

Changing Trends of Transfusion Transmissible Infections in Blood Donors in Vidharbha Region: A Retrospective Study of Thirteen Years

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ABSTRACT

Introduction: Blood Transfusion is the integral part of modern medicine. Aim of the study was to assess the changing trends in the prevalence of transfusion transmissible infections in blood donors during last 13 years.

Material and Methods: A retrospective study was conducted at blood bank of Shri Vasantrao Naik Government Medical College Yavatmal, Maharashtra. A total of 111462 donors were screened over a period of thirteen years.

Results: A declining trend was observed in all transfusion associated infections among the donors. The overall seropositivity of HIV, HBV, HCV, VDRL and Malaria was found to be 0.46%, 1.27%, 0.06%, 0.12%, 00% respectively.

Conclusion: Prevalence of HIV infection is decreasing in the blood donors as a result of drastic measures to combat the disease in general population. The HBV infection still remains a menace to be tackled, HCV, Syphilis and malaria maintain a low rate of positivity in rural India.

Keywords: Changing Trends, Transfusion Transmissible Infections, Vidarbha

INTRODUCTION

Blood Transfusion is the integral part of modern medicine and surgical procedures. It is a known vice that blood transfusion is associated with transfusion reactions and transfusion associated infections. The effects of transfusion associated infections range from subclinical infections to life threatening diseases. In India the first case of HIV infection was detected in 1986 among female sex worker in Chennai.¹ HIV infection resulting from blood transfusion was first reported in the United States in late 1982.²

The problems of transfusion associated AIDS resulted in a notification in 1989 under the Drugs and Cosmetics Act which made the HIV testing mandatory in blood donors.³

The increased risk of transfusion associated life threatening infections has prompted the NBTC to mandate the need to perform tests for HIV, HCV, HBsAg, Syphilis and Malaria.⁴ The aim of the study was to assess the changing trends of these infections in blood donors in the rural area as voluntary blood donations mostly reflect the general healthy population.

MATERIAL AND METHODS

The present study was carried out at Blood bank, SVNGMC Yavatmal, a tertiary care hospital and teaching institute, (Vidarbha region) Maharashtra, during a period of 2005 to 2017.

Retrospective review of blood donor record was done. The

blood was collected from voluntary blood donations which included camps and replacement donors bled in the blood bank.

Pre transfusion screening for transfusion transmitted infections were carried out on a total of 1,11,462 donors which included HIV, HBsAg, HCV, Syphilis and Malaria.

Donor selection was based on detailed history of past and present illness, personal history and clinical examination according to the criteria from National and State Blood Transfusion Council. A donor consent form including history of previous hospitalization, surgery, jaundice, fever, vaccination, dog bite, blood transfusion, occupation, high risk behavior, tattoo marks, etc was obtained to eliminate risky donors.

All mandatory tests were carried out on blood samples in pilot tubes taken at the time of collection. All blood donors' samples were screened for HIV, hepatitis B surface antigen (HBsAg), HCV, syphilis and Malaria. HIV, HBsAg, HCV tests were done by third generation kits provided by NACO (National Aids Control Organization); enzyme-linked immunosorbent assay (ELISA) procedure was done following the proper guidelines. Positive samples were confirmed by Elisa tests and rapid spot tests.

Syphilis was diagnosed by performing the rapid plasma reagin (RPR) test. Malaria testing was done by slide method using Leishman's staining.

RESULTS

Table-1 show donors and their seroprevalence of transfusion transmitted infections in different years. The overall seroprevalence for HIV, HBsAg, HCV, Syphilis and Malaria was 0.46%, 1.27%, 0.06%, 0.120% and 0% respectively.

A total number of 1,11,462 apparently healthy blood donors was tested for 13 years from 2005 to 2017 for HIV, HBsAg, HCV, Syphilis and Malaria. In this study 2126 of the donors were found to be positive for any of the transfusion transmitted infections.

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Year	HIV	HBV	HCV	VDRL	Malaria	Total Donors
2005	67	121	9	00	00	6080
2006	66	74	5	00	00	5859
2007	62	162	9	00	00	6841
2008	64	114	4	21	00	6118
2009	41	104	5	9	00	6587
2010	50	113	6	15	00	7608
2011	43	113	13	44	00	7666
2012	30	126	3	16	00	8410
2013	23	93	2	4	00	10625
2014	27	84	4	0	00	10219
2015	23	100	3	1	00	10961
2016	16	94	2	1	00	11902
2017	11	123	4	2	00	12586

Table-1: Year wise distribution of blood donors and the number of seropositive for the infectious diseases. A significant increase in number of blood donors is seen by 2017.

Year	HIV	HBsAg	HCV	VDRL
2005	1.1%	1.99%	0.14%	0
2006	1.12%	1.26%	0.08%	0
2007	0.90%	2.3%	0.13%	0
2008	1.046%	1.86%	0.06%	0.34%

Table-2: Infectious Disease Trend in blood donors from 2005 to 2008

Year	HIV	HBsAg	HCV	VDRL
2009	0.62%	1.57%	0.07%	0.13%
2010	0.65%	1.48%	0.07%	0.19%
2011	0.56%	1.47%	0.16%	0.57%
2012	0.35%	1.49%	0.03%	0.19%

Table-3: Infectious Disease Trend in blood donors from 2009 to 2012

Year	HIV	HBsAg	HCV	VDRL
2013	0.21%	0.87%	0.01%	0.03%
2014	0.26%	0.82%	0.03%	0%
2015	0.20%	0.91%	0.02%	0.009%
2016	0.13%	0.78%	0.01%	0.008%
2017	0.08%	0.97%	0.03%	0.01%

Table-4: Infectious Disease Trend in blood donors from 2013 to 2017

Sr. No	Name	2005	2008	2009	2011	2012	2013	2016	2017
1	Tulika Chandra North India	2001 0.23	0.27			0.03			
2	Rajvir Singh North India					0.25			
3	R Makroo North India	0.31	0.39	0.21		0.18	0.11		
4	Patel P Gujarat						0.13		
5	Arora D Haryana	0.3							
6	Fulzele P Maharashtra							0.60	
7	Our study Maharashtra	1.10	1.04	0.62	0.35	0.35	0.21		0.08
8	Mohan Raut Maharashtra	0.68	0.59	0.43	0.29				
9	Sastry J Pune Maharashtra			0.49			0.22		
10	Amrapali Nagpur Maharashtra						0.27		0.88
11	P Pallavi South India	0.55	0.34						

Table-5: shows Declining trend of HIV infection among donors in various regions of India, the number expresses the percentage of donors affected.

DISCUSSION

The new HIV infections in India have steadily decreased from 1,50,000 in 2005 through 100,000 to 80,000 in 2016.⁵ India has around 21.17 lakh people living with HIV in 2015 as compared to 22.26 lakhs in 2007. Andhra Pradesh and Telangana have highest number of people living with HIV,

followed by Maharashtra, having nearly 3.01 lakh people living with the disease. The adult HIV prevalence at national level has continued its steady decline from an estimated peak of 0.38% in 2001-2003, 0.34% in 2007, 0.28% in 2012, 0.26% in 2015.⁶

The first National AIDS Control Programme (NACP) was

launched in 1992 for prevention and control of HIV/AIDS in India. This was followed by NACP II in 1999 and NACP III in 2007. During different phases of the programme, the focus shifted from raising HIV/AIDS awareness to behaviour change, from a national response to a more decentralised response and to increasing involvement of NGOs and networks of people living with HIV/AIDS (PLHIV).⁶ NACP Phase-III (2007-2012) had the overall goal of halting and reversing the epidemic in

India.⁷ NACP phase IV (2012-2017) is acclaimed globally as one of the most successful programs which included prevention, care, support and treatment services.⁶

In our study the rate of HIV infected donors was 1.10% to 1.04% in 2005 to 2008; 0.62% to 0.35% in 2009 to 2012; 0.21% to 0.08% in 2013 to 2017. The percentage of HIV infected donors shows a declining trend from 2005 to 2017 and correlates well with the national level. The marked reduction in HIV seropositivity could be a result of successful implementation of NACP phase III and Phase IV, leading to increased awareness about the disease, its route of transmission, changes in risky sexual behavior of the general population and their treatment, increased number of voluntary blood donations as a result of national policy implemented through national and state blood transfusion council. Similar declining trend was observed by Chandra et al higher in 2001-2007⁸ which was 0.23% and 0.15% in 2008-2012.⁹ R.N Makroo et al reported a 0.31% seropositivity in 2005 which showed a declining trend to 0.15% in 2013.¹⁰ Rajvir Singh, Prakriti Vohra et al in a study spanning from 2008 to dec 2012 reported an incidence of 0.25% of HIV.¹¹ Fulzele Parag Prabhakar, Yasmin Khatib et al reported a HIV seropositivity of 0.6%.¹² Patel P J. reported a HIV incidence of 0.14%.¹³ Mohan M Raut, Umesh S Joge et al in a retrospective review of blood donors record over a period of seven years 2005 to 2011 reported HIV in 0.53% donors.¹⁴ P Pallavi, CK Ganesh et al in retrospective review of donor record between 2004 to 2008 reported a HIV 0.44%.¹⁵ Arora D, Arora b, in his data collected for 3.5 years from Oct 2002 to APRIL 2006 reported an infection of HIV 0.3%.¹⁶ Sastry Jayagowri M et al reported HIV 0.28%,¹⁷ Karmarkar PR et al in his retrospective analysis during 2009 to dec 2011 and found TTI to be 2.9%, HIV 0.18%.¹⁸ Dr. Amrapali L. Gaikwad et al reported a seroprevalence of 0.45% HBsAg 1.27%, HCV 0.32%, VDRL 0.01%, Malaria 0.02%, noted increasing trend for all serological markers was observed.¹⁹

Table No.5 shows the declining trend of HIV infection among donors in various regions of India

It shows that the percentage of HIV positive donors in Maharashtra was much more¹⁷ than other states of North India and south India upto 2012 but in the recent years it shows a significant decline and correlates well with the national level. The only exception being Amrapali et al who observed a rising trend in all the infections.

The prevalence for HBV in Indian population is in a range of 3-4.2% disease burden, more than 40 million people are in a carrier state and are responsible for unknowingly spreading the disease.²⁰ Prevalence is high inspite of availability of safe

and effective vaccine. Spread occurs horizontally through contaminated body fluids, unsafe injections, high risk sex practices, blood transfusions during the window period and vertical transmissions. Earlier the age of acquisition, greater are the chances of chronicity. Chronic hepatic diseases, cirrhosis and Hepatocellular carcinoma account for highest number of deaths (1,15,000 deaths) leaving behind deaths due to HIV and Tuberculosis.²¹ The seropositivity for HBV in our study was 1.99% in 2005 which showed a gradual declining trend through 1.86% in 2008, 1.49% in 2012 and 0.97% in 2017. Our study correlates with Sastry J et al¹⁷ which showed a declining trend from 1.89% in 2008 to 0.63% in 2013, Mohan Raut¹⁴ reported 2.55% in 2005 and 1.64% in 2011. However Amrapali et al¹⁹ reported a rising trend of 0.95% in 2013 to 1.44% in 2016.

Total global prevalence of HCV is estimated to be at an average of 1.6% (1.3-2.1%).

prevalence of Hepatitis C Virus (HCV) infection in the Indian population is estimated to be around 0.5%–1.5%. However, the prevalence of HCV is variable in different high risk populations according to various studies and there is still a paucity of data from large multi-centric studies. Studies on voluntary or mixed donors have reported a prevalence of hepatitis C below 2%. There continues to be variations in reporting the HCV prevalence, depending upon the geographical region population sub-groups included in these studies.²²

HCV infection is acquired through exposure to small amounts of blood and blood products, the routes of transmission being similar to the HBV and include injection drug use, blood transfusion, unsafe injection and unprotected sex practices etc. About 10 to 15 million people in India are chronic carriers of HCV infection.²² Though the prevalence is lesser than HBV, HCV infection is dreaded because of progression to chronicity and hepatocellular carcinoma in more number of patients. In our study HCV infection was reported to be 0.14% in 2005 which very gradually reduced to 0.03% in 2012 and remained constant thereafter. The seropositive rate here was lower than the regional rate of 0.55% and 0.33% observed by Amrapali et al¹⁹ and Sastry et al¹⁷ respectively. Karmarkar et al¹⁸ and Patel et al¹³ reported similar rates of 0.02% and 0.06%. P. Pallavi et al reported a higher seroconversion of 0.23%.¹⁵

Sexually transmitted diseases (STD) are widespread in developing countries and pose a problem with ignorance, low socioeconomic status, inability to come out openly for the treatment of the diseases. Syphilis is a classic example of STD that can possibly be controlled easily as well as treated effectively and economically, by implementing efficacious public health measures. VDRL reactivity in our study showed a rising trend from 0.34% in 2008 through 2011 which was highest with 0.57% then to decline again 0.03% in 2013 with fairly constant rate thereafter. Other studies showed a lower percentage upto 2013 but thereafter correlated well with our study. Patel et al¹³ reported a rising trend, Amrapali et al¹⁹ and Mohan Raut et al¹⁴ showed a rate of 0.03%. Statistically significant declining trend was observed in the consecutive

five years from 1.83% to 0.68% by Parul Punia et al,²³ points towards the success of improved STD controls programmes being implemented to reduce the disease burden.

None of the donors were found to be Malaria positive as we deferred the patients with history of fever. Also the possibility of overlooking of the malarial parasite cannot be ruled out in a leishman stained smear.

CONCLUSION

The study was carried out to note the changing trends of the transfusion transmitted infections amongst blood donors. During last 13 years a declining trend in the percentage of HIV infected donors was observed which very well correlated with the successful implementation of the NACP IV. However the strategy has to be maintained by proper follow up, lifelong treatment of the people living with HIV and measures to reduce the vertical transmission of the disease.

The other transfusion associated infections also showed a declining trend but to a lesser extent. The possible reason could be the increase in voluntary blood donations, increased awareness about health and related factors, possible behavioural changes. The HBV infection accounts for the maximum number of seropositive cases and focuses on the need to start a national program to control the disease with its life long carrier status and life threatening diseased state. Intensive screening and vaccination in high risk groups and areas with high endemicity could curb the disease. Also mass public awareness campaigns about the horizontal route of transmission, unsafe behavior, carrier states leading to spread of the virus and the fact that no treatment is available for the infection can probably lead to reduce the prevalence of the disease. Though HCV seropositivity was less and maintained so, public awareness about routes of transmission and progression to hepatocellular carcinoma and cirrhosis warrant a special attention. A small percentage of sexually transmitted diseases can be easily controlled with proper counseling and treatment of both partners.

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