



RESEARCH ARTICLE

BLOOD DONOR DEFERRAL DUE TO ANEMIA

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ABSTRACT

Introduction: In India minimum required hemoglobin for blood donation is 12.5 gm%. Blood donation deferrals due to anemia are very common and it decreases availability of precious blood donor for the blood bank.

Aim and Objective: To provide baseline information regarding the prevalence and spectrum of anemia in retrospective blood donors to help plan a future strategy for donor management.

Materials and Methods: This is a retrospective, single center-based study assessing the blood donor deferral due to anemia was carried out in Blood Bank, P.D.U. Medical College and Hospital, Rajkot, Gujarat (India). During the study period (January '2012 to December '2014), 34,435 retrospective blood donors were screened. Hemoglobin estimation was performed by Copper sulfate specific gravity method.

Result and Conclusion: In our study prevalence of anemia in blood donors is 2.8% and deferral due to anemia is 16%.

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INTRODUCTION

In India minimum required hemoglobin for blood donation is 12.5 gm%. Blood donation deferrals due to anemia are very common and it decreases availability of precious blood donor for the blood bank. Study was conducted from January '12 to December '14. Total blood donors were 34,435 out of which 32,226 were male and 2209 were female donors respectively. Blood donors are deferred due to several temporary or permanent reasons. A large majority of the donor population in a developing country, like India, is deferred due to temporary but easily correctable cause-Anemia. Which can be due to nutritional deficiency (mainly iron deficiency) and anemia due to blood loss. In this study we are assessing the prevalence of anemia in our otherwise healthy donor population by estimating the frequency of donor deferral due to anemia.

Aim and Objective

To provide baseline information regarding the prevalence and spectrum of anemia in retrospective blood donors to help plan a future strategy for donor management.

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MATERIALS AND METHODS

This is a retrospective, single center-based study assessing the blood donor deferral due to anemia was carried out in Blood Bank, P.D.U. Medical College and Hospital, Rajkot, Gujarat (India). During the study period (January '2012 to December '2014), 34,435 retrospective blood donors were screened. Hemoglobin estimation was performed by Copper sulfate specific gravity method. The minimal hemoglobin cutoff for donor selection was set at 12.5 gm% for both male and female donors. A venous blood sample in ethylene diaminetetraacetic acid (EDTA) was collected from all the blood donors who failed the screening test. This sample was run on automated hematology analyzer, Sysmex-KX 21. The general profile of blood donors is shown in (Table - 1). (Table - 2) depicts the severity of anemia in donor population, (Table - 3) depicts the morphologic typing of anemia, (Table - 4) depicts variation according to age.

RESULTS

The prevalence of anemia in female donors was significantly higher than in male donors (35.6% vs 1.4%). The general profile of blood donors is shown in (Table - 1). (Table - 2) depicts the severity of anemia in donor population, and (Table - 3) depicts the morphologic typing of anemia

(Table – 4) depicts variation according to age. Normocytic normochromic anemia was the most common type of anemia in our donor population. Microcytic hypochromic anemia was found in 30% of the female and 14.6% of the male donors. However, 25% of the female donors had macrocytic anemia compared with 1% among male donors.

Table 1. General profile of blood donors

Total no. of donors	34,435
Males	32,226(93.6%)
Females	2209(6.4%)
Total no. of deferrals	6061(17.6%)
Deferrals due to anemia	970(16%)
Prevalence of anemia in donors	2.8%
Prevalence of anemia in male donors	1.4%
Prevalence of anemia in female donors	35.6%

Table 2. Distribution of anaemia according to severity

Grading of anemia (according to severity) (Robbins and Cotran, 2014)	Male (%)	Female donors (%)
Mild anemia (Hb 10 – 12.5 gm%)	84.1	76.5
Moderate anemia (Hb 7 – 10 gm %)	15.9	20
Severe anemia (Hb< 7 gm %)	0	3.5

Table 3. Distribution according to type of anaemia

Morphologic type of anemia	Male donors %	Female donors %
Normochromic normocytic anemia	78.2	48.6
Microcytic hypochromic anemia	13.6	41.8
Macrocytic anemia	8.2	9.6

Table 4. Distribution according to age group

Age group (years)	Male %	Female %
18-30	17.7	25.2
31-40	32.1	30.9
41-50	50.2	28.2

DISCUSSION

Although this tests is quick, easy, and relatively inexpensive, its sensitivity, specificity, and accuracy is lower than that of an automated hematology analyzer. (Sunder and Vivekanand, 2009) So at our center we confirm result by running the EDTA venous sample of the subject on an automated analyzer.

Copper Sulfate Method

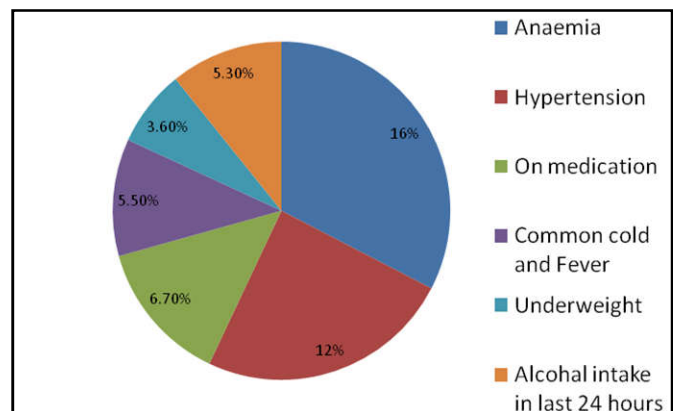
It is a qualitative screening test based on specific gravity. The density of the drop of blood is directly proportional to the amount of hemoglobin it contains. A drop of finger prick blood is dropped into copper sulfate solution (specific gravity - 1.053) becomes encased in a sac of copper proteinate, which prevents any change in the specific gravity for about 15 seconds. If hemoglobin is more than 12.5 gm%, the drop will sink within 15 s and the donor is accepted. If the drop does not sink in the prepared copper sulfate solution, the donor is rejected. In our study, the percentage of donors deferred due to anemia was estimated to be 16%. This is in accordance with blood donor deferral rates found in the studies, which range from 3% to 15%. (Deb *et al.*, 2002; Fred John and Mary Rithuvarkey,

2015). The prevalence of anemia in our study population was much lower than reported in our general population probably as majority of our donors are adult males (males, 93.6%; females, 6.4%). In a study conducted the prevalence of anemia was found to be 9.09%.

Comparative study of deferrals due to anaemia

Study	Donor deferrals due to anaemia (Prevalence in deferred donors)
1. Our study	16%
2. Retrovirus Epidemiology Donor Study-II Centres (REDS-II) (Alan <i>et al.</i> , 2012)	10%
3. Tertiary care hospital South India (Sundar <i>et al.</i> , 2009)	9.09%
4. JNMC Aligarh (Suhailur Rehman <i>et al.</i> , 2012)	11.43%
5. NIMHANS Bangalore. (Marimuthu <i>et al.</i> , 2010)	7%

Frequency of other causes of donor deferrals



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Conclusion

In our study prevalence of anemia in blood donors is 2.8% and deferral due to anemia is 16%. Majority of deferrals are due to normochromic normocytic anemia. Prevalance of microcytic hypochromic anemia is more in female donors as compared to male donors. Deferral are mainly due to mild anemia. Deferred donors should be informed and referred for further work up so that they can be appropriately treated. Donor deferrals due to anaemia were found more in elderly donors.

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