



SEROPREVALENCE OF HIV AND ITS TREND AMONG BLOOD DONORS IN A TERTIARY CARE CENTRE OF HARYANA

Pathology

Dr. Sarvek Bajaj	Assistant Professor Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar).
Dr. Ajay Kumar Kochhar*	Professor Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar). *Corresponding Author
Dr. Karandeep Singh	Professor Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar).
Dr. Monika Girdhar	Associate Professor Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar).

ABSTRACT

Background: Testing for various transfusion transmitted infections (TTIs) viz. HIV, syphilis, malaria, hepatitis B and hepatitis C is mandatory for blood donation in India. Screening of donors is done by history, examination and testing for TTIs. HIV detection includes tests for presence of anti-HIV antibody or HIV antigen or both. National adult (15–49 years) HIV prevalence in India is estimated at 0.22% (0.16%–0.30%) in 2017 (0.25% (0.18-0.34) among males and at 0.19% (0.14-0.25) among females). This study was carried out to find out seroprevalence of HIV among blood donors in a tertiary care setup of Haryana and study the trend of prevalence over 10 years. **Methods:** This was a retrospective study over a period of 10 years from 2010 to 2019. After taking history and biodata, donor samples were taken from the blood bags and tested for the presence of HIV using enzyme linked immunosorbent assay (ELISA). **Results:** A prevalence of 0.24% of HIV was seen among the donors from 2010-2019. There was a decline in the prevalence from 0.64% to 0.16% over the years. **Conclusions:** Among TTIs, HIV remains a major culprit in India. In a country where more sensitive and expensive testing is difficult, increasing participation of voluntary blood donors and minimizing need for replacement donors becomes an effective strategy to minimise the risk of transfusion transmitted HIV.

KEYWORDS

TTIs, HIV, Voluntary, Replacement, Donors, Seroprevalence

Introduction

According to the United Nations program on HIV/AIDS (UNAIDS), there are 38.0 million adults and children having HIV/AIDS in the world.¹ It was reported as a new entity on 5th June, 1981 by the U.S. Centers for Disease Control and Prevention (CDC) and referred to as “Acquired Immunodeficiency Syndrome” (AIDS) among patients presenting with Pneumocystis pneumonia and Kaposi's sarcoma. Its causative agent was discovered in 1986 by the International Committee on Taxonomy of Viruses and named Human Immunodeficiency Virus (HIV).² India has the third largest HIV epidemic in the world with 2.1 million AIDS patients.³ The first cases in India were detected in 1986 among sex workers in Chennai.⁴ National AIDS Control Organization (NACO) estimates 86% transmission is due to sexual contact, 2.4% due to intravenous drug users, 2.0% due to blood products, 3.6% due to perinatal transmission and 6.0% to others.⁵ Due to the menace of TTIs, testing for HIV 1&2 became mandatory under the Drugs and Cosmetics Act in 1989.⁶ HIV testing includes detection of anti-HIV antibody or HIV antigen or both. This study was done to evaluate trend of HIV prevalence among blood donors over the years.

1. Objectives of the study

This single center study was carried out to observe the HIV seroprevalence and its trend among the blood donors from southern Haryana in both rural and urban populations in a tertiary care center.

2. Materials

Place of Study

In blood bank in a tertiary care hospital in Agroha, Haryana.

Study Period

All donors who donated blood at this institute or at camps organized by this institute from a period 2010 to 2019.

3. Method in brief

All donors (18-60 years) were screened by trained staff for blood donation as per Drugs and Cosmetics act. Consent for testing was obtained from all donors as part of blood donation form. Samples were collected at the time of donation from primary bag and tested for the presence of HIV using ELISA. Third (J-Mitra Microlisa HIV Ab till 2013) and fourth generation kits (J-Mitra Microlisa HIV Ab and Ag

2014-2019) were used to detect the presence of HIV-1-p24 antigens and anti-HIV-1&2 antibodies in the serum.

Inclusion criteria – Donors who fulfilled the general criteria for blood donation

Exclusion criteria - Donors who did not fulfil the criteria for donation, paid and commercial donors and with history of high risk behavior, fever etc. were excluded

Statistical analysis: Data was analyzed statistically by Chi-square test.

Results

Total of 59355 people were screened for the presence of HIV. Of these, 56557 (95.29%) donors were males and 2798 (4.71%) were females (Table 1).

Of the 140 donors testing positive for HIV by ELISA, 97.86% (137/140) were males and 2.14% (3/140) were females. (Table 1).

Majority of the donors were voluntary (57140) and remaining were replacement (2215)

Table 1: Gender wise distribution of HIV seropositivity

Years	Donors Males Females	Total donors	Positive			
			M	F	Total	
2010	2294	51	2345	15	0	15
2011	2394	140	2534	13	1	14
2012	3063	230	3293	15	0	15
2013	4220	322	4542	19	0	19
2014	4371	249	4620	08	0	08
2015	6525	234	6759	10	1	11
2016	8512	453	8965	22	1	23
2017	8008	386	8394	10	0	10
2018	9102	370	9472	11	0	11
2019	8068	363	8431	14	0	14
TOTAL	56557	2798	59355	137	3	140

Majority of the positive cases (59.3% (83/140)) belonged to age group of 18-30 years. 29.3% (41/140) cases belonged to 31-40 years followed by 9.3% (13/140) in the age range of 41-50 years. Minimum cases (2.1% (3/140)) belonged to ages 51-60 years. (Table 2)

Table 2: Age wise distribution of the blood donors

Age group	No. of donors
18-30	83
31-40	41
41-50	13
51-60	3

Year-wise prevalence decreased from 0.64% to 0.16% over the years (Table 3) Overall prevalence was found to be 0.0024.

Table 3: Yearly prevalence of HIV at 95% Confidence interval

Year	Total tested	Tested positive	M+ve	F+ve	Prevalence	95% CI
2010	2345	15	15	0	0.0064	0.0032, 0.0096
2011	2534	14	13	1	0.0055	0.0026, 0.0084
2012	3293	15	15	0	0.0046	0.0023, 0.0069
2013	4542	19	19	0	0.0042	0.0023, 0.0061
2014	4620	08	08	0	0.0017	0.0005, 0.0029
2015	6759	11	10	1	0.0016	0.0007, 0.0026
2016	8965	23	22	1	0.0025	0.0015, 0.0036
2017	8394	10	10	0	0.0012	0.0005, 0.0019
2018	9472	11	11	0	0.0011	0.0005, 0.0018
2019	8431	14	14	0	0.0016	0.0008, 0.0025
TOTAL	59355	140	137	3	0.00236	
Overall prevalence						

Prevalence among male donors was found to be more than females (Prevalence-0.24%; 0.1%). This difference was found to be statistically insignificant at $p>0.05$. HIV was found to be more prevalent in replacement donors as compared to voluntary (Prevalence-0.21%; 0.86%) at $p<0.05$ (statistically significant) (Table 4)

Table 4: Comparison of prevalence- male vs female and replacement vs voluntary donors

Donors	Positive	Prevalence	p-value (sig. at $p<0.05$)
Male	137/56557	0.00239	0.150682
Female	3/2798	0.001	
Replacement	19/2215	0.0086	< 0.00001
Voluntary	121/57140	0.0021	

Discussion

Risk of TTIs is minimum with voluntary donors hence it is recommended that almost all the blood donation should be from voluntary donors. The possibility of giving incomplete/ inaccurate history is high amongst replacement donors as they might be driven by motive to benefit their patients. This makes voluntary donors preferable over replacement donors. Replacement donors are supposed to be at a higher prevalence rate of TTIs including HIV, syphilis etc.⁷ This notion is also supported by our study as replacement donors showed a higher rate of prevalence of HIV than voluntary donors (0.86%, 0.21% at $p<0.05$) in our study. (Table 4).

HIV seroprevalence among Indian donors varies from 0.084-3.87%.⁸ A study by Chatteraj et al revealed a seropositivity of 0.13% among the blood donors.⁹ Sonth et al screened 43,130 blood donors for HIV and found 350(0.81%) of them to be positive.⁹ The prevalence of HIV among the blood donors in our study was found to be 0.24% which is comparable to national prevalence (15-49 years) of 0.22%.¹⁰

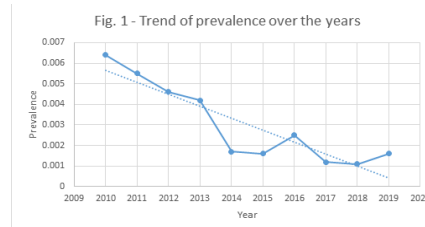
More men are HIV positive than women (NACO). At national level, the prevalence among adult males is 0.25% while amongst women it is 0.19%.¹⁰ In present study also, the rate was higher in men(0.24%), which is in agreement with the national average. In our study, majority of the cases were males(97.86%) and females made up only 2.14%.

Various studies done in blood donors in different regions indicate that there is a higher prevalence of HIV among southern states than northern states. This pattern also correlates with national data.¹⁰ Studies in neighboring states like Punjab(Kumar et al, 0.26%) and Delhi(Makroo et al, 0.25%) show a similar prevalence. Another study by Sehgal et al yielded similar prevalence (0.21%). (Table 5)

Table 5: Comparison of prevalences in various studies in different regions

Studies	Study region	Study period	HIV prevalence rate (%)
Srikrishna et al ¹⁴	Bengaluru	1997-1998	0.44
Sonth et al ⁹	Karnataka	2005-2009	0.81
Makroo et al ¹²	Delhi	1999-2009	0.247
Leena MS et al ¹¹	South India	2004-10	0.27
Ramani et al ¹³	Maharashtra	2005	0.66
Ramani et al ¹⁵	Gujarat	2005	0.32
Pagaro et al ¹³	Pune	2006-2012	0.373
Kumar et al	Punjab	2008-2013	0.26
Sehgal et al ⁷	Haryana	2010-2015	0.21
Mandal et al ¹⁶	West Bengal	2010-2012	0.42
Present study	Sothorn Haryana	2010-2019	0.24

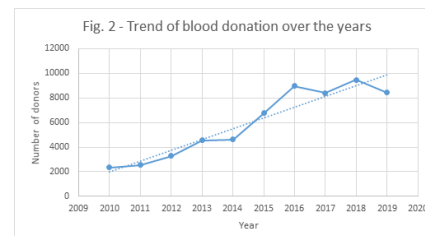
A fall in HIV prevalence is noted in this study over 10 years. (Fig. 1)



This decline could be attributed to rising awareness among donors, better history, improved screening, deferring the donors showing high risk behavior, efficient counseling and increasing trend of voluntary donation.

A decline in HIV sero-positivity was seen after 2013. This can be possibly explained by marked reduction in the number of replacement donors during the later part of the period.

The number of voluntary blood donors saw an increase over the period of this study. (Fig. 2)



This increasing trend could be explained by awareness and motivation among the masses and potential donors.

Conclusion

This study showed that risk of HIV by blood transfusion decreased over time. The finding of more HIV prevalence in replacement donors than voluntary donors highlights the need for increasing participation of voluntary donors so that almost all donation would comprise of voluntary donation and minimizing the dependency on replacement for blood. An increased response from voluntary donors towards blood

donation was seen in our study with time. More sensitive screening tests should be incorporated in blood banks nationwide but the low cost-effectiveness of these tests makes this difficult to achieve. Better monitoring of blood transfusion practices, proper testing, detailed counselling and history taking and increasing awareness among the donors will surely help achieve the goal of zero HIV transmission.

References

1. UNAIDS data available from <https://www.who.int/news-room/fact-sheets/detail/hiv-aids>
2. National guidelines for HIV testing. Available from http://www.naco.gov.in/sites/default/files/National_Guidelines_for_HIV_Testing_21_Apr2016.pdf.
3. AIDS data. Available from: <https://www.avert.org/professionals/hiv-around-world/asia-pacific/india>.
4. Paranjape RS, Challacombe SJ. HIV/AIDS in India: an overview of the Indian epidemic. *Oral Dis.* 2016 Apr;22 Suppl 1:10-4. doi: 10.1111/odi.12457. PMID: 27109267.
5. Gisselquist D, Correa M. Routes of HIV transmission in India: Assessing the reliability of information from AIDS case surveillance. *Int J STD AIDS.* 2006;17:731-5
6. Dasgupta PR, Jain MK, John TJ. Government response to HIV/ AIDS in India. *AIDS* 1994; 8: S83-90.
7. Sehgal PK, Garg Dinesh. *Int J Res Med Sci.* 2017 Sep; 5(9): 3916-3920
8. Chatteraj A, Behl R, Kataria VK. Infectious disease markers in blood donors. *Medical Journal Armed Forces India.* 2008 Jan 1;64(1): 33-5.
9. Sonth SB, Solabannavar SS, Baragundi MC, Patil CS. The prevalence of HIV-2 seropositivity in blood donors. *J Clin Diagn Res* 2010;4: 3091-4.
10. HIV Facts & Figures. Available from <http://naco.gov.in/hiv-facts-figures>
11. Leena MS, Shafee M. Trend and prevalence of transfusion transmitted infections among blood donors in rural teaching institute, South India. *J Pathol Nepal.* 2012;2: 203-6.
12. Makroo RN, Chowdhry M, Bhatia A, Arora B, Rosamma NL. Prevalence of HIV among blood donors in a tertiary care centre of north India. *Ind J Med Res.* 2011;134(6):950-
13. Pagaro PM, Pandit DP, Patel AR, Chaudhari U. Seroprevalence of human immunodeficiency virus in voluntary blood donors: Declining trend. *Med J DY Patil Univ* 2013;6:236-9
14. Srikrishna A, Sitalakshmi S, Damodar P. How safe are our safe donors? *Indian J Pathol Microbiol.* 1999 Oct;42(4):411-6. PMID: 11127370.
15. Ramani KV, Mavalankar DV, Govil D. Study of blood-transfusion services in Maharashtra and Gujarat States, India. *J Health Popul Nutr.* 2009 Apr;27(2):259-70. doi: 10.3329/jhpn.v27i2.3368. PMID: 19489420.
16. 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.* 2015 Apr 3;6(3):224-9. doi: 10.1016/j.jtcme.2015.02.003. PMID: 27419085.