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HIV Threat: A Study among Blood Donors

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ABSTRACT:

Background: *The Human Immunodeficiency Virus (HIV) has been able to threaten the human population all over the world. Among the various routes of spread of HIV, blood transfusion is a major route. So, an integrated strategy for blood safety is of utmost necessity for elimination of transfusion transmitted HIV infection.*

Materials and Methods: *A total of 15594 blood units from both voluntary and replacement donors were screened for the presence of HIV antibodies using 3rd generation ELISA.*

Results: *Of the total blood units screened, 225 were found to be positive for HIV antibodies.*

Conclusion: *HIV seropositivity among blood donors is a challenging task for safe transfusion services. So, blood units collected for transfusion should be tested using methods with the least false negativity, so that, transfusion transmitted HIV infection can be minimized, if not eliminated.*

Key words: *Blood transfusion, seroprevalence, transfusion transmitted infection, blood donors.*

INTRODUCTION

Human Immunodeficiency virus alone has been able to threaten the human population all over the world. It is estimated that there are about 35.3 million HIV infected persons worldwide; and 2.3 million new HIV infections occurred in 2012 alone with 6,300 new infections occurring in a day (WHO 2012). In the year 2012, 1.6 million people lost their lives due to AIDS alone. So, the HIV load world over is alarming.

Among the various routes of spread of HIV infection, blood transfusion is implicated as a major route. So, an integrated strategy of safe transfusions is of utmost necessity. According to NACO guidelines, all blood samples from blood donors must be tested for HIV 1 & 2, Hepatitis B & C, Syphilis and Malaria^[1].

As there is no large scale study on the seroprevalence of HIV in North-east India, the present study was undertaken with the following aims and objectives –

1. To study the seroprevalence of HIV among blood donors.
2. To compare the seroprevalence of HIV among voluntary and replacement donors.

MATERIALS AND METHODS

This study was conducted retrospectively in the State of the Art Model Blood Bank, Gauhati Medical College & Hospital, Guwahati. A total of 155994 blood units were collected from both voluntary and replacement donors over a period of 6 years from 2008 to 2013.

The donors, after answering the donor questionnaire, were carefully examined by trained medical officers. The eligibility criteria for donors, i.e., age between 18 to 60 years, minimum weight of 45 kgs, hemoglobin level of ≥ 12.5 gms, negative history of Hepatitis B, C and sexually transmitted diseases were strictly adhered to while selecting the donors. Donors were questioned for

high risk behavior for HIV, Hepatitis B & C and Syphilis. Data were collected from blood bank records and strict confidentiality of data was maintained while conducting the study.

All the donors were non-remunerated blood donors. Blood was collected both from outdoor voluntary blood donation camps and from in-house donors. Some of the in-house donors were voluntary donors, while, others were relatives or acquaintances of the patient requiring blood.

At the end of phlebotomy, blood was routinely collected in pilot tubes for pre-transfusion testing. After collection in pilot tubes, serum was separated. Samples which had observable particulate matter were centrifuged before testing, as suspended fibrin may give false positive results. Serum was stored at 2° to 8°C till the time of testing. Tests were done as early as possible preferably within 24 hours and not later than 48 hours.

All blood units were tested for HIV antibodies using 3rd generation ELISA as per recommendations by the Drugs and Cosmetics Act (3rd amendment 2001) ^[2], Govt. of India. Positive and negative controls were run with each batch of tests.

RESULTS

A total of 15594 units of blood were donated in the State of the Art Model Blood Bank, GMCH, over a period of 6 years from 2008 to 2013. Of the total number of blood units, 147241 (94.39%) were donated by males. The male to female ratio of donation is 19:1, showing a high significance between variable gender and blood donation ($\chi^2=225.66$, $p<0.01$). More than half of the donors (53.64%) were voluntary donors, the other 46.36% being replacement donors.

Of the total blood donors, 255 (0.16%) were positive for HIV. The prevalence of HIV, over the 6 year period varied from 0.31% in 2008 to 0.11%

in 2009 and 2012. Of the total HIV positive donors, 249 (97.65%) were males. Again, majority of the HIV positive donors were replacement donors, the total number of HIV positive replacement donors being 198 (77.65%). The total number of HIV positive voluntary donors was 57 (22.35%).

During the study, it was also revealed that, the fraction of blood collected from voluntary donors has shown a steady increase with advancing years from 6.86% in 2008 to 72.78% in 2013.

TABLE 1: SEROPREVALENCE OF HIV OVER SIX YEAR PERIOD

Trend analysis on Blood donation from 2008 to 2013							
Year	Total Collection	No .of voluntary donor(VD)	VD%	No. of replacement donor(RD)	RD %	No.of HIV+ve donor	HIV %
2008	20881	1432	6.86%	19449	93.14%	64	0.31%
2009	23621	13076	55.36%	10545	44.64%	26	0.11%
2010	24223	13654	56.37%	10569	43.63%	32	0.13%
2011	28242	15941	56.44%	12301	43.56%	54	0.19%
2012	29409	18015	61.26%	11394	38.74%	47	0.16%
2013	29618	21557	72.78%	8061	27.22%	32	0.11%
Total	155994	83675		72319		255	0.16%

TABLE 2: ASSOCIATION OF GENDER WITH RESPECT TO VOLUNTARY AND REPLACEMENT DONATION.

Gender of the donor	No. of voluntary donor	No .of replacement donor	d.f	χ^2
Male	78299	68942	1	225.66**
Female	5376	3377		

**Highly Significant (p<0.01)

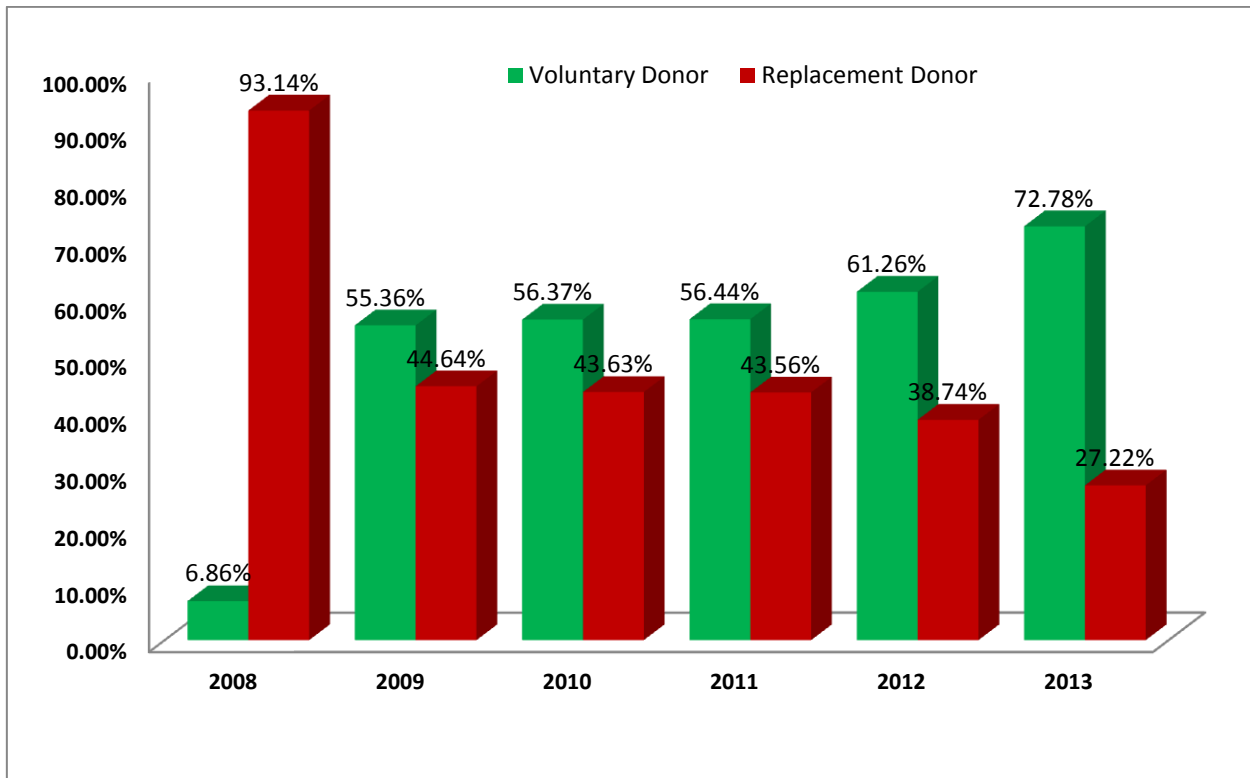


FIG. 1. FREQUENCY OF VOLUNTARY & REPLACEMENT DONORS IN PERCENTAGE

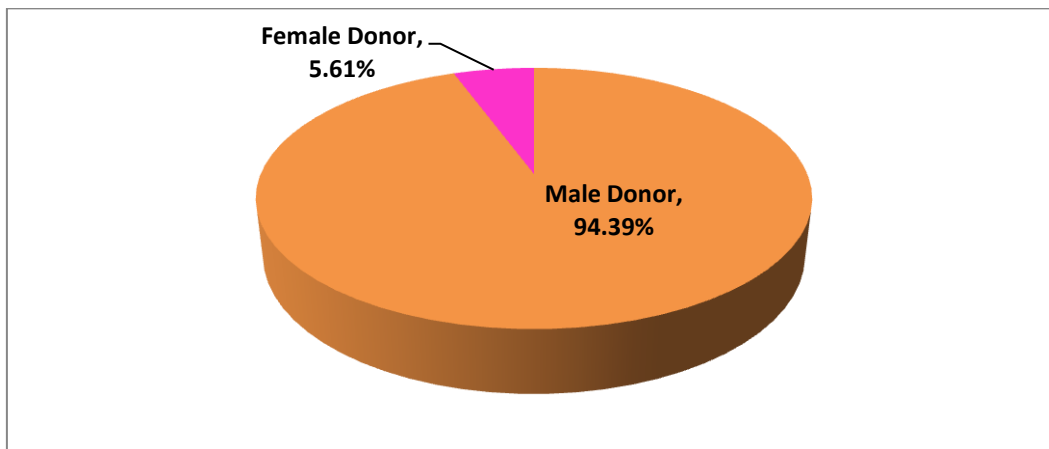


FIG 2: FREQUENCY OF DONORS WITH RESPECT TO GENDER

DISCUSSION

Transfusion of blood or its components becomes imperative for treatment of a wide array of life-threatening conditions. Again, sadly, blood transfusion is a very effective method of transmission of HIV infection. Studies have indicated that, after receiving HIV sero-reactive blood, 95% of the recipients become infected [3].

In high income nations, because of extra-ordinary success in preventing HIV and other transmissible viruses from entering the blood supply, the risk of TTI has dramatically declined [4]. But, this is not the case in developing nations. The national policy for safe blood transfusion is not very old and the transfusion services are hospital based and un-uniform [5].

South Africa is the leading country in terms of people living with HIV infection and India follows closely behind. According to estimates by the Government of India, about 2.4 million Indians are living with HIV (1.93 to 3.04 millions) with an adult prevalence of 0.31% (2009). Of the HIV infected population, 39% are females^[6]. These numbers are enormous and alarming. So, to stop the already growing population of people living with HIV/AIDS, stringent measures are to be implemented. Proper and effective screening of blood before transfusion is, therefore, mandatory.

In the present study, majority of the donors (94.39%) were males. Other studies which reflect this fact are studies by Rao and Annapurna et al in Pune, Rose et al in Vellore, Arora D et al in South Haryana^[7, 8, 9], Singh K et al in Coastal Karnataka, Pahuja et al in Delhi and Singh B et al^[10, 11, 12]. All of these studies showed that male blood donors were more than 90%.

The present study also revealed that 53.64% of the donors were voluntary donors. This finding correlated well with previous studies by Bhattacharya et al which had noticed a predominance of voluntary donors^[13].

The NACO in 2005 suggested an overall prevalence of 0.91% in India. India being a vast country with diverse social and cultural practices has differences in distribution of HIV positive persons. Reports suggest that HIV seroprevalence in Western India is 0.47%^[4]; while that in Punjab is 0.26% and in Andhra Pradesh is 0.9%^[14, 15]. The present study revealed that the seroprevalence of HIV among blood donors in our hospital was 0.16%. The prevalence over the 6 year period has been stated in table 1. This is the first hospital based study from North-East India studying the seroprevalence of HIV among blood donors.

In the present study, of the total 255 HIV positive cases, 97.65% were males and the rest 2.35% were females. Other studies by Unnikrishnan B et al from Coastal South India and Giri et al from rural Maharashtra also reported higher HIV

seropositivity in males^[16, 17]. This difference may be attributed to a difference in the sexual behavior and practices between the two sexes. However, the present study was done using 3rd generation ELISA. So, we could not detect those donors who were in the window period of HIV infection. Nucleic acid amplification technique will be of definite help in this regard and is definitely the call of the hour to decrease the spread of HIV infection through blood transfusion

CONCLUSION

HIV seropositivity among blood donors is a challenging task in transfusion services at present. But, the study was conducted in a tertiary care hospital. So, it does not give us a complete picture of the HIV seroprevalence in Assam. The present study revealed a higher HIV seropositivity among male donors and replacement blood donors and shows high statistical significance between variable gender and blood donation. Based on these results, non-remunerated and voluntary blood donation services are to be stressed upon.

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