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Original Research Article

A study of transfusion transmissible infections in blood donors in blood bank of north Gujarat

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ABSTRACT

Background and Objective: One of the main detrimental consequences of blood transfusion is donor-to-recipient infection transfer. Serological tests before transfusion may help to minimise TTIs. The purpose of this research was to establish the prevalence of TTIs among volunteer and blood donors.
Materials and Methods: Records from the blood bank attached to a tertiary care center were analysed. Past of 3 years records were entered and analysed through epi info 7.
Results: In present study, the prevalence of blood-borne infection among blood donors was 2.12%. HIV incidence was 0.52% and HBV, HCV and Syphilis 0.68%. 0.11%, respectively, and 0.81%. Replacement donor has a rate of 11.41% relative to voluntary donor of 0.70%.
Conclusion: Blood door selection procedure must be comprehensive, utilising traditional procedures. Blood preservation is the recipient's primary concern. Furthermore, community motivation and knowledge campaigns are needed to raise volunteer blood donors.

1. Introduction

A transfusion of blood is a therapeutic process that delivers a good blood to the individual by an intravenous line (IV) that is obligatory for the survival of patients with blood loss. Blood, on the other side, is a perfect delivery medium for any contagious infection that can exist in the blood[1]. Blood transfusions if not monitored can lead to transmission of various infective agents which may endanger human life and also lead to morbidity and economic burden to the patients.[1]

A transfusion transmissible infection (TTI) is any infection that is transmissible from person to person through parenteral administration of blood or blood products for example hepatitis B (HBV), hepatitis C (HCV), Human Immunodeficiency Virus (HIV), syphilis, and less commonly to malaria, toxoplasmosis, brucellosis and other viral infections.[2] Transfusion transmissible infectious diseases carry long term consequences for the recipients, families and the communities since the infected person represents a pool for the infection and can transmit the disease during its asymptomatic period.[3,4]

In developing countries India, blood safety is a major issue due to the high prevalence of infectious agents among blood donors.[5] The prevalence of human HIV in adults in India was recorded 0.2–0.3%.[6] The prevalence of average hepatitis B surface antigen in India was 4.7% (range 1% to 3%).[7] Overall, 0, 4-19.2% of blood donors had HCV infections.

While In India, HCV prevalence < 2% has been reported.[8] Minimising the chances of transfusion transmitted infections (TTI) remains an important measure of blood transfusion safety. Due to availability of nucleic acid amplification technologies classic TTI like HIV, HBV and HCV are detected during window period of disease. Nowadays donor evaluation, highly sensitive laboratory screening tests and pathogen inactivation procedures are important measures to decrease the risk of TTI.[9,10]

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TTI are very common in all over India including Gujarat but studies on TTI in donors from north Gujarat areas are lacking. The present research is performed to establish the incidence and transfusion patterns transmitted infections in a tertiary care hospital of northern Gujarat.

2. Materials and Methods

The research was a sort of secondary analysis of the results. Blood donation data from January 2018 to February 2020 were taken in to analysis. The donor inclusion criteria were as follows: age 18 to 60, weight 45 kg, haemoglobin level at least 12 g percent, no history of hepatitis B and hepatitis C and sexually transmitted infections, no history of jaundice in the last 1 year. Both donors were questioned for high-risk actions for HIV, hepatitis B, and syphilis. All donors were categorised in to two groups; replacement donors and volunteer donors. Testing was carried out for donors from both the groups before blood transfusion. For HIV-1 & 2, HBsAg, and HCV, enzyme-linked immunosorbent assay or (ELISA) were carried out while Rapid Plasma regain test was carried out for screening of syphilis. HIV-1 and 2 were detected by any of these four kits: ENzaids, Pareekshak Erbaliza or Meriliza kits. HBV ad HCV testing were done by Erbalisa or merilisa kits. Syphilis screening was done by Reckon rapid test kits.

2.1. Data analysis

All data were entered and analysed through Epi info version 7. Categorical variables were expressed through numbers and percentages.

3. Results

In present study 4433 donors details were reviewed. Prevalence of Transfusion transmitted infection were described in Table 1. Overall prevalence of all TTIs was 2.12%. Percentages of HIV and HBsAg infection were 0.52% and 0.68% respectively in present study syphilis has prevalence of 0.81%. Highest prevalence of HIV and HBsAg were seen in 2018. HCV infection was seen only in 2019 which was 0.16%.

Age distribution of the study participants is shown in Table 2. Highest number of HIV, HBsAg and HCV positive donors were seen among 18 to 30 years of age while in case of syphilis, positive donors were belonged to 31- to 40 years of age group.

Table 3 describes distribution of TTIs among blood donors according to their type of donation. Replacement donor has significantly higher number of all TTIs (HIV, HCV, HBsAg and Syphilis) as compared to voluntary donors.

4. Discussion

Transfusion related infections ose more danger in the developing countries like India as compared to developed countries. Viral infections like HBV, HIV, and HCV are the main cause of morbidity and mortality in blood recipients. The overall prevalence of TTIs in our study was 2.12% which is almost similar as previous observations by Mandal R et al.[11] (2,93%), Karmakar et al.[12] (2.79%) and Koshy et al.[13] In present study the HIV seroprevalence was 0.52%. In a study done by Suresh B et al.[14] the seroprevalence of HIV amonst donor was 0.36% and Sindhu et al[15] reported as low as 0.08%. In our study HIV prevalence amongst replacement donor was higher as 2.72% while in voluntary donor it was 0.52%. Sharma et al[16] showed the prevalence of HIV 0.45% in replacement donors and 0.32% in voluntary donors while it was 0.44% and 0.15% in replacement and voluntary donor, respectively in Chandigarh.[17] HIV transmission is possible during "window period" even if each unit is tested for HIV antibodies. This can be minimized by better selection of low-risk donors by stringent screening.

In our study, over all prevalence of HBV infection was 0.68%. Seroprevalence of HBV in the present study is in accordance with Gupta et al.[18] who reported seropositivity of 0.66%. In our study, prevalence of HBV infection was 3.24% amongst replacement donor while in voluntary donor it was 0.29%. Kaur et al.[17] reported 1.07% and 0.65% in replacement and voluntary donors; Pahuja et al[19] reported much higher prevalence of 2.23%. Increasing trends of HBV infection was seen in replacement donors which may be due to fact that replacement donors conceal information about their health during donor selection to get the blood for their patient, thus compromising blood safety. In our study, over all prevalence of HCV infection was 0.11%. Same prevalence was reported in Gupta et al. from Punjab reported. In our study, prevalence of HCV infection was 0.68% amongst replacement donor while in voluntary donor it was 0.03%. Kaur et al.[17] reported 0.5% and 0.3%, Sharma et al.[16] reported 0.52% and 0.23% in replacement and voluntary donor, respectively. In our study, over all prevalence of syphilis infection was 0.81%. Studies done by Pallavi et al[1] and Arora et al[20] reported prevalence of syphilis among blood donor was 0.23% and 0.9% respectively.

5. Conclusion

In the present research, the average prevalence of transfused infection among all donors was 2.12%. Blood donation is a Nobel job, and people must be inspired by it, but besides this, they must be trained and made cautious of the diseases transfused. Blood donors should screen themselves periodically for the various infections which may be present in the carrier stage. The pattern of transfusion transmissible

Table 1: Prevalence of TTIs among blood donors

TTIs	2018 (n=894)	2019 (n=3104)	2020 (Jan-feb) (n=435)	Total (n=4433)
HIV	07 (0.78%)	15 (0.48%)	01 (0.23%)	23 (0.52%)
HBsAg	13 (1.45%)	15 (0.48%)	02 (0.46%)	30 (0.68%)
HCV	00 (0.0%)	05 (0.16%)	00 (0.0%)	05 (0.11%)
VDRL	05 (0.56%)	26 (0.84%)	05 (1.5%)	36 (0.81%)
Total	25 (2.80%)	61 (1.97%)	08 (1.84%)	94 (2.12%)

Table 2: Age wise distribution of TTIs among blood donors (n=4433)

	18-30	31-40	41-50	≥51	Total (n=4433)
HIV	13	06	04	00	23 (0.52%)
HbsAg	16	11	03	00	30 (0.68%)
HCV	03	01	00	01	05 (0.11%)
VDRL	11	16	07	02	36 (0.81%)
Total	43	34	14	03	94 (2.12%)

Table 3: Distribution of TTIs among blood donors according to their type of donation

TTIs	Replacement (n=587)	Voluntary (n=3846)	Total (n=4433)	P value
HIV	16 (2.72%)	07 (0.18%)	23 (0.52%)	<0.001
HBsAg	19 (3.24%)	11 (0.29%)	30 (0.68%)	<0.001
HCV	04 (0.68%)	01 (0.03%)	05 (0.11%)	<0.001
VDRL	28 (4.77%)	08 (0.21%)	36 (0.81%)	<0.001
Total	67 (11.41%)	27 (0.70%)	94 (2.12%)	<0.001

infections may be different among the general population, but it can be used as monitoring tool.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

References

1. Pallavi P, Ganesh CK, Jayashree K, Manjunath GV. Seroprevalence and Trends in Transfusion Transmitted Infections Among Blood Donors in a University Hospital Blood Bank: A 5 Year Study. *Indian J Hematol Blood Transfus*. 2011;27:1–6. doi:10.1007/s12288-010-0047-x.
2. Stramer SL, Hollinger FB, Katz LM, Kleinman S, Metzel PS, Gregory KR, et al. Emerging infectious disease agents and their potential threat to transfusion safety. *Transfus*. 2009;49:1S–29S. doi:10.1111/j.1537-2995.2009.02279.x.
3. Kitchen AD, Barbara JA. Transfusiontransmitted Infections. Practical Transfusion Medicine. Second edition ed.; 2001.
4. Ataro Z, Urgessa F, Wasihun T. Prevalence and trends of major transfusion transmissible infections among blood donors in Dire Dawa blood bank, Eastern Ethiopia: Retrospective study. *Ethiop J Health Sci*. 2018;28(6):701–10.
5. Adhikary R, Bhavana MV. The risk of transfusion transmissible infections. Where do we stand in 2018? *Glob J Transfus Med*. 2018;3(2):88. doi:10.4103/gjtm.gjtm_33_18.
6. Sachan D, Varghese J, Joseph J, Srinivasan V, Jayanthi V, Rela M. HBsAg positive patient characteristics in hospital and blood donation camps. *ISRN Hematol*. 2013;doi:10.1155/2013/675191.
7. Narahari S, Juwle A, Basak S, Saranath D. Prevalence and geographic distribution of Hepatitis C Virus genotypes in Indian patient cohort. *Infect Genet Evol*. 2009;9(4):643–5. doi:10.1016/j.meegid.2009.04.001.
8. Makroo RN, Walia RS, Chowdhry M, Bhatia A, Hegde V, Rosamma NL. Seroprevalence of anti-HCV antibodies among blood donors of north India. *Indian J Med Res*. 2013;138(1):125.
9. Busch MP, Bloch EM, Kleinman S. Prevention of transfusion-transmitted infections. *Blood*. 2019;133(17):1854–64. doi:10.1182/blood-2018-11-833996.
10. Naidu NK, Bharucha ZS, Sonawane V, Ahmed I. Nucleic acid testing: Is it the only answer for safe Blood in India? *Asian J Transfus Sci*. 2016;10:79. doi:10.4103/0973-6247.175423.
11. Mandal R, Mondal K. Transfusion transmissible infections among blood donors from a sub-Himalayan rural tertiary care centre in Darjeeling, India. *J Tradit Complement Med*. 2016;6:224–9. doi:10.1016/j.jtcme.2015.02.003.
12. 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. doi:10.4103/0019-557x.128172.
13. Koshy JM, Manoharan A, John M, Kaur R, Kaur P. Epidemiological profile of seropositive blood donors at a tertiary care hospital in North India. *CHRISMED J Health Res*. 2014;1(2):91. doi:10.4103/2348-3334.134268.
14. Babu KVS, Suresh B, Venkataramana B, Mouli PC. Burden of transfusion transmissible viral infections among blood donors at a tertiary care referral teaching hospital in South India. *J Clin Sci Res*. 2016;5(3):160–3. doi:10.15380/2277-5706.jcsr.15.023.
15. Sidhu M, Kotwal U, Kapoor R, Raina T. Seroprevalence of human immunodeficiency virus, hepatitis B virus and hepatits C virus in blood donors of Jammu Province: A tertiary care centre experience. *Asian J Transfus Sci*. 2013;7(2):162. doi:10.4103/0973-6247.115601.
16. 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.

17. 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;23:147–9.
18. Gupta N, Kumar V, Kaur A. Seroprevalence of HIV, HBV, HCV and syphilis in voluntary blood donors. *Indian J Med Sci*. 2004;58:255–7.
19. Pahuja S, Sharma M, Baitha B, Jain M. Prevalence and trends of markers of hepatitis C virus, hepatitis B virus and human immunodeficiency virus in Delhi blood donors: A hospital based study. *Jpn J Infect Dis*. 2007;60:389–91.
20. 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(2):308. doi:10.4103/0377-4929.64295.

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