
Original Article

Prevalence of transfusion transmitted infections among the blood donors: a study in a tertiary care unit in Telangana

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ABSTRACT

Background: The provision of safe blood for transfusion to needy donors is a significant responsibility for any blood bank in a hospital setting. An awareness of the prevalence of Transfusion Transmitted Infections [TTI] is mandatory for Blood Bank Officers.

Objective: This study was undertaken to study the prevalence of these transfusion transmitted infections in our geographical area among the voluntary and replacement blood donors.

Methods: The data pertaining to the incidence of transfusion transmittable diseases detected during routine screening of blood taken from voluntary and replacement donors in a large tertiary multi – specialty hospital located in Hyderabad, Telangana State, over a period of three years, from January 2013 to December 2015, were collected and analyzed to assess the incidence of Transfusion Transmittable Infections [TTI] amongst the dependent population.

Results: The male gender was predominant (98.4%) among the blood donors, whether voluntary or replacement. 2.26% of the total samples had transfusion transmittable diseases. HBsAg was the most common with 1.2 % samples being positive while no malarial parasites were detected in any donor blood samples in the past three years. HIV was 0.28 % and HCV 0.79 %.

Conclusion: Transfusion Transmittable Infections pose a threat to patients admitted in any health care facility and if not carefully screened for will cause significant morbidity. Careful screening of all donor blood units in the blood bank of a hospital is absolutely necessary to prevent any untoward incidence of TTI in patients admitted to a health care facility.

Keywords: Transfusion transmitted infections, voluntary blood donors, replacement blood donors, prevalence.

INTRODUCTION

Blood is said to be the elixir of life. The Blood Bank of any Hospital or Healthcare Facility plays a crucial role in the delivery of safe and compatible blood or blood products to the dependent clientele. While timely transfusion of compatible blood may be critical in saving lives, it is incumbent upon those healthcare workers providing blood or blood products to ensure that such units of blood are free from Transfusion Transmitted Infections [TTI].¹ It is said that with every unit of blood, there is 1% chance of problems associated with transfusion, including transfusion transmitted diseases.² Diseases that can be caused through transfusion are by Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), malarial parasites and *Treponema pallidum*. According to the guidelines laid by National AIDS Control Organization (NACO), all blood samples must be routinely checked for all the above diseases. Any donor with a history of HIV, HBV or HCV should be permanently deferred. Donors with malaria can be accepted after 3 months.³ The Indian sub – continent is classified as an intermediate endemic zone for Hepatitis B Virus with the HbsAg carriage being 2-7% of chronic HBV infections.⁴ The population of India is more than 1.2 billion, with more than 2.5 million infected with HIV, 4 million with HBV and 15

million with HCV. Hence the risk of transmission of these agents though blood donors may be alarmingly high. The prevalence of the above infections is estimated to be 0.5% for HIV, 0.4% for HCV and 1.4% for HbsAg.⁵

Notwithstanding the stringent guidelines laid down by NACO and the implementation of these by Blood Banks, the transmission of HIV, HCV and HbsAg infections through blood and blood components continues to occur and cause significant morbidity.⁶ This could be due to the fact that these infections are generally undetected in the window period or the pre-sero-conversion phase of the infection, high cost of screening, a lack of funds and trained personnel, immunologically variant viruses, non-sero-converting chronic or silent carriers and inadvertent laboratory testing errors..

This study was undertaken to study the prevalence of these transfusion transmitted infections in our geographical area among the voluntary and replacement blood donors.

MATERIALS AND METHODS

The present study was conducted by the Department of Pathology and Blood Bank at Malla Reddy Narayana Multispecialty Hospital, Suraram, Hyderabad, from January 2013 to December 2015. The clientele of this Hospital are

from the lower middle to lower socio – economic stratum of society.

All donors were voluntary or else friends and relatives of the patient who were replacement donors. Only donors who were residing in the immediate geographical surroundings of the Hospital, which is located in an industrial development area of Hyderabad, were considered for this study. All the voluntary donors who did not reside in our geographical area were excluded from the study. The blood bank of this Hospital collects only whole blood units and does not have the facility for component preparation.

The eligibility criteria for the donors was age between 18-60 years, with a minimum weight of 45 kg, 12 gm / dl hemoglobin level, with no history of HIV, HBV or HCV or any other sexually transmitted infections. Careful physical and clinical history of all the donors was taken according to the blood donors selection criteria by NACO.

All the donors were counseled regarding the risk behavior and a registration form was filled wherein basic information regarding age, sex, body weight, occupation, number of previous donations was noted.

Aliquot samples of blood were taken from the donated whole blood units for screening for Transfusion Transmittable Infections as per NACO guidelines. These samples were then centrifuged to obtain the sera as needed. These sera were tested for antibodies to HIV-1 and HIV-2, HbsAg and HCV by VITROS Immunodiagnostics and Integrated System [Ortho Clinical Diagnostics, Johnson and Johnson], for syphilis by RPR method (Span Diagnostics) and by strip method (ASPEN) and malaria parasites by strip method (SPAN diagnostics). Samples were also screened by routine microscopic examination of Giemsa stained blood smears for malarial parasites.

Records of the blood units pertaining to the period under study were analyzed to ascertain the incidence of TTI, as well as the distribution of donors amongst males as compared to females and voluntary as compared to replacement donors.

RESULTS

A total of 7310 voluntary or replacement donors donated blood from January 2013 to December 2015. Year wise number of donors and their distribution is given in Table 1.

The male gender was predominant (98.4%) among the blood donors, whether voluntary or replacement. There were 5726 replacement donors as compared to 1584 volunteer donors [78.4 % versus 21.6 %].

Table 2 gives the distribution of transfusion transmittable infections detected during screening of the aliquot samples from the donated whole blood units for the period under study. We did not find any cases of malaria or syphilis in the samples screened in our Blood Bank during the period under study. HBsAg was the most common TTI indicator in our study with an incidence of 1.20%. 0.79% samples tested positive for HCV and 0.28% for HIV.

DISCUSSION

Blood transfusion plays a vital role in the delivery of good health care to patients in hospitals, and can be a life saving measure in many settings. However, it carries a risk of transmitting very dangerous diseases such as HIV, HBV, HCV, syphilis and malaria.^{7,8}

In our study, replacement donors constituted 78.4% of the total donors, as compared to 21.6% voluntary donors. This correlates with the results of other such studies which have also shown a greater percentage of replacement versus voluntary donors in our country.⁹⁻¹¹ However, in a study by Gupta et al¹², the majority of the donors were voluntary rather than replacement. Similar results were obtained in a study by Fernandez et al⁶, where in 61% of the donors were voluntary and 39% were replacement blood donors. No reason for the discrepancy can be given, except possibly that a more aggressive approach to obtaining voluntary donors was used in these Blood Banks.

The number of male donors was considerably higher than female donors with 98.4 % of our donors being males, which was similar to the study by Fernandez et al⁶, where nearly 97% of the donors were males, and by Karmakar et al with 85%.¹³ This could be ascribed to socio – economic factors such as the generally lower levels of nutritional health amongst women in the lower strata of our society, as well as to the fact that due to their pivotal role in managing the average Indian household, they are unable to come forward to donate blood when required.

The prevalence of transfusion transmittable infections in our country has been reported as: HBV – 0.66% to 12%, HCV – 0.5% to 1.5%, HIV – 0.084% to 3.87%, and syphilis – 0.85% to 3% respectively.⁹ The incidence of TTI diseases in our study was: HBsAg: 1.2%; HCV: 0.79 % and HIV: 0.28% which was comparable to the results of other studies.^{6, 12, 15}

In our study, we found the prevalence of HIV to be 0.28 %, while in a study by Giriet al¹⁶, the prevalence was found to be 0.07%, while Gupta et al¹² reported 0.084% and Tiwari et al¹⁷ reported 0.054%, which were lower compared to our results. A prevalence of 0.26% was reported by Kaur et al¹⁸ and 0.47% by Garg et al.¹⁵ A prevalence of 0.10 % was reported by Mumtaz et al¹⁹ from a study in Pakistan. Around the world, in the African countries, the prevalence was far higher, with 3.8% in Ethiopia²⁰ and 11.7% in Tanzania.⁹

The present study revealed a sero prevalence of 1.2 % of HBsAg and 0.79 % of HCV, which was far less than the study conducted by Giri et al¹⁶, Chatteraj et al¹⁴, Kaur et al¹⁸, and Singh B et al¹⁰. Variable results of 0.66% by Gupta et al¹² 2.45% by Choudhary et al²¹, 3.44% by Garg et al¹⁵, 5.86% by Mumtaz et al¹⁹, 2.5% by Dessie²⁰ have also been reported. Sero prevalence of HBV among blood donors differs largely based upon the socio – economic status of the population under study. Our clientele are mostly from lower socio-economic stratum of society with little access to clean water, adequate sanitation and health education. Most detected cases have either active liver disease or are chronic carriers and are unaware of their HBV status and the precautions to be adhered to prevent transmission within the family.

We had no cases of syphilis among the donors in our study which was low compared to the study by Giri et al (0.07%),¹⁶ Gupta et al (0.85%)¹² and Dessie et al (1.2%).²⁰ There were no cases of malaria among the donors in the period under study bringing the prevalence to 0.0 %.

The incidence of TTI amongst the donors in our study re – emphasizes the need for both a good health awareness program, and for ensuring safe drinking water and proper hygiene and sanitation to all the population in the area. The

need for an extremely careful and meticulous screening of all blood donors for TTI prior to transfusion has been highlighted by our study.

CONCLUSION

Availability of safe blood is a vitally important aspect of hospital care. This is obtained by regular screening of the blood donated before transfusion for these TTI. It is an essential part of any blood bank whether stand alone or part of a hospital setup to meticulously screen all donor blood samples to detect any TTI, and reject such donor units, to ensure that no morbidity arises as a result of such a transfusion. Moreover a proper health education program regarding the mode of transport of these diseases should be readily made to the patients within the hospital as well as within the community to reduce the incidence of such diseases amongst the community members.

REFERENCES

1. National blood policy, 2003. Available from: <http://www.unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN009847.pdf>. [Last accessed on 2012 Jun 15].
2. Widman FK (ed) (1985) Technical manual. American Association of Blood Banks, Arlington, pp 325–344
3. National AIDS Control Organization. Standards for Blood Banks and Blood Transfusion Services. New Delhi: Ministry of Health and Family Welfare Government of India; 2007
4. Lavanchy D. Hepatitis B virus epidemiology, disease burden, treatment, and current and emerging prevention and control measures: A review. *J Viral Hepat* 2004;11:97–107.
5. Nancy Singh. NAT: Safe Blood, Safe India. [Last accessed on 2011 Dec 09]. Available from: http://www.expresshealthcare.in/200810/knowledge_02.shtml.
6. Fernandez H, DSouza PF, DSouza PM. Prevalence of Transfusion Transmitted Infections in Voluntary and Replacement Donors. *Indian J Hematol Blood Transfus* 2010;26(3):89–91.
7. Irshad M, Peter S. Spectrum of viral hepatitis in thalassaemic children receiving multiple blood transfusions. *Indian J Gastroenterol* 2002;21:183–4.
8. Mollah AH, Nahar N, Siddique MA et al. Common transfusion-transmitted infectious agents among thalassaemic children in Bangladesh. *J Health Popul Nutr* 2003;21:67–71
9. Matee M, Magesa PM, Lyamuya EF. Sero prevalence of human immunodeficiency virus, Hepatitis B and C viruses and Syphilis infections among blood donors at the Muhimbili National Hospital in Dar es Salam, Tanzania. *BMC Public Health*. 2006;6:21.
10. Singh B, Verma M, Verma K. Markers for transfusion associated hepatitis in north Indian blood donors: prevalence and trends. *Jpn J Infect Dis* 2004;57:49–51.
11. Asif N, Kokhar N, Ilahi F. Sero prevalence of HBC, HCV and HIV infection among voluntary non-remunerated and replacement donors in northern Pakistan. *Pak J Med Sci* 2004;1:24–28.
12. Gupta N, Vijay Kumar, Kaur A. Sero prevalence of HIV, HBV, HCV, and Syphilis in voluntary blood donors. *Indian J Med Sci* 2004;58:255–7
13. Karmakar PR, Shrivastava P, Ray TG. Seroprevalence of transfusion transmissible infections among blood donors at the blood bank of a Medical College of Kolkata. *Indian J Public Health* 2014;58:61–4
14. Chattoraj A, Bhel R, Kataria V. Infectious disease markers in blood donors. *Med J Armed Forces India* 2008;64(1):33–5.
15. Garg S, Mathur DR, Garg DK. Comparison of seropositivity of HIV, HBsAg, HCV and syphilis in replacement and voluntary blood donors in Western India. *Indian J Pathol Microbiol* 2001;44:409–12.
16. Giri PA, Deshpande JD, Phalke DB et al. Sero prevalence of Transfusion Transmissible Infections Among Voluntary Blood Donors at a Tertiary Care Teaching Hospital in Rural Area of India. *J Family Med Prim Care* 2012;1(1):48–51.
17. Tiwari B, Ghimire P, Karkee S et al. Sero prevalence of human immunodeficiency Virus in Nepalese blood donors: A study from three regional blood transfusion services. *Asian J Transf Sci* 2008;2:66–8
18. Kaur H, Dhanon J, Pawar G. Hepatitis C infection amongst blood donors in Punjab – a six year study. *Indian J Hematol Blood Transfus* 2001;19:21–2.
19. Mumtaz S, Rehman MU, Muzaffar M et al. Frequency of seropositive blood donors for hepatitis B, C and HIV viruses in railway hospital, Rawalpindi. *Pak J Med Res* 2002;41(2):19–2.
20. Dessie A, Abera B, Fissehawale. Sero prevalence of major blood borne infections among blood donors at FelegeHiwot referral hospital, Northwest Ethiopia. *Ethiop J Health Dev* 2007;21:68–9.
21. Chaudhary IA, Samiullah, Khan SS et al. Sero prevalence of HBV and C among health donors at Fauji Foundation Hospital, Rawalpindi. *Pak Med J* 2007;23:64–7.

Table 1: Year wise distribution and categorization of donors in the study

<u>SERIAL NO</u>	<u>YEAR</u>	<u>NUMBER OF DONORS</u>	<u>VOLUNTARY [%]</u>	<u>REPLACEMENT [%]</u>	<u>MALE [%]</u>	<u>FEMALE [%]</u>
1	2013	2872	864 [30.1]	2008 [69.9]	2814[98]	58 [02]
2	2014	2329	484 [20.7]	1845 [79.3]	2298[98.6]	31 [1.4]
3	2015	2109	236 [11.2]	1873 [88.8]	2086[98.9]	23 [1.09]
4	<u>TOTAL</u>	7310	1584 [21.6]	5726 [78.4]	7198[98.4]	112[1.6]

Table 2: Incidence of detected transfusion transmittable infections

<u>SER NO</u>	<u>YEAR</u>	<u>TOTAL COLLECTION</u>	<u>HIV [%]</u>	<u>HBsAg [%]</u>	<u>HCV [%]</u>	<u>T. PALLIDUM [%]</u>	<u>MALARIAL PARASITE [%]</u>
1	2013	2872	5 [0.17]	38 [1.32]	26 [0.90]	NIL	NIL
2	2014	2329	7 [0.30]	28 [1.2]	17 [0.73]	NIL	NIL
3	2015	2109	9 [0.42]	22 [1.04]	15 [0.71]	NIL	NIL
4	<u>TOTAL</u>	7310	21 [0.28]	88 [1.20]	58 [0.79]	NIL	NIL

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