



PREVALENCE OF TRANSFUSION TRANSMITTED DISEASES AMONG BLOOD DONORS AT A TERTIARY CARE TEACHING HOSPITAL IN INDIA

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ABSTRACT

Aim of this study is conducted to evaluate the sero-prevalence of HBV, HCV, HIV, Syphilis and Malaria among blood donors in Bhopal along the duration of 3.5 years. All blood units received from replacement as well as voluntary blood donors were selected for the study at Chirayu medical college and Hospital associated blood bank, Bhopal, M.P., India during the period from February 2011 to July 2014. Blood transfusion has become an essential part of treatment in number of medical or surgical emergencies. It is also true that blood transfusion is an important mode of transmission of infection to recipients. Present study was planned to know the prevalence of such infections among voluntary as well as replacement donors of this area. Screening of blood units was done by enzyme-linked immunosorbent assay (ELISA) method for HIV, syphilis, malaria and hepatitis B and C. HIV testing was done using third generation ELISA kits. Syphilis was tested by latex agglutination assay and malaria was tested by using ELISA method (for malaria antigen). Any sample found reactive was retested for confirmation. Seropositive units were discarded. All records were collected from blood bank records maintained as per Drugs and Cosmetic Act of India. A 3.5 year retrospective study carried out at blood bank of Chirayu medical college Bhopal Madhya Pradesh. Study includes record of 2842 voluntary and 6718 replacement donors attending blood bank from February 2011 to July 2014. Overall TTIs prevalence in voluntary and replacement donors was 2.81% and 4.15% respectively in our study. Seroprevalence of HIV, HBV, HCV, Syphilis and Malaria was found to be 0.07%, 0.35%, 0.10%, 0.35% and 0.00% in voluntary blood donors while 0.11%, 2.67%, 0.47%, 1.78% and 0.00% being the seroprevalence of HIV, HBV, HCV, syphilis and Malaria in replacement blood donors. It is clear from these data that seroprevalence of HIV, HBV, HCV and syphilis in replacement blood donors is higher than that in voluntary blood donors. The highest seroprevalence was found in age group of 18-30 (2.06%). A noticeable numbers of replacement donors harbor HIV, HBV, HCV and Syphilis infections. So strict selection of donors and proper testing of donor's blood by using standard method is highly recommended to ensure safety for recipient. Efforts should be made to increase the number of voluntary donors and reduce replacement donations to a minimum.

INTRODUCTION

Blood transfusion is given for revival of life to critically ill patients as there is no genuine substitution of

human blood [1]. Contaminated blood transfusion can transmit infectious diseases and can be fatal instead of saving life. The discovery of transfusion transmissible



infections (TTIs) has heralded a new era in blood transfusion practice worldwide with emphasis on two fundamental objectives, safety and protection of human life [2]. Measuring their severity, WHO has recommended pre-transfusion blood test for Human immunodeficiency virus (HIV), Hepatitis B virus (HBV), Hepatitis C Virus (HCV) and Syphilis as mandatory [3]. According to NACO guidelines, all mandatory tests should be carried out on donor's blood samples for HIV, HBV, HCV, syphilis and malaria. The whole blood or components from any unit that tests positive should be discarded [4]. Only continuous improvement and implementation of donor selection, sensitive screening tests and effective inactivation procedures can ensure the elimination, or at least reduction of the risk of acquiring TTIs [5]. For this NACO recommended 3rd or 4th generation ELISA HIV I & II test kits which are 100% sensitive should be preferred at blood banks for screening of donated blood [6]. Transfusion departments have always been a major portal to screen, monitor and control infections transmitted by blood transfusion. Blood transfusion departments not only screen TTIs but also give clue about the prevalence of these infections in healthy populations [7]. Evaluation of data on the prevalence of TTIs among blood donors permits an assessment of the accurate estimation of risk of TTIs which helps in the creation of long term strategies to improve public health and to prevent spreading of disease in local population [8]. The aim of current study was to provide the detail epidemiological analysis of TTIs in blood donors of Bhopal district.

MATERIALS AND METHODS

The study was conducted at Chirayu Medical college and Hospital associated blood bank, Bhopal. Tests were routinely done on every blood unit. The Medical officer first fill up a registration form which carried all the information of donor like personal details, demographic details, occupation details and medical history regarding risk factor like history of previous surgery, hospitalization, blood transfusion,. The donors were then screened by a

doctor according to blood donor selection criteria and guideline from drug and cosmetic act NACO [9,10] and blood donors who were unfit to donate blood according to standard blood donors selection criteria (As per the Drugs and Cosmetics Act,1999) [11] were excluded. Hemoglobin estimation was performed. This screening procedure was very helpful to exclude the professional donors. The total number of 9560 donors were considered medically fit and accepted for blood donation during the study period. On completion of blood donation, the units were screened for the five commonest TTIs namely HIV I & II, HBV, HCV, syphilis and malaria. The blood samples were collected from voluntary as well as replacement blood donors. All sera were initially tested for Hepatitis B Surface antigen (HbsAg), anti-HIV antibody, anti-HCV antibody, syphilis and malaria by enzyme linked immuno-sorbent assay (ELISA) test using a commercial kit by Tulip diagnostic Qualisa Microwell enzyme immunoassay third generation. Internal positive and negative controls along with external control which is known positive sample is tested while performing the ELISA. The data were recorded on specially formed proforma then tabulated and analyzed.

RESULTS

In the present study out of 9560 Voluntary and replacement donors, 9187(96.09%) were male and 373(3.90%) female which shows predominance of male. The most common age group of donors was found to be 18-30 years (54.87%) followed by age group of 31-40 years (30.92), 41-50 years (11.98%), and 51-60 years (2.23%) as shown in Table 1. The overall prevalence of HBV, HCV, Syphilis and HIV among Voluntary and replacement donors in the study area is 3.75%. The HBV prevalence is (190 cases) 1.987%, Syphilis (130 cases) 1.359%, HCV (35 cases) 0.366% and HIV (10 cases) 0.104% in overall 9560 donors. No donor was found to be positive for Malaria. Highest prevalence of transfusion transmitted infections was within age group 18-30 years (2.06%) followed by 31-40years (1.16%), 41-50 years (0.45%) and 51-60 years (0.08%). shown in Table 2.

Table 1. Age wise distribution of total donors from 18 years to 60 years

Age group in years	Cases (%)
18-30	5246 (54.87%)
31-40	2956 (30.92%)
41-50	1145 (11.98%)
46-60	213 (02.23%)
Total	9560 (100%)

Table 2. Age wise distribution of infected cases of HIV, HBSAg, HCV and Syphilis

Age group in years	Total number of donor	HIV	HBSAg	HCV	Syphilis	Malaria	Total infected	%
18-30	5246	05	121	19	52	00	197	2.06%
31-40	2956	05	54	11	45	00	115	1.16%
41-50	1145	-	11	04	30	00	45	0.45%
51-60	213	-	04	01	03	00	08	0.08%
Total	9560	10	190	35	130	00	365	



Table 3. TTI Prevalence in India

Comparison of TTIs prevalence rate in different parts of India					
Place	HIV%	HBV %	HCV%	Syphilis%	Reference (12-19)
Bangalore, Karnataka	0.44	1.86	1.02	1.6	Srikrishna A et al (1999) ,11
Ludhiana	0.084	0.66	1.09	0.85	Gupta N. et al (2004) 12
Delhi	0.56	2.23	0.66	-----	Pahuja S etal (2007) 8
Lucknow (UP)	0.23	1.96	0.85	0.01	Chandra T et al (2009) 10
Southern Haryana	0.3	1.7	1.0	0.9	Arora D et al (2010)7
West Bengal	0.28	1.46	0.31	0.72	Bhattacharya P et al (2007)
Jhalawar, Rajasthan	0.02	2.56	Nil	0.20	Diwan R et al (2012) 22
Ahmedabad, Gujrat	0.16	0.98	0.11	0.23	Shah N et al (2013)
Present study (2014)	0.104	1.987	0.366	1.359	

DISCUSSION

With every unit of blood, there is 1% chance of transfusion associated problems including TTIs. The risk of TTI has declined dramatically in high income nations over the past two decades, but the same may not hold good for the developing countries. The national policy for blood transfusion services in our country is of recent origin and the transfusion services are hospital based and fragmented. Voluntary donors (VD) are motivated blood donors who donate blood at regular intervals and replacement donors (RD) are usually one time blood donors who donate blood only when a relative or a friend is in need of blood.

Various studies in India about the seroprevalence of HCV have shown data ranging from the lowest (nil) in the study by Diwan R et al in 2012 to the higher one of 1.09% (Gupta et al, 2004). A significantly lower prevalence of 0.366% has been noted in our study. Sexually transmitted infections are wide spread in developing countries and constitute a major public health problem. The antibodies detected for syphilis shows reactivity of 1.359% in our study which is lower as compared to Srikrishna A et al but higher than other studies in India as shown in table 3. There has been a significant difference between seropositivity amongst voluntary and replacement blood donors. HIV prevalence was found to be lower in our study as compared to others except Diwan R et al and Gupta N et al as shown in table 3. HBV prevalence was found to be lower than Pahuja S et al and Diwan R et al.

The current practice of selection of voluntary donors over replacement donors to meet with the need for blood in a hospital coupled with more numbers of voluntary donor drives in the community as well as availability of better testing reagents (particularly for HIV and HCV infections) is sure to lower down the threats of transmitting TTIs to patients via transfusion of blood and blood products. As is apparent from the results of present study the results of which are comparable to other studies

in India. Voluntary blood donors have significantly lower rates of prevalence for markers of TTIs as compared to replacement blood donors. Awareness of general population about voluntary regular blood donation should be created, to minimize the chances of spreading of transfusion transmitted infections. Replacement donors carry a relatively higher risk of transfusion transmitted infections due to chances of missing professional donors during donor screening procedures. Hence blood from replacement donors should be accepted only in cases of dire emergencies when transfusion of blood or blood products would be lifesaving. As is apparent from the results of present study, higher incidence of transfusion transmissible infections have been observed among replacement donors compared to voluntary donors.

CONCLUSION

The major concern in transfusion services today is increased seropositivity among replacement donors for HCV, HIV, HBV and syphilis. A noticeable number of replacement donors harbor HIV, HBV, HCV, Malaria and Syphilis infections. So strict selection of donors and proper testing of donor's blood by using standard method is highly recommended to ensure safety for recipient. With the advent of nucleic acid amplification techniques (NAT), western countries have decreased the risk of TTIs to a major extent. But the cost-effectiveness of NAT is poor. The NAT has added benefits but its high financial cost is of concern, especially in underdeveloped countries like India. Apart from NAT for donor screening, other factors such as public awareness, vigilance of errors, educational and motivational programs is sure to help in decreasing the infections. Efforts should be made to increase the number of voluntary donors and reduce replacement donations to a minimum. Motivation of potential local blood donor population would help in effective implementing of voluntary blood donation program in the community.

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