International Journal of Research in Medical Sciences
*Sehgal PK et al. Int J Res Med Sci. 2017 Aug;5(8):3368-3371*
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20173524

**Original Research Article**

# Patterns of voluntary and replacement blood donors in a tertiary care center: a retrospective study

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**Received:** 11 July 2017
**Accepted:** 14 July 2017

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## ABSTRACT

**Background:** Blood donor base is the foundation of any blood transfusion system. In India any able-bodied individual between the age of 18 and 60 years can donate blood. Blood donors are of two types: voluntary donors and replacement donors. Blood donation should be done by low risk population otherwise there is high risk of transfusion transmissible infections like HIV, hepatitis B, hepatitis C and malaria. The present study was conceived to see the patterns of blood donation among voluntary and replacement blood donors in tertiary care centre.
**Methods:** In this study 50 (27 male and 23 female) adult skulls were investigated to determine the type of asterion, its distance from important bony landmarks and also the nearby venous sinuses were measured.
**Results:** Of the total 340078, 298421(87.75%) collections were voluntary and 41657(12.25%) were replacement collections. A total of 2810 camps were held to gather blood through voluntary donors. Number of blood camps held show an increasing pattern as we progress in time. Also, the trends in voluntary blood donations increased over the period and more donors donated blood whereas replacement donors decreased over the period and eventually vanished in time.
**Conclusions:** For a safe blood service in our country, where comprehensive laboratory tests are neither possible nor pragmatic, it is best to switch over to 100% voluntary donations, as it is now established that only voluntary non-remunerated regular donation is the safest. Thus, one of our key strategies to enhance blood safety is to focus on motivating non-remunerated blood donors and phasing out even replacement donors.

**Keywords:** Blood safety, Donor, Infection, Replacement, Voluntary

## INTRODUCTION

Voluntary blood donation is undoubtedly, the highest form of humanitarian service as it is done without expectation of even knowing who it will help. There is a higher altruistic thought that motivates such action. One single blood donation actually helps many patients as blood is usually segregated into red blood cells (RBC's), Platelets, white blood cells (WBC's) and Plasma and given accordingly for their requirement.

The need for blood is constantly increasing the world over. Apart from diseases like dengue, millions lose their lives to natural and man-made disasters. The number of people dying in road accidents is also growing. Although over 88 million units of blood are collected the world over it is still not sufficient for the 6,910 million world population which requires 150 million units annually. In some developed countries, the number of voluntary blood donors is very high, like Switzerland where number of voluntary blood donors per 1,000 population figures is

113 and in Japan, it is 70 but in India it is still very low, 8 for every 1,000 population.[1]

Blood donor base is the foundation of any blood transfusion system. In India any able-bodied individual between the age of 18 and 60 years can donate blood. After the historic directives of the Supreme Court officially, there is theoretically no paid blood seller in India from January 1, 1998.[2]

***So, at the moment, blood donors are of two types***

*Voluntary blood donor*

A voluntary blood donor donates blood out of his/her free will without expecting anything of monetary value from the blood bank or patients" relatives or any other source at the time of donation or in future. Acceptance of voluntary blood donor's certificates, badges or cards is permissible according to the law of the land. Such recognition of donor is universal.[3]

*Replacement blood donor*

Replacement blood donor is a member of the family or a friend of the patient who donates blood in replacement of blood needed for the particular patient without involvement of any monetary or other benefits from any source. Normally, blood bank or transfusion centre provides the right group of blood for the patient and replacement donor belonging to any other blood group replaces the supply in quantity.[3]

Blood donation is not hazardous and it proves to be a healthy habit that helps blood renewal. The volume of blood donation is about 350-400 ml, almost 7.5% of the adult blood volume. It is compensated in a short period of time.

The present study was aimed to see the trend of voluntary and replacement blood donors over the period from 2007 to 2016 at a tertiary care centre in North India.

## METHODS

This was a retrospectively record based study done at Department of Transfusion Medicine, PGIMS, Rohtak, Haryana over a period of 10 years (2007–16). All blood donations collected over this period were included. The donors were either voluntary or replacement donors. Replacement donors were either relatives or friends of patients.

***Criteria for blood donation were***

- Age between 18 and 60 years
- Haemoglobin - not less than 12.5 g/dL
- Pulse - between 50 and 100/minute with no irregularities
- Blood pressure - Systolic 100-180 mm Hg and Diastolic 50 - 100 mm Hg
- Temperature - Normal (oral temperature not exceeding $37.5^0$C)
- Body weight - not less than 45 Kg.

Before donation "Blood Donation Form" had been filled by every donor and this form had particulars about age, gender, address, and occupation, date of previous donation, any illness and medical treatment taken. The consent was taken. Donation taken only after physical examination carried out by the doctor. Professional donors were not taken for donation and ruled out by asking family and personal questions regarding patients. Blood donations were taken either in outdoor blood donation drives or in blood bank, without remuneration were considered as Voluntary Donors (VD). Replacement Donors (RD) included donation given for a particular patient.

## RESULTS

Of the total 340078, 298421 (87.75%) collections were voluntary and 41657 (12.25%) were replacement collections. A total of 2810 camps were held to gather blood through voluntary donors. A total of 2810 blood camps were also held during the same period. Number of blood camps held show an increasing pattern as we progress in time. Also, the trends in voluntary blood donations increased over the period and more donors donated blood whereas replacement donors decreased over the period and eventually vanished in time.

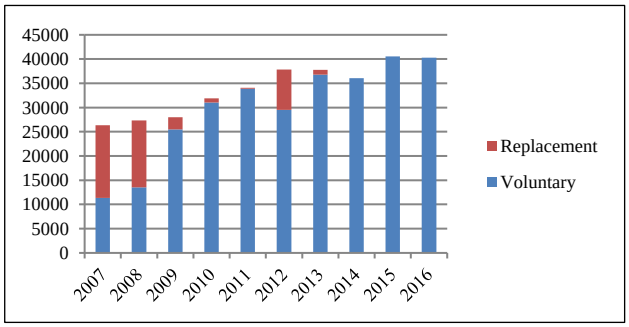


**Figure 1: Trends in blood donations over the study period.**

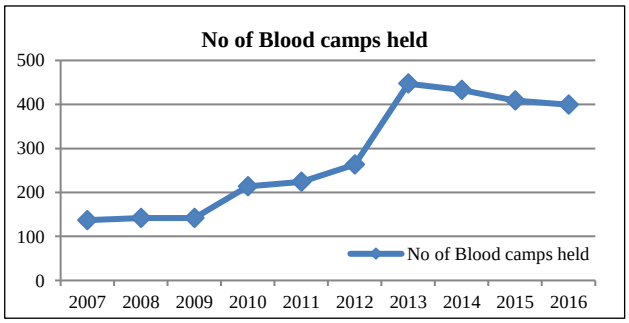


**Figure 2: Trends of blood camps held year wise.**

**Table 1: Trends in voluntary and replacement blood donation.**

| Year | Voluntary collection | Replacement collection | Total collections |
|---|---|---|---|
| 2007 | 11354 (43.1%) | 14999 (56.9%) | 26353 |
| 2008 | 13563 (49.6%) | 13790 (50.4%) | 27353 |
| 2009 | 25463 (90.9%) | 2523 (9.1%) | 27986 |
| 2010 | 31032 (97.3%) | 829 (2.7%) | 31861 |
| 2011 | 33873 (99.4%) | 175 (0.6%) | 34048 |
| 2012 | 29500 (77.9%) | 8329 (22.1%) | 37829 |
| 2013 | 36760 (97.3%) | 1012 (2.7%) | 37772 |
| 2014 | 36030 (100%) | 0 | 36030 |
| 2015 | 40553 (100%) | 0 | 40553 |
| 2016 | 40293 (100%) | 0 | 40293 |
| Total | 298421 (87.75%) | 41657 (12.25%) | 340078 |

**Table 2: Whole blood and blood components were also issued during the same period which is depicted.**

| Year | Components issued | Whole blood issued |
|---|---|---|
| 2007 | 17405 | 16632 |
| 2008 | 26366 | 12379 |
| 2009 | 34325 | 6158 |
| 2010 | 41133 | 3889 |
| 2011 | 45368 | 4694 |
| 2012 | 52483 | 4282 |
| 2013 | 59050 | 4509 |
| 2014 | 56115 | 3766 |
| 2015 | 65229 | 4427 |
| 2016 | 65144 | 3633 |

## DISCUSSION

Voluntary blood donors are the cornerstone of a safe and adequate supply of blood and blood products. The safest blood donors are voluntary which are non-remunerated and belong to low-risk populations.

Despite this notion, family/replacement donors still provide more than 45% of the blood collected in India. Such donors are supposed to be associated with a significantly higher prevalence of transfusion-transmissible infections (TTIs) including HIV, hepatitis B, hepatitis C, syphilis and malaria.[3]

In our study, voluntary donations were about 87% of the total. In northern India, the voluntary donor rates vary from 9.1% to 52.3% and the National AIDS Control Organization (NACO) reported that in 2007, voluntary donations in India were about 55%.[3] The authors encountered a steady rise in voluntary donors from about 43% in 2007 to about 100% in 2016, a trend noted in other studies too.[4-7] However, replacement donors still comprise a large proportion of blood donors.[8-10] (Table 2).

The current scenario is definitely hopeful however challenges continue to exist. The target for the country is to achieve more than 90% voluntary blood donors. There are marked regional variations, some states collect voluntary blood units more than the national average, others are far below in meeting targets. The VBD in almost 13 states of the country is less than 50%. Seasonal variations also account for fluctuations in blood collections. The voluntary blood donation is less during extremes of weather conditions like harsh summer or winter months. It is also affected by examination periods of students and vacations of educational institutions.[11]

For a safe blood service in our country, where comprehensive laboratory tests are neither possible nor pragmatic, it is best to switch over to 100% voluntary donations, as it is now established that only voluntary non-remunerated regular donation is the safest. Thus, one of our key strategies to enhance blood safety is to focus on motivating non-remunerated blood donors and phasing out even replacement donors.

The key to recruiting and retaining safe blood donors is good epidemiological data on the prevalence (and incidence, where possible) of infectious markers in the general population to identify low-risk donor populations coupled with an effective donor education, motivation and recruitment strategy to recruit new voluntary non-remunerated blood donors from these populations. A pleasant environment in the blood bank, good donor care, polite and effective communication between staff and donors are all important factors for the retention of blood donors.

A guideline designed to assist those responsible for blood donor recruitment and implement a programme to improve communication with blood donors has been developed by National AIDS Control Organization (NACO). These guidelines provide approaches for organizing, collecting information and developing plans; as well as providing ideas that individual centres might consider for recruiting, educating and retaining safe donors.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Sehgal PK, Garg D. Patterns of voluntary and replacement blood donors in a tertiary care center: a retrospective study. Int J Res Med Sci 2017;5:3368-71.