILIS AMONG BLOOD DONORS ATTENDING
TERTIARY CARE HOSPITAL, GUJARAT

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ABSTRACT

Background: Blood transfusion is lifesaving but it is also an important mode of transmission of infections to recipients. With every unit of blood there is a 1% chance of transfusion associated problems including transfusion transmitted infections.

Aim: The aim of the present study was to find out prevalence of transfusion transmitted infections (TTI) in voluntary and replacement donors in our hospital transfusion service set up. This study also aids in evaluating the safety of the collected donations.

Material and Methods: This five years record based descriptive retrospective study was conducted from January 2009 to December 2013 at the blood bank, P.D.U. Government Hospital and Medical College, Rajkot, Gujarat, India. Donors and cases of TTI were identified from computer records of blood bank of hospital and monthly report sent to GSACS (Gujarat State AIDS Control Society), Ahmadabad. The data were analysed in computer software, Microsoft excel 2010.

Result: A total of 48162 donors were tested, out of which 10478 (21.76%) were replacement donors and 37684 (78.24%) were voluntary donors. The seroprevalence of HIV, HBV, HCV and syphilis was 0.21%, 0.95%, 0.24% and 0.19% respectively in total donors. Replacement donors had a high incidence of TTI was 274(2.62%) as compared to voluntary donors were 492(1.31%).

Conclusion: The seroprevalence was more in replacement donors as compared to voluntary donors. It concludes that motivating voluntary blood donors are the most effective way of ensuring adequate supplies of safe blood on a continuing basis.

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INTRODUCTION

Blood Transfusion Service (BTS) is an integral and indispensable part of the healthcare system now. The priority objective of BTS is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels (Muhammad Badrul Islam, 2009). Transfusion of blood and its components is life saving as well as it has life threatening hazards. With every unit of blood there is a 1% chance of transfusion associated problems including transfusion transmitted diseases (Widman, 1985). With an estimated population of 1.21 billion, India has the world's third largest population suffering from HIV/AIDS. The estimated adult HIV prevalence was 0.31% in 2009 (<http://pib.nic.in/newsite/erelease.aspx?relid=67983>). India has intermediate endemicity of hepatitis B with HBsAg prevalence of 2–10% among the study population. It has been estimated that up to 40 million people out of the 350 million hepatitis B chronic carriers worldwide arise in India. (Datta, 2008) HCV is a leading cause of chronic liver diseases, viz., hepatic fibrosis, cirrhosis, end-stage liver disease and hepatocellular carcinoma (HCC).

In India, there are about 12–13 million HCV carriers and modeling data predict that the burden of disease could soon increase substantially (Narahari, 2009). Despite implementation of various screening assays for detection of TTIs, TTI is still a major concern to patients, physicians and policy makers who wish to see a risk free blood supply. Majority of these problems are due to prevalence of asymptomatic carriers in the society as well as due to blood donations during the window period of infections.

MATERIALS AND METHODS

This five years record based descriptive retrospective study was conducted from January 2009 to December 2013 at the blood bank, P.D.U. Government Hospital and Medical College, Rajkot, Gujarat, India. Donors and cases of TTI were identified from computer records of blood bank of hospital and monthly report sent to GSACS (Gujarat State AIDS Control Society), Ahmadabad. The data were analysed in computer software, Microsoft excel 2010. A total of 48162 donors were analyzed for prevalence of TTI. These included the replacement donors and the voluntary donors. All sample were screened for human immunodeficiency virus by ELISA test, hepatitis B antigen by

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ELISA test, hepatitis C virus by ELISA test and syphilis by Rapid regain test. Tests were performed according to the manufacturer's instruction. All reactive samples were repeated in duplicate before labeling them seropositive. The donated blood was discarded whenever the pilot donor sample was found positive for any TTI. Seropositive blood bags were also tested by rapid kit methods.

RESULTS

A total of 48162 units of blood was collected from January 2009 to december 2013 and the proportion of blood collected from voluntary blood donors was 37684 (78.24%) and the rest 10478 (21.76%) were from family replacement donation. The total number of blood donors positive for serological markers of TTI was 766 (1.59%). Of these, the number of voluntary blood donor positive for TTI markers was 492(1.31%) and 274 (2.62%) donors were positive for TTI markers in family replacement blood donors (Table 1). From 2009 to 2013, increased voluntary donation suggests that motivation and recruitment of potential local blood donor population would lead to effective voluntary system.

Table 2 shows that the most common TTI in voluntary donors was HBV 0.83% (Table 2). Prevalence of different TTIs among the replacement donors are shown in (Table 3). The most common TTI was HBV (1.37%) in replacement donors followed by HCV, HIV and syphilis.

Replacement donors had a high incidence of TTI as compared to voluntary donors. The concurrent rates for seroreactivity were highest for HBV followed by HCV, HIV, and syphilis in both voluntary and replacement donors in descending order.

DISCUSSION

Determined seroprevalence of HIV, HBV, HCV and syphilis was lower than the infections reported in other countries: Ethiopia (HIV-4.5%, HBV-8.2%, HCV-5.8%) (Diro *et al.*, 2008); Tanzania (HIV-8.7%, HBV-11%, HCV-8%, syphilis-12.7%) (Matee *et al.*, 1999); Thailand (HIV-0.69%, HBV-4.61%, HCV-2.90%) (Luksamijarulkul *et al.*, 2002); Pakistan (HBV-2.45%, HCV-2.52%) (Chaudhary *et al.*, 2007). Lower prevalence of TTIs during this study may be attributed to lower infection rates in present study as compared to the other countries/studies under review.

Results of present study have been compared with similar studies carried out in different region of India (Table 4).

Voluntary donors constituted 78.24% as compared to 21.76% of replacement donors. This finding is similar the study done by Hilda Fernandes ET AL. (Hilda Fernandes, 2010) and Gupta *et al.* (2006).

The increase in voluntary donors may be attributed to the increasing public awareness and involvement of government bodies like NACO (National AIDS control organization) that actively propagate voluntary donation in our country.

Table 1. Prevalence of TTIs among Voluntary and Replacement donors

YEAR	Voluntary		Replacement		Grand Total	
	Tested	Reactive	Tested	Reactive	Tested	Reactive
2009	4543	69(1.52%)	3879	105(2.71%)	8422	174(2.07%)
2010	5188	84(1.62%)	4275	120(2.81%)	9463	204(2.16%)
2011	7709	134(1.74%)	1889	49(2.59%)	9598	183(1.91%)
2012	9683	109(1.13%)	208	0(0%)	9891	109(1.10%)
2013	10561	96(0.91%)	227	0(0%)	10788	96(0.89%)
TOTAL	37684 (78.24%)	492(1.31%)	10478 (21.76%)	274(2.62%)	48162	766(1.59%)

Table 2. Prevalence of different TTIs in voluntary donors

Year	Voluntary donors (in Numbers)	HIV	HBV	HCV	syphilis
2009	4543	10(0.22%)	42(0.92%)	10(0.22%)	7(0.15%)
2010	5188	8(0.15%)	47(0.91%)	14(0.27%)	15(0.29%)
2011	7709	15(0.19%)	77(1.00%)	26(0.34%)	16(0.21%)
2012	9683	16(0.17%)	73(0.75%)	11(0.11%)	9(0.09%)
2013	10561	8(0.08%)	74(0.70%)	8(0.08%)	6(0.06%)
TOTAL	37684	57(0.15%)	313(0.83%)	69(0.18%)	53(0.14%)

Table 3. Prevalence of different TTIs in replacement donors

Year	Replacement Donors (in Numbers)	HIV	HBV	HCV	syphilis
2009	3879	18(0.46%)	58(1.50%)	14(0.36%)	15(0.39%)
2010	4275	21(0.49%)	62(1.45%)	20(0.47%)	17(0.40%)
2011	1889	4(0.21%)	24(1.27%)	13(0.69%)	8(0.42%)
2012	208	0(0%)	0(0%)	0(0%)	0(0%)
2013	227	0(0%)	0(0%)	0(0%)	0(0%)
TOTAL	10478	43(0.41%)	144(1.37%)	47(0.45%)	40(0.38%)

Table 4. Comparison with different studies

Studies	HIV	HBV	HCV	Syphilis	Total
Gupta <i>et al.</i> 1 (10)	0.08	0.66	1.09	0.85	2.68
Bhawani <i>et al.</i> (11)	0.39	1.41	0.84	0.08	2.72
Chandra <i>et al.</i> (12)	0.23	1.96	0.34	0.01	2.54
Jasani <i>et al.</i> (13)	0.25	1.35	0.85	0.90	3.35
Patel <i>et al.</i> (14)	0.08	0.3	0.09	0.06	0.5
Dr.Mayuri <i>et al.</i> (15)	0.33	1.51	0.22	0.36	2.42
Present study (our study)	0.21	0.95	0.24	0.19	1.59

Conclusion

From 2009 to 2013 year showed increased voluntary donation suggesting that motivation and recruitment of potential local blood donor population would lead to effective voluntary system. Prevalence of TTI is increased from 2009 to 2010, thereafter gradually decreased from 2011 to 2013. This is because of stringent screening of blood donors due to which donors with high risk behavior are eliminated at basic level of pre donation screening and counseling. Another important contributor lowering Seroprevalence, is Large pool of voluntary non remunerated blood donors Post donation counseling has been (started in 2011), which also helps in preventing repeat blood donation by donors who know their seropositivity status.

HBV is the commonest TTI amongst all blood donors followed by Syphilis, HIV, HCV, HIV and syphilis in both voluntary and replacement donors in descending order. Replacement donors had a high incidence of TTI as compared to voluntary donors. SO Repeated voluntary blood donation should be encouraged for prevention of transfusion-transmissible diseases. The present study concludes that motivating voluntary blood donors are the most effective way of ensuring adequate supplies of safe blood on a continuing basis. Use of advanced test methods like fourth generation ELISA and NAT (Nucleic acid Amplification Technique) testing can be helpful in shortening the window period but this requires additional financial resources, trained staff which may further add economic burden on overall health economy. At last, absolutely effective way for safe transfusion is rational use of blood and blood products. It should be transfused only when it is absolutely essential for the care of the patient.

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