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Seroprevalence of transfusion transmissible infections among blood donors in a tertiary care hospital of Andhra Pradesh

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Abstract
This study was conducted to evaluate the prevalence of markers of hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) and syphilis among blood donors in a tertiary care hospital of Andhra Pradesh, a six-year experience. All the blood donors who came to Konaseema Institute of Medical Sciences hospital to donate blood during 2004-2009 and people who gave voluntary written consent were selected for the study. Seroprevalence of antibodies against HBV, HCV and HIV was studied by ELISA in voluntary and replacement blood donors from 2004 to 2009. RPR was done for screening of syphilis. Blood samples of 8097 persons were tested. The seroprevalence of HIV, HBV, HCV and syphilis was found to be 0.39%, 1.41%, 0.84% and 0.08% respectively. Infections were slightly more common among replacement donors compared to voluntary donors. There was a gradual decrease of TTIs in blood donors over the years.

Keywords: Hepatitis B virus; Human immunodeficiency virus; Hepatitis C virus; Syphilis; Blood donor.

Introduction

Timely transfusion of blood saves millions of lives, but unsafe transfusion practices puts millions of people at risk of transfusion-transmissible infections (TTIs) (Bihl et al, 2007). 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 (Tiwari et al, 2008). TTIs can exist as asymptomatic diseases in the hosts, so donors must be screened for high-risk behaviour related diseases. Evaluation of data on the prevalence of transfusion transmissible infections namely HIV, HBV, HCV and syphilis among blood and plasma donors permits an assessment of the occurrence of infections in the blood donor population and consequently the safety of the collected donations. It also gives an idea of the epidemiology of these diseases in the community. Transfusion associated infections continue to be a big threat (Kapur et al, 1998).

Hepatitis B is one of the most common diseases transmitted by blood and has infected two million people worldwide including an estimated 400 million chronically infected cases. Individuals with chronic infection have a high risk of developing liver cirrhosis and hepatocellular carcinoma (Karki et al, 2008). Hepatitis C virus (HCV) infection is another common chronic blood born infection with an estimated 3.9 million persons infected by the virus and a high rate of development of liver cirrhosis. Infection by HBV and HCV causes serious mortality and morbidity. There is an estimated 5.7 million cases of HIV in India, second highest pool of patients in the world. Syphilis is less often transmitted by blood and the prevalence is low in most studies reported (Bhattacharya et al., 2007). This study is aimed to assess the prevalence and trends of the transfusion transmissible infections from 2004–2009 among blood donors of Andhra Pradesh.

Materials and Methods

Present study was carried out at Konaseema Institute of Medical Sciences, Amalapuram, Andhra Pradesh. A routine screening of every unit of blood to exclude HIV, HBV, HCV and syphilis was done over a period of six years, from Jan 2004 to Dec 2009. In the six-year period, 8097 donors were tested. Donors were selected by the standard criteria for fitness to donate blood and gave voluntary written consent to participate in this study. Blood samples were screened for HIV (General Biologicals, Taiwan), HBV (Organon Teknika, Boxtel, The Netherlands), HCV (Murex and Biorad, Belgium) by ELISA and syphilis by RPR (Carbogen, Tulips Diagnostics, India).

A detailed predonation questionnaire was included in the donor registration form.

Information regarding risk factors like history of surgery, hospitalization, blood transfusion, occupation, high risk behavior and tattoo marks was collected. Statistical analysis was done using SPSS-16 statistical software and Chi-square test was used as a test of significance.

Yearly distribution of data

Year	Vol D		Rep D		Total	HIV%	HBV%	HCV%	RPR%	Exp	Total
	M	F	M	F							
2009	188	5	2076	11	2280	5(0.21)	21(0.92)	12(0.52)	3(0.13)	8	48
2008	599	18	1193	8	1818	5(0.27)	24(1.32)	12(0.66)	2(0.11)	9	52
2007	656	88	721	9	1474	4(0.27)	24(1.62)	11(0.74)	2(0.13)	16	57
2006	509	63	621	10	1203	8(0.66)	21(1.74)	18(1.49)	0	7	54
2005	233	59	560	9	861	5(0.58)	17(1.97)	7(0.81)	0	2	31
2004	114	14	295	8	431	5(1.16)	7(1.62)	8(1.85)	0	7	27
Total	2299	242	5466	55	8067	32	114	68	7	49	269

No statistical significance was found with year of study.

Distribution of seropositive cases

Infection	Rep D	Vol D	Total	Male	Female
HIV	33	0	32	32	0
HBV	77	37	114	109**	5
HCV	58	10	68	68	0
RPR	4	3	7	7	0
Total	171	50	221	216	5

** Significantly higher HBV prevalence in the male group ($P < 0.05$).

Results

Out of 8067 donors, 68.36% were replacement donors and 41.64% were voluntary donors. Of the total 8067 donors, 96.14 % were male donors, female donors made up 10.52 % of voluntary donors and 1% of replacement donors. Majority of the donors belonged to the age group of 18-40 yrs.

Of all the blood units collected 3.33% were discarded, 2.73% was due to infections and the rest due to expiry. The seropositivity for various TTIs among replacement donors was 2.48%, whereas it was only 2.04% among voluntary donors. Of the 221 positive blood units, only five were from females (2.26%), all of whom were found to be positive for HBV.

The seroprevalence of HIV, HBV, HCV and syphilis among the 8067donors was found to be 0.39%, 1.41%, 0.84% and 0.08% respectively. The replacement donors made up 61.99% of total discards. All kinds of infections were found to be more prevalent among 'O' blood group persons. In our study, there were four cases of coinfection, two persons were positive for HIV and RPR, one person had HIV and HBV and one had HIV and HCV infection.

Discussion

Stringent screening of donors for transfusion transmissible infections is crucial to ensure safe supply of blood and blood products. Our study was dominated by replacement donors in whom all infections were found to be more prevalent. The size of voluntary donors was smaller and infections slightly less prevalent. Voluntary donors mainly consisted of students, religious groups and voluntary organizations. Females made a smaller section of the study as they were found to be anaemic and did not fulfill the required fitness criteria. The prevalence of all infections was found to be low among females. There is no association between various blood groups and prevalence of infections. The reason for 'O' blood group persons outnumbering others among the infected is because of 'O' being the common blood group.

Comparison of various studies

Place	Group	HIV	HBV	HCV	Syphilis	Author and Year
Nigeria	Blood donors	7.6%	13.2%	3.6%	_	Fasola et al 2001–2006
Nepal	Vol donors	0.12%	0.47%	0.64%	0.48%	Shrestha et al 2004–2007
Trivandrum, Kerala	Vol and rep donors	0.2%	1.3%	1.4%	0.2%	Mathai et al 1994–96
Jodhpur, Rajasthan	Vol and rep donors	0.44%	3.4%	0.28%	0.22%	Garg et al 1994–99
Lucknow, U.P.	Vol and rep donors	0.23%	1.96%	0.85%	0.01%	Chadra et al 2001–2006
Present study	Vol and rep donors	0.39%	1.41%	0.84%	0.08%	Bhawani et al 2004-2009

Vol = voluntary; Rep = replacement

In our study, HIV, HBV and HCV prevalence among donors shows a downward trend over the period of six years. The HIV prevalence of 0.39% over a period of six years is high compared to other Indian studies of this period. There is a dip in HIV incidence from the year 2007 onwards. The prevalence of HBV is in accordance or slightly lower than the other Indian studies. The prevalence of HCV is in accordance with other studies whereas HCV prevalence among hospital-based population was found to be an alarming high of 7.7%. In the present study, prevalence of syphilis was found to be 0.08%, which was lower compared to other studies.

Conclusion

Professional blood donors were discouraged in our study as they were unsafe. Voluntary donors were found to be safer compared to replacement donors. Low level of test positivity reported in this study is due to better coordination between blood bank and user department, giving ample time for procuring blood. Motivation and recruitment of potential local blood donor population would lead to an effective voluntary system.

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