Prevalence of HIV seropositivity in blood donors of Gujarat

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Abstract

Introduction: Lack of health education and poor awareness leads to increase the number of source of infections in the community and resulted in the higher percentage of transfusion-transmitted HIV in India. Screening of TTIs among blood donors helpful to observe the direction and prevalence of seropositivity of HIV among healthy blood donors.

Objective: To detect the HIV seropositivity among healthy blood donors in Gujarat.

Materials and Methods: A retrospective cross-sectional study was conducted at Blood Bank of Gujarat among all voluntary and replacement donors. Total 7,935 donors were screened over the period of year 2010 to 2017 according the guideline of WHO.

Results: Blood units were collected from replacement donors (54.1%) and voluntary blood donors (45.9%). Almost 97.4% were male donors and remaining were female donors. Around 0.088% blood donors were found seropositive for HIV. Highest incidence of HIV seropositivity was found in year 2016 & 2017.

Conclusion: replacement donors were higher in number than the voluntary donors. In developing countries, availability of safe transfusion of blood & blood products is the main challenge and on the health sector of developing countries. Sometimes, replacement donors bury their medical history to donate blood for their relatives which indicate that blood safety depends mainly on right and decent reply of the screening questions. Emphasis should be given to increased awareness and change in attitude of community regarding blood donation. Blood camps should be increased to encourage the people for voluntary blood donation.

Keywords: Blood Donors, HIV Seropositivity, Replacement Donors, Transfusion Transmitted Infection (TTIs), Voluntary Donors.

Introduction

Still many countries, especially in developing countries have very huge burden of Human immunodeficiency virus (HIV).[1] In India, there were 21,00,000 (17,00,000 – 26,00,000) people living with HIV in 2016 with 80,000 (62,000 – 1,00,000) new HIV infections and 62,000 (43,000 – 91,000) AIDS-related deaths.[2]

Human Blood is limited and valuable for rescuing lives of patients. Provide safe blood for transfusion to prevent transmission of infectious diseases through donated blood is the elemental component of medical and surgical therapy. and there is no genuine substitution of human blood.[3,4] Every year, almost 108 million units of donated blood collected worldwide[1] and there is 1% chance of transfusion-associated problems including transfusion transmitted infection (TTIs) were observed with each unit of blood.[4,5] Of course, morbidity decreased by blood transfusion in many disease conditions but there is a hidden exposure of TTI including HIV, hepatitis, syphilis, malaria and less frequently toxoplasmosis, brucellosis and some viral infections like Epstein-Barr virus, cytomegalovirus and herpes.[3] So, cautious screening of blood is the essential process.[6]

Due to lack of health education and poor awareness leads to increase the number of source of infections in the community and resulted in the higher percentage of transfusion-transmitted HIV in India.[4,7] Almost 0.084-3.87 per cent prevalence of HIV observed in Indian blood donors. One of study done among blood donors at a tertiary care center of the Armed forces found seropositivity rates of 0.12 per cent in 2003, 0.17 per cent in 2004 and 0.10 in 2005, with an overall seropositivity of 0.13 per cent.[8]

Screening of TTIs among blood donors helpful to observe the direction and prevalence of seropositivity of HIV among healthy blood donors.[6,9] So, this study was conducted with the objectives to detect the HIV seropositivity among healthy blood donors in Gujarat.

Materials and Methods

This retrospective cross-sectional study was conducted at Blood Bank of GMERS Medical College and Civil Hospital, Himmatnagar, Gujarat, India during January 2010 to December 2017 after ethical permission of institutional ethical committee among all voluntary and replacement donors. Voluntary blood donation was also conducted in the blood bank as well as various blood donation camps. Precaution was taken to exclude professional donors by taking relavent history and examination.

We included seven consecutive years in our study to identify the trend of increase or decrease the incidence of TTIs. Tests are routinely done on every blood unit to exclude HIV. During this period 7,935 donors were tested. Blood was collected from healthy donors as criteria set by WHO.[4,9]

The screening for HIV was done by third generation ELISA method. Tests were performed according to manufacturer's instructions. Repeat sample testing was done of all reactive samples in duplicate as per guideline

of National AIDS Control Organisation (NACO). Repeat reactive were labelled as ELISA positive and were discarded.

Results

Table 1: Gender wise distribution of donors (N=7935)

Year	Total Donors	Replacement Donors (%)		Voluntary Donors (%)	
		Male	Female	Male	Female
2010	553 (7.0)	336 (7.9)	2 (5.6)	207 (5.9)	8 (4.8)
2011	545 (6.9)	326 (7.7)	4 (11.1)	208 (6.0)	7 (4.2)
2012	759 (9.6)	380 (8.9)	3 (8.3)	362 (10.4)	14 (8.4)
2013	654 (8.2)	242 (5.7)	0 (0.0)	384 (11.0)	28 (16.9)
2014	1193 (15.0)	488 (11.5)	2 (5.6)	658 (18.9)	45 (27.1)
2015	1048 (13.2)	650 (15.3)	4 (11.1)	365 (10.5)	29 (17.5)
2016	1408 (17.7)	764 (18.0)	12(33.3)	613 (17.6)	19 (11.4)
2017	1775 (22.4)	1065 (25.1)	9 (25.0)	685 (19.7)	16 (9.6)
TOTAL	7935 (100.0)	4251 (53.6)	36 (0.5)	3482 (43.9)	166 (2.1)

Table 1 and figure 1 shows that total 7935 blood units were collected from replacement donors (54.1%) and voluntary blood donors (45.9%) at the study setting during January 2010 to December 2017. Highest number (25.1%) of blood donors noted during year 2017 and lowest (7.9%) in 2010. Out of total blood donors, 97.4% were male and remaining were female.

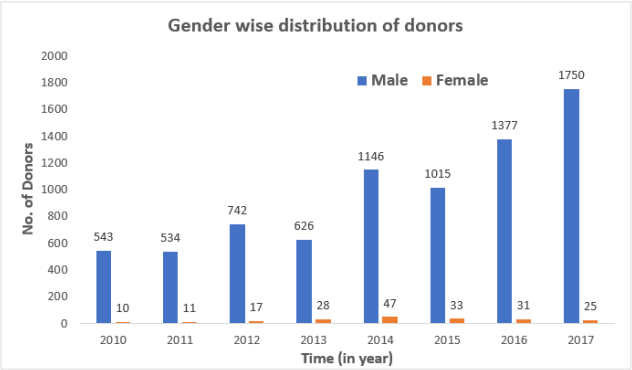

Fig. 1: Gender wise distribution of donors (N=7935)

Table 2: Year wise distribution of HIV seropositive donors (N=8235)

Year	Total Blood donors	Total HIV Seropositive
2010	553	1
2011	545	1
2012	759	0
2013	654	1
2014	1193	0
2015	1048	0
2016	1408	2
2017	1775	2
Total	7935	7

Table 2 and figure 2 shows that 0.088% blood donors were found seropositive for HIV. Highest incidence of HIV seropositivity was found in year 2016 & 2017.

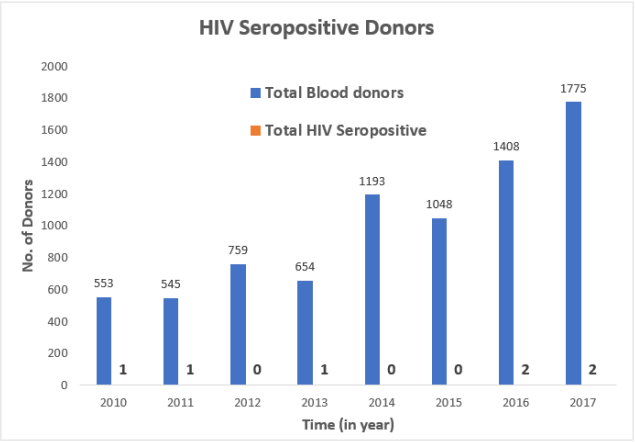

Fig. 2: Year wise distribution of HIV seropositive donors (N=8235)

Discussion

In Health care system, Blood transfusion is a fundamental part which potentially saves lots of lives every day. Blood and blood products must be free from HIV, hepatitis viruses and other threatening infections and transfused safely to the needy persons which is the basic requirement of each country of the world. According to World Health Organization (WHO) guideline, at minimum, all the blood and blood products for transfusion should be tested for HIV, hepatitis B & C and Syphilis. To reach the health-related Millennium Development Goals (MDGs) to reduce child mortality and decrease the new cases of HIV, Blood safety is integral to the WHO HIV/AIDS plan.[6]

Replacement donation is encouraged by WHO. In present study, 45.9% were voluntary and 54.1% were replacement donors. This finding is comparable with the study from Karnataka[10] and from Haryana[3] reported it as 58% and 31.4% respectively but not comparable with the study done by Sehgal S et al[6] & Patel PA et al[11] from western Ahmedabad reported voluntary blood donors as 77.6% & 95.56% respectively.

Replacement donors present in biggest group of blood donors in India[12] as correlate in present study also low number of voluntary donors could shows absence of knowledge in the general community about voluntary blood donation. It is observed that few of the replacement donors are definite professional donors who are paid by the patient's relative instead of blood bank.[13]

In our study, males (97.6%) outnumbered females (2.4%). This finding is correlate with the similar study done in India by Shehgal S et al,[6] Pallavi P et al,[14] Patel PA et al,[11] Arora D et al,[3] Singh K et al,[15] Pahuja et al[16] & Singh B et al,[13] observed >90% of the male donors.

According to WHO Global Database on Blood Safety (GDBS) 2013 report prevalence of HIV as 0.003% in high-income countries, 0.020% in middle-income countries and 1.080% in low income countries.[17] In present study, the prevalence of HIV was 0.088%.

Table 3: Comparison HIV seropositivity of various studies with present study

Study	Duration of Study	HIV Seropositivity (%)
Armstrong SA et al[18] (1997), Canada	3	1.12
Mahalakshmi B et al[19] (2004), Chennai	1	0.62
Gupta et al[20] (2004), Ludhiana	2.10	0.084
Bhattacharya et al[21] (2007), Kolkata	2	0.28
Chandra et al[22] (2009), Lucknow	7	0.23
Arora D et al[3] (2010), Hariyana	3.5	0.3
Das BK et al[23] (2011), Kolkata	1	0.32
Pallavi P et al[14] (2011), Mysore	5	0.44
Bhatt SK et al[24] (2012), Ahmedabad	4	1.32
Kulkarni N et al[25] (2012), Karnataka	5	0.91
Shah N et al[26] (2013), Ahmedabad	6.5	0.16
Pathak S et al[27] (2013), Delhi	4.7	0.25
Bodariya O et al[4] (2013), Surendranagar	5	0.16
Chaurasiya R et al[28] (2016), New Delhi	2	0.27
EBAA[29] (2017), America	4	0.21
Basak S[30] et al (2017), Kolkata	5	0.28
Present study	7	0.088

Conclusion

Present study results show that replacement donors were higher in number than the voluntary donors. In developing countries, availability of safe transfusion of blood & blood products is the main challenge and on the health sector of developing countries. Sometimes, replacement donors bury their medical history to donate blood for their relatives which indicate that blood safety depends mainly on right and decent reply of the screening questions. Emphasis should be given to increased awareness and change in attitude of community regarding blood donation. Blood camps should be increased to encourage the people for voluntary blood donation.

Limitation

The ideal condition to conduct a prevalence study is to sample the general population and present study conducted among donors who were visited study setting. As blood donors are specifically selected based on extensive questionnaire and a physical examination, and apparently healthy individuals with lowest risk of TTIs are allowed to donate blood. Further, the donor pool was predominantly composed of male population and with only 2.4% of female donors, the prevalence cannot be generalized to female population of this region.

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References

1. Karabaev BB, Beisheeva NJ, Satbaldieva AB, Ismailova AD, Akmatov MK. Seroprevalence of hepatitis B, hepatitis C, human immunodeficiency virus, Treponema pallidum, and co-infections among blood donors in Kyrgyzstan: a retrospective analysis (2013–2015). Infectious Diseases of Poverty 2017;6(45).
2. Overview of HIV/AIDS of India. UNAIDS 2016. Available from: http://www.unaids.org/en/regionscountries/countries/india. [cited on 6th September, 2018]
3. Arora D, Arora B, Khetarpal A. Seroprevalence of HIV, HBV, HCV and syphilis in blood donors in Southern Haryana. *Indian J Pathol Microbiol* 2010;53:308-9.
4. Bodarya O, Shrivastav AV, Bhavsar U, Ramanuj A, Joshi JR, Agnihotri AS. Seronegativity HBsAg, HCV and HIV among blood donors: A fi ve year study. *Muller J Med Sci Res* 2015;6:142-6.
5. Pawle J, Biradar SS, Domble VD. Seroepidemology of HIV, HBV, HCV infections among blood donors in Bagalkot district – A cross sectional study. *Medical Innovatica* 2013;2:8-10.
6. Sehgal S, Shaiji PS, Brar PK. Seroprevalence and Trends of Transfusion Transmissible Infections in Blood Donors in Andaman and Nicobar Islands- An Institutional Retrospective Study. *J Clin Diagnostic Res* 2017;11(4):21-4.
7. Rose D, Sudarsanam A, Padankatti T, Babu PG, John TJ. Increasing prevalence of HIV antibody among blood donors monitored over 9 years in one blood bank. *Indian J Med Res* 1998;108:42-4.
8. Makroo RN, Chowdhry M, Bhatia A, Arora B, Rosamma NL. Prevalence of HIV among blood donors in a tertiary care centre of north India. *Indian J Med Res* 2011;134:950-53.
9. Blood Donor Selection- Guidelines on assessing donor suitability for blood donation. Available from: http://www.who.int/bloodsafty/publications/BD selection.pdf. [Assessed on 8th September, 2018].
10. Kulkarni N. Analysis of the seroprevalence of HIV, HBsAg, HCV, & Syphilitic infections detected in the pre transfusion blood: A short report. *Int J Blood Transfus Immunohematol* 2012;2:1-3.
11. Patel PA, Patel SP, Oza HV. Seroprevalence of Transfusion Transmitted Infections (TTIs) in blood donors at Western Ahmedabad – a secondary care hospital-based study. *Int J Biol Med Res* 2012;3:1806-10.
12. Makroo RN, Salil P, Vashist RP, Shiv Lal. Trends of HIV infection in blood donors of Delhi. *Indian J Pathol Microbiol* 1996;39:139-42.
13. Singh B, Verma M, Kotru M, Verma K, Batra M. Prevalence of HIV & VDRL seropositivity in blood donors of Delhi. *Indian J Med Res* 2005;122:234-36.
14. 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.
15. Singh K, Bhat S, Shastry S. Trend in seroprevalence of Hepatitis B virus infection among blood donors of coastal Karnataka, India. *J Infect Dev Ctries* 2009;3:376–79.
16. Pahuja S, Sharma M, Baitha B, Jain M. Prevalence and trends of markers of hepatitis C virus, hepatitis B virus and human immunodefiiency virus in Delhi blood donors. A hospital based study. *Jpn J Inf Dis* 2007;60:389–91.
17. Blood safety and availability, WHO. Available from: http://www.who.int/mediacentre/factsheets/fs279/en/ [Accessed on 5th September 2018]
18. Armstrong SA, Gangam N, Chipman ML, Rootman DS. The prevalence of positive hepatitis B, hepatitis C, and HIV serology in cornea donors prescreened by medical and social history in Ontario, Canada. *Cornea* 1997;16:512-6.
19. Mahalakshmi B, Madhavan HN, Pushpalatha R, Margarita S. Seroprevalence of human immunodefiiency virus, hepatitis B virus and hepatitis C virus among eye donors. *Indian J Ophthalmol* 2004;52:61-2.
20. 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.
21. Bhattacharya P, Chandra PK, Datta S, Banerjee A, Chakraborty S, Rajendran K, et al. Signi fi cant increase in HBV, HCV, HIV and syphilis infections among donors in West Bengal, Eastern India 2004-2005: Exploratory screening reveals high frequency of occult HBV infection. *World J Gastroenterol* 2007;13:3730-3.
22. Chandra T, Kumar A, Gupta A. Prevalence of transfusion transmitted infections in blood donors: An Indian experience. *Trop Doct* 2009;39:152-4.
23. Das BK, Gayen BK, Aditya S, Chakrovorty SK, Datta PK, Joseph A. Seroprevalence of Hepatitis B, Hepatitis C, and human immunode fi ciency virus among healthy voluntary fi rsttime blood donors in Kolkata. *Ann Trop Med Public Health* 2011;4:86-90.
24. Bhat SK, Kohli MS,Aggarwal SV, ShahAM, Dani JS. Seroprevalence of HIV, HBV and HCV in the donor eyes in the western regional institute of ophthalmology. *Natl J Med Res* 2012;2:306-8.
25. Kulkarni N. Analysis of the seroprevalence of HIV, HBsAg, HCV and syphilitic infections detected in the

pretranfusion blood: A short report. A short report. *IJBTI* 2012;2:13.
26. Shah N, Shah JM, Jhaveri P, Patel K, Shah CK, Shah NR. Sero-prevalence of HBV, HCV, HIV and syphilis among blood donors at a tertiary Care Teaching Hospital in Western India. *GMJ* 2013;68:35-9.
27. Pathak S, Chandrashekhar M. Transfusion transmittable infections — Seroprevalence among blood donors in a tertiary care hospital of Delhi. *Asian J Transfus Sci* 2013;7:116-8.
28. Chaurasia R, Zaman S, Das B, Chattrjee K. Screening donated blood for transfusion transmittd infections by serology along with NAT and response rate to notifiation of reactive results: An Indian experience. *J Blood Transfusion* 2014;2014:412105.
29. Eye Banking Statistical Report. Eye Bank Association of America 2016. Available from: http://www.restoresight.org [accessed on 4th September 2018].
30. Basak S, Basak SK, Biswas B. Comparison of seropositivity of human immunodefiiency virus, hepatitis B virus, hepatitis C virus, and syphilis among Hospital Cornea Retrieval Programme-Donors versus voluntary cornea donors at a large eye bank in Eastern India. *Indian J Ophthalmol* 2017;65:1138-42.

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