

## Original Research Article

# Poor nutritional status affecting blood donor deferral pattern at blood centre of North-East region of India

Ashish Maheshwari<sup>1\*</sup>, Nawanita Kumari<sup>2</sup>, Satya Prakash<sup>3</sup>

<sup>1</sup>Department of Transfusion Medicine, Institute of Liver and Biliary Sciences, New Delhi, India

<sup>2</sup>Department of Transfusion Medicine and Blood Bank, AIIMS, Patna, India

<sup>3</sup>Department of Transfusion Medicine and Blood Bank, AIIMS, Bhubaneswar, India

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### \*Correspondence:

Dr. Ashish Maheshwari,

E-mail: [dr.ashishmaheshwari@gmail.com](mailto:dr.ashishmaheshwari@gmail.com)

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## ABSTRACT

**Background:** Due to the stringent criteria for the selection of blood donors, donor deferral rate is increasing day by day, leading to a decrease in donor base for the blood bank. This study was done to analyze the incidence of deferral rate and deferral pattern to review the donor recruitment and retention policy and to highlight the role of nutrition improvement.

**Methods:** A retrospective observational single-centre study was conducted in the department of transfusion medicine of North-East region of India from April 2018 to April 2019.

**Results:** During the study period, a total of 3920 donations were made, and a total of 1992 donors were deferred. The overall deferral rate was 33.6% with male deferral rate was 29.4%, and the female deferral rate was 78.4%. Low haemoglobin and low weight contribute around 50% of total deferral.

**Conclusions:** Analysis of donor deferral in a specific region is of utmost significance. Strategies to improve the health status of the population will help to increase donor pool in future, making easy availability of blood. The nutritional programme should be initiated for this group of deferred donors.

**Keywords:** Blood, Donor, Deferral, Nutrition

## INTRODUCTION

Blood transfusion services are vital for the health care system without which specialized medical care is not possible. The need for blood is paramount and universal, in any hospital with an advanced medical facility. Availability of safe blood and blood component to the patient is very critical for improving health care. According to WHO data, wide variations are there in rates of blood donation based on different income group of countries and different regions which ranges from 0.3 to 56 donations per 1000 population with 7.9 median donations in South-East Asian region.<sup>1</sup>

The National AIDS Control Organization (NACO) statistics reveal that the annual blood donation in India is

approximately 7.4 million blood unit against the need for a total of 10 million units.<sup>2</sup> Voluntary and non-remunerated blood donors are the backbone of a safe, sustainable blood supply system. Blood centres are continuously trying to promote repeat voluntary donation as much as possible as per the recommendation laid by the WHO. The minimum criteria for blood donor selection and deferral in India are followed from Drug and Cosmetic Act 1940 which is supplemented by the Standards for blood bank and blood transfusion service which is recently revised in October 2017 National Blood Transfusion Council (NBTC) guideline.<sup>3,4</sup> Based on screening criteria, donor goes through a process of appropriate medical history, physical examination including vitals and haemoglobin testing before blood

donation. Only those donors who meet the donation criteria are allowed to donate blood.

Due to the stringent criteria for the selection of blood donors, donor deferral rate is increasing day by day, leading to a decrease in donor base for the blood bank. It is the result of increasing awareness and education among blood donors and continued research in donor deferral criteria as a part of advances in the medical field. Donor deferral is divided into two broad categories, i.e. temporary and permanent. Reasons for temporary donor deferral are correctable by nutritional improvement and medical treatment, which can improve experience and attitude of donor and also can increase the base of prospective blood donors for a blood bank in the near future. Further donor deferral pattern is also affected regionally by differences in the regional diseases and nutritional and educational status of the community. By understanding these regional issues and reasons for donor deferral pattern can help in making health policies focused more towards local needs of the population. Donors from Bihar, West Bengal, Sikkim, Jharkhand, Nepal, and Bhutan frequently visit at our tertiary care centre in North-East part of India. This study was done to analyze the incidence of deferral rate and deferral pattern at tertiary care hospital-based blood centre situated at North-East region of India to review the donor recruitment and retention policy and to highlight the role of nutrition improvement and Iron status in blood donors.

## METHODS

A retrospective observational single-centre study was conducted in the department of transfusion medicine of North-East region of India from April 2018 to April 2019. All the voluntary and replacement donors who presented for blood donation were included in the study after giving written informed consent for donating blood before screening by blood bank medical officer. The study included total 5912 blood donors during the study period and out of this 1992 donors were deferred from blood donation. Pre donation screening was conducted by taking detailed medical and surgical history and general physical examination and Hemoglobin testing of the donor for accessing the fitness for blood donation. The vitals, including blood pressure, temperature, and pulse rate, were recorded. Height and weight were also measured. Haemoglobin was estimated using finger-prick sample by “HemoCue Hb 201 plus System”. Following this, the donors were either declared fit for blood donation or deferred, either temporarily or permanently. Drug and cosmetic act guidelines along with revised NBTC 2017 guidelines were used for deferral of blood donors. The demographic characteristics of the donors were recorded. The donors were divided into first time or repeat donors and voluntary or replacement donors. The reasons for donor deferral were analyzed to find out proportions and percentage deferral of donor and reasons for it.

## Statistical analysis

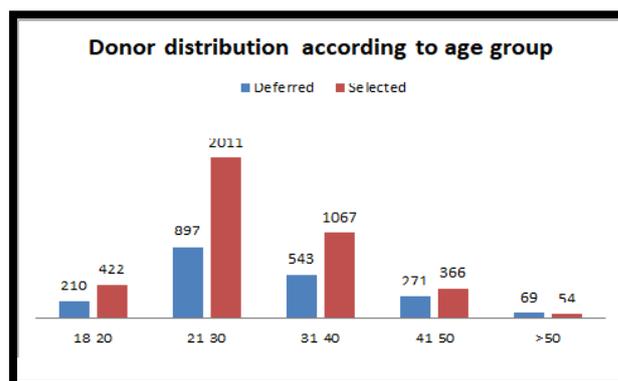
Data were analyzed using Microsoft Excel version 2010 and SPSS software version 23 for demographics and comparative differences between deferred donors population under study were compared using independent T test. P values of more than 0.05 was considered statistically significant.

## RESULTS

It was a retrospective observational study conducted at tertiary care hospital-based blood bank situated in North-East region of India from April 2018 to April 2019. During the study period as shown in Table 1, total 3920 donations were made, out of which 457 (11.6%), were voluntary donors and 3463 (88.4%) were replacement donors. Relative donors were considered as replacement donors. Most of the donors were between 21 to 30 year of age (Young age group) and contributed 51.3% of the donation pool as shown in Figure 1. A total of 97.1% (3808) donors were male donors out of which 10% (392) were voluntary, and 87.1% (3416) were replacement donors. Female donors were only 2.9% (112), and out of this, most of the fit female donors were of voluntary type.

**Table 1: Demographic profile of donor population.**

Donor category	Male	Female	Total
<b>Selected (fit) donor</b>			
Replacement donor	3416	47	3463
Voluntary donor	392	65	457
<b>Deferred (unfit) donors</b>			
Replacement donor	1550	295	1845
Voluntary donor	35	112	147
<b>Total</b>	<b>5393</b>	<b>519</b>	<b>5912</b>



**Figure 1: Donor distribution according to age group.**

A total of 1992 donor were deferred from giving blood; which included 1585 male and 407 female deferral. The overall deferral rate was 33.6% with male deferral rate was 29.4%, and the female deferral rate was 78.4%. The number of male donor deferral was higher as compared to female, but the percentage prevalence of deferral was highly significant among female donor than male blood

donors, as shown in Table 2. The prevalence of temporary deferral was 93.82% (1869) while permanent deferral was 6.17% (123) of total registration for donation. Majority of the temporary donors were deferred based on the physical examination (66.51%) during the donor selection procedure which includes low haemoglobin (34.31%),

high blood pressure (17.17%) and underweight (15.31%) during the screening procedure. Other reasons included medications (mostly Ayurveda and homoeopathic of unknown type), alcohol consumption in last 72 hours, inadequate sleep, major or minor surgery in the past one year or 6 months, and last donation within three months.

**Table 2: Reasons for temporary donor deferral.**

Deferral reason	Male		Female		Total		P value	OR ( 95% CI)
	N	%	N	%	N	%		
<b>Low hemoglobin</b>	518	32.68	160	39.31	678	34.04	0.0001	4.194 (3.410-5.159)
<b>Underweight</b>	250	15.77	55	13.51	305	15.31	0.0001	2.438 (1.796-3.311)
<b>Abnormal B.P</b>	237	14.95	105	25.79	342	17.17	0.0001	5.650 (4.405-7.247)
<b>Medication (unknown mostly)</b>	308	19.43	54	13.28	369	18.52	0.0001	1.917 (1.416-2.596)
<b>Alcohol (within 72 hours)</b>	70	4.42	0	0	70	3.51	NC	NC
<b>Inadequate sleep</b>	54	3.41	10	2.46	64	3.21	0.052	1.942 (0.997-3.784)
<b>Surgical reasons</b>	14	0.88	13	3.19	20	1.01	0.0001	9.871 (4.678-20.831)
<b>Donation within 3 months</b>	20	1.26	1	0.25	21	1.05	0.515	0.519 (0.099-2.728)
<b>Total</b>	1471	92.81	398	97.79	1869	93.82	0.0001	8.77 (7.09-10.838)

NC: Not calculated (Zero value)

**Table 3: Reasons for permanent donor deferral.**

Deferral reason	Male		Female		Total		P value	OR ( 95% CI)
	N	%	N	%	N	%		
<b>H/O jaundice (hepatitis B and C)</b>	19	1.20	2	0.49	21	1.05	0.904	1.094 (0.292-4.095)
<b>High risk behavior</b>	70	4.42	6	1.47	76	3.81	0.784	0.889 (0.396-1.996)
<b>Age &gt; 60 years</b>	8	0.51	0	0	8	0.41	NC	NC
<b>Heart disease</b>	10	0.63	0	0	10	0.50	NC	NC
<b>Status asthmatics</b>	5	0.31	1	0.25	6	0.30	0.495	2.080 (0.34-12.68)
<b>Post kidney transplant</b>	2	0.13	0	0	2	0.10	NC	NC
<b>Total</b>	114	7.19	9	2.21	123	6.17	0.563	0.817 (0.419-1.594)

NC: Not calculated (Zero value)

Among the 123 permanent donors deferred, 76 were giving history of high-risk behaviour (including 29 male professional blood donors), 21 were with history of jaundice for hepatitis B and hepatitis C, 10 were affected by cardiovascular diseases, 6 were giving history of status asthmatics, 2 were of post kidney transplant with uncontrolled hypertension and 8 donors presented first time for blood donation after the age of 65 as shown in Table 3. The highest numbers of deferral were seen in the age group of 21 to 30 years in both male and female.

## DISCUSSION

Appropriate donor screening is vital in the field of transfusion medicine to prevent attrition of blood donors and ensure safe blood supply to its recipients. Donor and recipient safety is considered in the formulation of blood donation criteria.<sup>5</sup> We analyzed donor deferral pattern to provide insight into the reasons for donor deferral.

We found that 88.3% donations were from replacement donors and 11.7% from voluntary donors which is similar

to the study done by Sehgal et al and contrary to the study done by Kulkarni et al and Kate et al reporting high voluntary donation rate up to 87%.<sup>6-8</sup> In our Eastern region of India, maximum donations are from replacement donors. In our study, the majority of blood donors were male (97.1%) and the rest were female (2.9%). This finding was similar to various studies reporting up to 95% of blood donation by male donors.<sup>6,9</sup> Female donors contribute very less to blood donor's pool due to many reasons such as ignorance and lack of motivation and awareness about the blood donation process.<sup>10</sup>

In our study, donor deferral rate was 33.7% which was quite high as compared to other studies ranging from 4.2% to 35.6%.<sup>7,10,11</sup> among deferred donors, and 93.6% were replacement donors, and 7.4% were voluntary donors. They come for donation even after having poor health conditions and malnourished status such as in Bihar state malnourish status is averaging up to 49.2%.<sup>12</sup> We found high (78.4%) deferral rate in females who turned up for blood donation as compared to males (29.4%). It can be due to the fact that female donors have

poor nutritional status and attitude of ignorance for themselves, leading them to anaemia and underweight. The temporary deferral was more common than permanent (93.82% vs. 6.18%).

In the present study, we found a low haemoglobin level as the leading cause of donor deferral (34%) followed by medication (18.52%) as 2nd most common cause of temporary deferral. Various studies also found anaemia as a major cause of deferral.<sup>7,8,10,13-16</sup> Other causes of temporary deferral were high blood pressure 17.2% and underweight 15.31%.

The high prevalence of anaemia in a particular region reflects the poor nutritional status of that area. High incidence of donor deferral because of low haemoglobin in females as compared to males (39% vs. 32%) can be explained by the depleted iron store because of poor nutrition, tropical disease and regular menstrual blood loss. So, efforts should be made specifically directed towards the management of iron deficiency either by iron-fortified food diet or medications. The different national programme for anaemia alleviation may be started on the line of "twelve by twelve initiative".<sup>13</sup>

Underweight was also one of the major causes of deferral in the present study. An anaemia and underweight, particularly in the rural population of Bihar state and Nepal regions, is cumulatively accounting 49.35% temporary deferral which is quite significant and preventable. It further reflects the poor nutritional status of this region. It needs proper counselling and national support to improve the health status of the population, which will also increase the blood donor pool. Similarly, Giddens et al in his book showed good donor return response for blood donation after temporary deferral with counselling and proper national advice.<sup>17</sup> In the present study, we found deferred donors were very keen to donate blood in near future after counselling, motivation and proper explanations of the reasons for their deferral in temporarily deferred donors also reported the same fact.

## CONCLUSION

Analysis of donor deferral in a specific region is of utmost significance to get an idea of a population base of that region reflecting their health, education, socio-economic status, and nutritional status as well as different practices prevailing in that particular region. Low haemoglobin and low weight contribute around 50% of total deferral, which are significant and preventable causes of deferral. Strategies to improve the health status of the population will help to increase donor pool in future, making easy availability of blood. The nutritional programme should be initiated for this group of deferred donors.

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*Ethical approval: This retrospective Study was conducted as per approval norms of Drug and cosmetic Act and NBTC 2017 guidelines for Institutional Ethics*

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