

**Pattern of Anemia Amongst Deferred Blood Donors At A Tertiary Care Hospital In Bikaner, Rajasthan, India**

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**Abstract**

**Background:** A large majority of the donor population in a developing country, like India, is deferred due to temporary but easily correctable cause like anaemia. Nutritional anaemia is a worldwide problem with the highest prevalence in developing countries like India. A proper track of temporarily deferred donors regarding their management should be made in blood bank so that these donors can be recruited back in donor's pool.

**Aim:** To study the prevalence and severity of anaemia in otherwise healthy persons who have reported for blood donation and to study the morphologic type of anaemia in anaemic cases among reported blood donors.

**Subjects and Methods:** This Cross sectional study was conducted over a period of 2 months (May- June 2017) at blood bank, of associated group hospital S.P. Medical College, Bikaner; which is a Tertiary Care Hospital in North India in coordination with RSACS Jaipur. Total 5227 reported donors were interviewed during this period. Donor selection criteria laid down by the Drug and Cosmetic Act of India. Criteria laid down by director general Health Services, New Delhi and Drug's Controller of India were strictly followed. Each donor was evaluated based on detailed medical history and physical

examination of donors with regard to hemoglobin, blood pressure, RR, temperature, and pulse rate. All the persons with haemoglobin less than 12.5gm% were deferred and further studied.

**Results:** Total 5227 pre donation screening interviews were conducted at our blood bank unit and various blood donation camps during the study period, of which 5038 were males (96.4%) and 189 (3.6%) were females. Here, females contributed a small proportion of 3.6% only. Total number of deferrals due to various reasons was 940 giving an overall incidence of 18%. In our study, the most common cause of deferral was anemia both in male and female donors. Donors deferred due to anemia were 526, so the prevalence of anemia among donors was 10.06 %. Out of the total 526 anemic donors 442 were males and 84 were females. We found that deferral rate due to anemia among the female donors was higher than male counterparts. The most common type was microcytic hypochromic anemia 287(54.56%).

**Conclusion:** The data of the present study shows that there is a need to understand the problem and to educate the regular donors regarding iron deficiency and iron supplementation. This is our responsibility towards these

very important persons of society who give gift of life to needy patients in morbid situations.

**Keywords:** Blood donor, Deferral, Anaemia, Microcytic Hypochromic Anaemia

### **Introduction**

In current medical and surgical practice, a blood transfusion can be a vital, life-saving procedure. But it requires an adequate supply of safe blood from a healthy donor. For this, proper healthy and safe donor selection is necessary in addition to the laboratory screenings of blood bags for infectious diseases.

It is 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 Transmissible Infections.<sup>[1]</sup>

The deferral of blood donors is a painful and sad experience for the blood donors as well as the blood donation centres. Deferring prospective donors often leaves them with negative feelings about themselves as well as the blood donation process.<sup>[2]</sup> Additionally these donors are less likely to return for blood donation in the future.<sup>[3]</sup> A large majority of the donor population in a developing country, like India, is deferred due to Anaemia.<sup>[4]</sup> Iron deficiency anaemia account for 841000 deaths annually worldwide. Africa and part of Asia bear 71% of global mortality burden.<sup>[5]</sup>

All donors should be screened for anaemia prior to donation.<sup>[6]</sup> The minimal haemoglobin cut-off for donor selection was set at 12.5gm % for both male and female donors.<sup>[7]</sup> Each unit of transfused whole blood or packed red cells is expected to increase haemoglobin by about 1 gm/dl in a patient of 70 kg weight and who is not having active blood loss.<sup>[8]</sup> Iron lost from one unit blood donation constitutes to roughly 6% and 9% of total body iron in

men and women with an average of 4.0 g and 2.3 g total body iron, respectively.<sup>[9]</sup> Haemoglobin reaches to its lowest level 1 to 2 weeks after donation and reaching to its pre-donation levels after 3-4 weeks.<sup>[10]</sup>

Short intervals between donations may increase the risk of iron depletion, while longer intervals and/or iron supplementation after donations may prevent iron deficiency.

The short-term temporary deferral due to anaemia can have a very negative impact on blood donor return rate and subsequent blood donation. These donors should be appropriately counselled and managed to improve the efficiency of the voluntary blood donation programme under National Blood policy of India.

### **Subjects and methods**

This study was conducted over a period of 2 months (May- June 2017) at blood bank, of associated group hospital S.P. Medical College, Bikaner; which is a Tertiary Care Hospital in North India and caters patients from Western Rajasthan, Punjab, Haryana, U.P, M.P. & Bihar in coordination with RSACS Jaipur. Donors were carefully screened and counseled (pretest) by trained personnel after complete medical examination and satisfactorily answering the donor questionnaire.

Total 5227 reported donors were interviewed during this period. Donor selection criteria laid down by the Drug and Cosmetic Act of India. Criteria laid down by director general Health Services, New Delhi and Drug's Controller of India were strictly followed. Each donor was evaluated based on detailed medical history and physical examination of donors with regard to hemoglobin, blood pressure, RR, temperature, and pulse rate. All the persons with haemoglobin less than 12.5gm% were deferred and further studied.

Haemoglobin estimation was performed by HemoCue method. Venous blood samples were collected in EDTA (ethylene diamine tetra acetic acid) anti-coagulated tube and plain tube from the persons whose haemoglobin was less than 12.5 gm % by HemoCue method. The EDTA anti-coagulated blood was used for complete blood count. The complete blood count was carried out by using fully automated haematology analyzer. Peripheral Blood Film were prepared and stained with Leishman stain and Peripheral Blood Films were examined under oil immersion lens of microscope for morphological typing of anaemia.

**Results**

Total 5227 pre donation screening interviews were conducted at our blood bank unit and various blood donation camps during the study period, of which 5038 were males (96.4%) and 189 (3.6%) were females. Here, females contributed a small proportion of 3.6% only. Voluntary blood donation camps were held average 80-90 per year in Bikaner city and nearby Rural and Urban areas. 4851 (92.8%) were voluntary and 376 (7.2%) replacement. Out of 5227 registrations, 4287 were found fit for donation. Total numbers of deferrals due to various reasons were 940 giving an overall incidence of 18%. Out of 940 deferrals, 802 were males and 138 were females. The deferral rate among male donors was 15.9% and among female donors was 73%. This shows that females were found to have higher deferral rate among female donors than males. From this study we found that temporary causes of deferral were 856 (91.06%) of the total causes while permanent were only 84 (8.94%).. In our study, the most common cause of deferral was anemia both in male and female donors. The next common cause was low body weight. It is observed that the leading reason for rejecting donors was low Haemoglobin levels.

**Table 1: Distribution of deferrals according to gender**

	No. of total registrations	No. of deferrals	Percentage deferrals
Male	5038	802	15.9%
Female	189	138	73%
Total	5227	940	18%

**Table 2: Deferral due to Anemia among total registered donors**

	Total Registrations	Deferral due to anemia	Percentage deferral due to anemia
Males	5038	442	8.77%
Females	189	84	44.44%
Total	5227	526	10.06%

Donors deferred due to anemia were 526, so the prevalence of anemia among donors was 10.06 %. Out of the total 526 anemic donors 442 were males and 84 were females. In which 442(8.77%) were males among the total registered males, and 84(44.44%) females among the total registered females. This shows that females have higher prevalence of anemia deferral among themselves as compare to male counterparts.

**Table 3: Prevalence of Anemia among Deferred Donors**

	Total Deferral	Deferral due to anemia	Prevalence of anemia among deferred donors
Males	802	442	55%
Females	138	84	61%
Total	940	526	56%

Overall males (442; 84% of total anemic) deferred was more than females (84; 16% of total anemic), while females (84; 61%) were found to have higher deferral rate due to anemia among the female deferral donors than male counterparts (442; 55 %). This further shows that both females and males have a very high prevalence rate of anemia.

**Table 4: Morphological Distribution of anemia among registered donors**

Morphological type	Male	Female	Total
Microcytic Hypochromic	219	68	287
Normocytic Normochromic	124	9	133
Macrocytic Normochromic	21	2	23
Mixed Cellular Morphology	78	5	83
Total	442	84	526

Based on red cell indices and peripheral film examination anemic persons were classified into four morphological subtypes:

1. Microcytic Hypochromic;
2. Normocytic Normochromic;
3. Macrocytic Normochromic;
4. Mixed population of Microcytes and Macrocytes.

The most common type was microcytic hypochromic anemia 287(54.56%), amongst them 219 (76.30%) were male and 68 (23.69%) were female. The next most common type was normocytic normochromic 133 (25.28%).

**Table 5: Age wise distribution of Microcytic Hypochromic anemia**

Age Group	Male	Female	Total
<18	9	0	9
18-20	34	17	51
21-30	67	22	89
31-40	70	18	88
41-50	26	7	33
51-60	11	4	15
>60	20	2	22
Total	219	68	287

Table 5 shows the age wise distribution of persons who were deferred due to Microcytic Hypochromic anemia. It is seen that the females in the reproductive age group have higher deferral rate due to anemia.

**Discussion**

Total 5227 pre donation screening interviews were conducted at our blood bank and various blood donation camps during the study period, of which 5038 were males (96.4%) and 189 (3.6%) were females. Most of the donors were males (96.4%); females accounted for only 3.6% of the donors. This shows that even in today’s era awareness about blood donation is much less in females as compared to males and there is grave need to motivate them, to come forward and give their contribution in this noble cause.

The rate of deferral differs from region to region and sometimes in the same region and one centre to another. In our study the Deferral Rate was 18%.

- Like most other studies done in past Krishna et al [15], Bahadur et al [11], S Awasthi et al [12], Naveen et al [13], Dhaval R et al [19], Sadhana Mangwana [17], Ramesh Patil et al [18], Sareen et al [16], the most common reason for deferral was low hemoglobin. In our study deferral due to

low hemoglobin was 55.96%, which was comparable to Ramesh Patil et al <sup>[18]</sup> (64.9%) and Naveen et al <sup>[13]</sup> (55.8%) but higher than other studies like Krishna et al (32.8%) <sup>[15]</sup>, Bahadur et al (15.5%) <sup>[11]</sup>, S Awasthi et al (33.5%) <sup>[12]</sup>, Dhaval R et al (24.11%) <sup>[19]</sup>, Sadhana Mangwana (25.68%) <sup>[17]</sup>, Sareen et al (39.42%) <sup>[16]</sup>.

The most common type was microcytic hypochromic anemia 287 (54.56%), amongst them 219 were male and 68 were female. S G Ahmed et al <sup>[20]</sup>, also reported that the most common morphological type of anemia is microcytic hypochromic anemia (56.6%). Prakash Joshi et al (55.53%)<sup>[21]</sup>, also reported that the most common morphological type of anemia is microcytic hypochromic anemia. The next most common type was normocytic normochromic 133 (25.28%). Among females most common type of anemia was microcytic hypochromic which contributed 68 (80.95%) of all types. There is need to make strategies to educate, motivate, and treat donors deferred due to anemia/low hemoglobin, so that they can be recruited again.

### Conclusion

Present study proved that anaemia is a common health problem faced by the society. Females particularly of the reproductive age group are more commonly affected than males. Most common cause of anaemia is nutritional deficiency of iron. Health facilities can target their approach towards the same by providing nutrition education and preventive supplements. The haemogram reports should be measured at regular intervals of the same population and record should be maintained by the department implemented by the government, so as to know the effectiveness of the measures.

Rationalize and revalidate of strategies should be made to educate, motivate, and treat donors deferred due to anemia/low haemoglobin, so that they can be recruited

again. All efforts should be made to ensure safe motherhood.

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