

## Original Research Article

# Analysis of the profile of blood donors in a blood bank of a private medical college of Kolkata

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**Received:** 15 August 2017

**Accepted:** 07 September 2017

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## ABSTRACT

**Background:** Blood is the only oxygen transporter in the body and is crucial in saving lives. Research has failed to find a true substitute for blood and blood components and depends on human donors. There are several infectious and non-infectious risks associated with transfusion. An unsafe transfusion is very costly from both human and economic points of view. In that perspective the present study is aimed to assess the profile of blood donors. The objectives of the study were to assess the profile of blood donors as per records of Blood Bank of a private medical college of Kolkata and to find out the prevalence and trends of transfusion transmitted infections among those donors.

**Methods:** A record based cross sectional study was conducted for the period May 2013 to April 2016 at Blood Bank of a private medical college and information regarding 5383 blood donor's profile were collected and analysed.

**Results:** The total donors were found to be 5383 out of which (87.72%) were voluntary donors and (12.28%) replacement donors. The donors had a male predominance (79.84%). The most available blood group was B+ (49.42%) and the least available blood group was A- (0.38%). The commonest transfusion transmitted infection was Hepatitis B (1.11%) followed by Hepatitis C (0.28%) and HIV (0.21%). The transfusion transmitted infections (TTI) shows a decreasing trend over the 3 years.

**Conclusions:** The voluntary donors have increased over the 3 years but there is always a male predominance. The pattern of TTIs in the blood bank depicts the national trend too.

**Keywords:** Blood donors, Transfusion transmitted infections, Blood bank

## INTRODUCTION

Blood is a very important and life saving component of the body and hence its transfusion for various ailments is a landmark for improving health. The concept of providing safe and adequate blood is a contributory factor for the country's National Health Care Policy and infrastructure. Timely transfusion of blood saves millions of lives, but unsafe transfusion practices puts millions of people at risk of transfusion transmitted infections (TTIs). Globally, more than 81 million units of blood are donated

each year. More than 18 million units of blood are not screened for transfusion transmissible infections. With every unit of blood, there is a 1% chance of transfusion associated problems including transfusion transmitted diseases.<sup>1</sup>

Recently, transfusion medicine has gained immense potency and the use of specific components of blood (e.g. factor VIII concentrates), packed red cells or platelets rather than whole blood is important. But there is shortage of sufficient blood units. Like in any developing

country in India too, there is a dependency on family replacement and remunerated donors. Though the World Health Organization advocates that member states should establish national blood transfusion services that will operate on the basis of voluntary, non-remunerable basis, family/replacement donors still provide more than 45% of the blood collected in our blood banks.<sup>2</sup>

In West Bengal out of total 110 blood banks, 58 are state government run, 16 run by central government while 36 are run by private institutions. Voluntary blood donation accounted for only 13% of donations in state government blood banks, 43% in central blood banks and about 19% in private blood banks.<sup>3</sup>

The magnitude of the TTIs varies from country to country depending on loads in that particular population. There is a risk of 1–2 per 1000 recipients receiving contaminated blood with viral, bacterial or parasitic agents. The Indian subcontinent is classified as an intermediate hepatitis B virus (HBV) endemic (HBsAg) zone and has the second largest global pool of chronic HBV infections. The risk of transfusion transmission of these viruses maybe alarming due to high sero-prevalence of HIV, anti-HCV and HBsAg among blood donors.<sup>4</sup>

It is important to note that the problem of TTIs is directly proportionate to the prevalence of infections in the blood donor community.<sup>5</sup>

This study was thus carried out to assess the blood donors profile and to find out the prevalence and trend of transfusion transmitted infections (TTIs) among the donors as per records of blood bank of a private medical college of Kolkata.

## METHODS

A record based, cross sectional epidemiological study was conducted at the blood bank of KPC Medical College and Hospital taking the study population as 5383

blood donors who attended the blood bank during the time span of May 2013 to April 2016. The data was collected by reviewing the records of the blood bank during the stated time span and the monthly format of blood bank was taken as the study tool. The exclusion criteria for blood donation were age <18 years and >60 years, weight <45 kg, systolic blood pressure >140 and diastolic blood pressure >90, current history of medication, recent blood transfusion, any infection, anaemia and recent history of any surgical procedure. The institutional ethical clearance was taken prior to the study. The collected data were analysed using MS Excel and SPSS software.

## RESULTS

The study was carried out taking a total of 5383 donors who attended the blood bank of KPC Medical College and Hospital (KPCMC&H) during May 2013 to April 2016. Among the different types of donors voluntary donors were 87.72% and replacement donors were 12.28%. To test the presence of any significant difference in the proportion of voluntary and replacement donors in the sample, a proportion test (Z test) was carried out. It reveals that the proportion of voluntary donors is significantly higher than that of replacement donors ( $p < 0.05$ ). The Table 1 also indicates a male predominance both in case of voluntary donors (78.29%) and replacement donors (90.92%) and on applying Chi square test it shows a significant male predominance ( $p < 0.05$ ). The sex distribution of different types of donors shows male donors to be 79.84% and female donors to be 20.16% (Table 1, Figure 1 and 2).

A trend analysis was carried out by fitting linear mathematical trend equation  $y_t = a + bt$ ; where  $y_t$  denotes the proportion of voluntary donors and  $t$  refers to the time points (years) in the study. However, the analysis does not show a significant ( $p > 0.05$ ) increasing trend ( $b = -0.055$ ,  $a = 0.88$ ) in proportion of voluntary donors over the years. The most available group is B+ (49.4%) and the least being A- (0.38%) (Table 2, 3 and Figure 3).

**Table 1: Distribution of different types of blood donors.**

| Type of donors     | Male         | Female       | Total        | P value |
|--------------------|--------------|--------------|--------------|---------|
| <b>Voluntary</b>   | 3697 (78.29) | 1025 (21.71) | 4722 (87.72) | <0.05   |
| <b>Replacement</b> | 601 (90.92)  | 60 (9.07)    | 661 (12.28)  | <0.05   |
| <b>Total</b>       | 4298 (79.84) | 1085 (20.16) | 5383 (100)   | <0.05   |

**Table 2: Sex distribution of different blood donors.**

| Year             | Voluntary donor |             |       | Replacement donor |            |       |
|------------------|-----------------|-------------|-------|-------------------|------------|-------|
|                  | Male            | Female      | Total | Male              | Female     | Total |
| <b>2013-2014</b> | 847 (84.36)     | 157 (15.63) | 1004  | 209 (96.31)       | 08 (3.69)  | 217   |
| <b>2014-2015</b> | 1375 (76.39)    | 425 (23.61) | 1800  | 191 (88.83)       | 24 (11.16) | 215   |
| <b>2015-2016</b> | 1475 (76.90)    | 443 (23.10) | 1918  | 201 (87.77)       | 28 (12.22) | 229   |

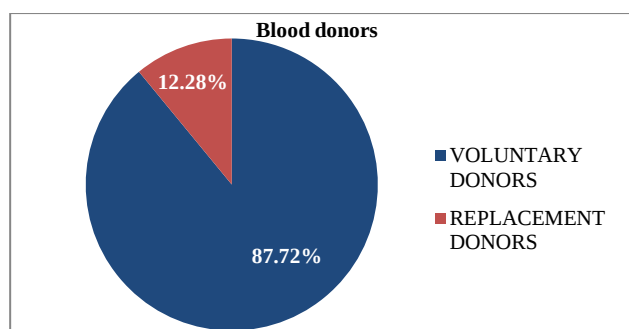


Figure 1: Distribution of different types of blood donors.

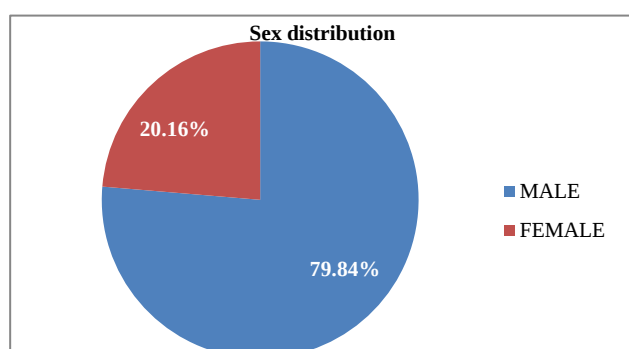


Figure 2: Distribution of different types of donors according to sex.

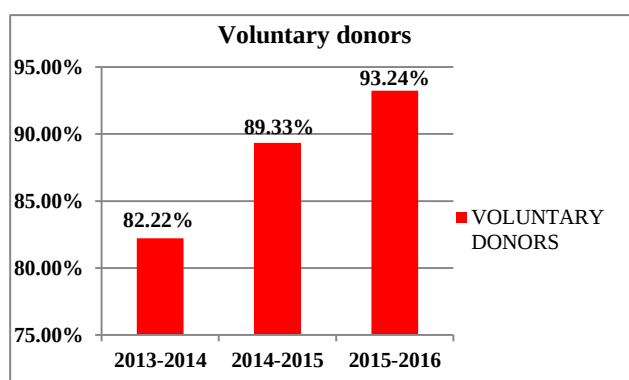


Figure 3: Trend of voluntary donors.

Table 3: Distribution of donors according to different blood groups.

| Blood group | Number | Percentage (%) |
|-------------|--------|----------------|
| A+          | 1144   | 21.26          |
| B+          | 2660   | 49.42          |
| AB+         | 168    | 3.13           |
| O+          | 1268   | 23.56          |
| A-          | 20     | 0.38           |
| B-          | 47     | 0.88           |
| AB-         | 22     | 0.41           |
| O-          | 52     | 0.96           |

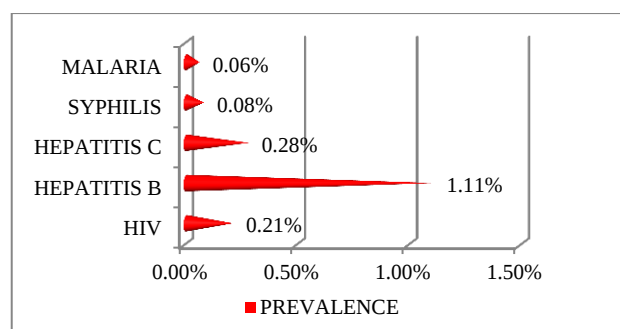


Figure 4: Distribution of TTIs according to their prevalence.

Table 4: Trend analysis of different TTIs.

| TTIs        | a value<br>$Y=a+bt$ | b value<br>$Y=a+bt$ | P value |
|-------------|---------------------|---------------------|---------|
| HIV         | 0.223               | 0.090               | 0.081   |
| Hepatitis B | 0.013               | 0.009               | 0.121   |
| Hepatitis C | 0.310               | 0.155               | 0.173   |
| Syphilis    | 0.087               | 0.055               | 0.333   |
| Malaria     | 0.060               | 0.015               | 0.333   |

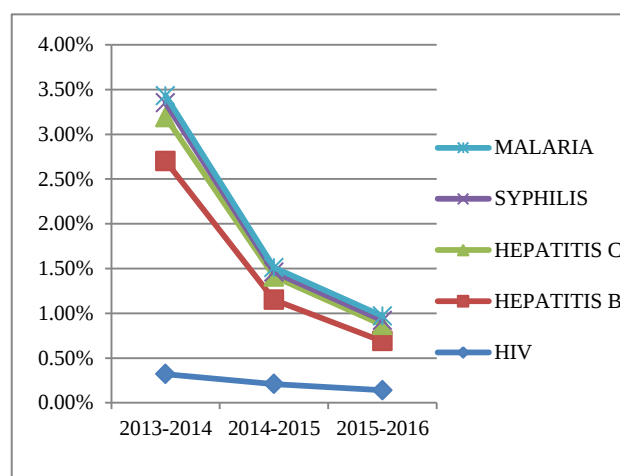


Figure 5: Trend of different TTIs over the years.

The highest prevalence of TTIs was found to be of Hepatitis B (1.11%) followed by hepatitis C (0.28%). A trend analysis was carried out using linear mathematical trend equation. All the individual TTIs were fitted in the equation and each trend analysis was carried out separately but it indicates an insignificant decreasing trend over the years ( $p>0.05$ ) (Table 4, Figure 4 and 5).

## DISCUSSION

In the study the voluntary donation is 87.72% which is different from the study done by Sunderam et al where the voluntary donation was 56.3%.<sup>1</sup> This reflects presence of awareness about blood donation in general population. The proportion was found to be low as compared to studies conducted by Singh et al, Kakkar et al and Pahuja

et al where replacement donors were predominant group as 82.4%, 94.7% and 99.48% respectively.<sup>6-8</sup>

The prevalence of different types of TTIs showed the highest prevalence with hepatitis B infection (1.11%). This finding was similar to study conducted by Chandra et al, Sawke et al and Bhawani et al who have also found HBV to be the commonest TTI among the donors.<sup>9-11</sup> The different percentages being 1.96%, 2.90% and 1.41% respectively.

In the present study the prevalence of HIV in donors was found to be 0.05%. Other studies conducted in various parts of India reported HIV prevalence in donors as 0.23%, 0.51%, 0.39% and 0.08%. A WHO report states that the viral dose in HIV transmission through blood is so large that one HIV positive transfusion leads to death, on an average, after 2 years in children and after three to 5 years in adults. The most available blood group found was B+ which depicts the general population picture.<sup>1</sup>

## CONCLUSION

The analysis of the blood bank data depicts that there is an increase in voluntary donation over the years indicating good IEC activities. However the trend analysis does not show a significant increasing trend. The transfusion transmitted infections shows a decreasing trend over the three years which also depicts the national trend. Blood donation in the form of voluntary donation along with screening of blood before transfusion is necessary for prevention of TTIs and hence the need for this study.

## ACKNOWLEDGEMENTS

I am grateful to all the authorities of the blood bank of KPCMC&H for their immense help. I would also like to thank all the faculties of Community Medicine department of KPCMC&H for helping me out in carrying out the study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee of KPC Medical College and Hospital*

## REFERENCES

1. Sunderam S, Karir S, Haider S, Singh S, Kiran A. Sero-Prevalence of Transfusion Transmitted

2. Infections among Blood Donors at Blood Bank of Rajendra Institute of Medical Sciences, Ranchi. Healthline J. 2015;6:1:36-40.
2. Dutta S, Sinha D, Chatterjee S, Basu M, Misra RN. Profile and awareness of blood donors: A study in Blood Bank of a tertiary care hospital of Kolkata. IJPSR. 2016;7(9):3881-6.
3. State Bureau of Health Intelligence: Demographic features; Health on the March 2012-13; Directorate of Health Services, Government of West Bengal; 2014: 150.
4. Radhiga ST, Arumugam P, Kalpana S, Natarajan MV. Patterns of Transfusion Transmitted Infection in Past Ten Years Among Voluntary Blood Donors In Chennai-A CrossSectional Study. IOSR J Pharm Biol Sci. 2012;2(1);1-4.
5. Jharkhand State News. Available at: <http://www.jharkhandstatenews.com/prostitution-viamigration-behind-spread-of-aids-in-jharkhand>. Accessed on 3 June 2017.
6. Singh B, Verma M, Kotru M, Verma K, Batra M. Prevalence of HIV and VDRL seropositivity in blood donors of Delhi. Indian J Med Res. 2005;122:234-6.
7. Kakkar N, Kaur R, Dhanoa J. Voluntary donors—need for a second look. Indian J Pathol Microbiol. 2004;47:381-3.
8. Pahuja S, Sharma M, Baitha B, Jain M. Prevalence and trends of markers of hepatitis C virus, hepatitis B virus and human immunodeficiency virus in Delhi blood donors. A hospital based study. Jpn J Inf Dis. 2007;60:389-91.
9. Chandra T, Kumar A, Gupta A. Prevalence of transfusion transmitted infections in blood donors: an Indian experience. Trop Doct. 2009;39:152-4.
10. Sawke N, Sawke GK, Chawla S. Seroprevalence Of Common Transfusion-Transmitted infections among Blood Donors at Bhanpur, Bhopal, M.P. from 2006-2008. Peoples J Sci Res. 2010;3(1):5-7.
11. Bhawani Y, Rao PR, Sudhakar V. Seroprevalence of transfusion transmissible infections among blood donors in a tertiary care hospital of Andhra Pradesh from. 2004-2009. Biol Med. 2010;2(4):45-8.

**Cite this article as:** Haldar D, Majumdar KK, Karir S, Chakraborty AK, Dey A, Mandal AK. Analysis of the profile of blood donors in a blood bank of a private medical college of Kolkata. Int J Community Med Public Health 2017;4:3899-902.