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 8,00,000 (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 worldwide¹ 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 relevant 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.

![Gender wise distribution of donors](image)

**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.
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 Karnataka10 and from Haryana3 reported it as 58% and 31.4% respectively but not comparable with the study done by Sehgal S et al6 & Patel PA et al11 from western Ahmedabad reported voluntary blood donors as 77.6% & 95.56% respectively.

Replacement donors present in biggest group of blood donors in India12 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 al6, Pallavi P et al,14 Patel PA et al,13 Arora D et al,3 Singh K et al,15 Pahuja et al16 & 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 al18 (1997), Canada | 3                 | 1.12                   |
| Mahalakshmi B et al19 (2004), Chennai | 1                 | 0.62                   |
| Gupta et al20 (2004), Ludhiana | 2.10              | 0.084                  |
| Bhattacharya et al21 (2007), Kolkata | 2                 | 0.28                   |
| Chandra et al22 (2009), Lucknow | 7                 | 0.23                   |
| Arora D et al23 (2010), Hariyana | 3.5               | 0.3                    |
| Das BK et al24 (2011), Kolkata | 1                 | 0.32                   |
| Pallavi P et al14 (2011), Mysore | 5                 | 0.44                   |
| Bhatt SK et al25 (2012), Ahmedabad | 4                 | 1.32                   |
| Kulkarni N et al26 (2012), Karnataka | 5                 | 0.91                   |
| Shah N et al26 (2013), Ahmedabad | 6.5               | 0.16                   |
| Pathak S et al27 (2013), Delhi | 4.7               | 0.25                   |
| Bodariya O et al4 (2013), Surendranagar | 5                 | 0.16                   |
| Chaurasiya R et al28 (2016), New Delhi | 2                 | 0.27                   |
| EBAA29 (2017), America | 4                 | 0.21                   |
| Basak S30 (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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