1. Introduction

In current medical and surgical practice, a blood transfusion can be a vital, life-saving procedure. The National AIDS Control Organization's (NACO) statistics show that the annual rate of blood donation in India is about 7.4 million units, against the requirement of 10 million units.\(^1\,^2\) Voluntary blood donation is the donation of whole blood or plasma voluntarily without inducement or reward.\(^3\) A replacement donor is a person who donates blood upon the request of a specific patient or patient's family or acquaintance which, in principle, is intended to be used specifically for the treatment of that patient.\(^4\) According to World Health Organization (WHO) figures, over 81 million units of blood are collected...
A blood bank plays a pivotal role in ensuring the supply of safe blood as and when required. However given the ever changing socio-economic environment and human factors involved, healthy donor recruitment and retention is a challenge that faces the health industry today, hence studying the profile of blood donors will help to identify the population which could be targeted to increase the pool of voluntary blood donors.

While it is important to ensure that there is an adequate supply of blood, it is also essential that the blood collection process does not harm either the donor or the recipient. This is achieved by having donor deferral criteria and stringent screening of collected blood for possible transfusion transmitted infections.

The first step towards blood safety is to encourage blood donations from voluntary non-remunerated donors and obtained from low risk and regular donors, who are donating blood two to three times a year. Youths who are healthy, enthusiastic and approachable as a group, if recruited young may become future donors and motivators for blood donation.

The aim of this study was to determine the profile of donors who presented themselves at a tertiary care hospital in Rajkot Gujarat, India and to identify sections of the population which could be targeted to increase the pool of voluntary blood donors as well as to ascertain the reasons for blood donation deferral among these donors.

2. Method

The present retrospective study was carried out in the Blood Bank P.D.U. Government Hospital Rajkot, Gujarat, India which is a tertiary care government hospital. Data was collected from the records maintained by the blood bank. Study participants included all those who donated blood between 1st January 2010 and 31st December 2012. Donors presenting at indoor as well as outdoor locations were included in the study. Standard Operating Procedures based on national guidelines were used for donor selection and deferral. Briefly, the cutoff for Hemoglobin (Hb) was 12.5 gm/dl by the finger prick method; all donors were screened for hemoglobin using Copper sulphate (CuSO4). Donors with systolic blood pressure between 100 and 160 mmHg and diastolic blood pressure between 60 and 90 mmHg were accepted for blood donation. Deferral reasons were analyzed amongst different categories viz. Gender based (male-female) and various age group categories. Repeat donors were not segregated and for the sake of simplicity of analysis, all repeat presentations were considered as independent attempts for blood donation.

3. Results

The study of 29261 blood donors in Rajkot of age 18 to 55 years both males & females showed following facts

Table 1. Total blood donations in 2010, 2011 & 2012

| Year | Number of blood donors |
|------|------------------------|
| 2010 | 9441                   |
| 2011 | 10054                  |
| 2012 | 9766                   |
| TOTAL DONORS | 29261 |

Table 2. Showing sex wise distribution of blood donors in Percentage in 3 years (2010, 2011 & 2012)

| Year | Males | In percentage | Females | In percentage |
|------|-------|---------------|---------|---------------|
| 2010 | 8906  | 94.33         | 535     | 5.67          |
| 2011 | 9359  | 93.08         | 695     | 6.92          |
| 2012 | 9180  | 93.99         | 586     | 6.01          |
Table 3 Showing indoor and outdoor blood collection in Percentage in 3 years (2010, 2011 & 2012)

| Year | Indoor collection | In percentage | Outdoor collection | In percentage |
|------|-------------------|---------------|--------------------|---------------|
| 2010 | 4862              | 51.49         | 4579               | 48.51         |
| 2011 | 5174              | 51.46         | 4880               | 48.54         |
| 2012 | 3711              | 37.99         | 6055               | 62.01         |

Table 4. Showing age wise distribution of blood donors in Percentage in 3 years (2010, 2011 & 2012)

| Year | < 25 Year | 26 to 35 Year | 36 to 45 Year | 46 to 55 Year |
|------|-----------|---------------|---------------|---------------|
| 2010 | 36.8      | 37.3          | 20.8          | 5.1           |
| 2011 | 37.4      | 36.7          | 21.9          | 4.0           |
| 2012 | 41.5      | 38.8          | 16.0          | 3.7           |

Fig 1. Pie chart 1 showing caste wise distribution of blood donors (Overall data 2010 to 2012)

In total one thousand and eighty nine (3.72 %) were found unfit for donation during the study period were found unfit to donate for various reasons, the majority (83.93%), were deferred for temporary reasons, and a smaller subset (16.07%) were permanently deferred. The causes of deferrals in the temporary and permanent subsets are shown in Table 5. Anemia (Hb<12.5) was the leading cause of donor rejection (38.07%), closely followed by under-weight (30.0%) donors. In the permanently deferred category, (uncontrolled) hypertension was the most common cause, constituting 84 % of all the permanently rejected potential donors.
Table 5 Causes of temporary and permanent deferral with their relative proportion

| Causes                  | Number | % Temporary deferral | % Total Deferral |
|-------------------------|--------|----------------------|------------------|
| TEMPORARY DEFERRAL ( Total no 914 ) |        |                      |                  |
| Hb < 12.5 gm%           | 348    | 38.07                | 31.95            |
| Under Weight            | 274    | 30.0                 | 25.16            |
| Previous donations <3 month | 98     | 10.72                | 8.99             |
| Medications             | 75     | 8.2                  | 6.88             |
| Menstruation            | 69     | 7.54                 | 6.33             |
| Previous surgeries      | 20     | 2.2                  | 1.83             |
| Tattoo                  | 5      | 0.54                 | 0.5              |
| Miscellaneous           | 25     | 2.73                 | 2.29             |
| Total                   | 914    | 100                  | 83.93            |

| Causes                  | Number | % Permanent Deferral | % Total Deferral |
|-------------------------|--------|----------------------|------------------|
| PERMANENT DEFERRAL ( Total no 175 ) |        |                      |                  |
| Hypertension            | 147    | 84.0                 | 13.4             |
| Age                     | 18     | 10.3                 | 1.7              |
| Diabetes                | 6      | 3.4                  | 0.6              |
| Miscellaneous           | 4      | 2.3                  | 0.37             |
| Total                   | 175    | 100                  | 16.07            |

4. Discussion

This study attempts to analyze the pattern of blood donation in a tertiary care hospital between 1 January 2010 and 31 December 2012.

While losses resulting from consequences of rigorous screening for transfusion transmitted infections have been the focus of our attention for more than a decade, reasons for donor deferral have not received as much attention. In this study, we analyzed blood donation pattern as well as donor deferral patterns in an attempt to provide insight into the reasons for blood donation & donor deferral in a country.

A total of 29261 people came to donate blood during the study period. In the present study a majority of the donors were under the age of 25 (38.5 %), followed by those aged 26-35 (37.60%). Only 4.2 % of the donors were between age group 46 to 55 years. Males dominated the donor population (93.8%) with females making up the numbers with 6.2%. Also the study highlighted the need and importance of organizing outdoor blood donation camps as around 53.02% of the demand of blood was fulfilled from outdoor camps. Also Hindu population which makes a major part of the population of the area came up with 89.11 % of the total blood donation.

The donors in this study are young, 76.1% were under the age of 35, and males formed 93.8% of the donor population. Corporate social responsibility is a new concept that has risen amongst the corporate sector and they do their part by organizing blood donation drives. Education generates awareness and is the major reason for our donor population consisting of a large number of educated youth.

In the study conducted by Shashahani et al, it was found that moral duty and altruism, charity, maintenance of one's own health and free blood investigations were some of the factors motivating people to donate blood. This study highlights significant similarities between the demographics of the donor population in the hospital and the donor populations in the city of Sao Paulo and Srinagar in terms of age, gender and reason for donation.

Furthermore, educated youth usually form the target group when the blood bank organizes any blood donation drive as they can easily be motivated in an effort to retain them as repeat voluntary donors.
In total one thousand and eighty nine donors (3.72 %) were found unfit for donation during the study period, donors were found unfit to donate for various reasons, the majority (83.93%), were deferred for temporary reasons, and a smaller subset (16.07%) were permanently deferred. The causes of deferrals in the temporary and permanent subsets are shown in Table 5. Anemia (Hb<12.5) was the leading cause of donor rejection (38.07%), closely followed by under-weight (29.97%) donors. In the permanently deferred category, (uncontrolled) hypertension was the most common cause, constituting 84 % of all the permanently rejected potential donors.

It is encouraging to note that the blood bank in this study has functioned in accordance with guidelines issued by NACO\(^{13}\) regarding banning professional donors as none were identified in the period of study.

5. Conclusion

The study showed that most of the donors were young age group. This is an encouraging note, as they could be motivated to become regular voluntary donors.

However, a large number of donations were from the male Hindu population. Thus in order to increase the number of voluntary, non-remunerated, low-risk donors a concerted effort by all parties concerned is essential in raising awareness regarding the importance of voluntary blood donation. This includes advertising campaigns and distribution of brochures stating the requirement of blood products in the area and clarifying myths about blood donations. Furthermore, non-monetary incentives such as pre-donation medical check-ups and testing could be provided to nurture the habit of regular blood donation in our population.

Also a large number of donation came from the outdoor camps which were organized by the blood bank on various occasions, there is a need to focus on well organized outdoor camps although these camps proves to be a bit costly to the blood bank but these camps are proving to be a major source of blood donations.

Salient findings in our study on predominantly voluntary blood donor’s deferral pattern are as follows.

- Total deferral during the study period was 3.72 %
- Most common reasons for deferral were low Hemoglobin (31.95%), under weight (25.16 %), high blood pressure (13.4 %) and history of antibiotic/medication use (6.88%).
- Majority of them (83.93%) was being deferred for temporary reasons.
- Permanent deferral accounted for (16.07%) with hypertension being the most common cause (84 %) in this category

6. Recommendations

- A large number of donations were from the male Hindu population. Thus in order to increase the number of voluntary, non-remunerated, low-risk donors a concerted effort by all parties concerned is essential in raising awareness regarding the importance of voluntary blood donation.
- Also a large no of donation came from the outdoor camps which were organized by the blood bank on various occasions; there is a need to focus on well organized outdoor camps on regular interval.

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