

Research Article

Prevalence of Transfusion Transmitted Infections Giving Importance to HIV in Screening of Healthy Blood Donors and the Challenges Ahead

Smita Mahapatra*

Department of Transfusion Medicine, S.C.B. Medical College, Odisha

*Corresponding author

Smita Mahapatra, C/O- Mr. N.K. Mishra, N-1/256, I.R.C. Village, Nayapalli, Bhubaneswar, Orissa, India, Pin code- 751015, Tel: 91-9437094138; E-mail: doctorsmita@rediffmail.com

Submitted: 06 December 2014

Accepted: 05 January 2015

Published: 07 January 2015

Copyright

© 2015 Mahapatra

OPEN ACCESS

Keywords

- Blood donors
- Transfusion transmitted infection
- Seroprevalence

Abstract

Transfusion transmitted infections, particularly the viral agents and continuous patronage of paid donors due to the scarcity of blood/blood components is the major emerging challenge faced by the blood banks nowadays. The priority of the present study is estimation of seroprevalence of transfusion transmitted infections among both voluntary and directed blood donors in the Department of Transfusion Medicine, SCB Medical College & Hospital, Cuttack, Odisha state in India. A total number of 15,566 units over a period of 8 months were tested for HIV 1 /2 IgG/IgM, HBsAg, anti-HCV IgG/IgM by Enzyme linked immunosorbent assay technique(ELISA), anti IgG, IgM, IgA against Trepanoma Pallidum by immunochromatographic assay and rapid test for malaria Ag to Plasmodium falciparum and Plasmodium lactate dehydrogenase. Seroprevalence of HBV was highest (0.44 %,) followed by HCV (0.11%), HIV and syphilis (0.025%) with no reported case of Malaria. Since there is an alarming rise in the incidence of transfusion transmitted infections, especially hepatitis cases among the blood donors, special preventive measures need to be taken to prevent the transmission of these dreadful viruses through blood/blood components transfusion.

INTRODUCTION

Since decades, blood and blood products transfusion has been considered as supportive for the medical and surgical patients saving millions of lives globally. Equally, the worse part of unsafe transfusion practices carrying significant risk of transmitting transfusion transmitted infections (TTIs) can, at no cost, be ignored. This is despite the judicious donor screening and testing practices [1]. TTIs can exist as asymptomatic diseases (silent killer) in the hosts, and in that window period, there is serious threat to the safety of collected donations [2]. The role of Transfusion Medicine department is to screen, monitor and control infections transmitted by transfusion of blood and also to give clue about the prevalence of these infections in the population [3].

The present study has been based on the seroprevalence of HIV, HBV, HCV, Syphilis and Malaria in both voluntary and replacement healthy donors. This gives information regarding safety associated with blood transfusion and an accurate measurement of risk versus benefits of blood transfusion [4].

MATERIALS AND METHODS

The study was conducted in the Department of Transfusion Medicine in SCB Medical College & Hospital, Cuttack on 15,566 voluntary and replacement donors during the period from 1st January to 30th September 2014. The age distribution of all the donors varied from 18 to 59 years. Prior to blood collection, the donors were requested to answer a questionnaire to determine their eligibility as per the criteria set by World Health Organization (WHO). The inclusion criteria of donors for blood donation included weight being more than 45 kilograms, Hemoglobin being more than 12.5 g/dl, temperature, pulse, blood pressure being normal and the person being free from acute respiratory disease. The donors who were either not fitting into these criteria or suffering from diabetes, cancer, heart diseases, unexplained weight loss, endocrine disorders, and tuberculosis were debarred from blood donation. Both voluntary and replacement donors' details were noted from the donor consent forms kept in the blood bank records. The donor blood samples were later screened for mandatory screening tests of the TTDs.

Serum samples were tested for p24 antigen and anti-

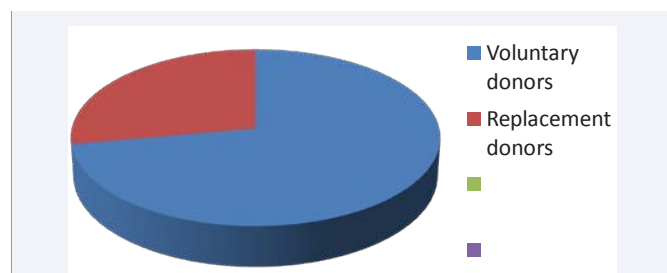


Figure 1 Relative frequency of voluntary and replacement donors.

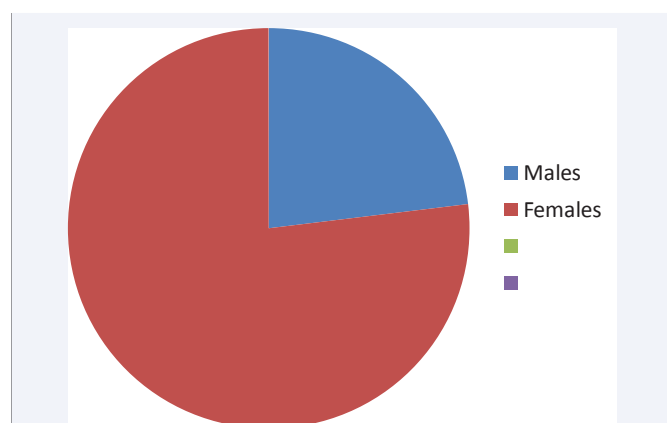


Figure 2 Percentage of male and female donors.

HIV 1 / 2 IgG/IgM(ELISA kit of SD Biostandard Diagnostic Pvt. Ltd), HBsAg(Qualis microwell enzyme immunoassay),anti-HCV IgG/IgM(ELISA kit of SD Biostandard Diagnostic Pvt. Ltd),anti IgG,IgM,IgA against Trepanoma Pallidum, causative agent for syphilis (immunochromatographic assay by SD Biostandard Diagnostic Pvt. Ltd) and rapid test for malaria Ag to Plasmodium falciparum and Plasmodium lactate dehydrogenase (Alere Medical Pvt. Ltd). All tests were performed in accordance with the instruction of the reagent manufacturer. Quality of the reagent was tested before hand. Appropriate control was incorporated in all test procedures. All the test results were also stored in the software for future references.

RESULTS

Total number of blood samples tested were 15,566 of which 11,235 were voluntary and 4,331 were directed donors (Figure I). Male donors (95.8%) outnumbered female donors (4.19%) (Figure II). Month wise screening picture of different TTIs is shown in table number III. Prevalence of HBV was found to be highest constituting 0.45% followed by HCV (0.11%), HIV (0.025%), VDRL (0.025%), and not a single case of malaria was detected (Table IV). At confidence level of 95%, the corresponding confidence interval found with HBV was $\pm 0.11\%$, HCV $\pm 0.05\%$, HIV $\pm 0.02\%$ and VDRL $\pm 0.02\%$. Range of true population proportion was 0.34% - 0.056% for HBV, 0.06% - 0.16% for HCV, and 0 - 0.05% for both HIV and VDRL.

DISCUSSION

Blood transfusion, even though a lifesaving procedure is associated with acute and delayed complications and carries risk

of transmission of TTIs. Despite stringent donor screening and testing practices, availability of completely safe blood free from TTIs remains the ultimate goal [1]. Even with the improvement of technology in development of more sensitive methods to detect marker of TTIs, still the prevalence of problem of window period, false-negative results, unnoticed asymptomatic carriers, genetic variability in viral strains and technical errors persist [5].

In the present study, the male donors were more in number than the females and the seroprevalence of TTIs was found to be only in male donors. This finding is indicative of risk behavior of males like outside socialization, polygamy, etc.. Reason for less female participation for donating blood may be due to lack of awareness, motivation and education of blood donation among them.

Among the various TTIs, the rising incidences of Hepatitis have become a global concern. Hepatitis B and C are highly infectious and pose a major public problem in developing countries and are the commonest cause of chronic liver disease in various places worldwide.⁶ Hepatitis B has infected almost two million people worldwide and around 400 million are chronically infected who are more prone to liver cirrhosis and hepatocellular carcinoma [7]. Hepatitis C is another cause of chronic blood borne infection affecting almost 3.9 million persons with high rate of development of liver cirrhosis. Infection by HBV and HCV cause serious mortality and morbidity [8]. The present study shows highest prevalence of HBV (0.45%) followed by HCV (0.11%) as compared to other TTIs.

The prevalence of HBV reactive donors varies in different countries. It is as low as 0.1-0.5% in a healthy population in United States and Western Europe, whereas it ranges from 5-20% in far Eastern and some tropical countries [9]. Seroprevalence of HBsAg in various Indian studies has shown to range from 1.86 to 4%.^{10, 11} Whereas there is wide variation globally in the seroprevalence of HCV showing lowest incidence in United States (0.1%)⁹ and highest in Egypt (24.8%) [10]. In the Indian context, the prevalence ranges from 0.4% - 1.09% [10-12]. In the present study we have found the incidence of HBV and HCV to be 0.45% and 0.11% respectively.

The primary tool to determine the seroprevalence of various transfusion associated infections is serosurvey which can estimate the efficacy of blood and blood products and can give an idea regarding the epidemiology of these diseases in the community [13].

Results from the present study along with other studies showed the increasing prevalence of both HBsAg and HCV in an apparently healthy population as compared to HIV. Thus, emphasis must be given to increase the knowledge and to educate the risk-prone individuals to avoid donation [14].

CONCLUSION

The transmission of TTIs through blood transfusion is still prevalent in India even with adoption of effective preventive strategies, including new laboratory tests. The need of the hour is to fight against transmission of these dreadful infections in blood transfusion by educating people, creating awareness, with mandatory screening of donors and implementing advanced

Table 1: Month wise screening report of five diseases.

MONTHS	Voluntary donor						Replacement donor					
	HIV	HBV	HCV	Syphilis	Malaria	Total	HIV	HBV	HCV	Syphilis	Malaria	Total
JAN	-	6	-	-	-	1660	-	-	-	-	-	201
FEB	-	3	-	-	-	1254	-	2	-	-	-	716
MAR	-	1	1	-	-	1110	-	-	-	-	-	175
APR	-	7	-	-	-	1088	-	3	-	-	-	467
MAY	-	3	1	-	-	614	-	4	-	-	-	718
JUN	-	4	-	-	-	826	-	3	-	-	-	453
JULY	-	6	1	3	-	1508	-	4	2	-	-	634
AUG	2	7	1	-	-	1293	1	7	5	1	-	690
SEP	1	7	7	-	-	1882	-	4	-	-	-	277

Table 2: Positive cases among blood donors.

Screening tests	Positive no.	Percentage
Anti HIV	4	0.025%
HBV(HBsAg)	71	0.45%
Anti HCV	18	0.11%
VDRL	4	0.029%
Malaria	0	0

technologies like Nucleic Acid Testing (NAT) along with judicious use of blood and blood components.

REFERENCES

- Kaur G, Basu S, Kaur R, Kaur P, Garg S. Patterns of infections among blood donors in a tertiary care centre: a retrospective study. *Natl Med J India*. 2010; 23: 147-149.
- Kakepoto GN, Bhally HS, Khaliq G, Kayani N, Burney IA, Siddiqui T. Epidemiology of blood-borne viruses: a study of healthy blood donors in Southern Pakistan. *Southeast Asian J Trop Med Public Health*. 1996; 27: 703-706.
- Khan ZT, Asim S, Tariz Z, Ehsan IA et al. Prevalence of Transfusion transmitted infections in healthy blood donors in Rawalpindi District, Pakistan-a five year study. *Int J Pathol*. 2007; 5:21-25
- Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. *Indian J Pathol Microbiol*. 2010; 53: 308-309.
- Singh B, Kataria SP, Gupta R. Infectious markers in blood donors of East Delhi: prevalence and trends. *Indian J Pathol Microbiol*. 2004; 47: 477-479.
- Kakepoto GN, Bhally HS, Khaliq G, Kayani N, Burney IA, Siddiqui T. Epidemiology of blood-borne viruses: a study of healthy blood donors in Southern Pakistan. *Southeast Asian J Trop Med Public Health*. 1996; 27: 703-706.
- Karki S, Ghimire P, Tiwari BR, Maharjan A, Rajkarnikar M. Trends in hepatitis B and hepatitis C seroprevalence among Nepalese blood donors. *Jpn J Infect Dis*. 2008; 61: 324-326.
- Bhawani Y, Rao PR, Sudhakar V. Seroprevalence of transfusion transmitted infections among blood donors in a tertiary care hospital of Andhra Pradesh. *Biology and Medicine*. 2010; 12: 45-48.
- Dienstag JL, Isselbacher KJ. Acute viral hepatitis In Braunald E, Fauji AS, Kasper DI et al. 15th ed. *Harrison's principles and practice of internal medicine*. New York Mc Graw Hill. 2001; 1721-1737.
- Chandrasekaran S, Palaniappan N, Krishnan V, Mohan G, Chandrasekaran N. Relative prevalence of hepatitis B viral markers and hepatitis C virus antibodies (anti HCV) in Madurai, south India. *Indian J Med Sci*. 2000; 54: 270-273.
- Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors? *Indian J Pathol Microbiol*. 1999; 42: 411-416.
- Sharma RR, Cheema R, Vajpayee M, Rao U, Kumar S, Marwaha N. Prevalence of markers of transfusion transmissible diseases in voluntary and replacement blood donors. *Natl Med J India*. 2004; 17: 19-21.
- Singh K, Bhat S, Shastri S. Trend in seroprevalence of Hepatitis B virus infection among blood donors of coastal Karnataka, India. *J Infect Dev Ctries*. 2009; 3: 376-379.
- Gupta N, Kumar V, Kaur A. Seroprevalence of HIV, HBV, HCV and syphilis in voluntary blood donors. *Indian J Med Sci*. 2004; 58: 255-257.

Cite this article

Mahapatra S (2015) Prevalence of Transfusion Transmitted Infections Giving Importance to HIV in Screening of Healthy Blood Donors and the Challenges Ahead. *Clin Res HIV/AIDS* 2(1): 1013.