

Prevalence of HIV Infection among Blood Donors in a Tertiary Care Hospital of Haryana: A Retrospective Study

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ABSTRACT

Introduction: Blood is a scarce, but life saving resource. At the same time, unsafe transfusion practice also puts millions of people at risk of Transfusion Transmissible Infections (TTIs).

Aim: To determine the prevalence and trend of blood borne infection namely Human Immunodeficiency Virus (HIV) among blood donors donating blood in a tertiary care hospital of Haryana, India.

Materials and Methods: A retrospective study was conducted in the Department of Transfusion Medicine of Pt. B.D Sharma PGIMS, Haryana, India, from September 2012 to August 2014 to calculate the prevalence and trend of HIV positivity among

blood donors over a period of five years (2008-2012). Results were expressed in terms of frequency and percentage.

Results: There were a total of 1,59,077 donations, including both voluntary and replacement donors. The overall prevalence of HIV infection among blood donors was found to be 0.26% over a period of five years (2008-2012). The HIV prevalence among blood donors showed an increased trend from 2008 (0.18%) to 2011 (0.34%), and then there was a dip in the year 2012 (0.23%).

Conclusion: The number of female blood donors were less in comparison to male blood donor. The maximum number of donors were voluntary males followed by replacement males.

Keywords: Human immunodeficiency virus, Source, Transfusion transmissible infections, Trend

INTRODUCTION

In India, the main causes of blood for transfusion are voluntary donors and replacement donors. A voluntary blood donor purposely donates blood without looking for any compensation whereas a replacement donor is demanded to donate blood by the patient or his attendants [1,2]. The transfusion of blood and blood products is an essential part of patient care and sometimes the only option for survival. When used correctly, not only it saves lives and improves health but also support complex medical and surgical procedures including transplantation. The blood transfusion improve the life expectancy and quality of life of patients suffering from a wide spectrum of life-threatening inherited disorders such as haemophilia, thalassemia and acquired conditions, such as, cancer and traumatic thalassaemia. However, it also carries a potential risk of complications and transfusion related infections. The risk of TTIs can be minimised by safety measures in blood collection, processing and testing [3].

In India, screening of every unit of donated blood for TTIs is made mandatory by the government. Every unit of the donated blood must be screened for Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), HIV, malaria and syphilis in all blood banks [4]. Despite strict donor screening, the difficulties of 'window period', false-negative results, frequency of asymptomatic carriers, genetic variability in viral strains and technical errors remains the area of concern [5]. According to a report on assessment of blood banks in India 2016, the seropositivity of TTI among blood donors was 0.14% for HIV, 0.34% for Hepatitis C, 0.87% for Hepatitis-B, 0.17% for Syphilis and 0.06% for Malaria. However, there is a huge variation between states. The HIV seroprevalence among blood donors was 0.12% in Haryana [6]. The adult (15-49 years) HIV prevalence in India was estimated as 0.22% (0.17-0.29%) in 2020; with 0.23% and 0.20% among males and females respectively while Haryana had an estimated adult HIV prevalence in the range of 0.20-0.21% [7].

The risk of transfusion transmission of the HIV viruses may be alarming due to high seroprevalence of HIV among blood donors who represent general population. Assessment of statistics on the frequency of TTIs like HIV among blood donors allows a calculation

of the approximately precise estimation of risk of HIV which aids in the formation of long term policies to develop public health and to avoid spreading of these diseases in the overall population [8]. The present study was undertaken to determine the prevalence and trend of HIV infection among blood donors in a tertiary care hospital of Haryana, India.

MATERIALS AND METHODS

A retrospective study was conducted in the Department of Transfusion Medicine of Pt. B.D Sharma PGIMS Rohtak Haryana, India, to calculate the prevalence and trend of HIV infection among blood donors (voluntary and replacement) over a period of five years (January 2008 to December 2012). The study was carried out from September 2012 to August 2014. Ethical approval to conduct the study was taken from Institutional Ethics Committee (IEC/Thesis/Dr. Inderjeet Singh (CM-7)/2012). Prevalence of HIV infection among voluntary donors and replacement donors were studied.

Inclusion criteria: All the blood donors who donated blood (as per NACO guidelines) from 2008 to 2012 in the Department of Transfusion Medicine of Pt. B D Sharma PGIMS Rohtak were included [6].

Exclusion criteria: Incomplete records were excluded from the study records of all the donors along with their laboratory results.

STATISTICAL ANALYSIS

Collected data were entered in the Microsoft excel spreadsheet, coded appropriately and later cleaned for any possible errors. Analysis was carried out using Statistical Package for the Social Sciences (SPSS) for windows version 20.0, and online Graph Pad software (Prism 5 for windows) version 5.01. Normally distributed data were presented as means and standard deviation and categorical data were expressed as frequency.

RESULTS

The [Table/Fig-1] shows that out of the 1,34,031 voluntary donors, majority (96.3%) were male donors. Similarly out of the 25046 replacement donors, majority (99.6%) were male donors.

Year	Voluntary		Total voluntary n (%)	Replacement		Total replacement n (%)	Total donors (voluntary+replacement) n (%)
	Male n (%)	Female n (%)		Male n (%)	Female n (%)		
2008	12699 (93.6)	864 (6.4)	13563 (100)	13746 (99.7)	44 (0.3)	13790 (100)	27353
2009	24738 (94.9)	1325 (5.1)	26063 (100)	1916 (99.6)	7 (0.4)	1923 (100)	27986
2010	30035 (96.8)	997 (3.2)	31032 (100)	828 (99.9)	1 (0.1)	829 (100)	31861
2011	32971 (97.3)	902 (2.7)	33873 (100)	174 (99.4)	1 (0.6)	175 (100)	34048
2012	28636 (97.1)	864 (2.9)	29500 (100)	8295 (99.5)	34 (0.5)	8329 (100)	37829
Total	129079 (96.3)	4952 (3.7)	134031 (100)	24959 (99.6)	87 (0.4)	25046 (100)	159077

[Table/Fig-1]: Sex-wise and year wise voluntary and replacement blood donors in PGIMS, Rohtak. (Figures in parentheses indicate percentages).

The [Table/Fig-2] revealed that out of the total 1,59,077 donations, 416 (0.26%) were HIV positive. The year-wise HIV prevalence among blood donors showed an increased trend from 2008 (0.18%) to 2011 (0.34%).

Year	Total donations	HIV, n (%)
2008	27353	51 (0.18)
2009	27986	70 (0.25)
2010	31861	89 (0.28)
2011	34048	117 (0.34)
2012	37829	89 (0.23)
Total	159077	416 (0.26)

[Table/Fig-2]: Year-wise prevalence of HIV infection among blood donors in PGIMS Rohtak. (Figures in parentheses indicate percentages)

As evident from [Table/Fig-3] both the voluntary and replacement donors had similar prevalence for HIV infection. The overall prevalence of HIV among blood donors was 0.26%.

Type of donors	Total donations	HIV, n (%)
Voluntary	134031	351 (0.26)
Replacement	25046	65 (0.26)
Total	159077	416 (0.26)

[Table/Fig-3]: Prevalence of HIV infection among blood donors. (Figures in parentheses indicate percentages)

DISCUSSION

Transfusion of blood and blood components as a specialised modality of patient management saves millions of lives worldwide. The strategies to prevent the spread of blood borne infections have been extremely effective but transmission still occurs. Evaluation of data for the prevalence of TTIs (like HIV) permits an assessment of acquisition of HIV infection in the blood donor population and consequently the safety of collected blood donations. It also gives an idea of epidemiology of HIV infection in the apparently healthy population. The improved screening and testing of blood donors has significantly reduced TTIs, in most developed countries. This has not been so in developing nations. Poor health education and the lack of awareness result in the reservoir of infections in the population.

Present study shows the overall prevalence of HIV infection in the five years (2008-2012) was 0.26% among blood donors in PGIMS Rohtak, Haryana, India. Negi G and Gaur DS from Uttarakhand reported that the mean percentage of HIV infection per year was found to be 0.2% [9]. Similar results were reported by Chandra T et al., from Uttar Pradesh, showed seropositivity for the HIV infection ranging from 0.03-0.27% [10]. The seroprevalence of HIV in other studies is shown in [Table/Fig-4] [11-18].

Main donor population in present study was that of males (96.8%) instead of females (3.2%) and this finding was similar to study by Chavan SK and Chavan KB who observed proportion of male donors were higher (97.3%) as compared to females (2.7%) [19]. Other studies Kalpana SR et al., Barla M et al., too showed male predominance [20,21]. There is need to increase awareness in

Author name	Publication year	Study area	Seroprevalence of HIV infection (%)
Manjunath MR et al., [12]	2014	Karnataka, India	0.27
Mandal R and Mondal K [13]	2016	West Bengal, India	0.42
Hassan MJ et al., [14]	2016	New Delhi, India	0.33
Sulhyan KR et al., [15]	2017	Maharashtra, India	0.24
Archana R and Yogesh P [16]	2018	Madhya Pradesh, India	0.11
Naik VSS et al., [11]	2020	Andhra Pradesh, India	0.23
Divyashree BN et al., [17]	2020	Andhra Pradesh, India	0.14
Dhote SW et al., [18]	2021	Maharashtra, India	0.07
Inderjeet Singh et al., (Present study)	2022	Karnataka, India	0.26

[Table/Fig-4]: Comparison of HIV seropositivity of blood donors in different studies [11-18].

females about blood donation. The rejection rate in female donors is more due to anaemia and underweight.

Limitation(s)

Donor pool was majority of male population, so prevalence cannot be generalised to female population.

CONCLUSION(S)

In the present study, the overall prevalence of HIV infection was found to be 0.26% over a period of five years (2008-2012). Among blood donors there was male predominance. The sustainable and reliable approach to reduce the prevalence of this infection is to improve people's awareness about modes of transmission of blood borne infections.

REFERENCES

- [1] Sehgal S, Shaiji PS, Brar RK. Seroprevalence and trends of transfusion transmissible infections in blood donors in Andaman and Nicobar Islands-an institutional retrospective study. *J Clin Diag Res.* 2017;11(4):EC21-24.
- [2] Agravat AH, Gharia AA, Pujara KM, Dhruva GA. Profile of blood donors and analysis of deferral pattern in a tertiary care hospital of Gujarat, India. *International Journal of Biomedical and Advance Research.* 2013;4(9):623-28.
- [3] World Health Organization. Action framework to advance universal access to safe, effective and quality assured blood products 2020-2023. Geneva: World Health Organization; 2020.
- [4] National AIDS Control Organization. Standards for blood banks and blood transfusion services. New Delhi: NACO, Ministry of Health and Family Welfare, Government of India; 2007.
- [5] Kaur G, Basu SA, 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(3):147-49.
- [6] National AIDS Control Organization. Assessment of blood banks in India- 2016. New Delhi: NACO, Ministry of Health and Family Welfare, Government of India. Available from: <http://naco.gov.in/sites/default/files/Assessment%20of%20Blood%20Banks%20in%20India%20-%202016.pdf>. [Last accessed on 2022 Feb 18].
- [7] National AIDS Control Organisation & ICMR-National Institute of Medical Statistics (2021). India HIV Estimates 2020: Technical Brief. New Delhi: NACO, Ministry of Health and Family Welfare, Government of India. Available from: http://naco.gov.in/sites/default/files/India%20HIV%20Estimates%202020__Web_Version_0.pdf [Last accessed on 2022 Feb 18].
- [8] 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(1):61-64.
- [9] Negi G, Gaur DS. Trends of transfusion transmissible diseases among blood donors at Uttarakhand, India. *Indian J Community Med.* 2014;39:183-86.

- [10] Chandra T, Fatima Rizvi SN, Agarwal D. Decreasing prevalence of transfusion transmitted infection in Indian scenario. *Scientific World Journal*. 2014;1:01-04.
- [11] Naik VSS, Neeraja M, Sujeeva Swapna R, Bhavani C, Sravani P, Kumar STCS. Seroprevalence of transfusion transmitted infections in voluntary and replacement blood donors in a tertiary care hospital blood bank of Anantapur, Andhra Pradesh, India: 5 years retrospective study. *Int J Res Med Sci*. 2020;8:455-59.
- [12] Manjunath MR, Mamatha P Samaga, Bhat YM, Shivakumar S. Trends of transfusion transmittable infections among voluntary blood donors in a tertiary care hospital, Mandya. *J Evolution Med Dent Sci*. 2014;3(45):11040-44.
- [13] 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;6:224-29.
- [14] Hassan MJ, Khan S, Jairajpuri ZS, Rana S, Imteyaz SP, Jetley S. Seroprevalence of transfusion transmitted infections by using 4th generation enzyme-linked immunosorbent assay kit: A 3 year study in a tertiary health care centre of Delhi. *Annals Pathol Lab Med*. 2016;3(04):333-39.
- [15] Sulhyan KR, Anvikar AR, Ratnaparkhi AD. Seroprevalence of transfusion transmissible infections among blood donors at a tertiary care centre in Maharashtra, India. *Intern J Contemporary Med Res*. 2017;4(9):1865-67.
- [16] Archana R, Yogesh P. Seroprevalence of transfusion transmitted infections among blood donors in a tertiary care hospital in Madhya Pradesh. *J Med Sci Clin Res*. 2018;6(4):50-53.
- [17] Divyashree BN, Sankar S, Khanna RM. Sero-prevalence and trends of transfusion transmissible infections among blood donors in a rural tertiary care centre-A 7 years study. *Indian J Pathol Oncol*. 2020;7(4):576-81.
- [18] Dhote SW, Srivastava AR, Singh I. Prevalence and trends of transfusion transmissible infections in blood donors in a tertiary care centre-an institutional 4-year retrospective study. *National Journal of Laboratory Medicine*. 2021;10(4):PO16-19.
- [19] Chavan SK, Chavan KB. Seroprevalence, trend of transfusion transmittable infections and co-infections rate among blood donors at tertiary care hospital-10 years study. *Int J Res Health Sci*. 2014;2(4):1014-20. Available from: <http://www.ijrhs.com/issues.php?val=Volume2&iss=Issue4>.
- [20] Kalpana SR, Anvikar AR, Ratnaparkhi AD. Seroprevalence of transfusion transmissible infections among blood donors at a tertiary care centre in Maharashtra, India. *Intern J Conte Med Research*. 2017;4(9):1865-67.
- [21] Barla M, Pailoor K, Keshava MS, Jayaprakash CS, Olivia D, Lakshmi C. Transfusion transmitted infections among voluntary blood donors from rural areas in coastal Karnataka, India. *Hematol Transfus Int J*. 2018;6(4):121-23.

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