



Transfusion Medicine

COMPARATIVE ANALYSIS OF HAEMATOLOGICAL PARAMETERS AMONG INFREQUENT AND REGULAR REPEAT WHOLE BLOOD DONORS IN A TERTIARY CARE CENTRE-A PILOT STUDY

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ABSTRACT

Blood transfusion service is a vital part of our health care system. Stringent blood donor screening and medical examination plays a vital role in maintaining the quality and safety of blood components. Voluntary non-remunerated blood donors form the backbone of blood transfusion services. However, regular donation by such voluntary donors may cause significant depletion of iron stores in the body. This has the potential to adversely affect the donor's health, and also to lower the quality of blood being collected subsequently. Even though a pre-donation hemoglobin estimation is routinely done in blood centres, it may fail to recognize subclinical iron store depletion. Testing Ferritin level of all donors is not cost effective and practical in resource limited centres. This study was aimed to identify any significant changes in hematological parameters over repeated blood donations, that may point towards a potential Iron deficiency in an otherwise healthy donor. This was a cross sectional study involving 138 whole blood donors who had attended the blood centre, Department of Transfusion Medicine, Government Medical college, Thiruvananthapuram. The study subjects were categorized into 2 groups based on the number of donations and a Complete blood count (CBC) was done for each group. Data was analyzed using SPSS software, quantitative variables expressed as Mean and Standard Deviation, p value <0.05 was considered statistically significant. Results were analysed by Independent Samples T test. Statistically significant variables were further analysed using Kruskal-Wallis test. Second time blood donors constituted major part of sample size (20/138). Mean Hemoglobin value showed no significant change among the two donor categories. Mean corpuscular volume (MCV) of repeat whole blood donors is significantly lower than infrequent donors independent samples T test, t-value=3.309. (p-value=0.001). Donors were further subdivided into 5 groups in the order of increasing number of donations and significant difference was observed in MCV and proved by Kruskal-Wallis test(H=19.1344) As per our study, a significant reduction in MCV among repeat donors with a normal hemoglobin value compared to infrequent donors. This might point towards an impending Iron deficiency anemia in near future. A prompt detection of subclinical iron deficiency in voluntary blood donors is the need of the hour since it can cause adverse consequences in donor health and can considerably lower the donor availability as well. Blood centres should take measures like routine Iron stores evaluation of regular repeat donors, educating donors regarding the importance of maintaining a healthy diet, Iron tablet supplementation to prevent donor Iron deficiency anemia (IDA) etc.

KEYWORDS : Regular voluntary donors, Mean Corpuscular volume (MCV), Haemoglobin

INTRODUCTION

Blood transfusion services form a very essential component of the healthcare system and play an important role in the management of patients, both surgical and medical. Our nation's health care system promotes and motivates the practice of regular non-remunerated voluntary blood donation. A donor who has donated blood at least three times, the last donation being within the previous year, and continues to donate regularly at least once per year is termed as a Regular blood donor. Voluntary blood donors are the cornerstone of a safe and adequate supply of blood and blood products. The safest blood donors are voluntary, non-remunerated blood donors from low-risk populations. The effectiveness of the transfusion process depends on the quality of the blood transfused and the safety of the donor thereafter. Donation-induced iron deficiency is one of the long-term complications anticipated in repeat whole blood donors. Hence its mandatory to carry out a pre-donation hemoglobin estimation for all donors in blood centres. As stipulated by the Indian Drugs and Cosmetics Act, 1940, both males and females must have a hemoglobin (Hb) level of 12.5 g/dl and hematocrits (Hct) of 38% in order to donate whole blood. Pre-donation hemoglobin testing is one of the most crucial tests performed on donors to identify their eligibility to donate blood. This is to avoid unintentionally acquiring blood from an ineligible donor (with Hb<12.g/dl).¹

The development of iron deficiency involves three sequential events: iron depletion, iron-deficient erythropoiesis and finally, iron deficiency anemia. The event continues until the anemia becomes clinically apparent. However, the pre-donation hemoglobin estimation is less sensitive in the early stages of iron deficiency. One may have to go beyond Hb estimation to access other hematological parameters that might give information on subclinical physiological processes in a prospective donor.² As per national AIDS Control Society (NACO) and National Blood Transfusion Council (NBTC), minimum interval between whole blood donations is 90 days for males and 120 days for females. The onset of donation-induced iron deficiency may be determined using the complete blood count. In view of these, this study

sought to compare and evaluate the hematological parameters of infrequent and regular repeat whole blood donors.

METHODOLOGY

Study Design

This was a hospital based Cross sectional study conducted on 138 consented whole blood donors who have attended the blood centre of Department of Transfusion Medicine, Government Medical College, Thiruvananthapuram in the month of August 2022

Inclusion Criteria

1. Whole blood donors who come to our blood centre during the time period of study and are declared fit by pre-donation screening.
2. Age group of 18-60 years as per the standard operating procedure of our Department

Exclusion Criteria

1. Donor samples from Outdoor camps.
2. Samples kept for > 1 hour at room temperature.

Data Collection

Donors within age group 18-60 years registering at the blood centre were considered for the study. Routine screening and medical examination were conducted and those deemed fit for blood donation were explained about the study and a written consent was obtained. Pre-donation Hb estimation was done with Hemocue 201. After providing comfortable time following Hemocue201 testing, 5 ml of venous blood was collected in an EDTA bottle from a hand preferred by the donor. This sample was immediately run in 3 Part Hematology Analyzer. The results were collected and every data was manually entered in Excel sheet daily.

The study subjects were classified into two categories -regular repeat donors as per NACO definition and infrequent donors. Hematological parameters compared were Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), Red Cell Distribution Width (RDW) and

platelets concentration.

The study subjects were then further categorized in to 5 groups based on frequency of donations -the number of donations being 0-1, 2-3, 4-6, 7-10, >10 times and the statistically significant variable -MCV were compared.

Statistical Analysis

Quantitative variables were expressed as Mean and Standard Deviation, p value <0.05 was considered statistically significant. Results were analysed by Independent Samples T test. Statistically significant variables were further analysed using Kruskal-Wallis test.

RESULTS

Second time blood donors constitute major part of sample size (20/138). Mean Haemoglobin value showed no significant change among the two donor categories. Mean corpuscular volume (MCV) of repeat whole blood donors is significantly lower than infrequent donors (Independent samples T test, t-value=3.309; (p-value=0.001). (Figure 1 and 2)

Donors were further subdivided into 5 subgroups in the order of increasing number of donations and significant difference was observed in MCV and proved by Kruskal-Wallis test (H=19.1344). (Figure 3)

CONCLUSION

This Pilot study suggests that regular repeat whole blood donors have significantly low MCV compared to infrequent donors, which might be an indicator of underlying Iron deficiency.

Proper measures must be undertaken in blood centres to monitor Iron deficiency anemia in to repeat whole blood donors.

Multicentric studies with larger sample size are warranted to determine the number of donations above which significant changes in haematological profile occur in regular repeat whole blood donors with normal haemoglobin levels.

REFERENCES

1. National AIDS Control Organization Ministry of Health and Family Welfare Government of India New Delhi 2007
2. Ogar Ogar C, Chioma Okpokam D, Uchechi Okoroihu H (2021) Comparative analysis of hematological parameters of first-time and repeat blood donors: Experience of a blood bank in southern Nigeria. Hematology. Transfusion and cell therapy .October–December 2022, Pages 512-518.
3. Singh R, Kumar M, Kumar Singh D, Kharbanda P, Verma S. Comparative Analysis of Red Cell Parameters of First-time and Repeat Blood Donors: A Descriptive Study. Journal of Clinical and Diagnostic Research. 2023 May, Vol-17(5): EC05-EC07

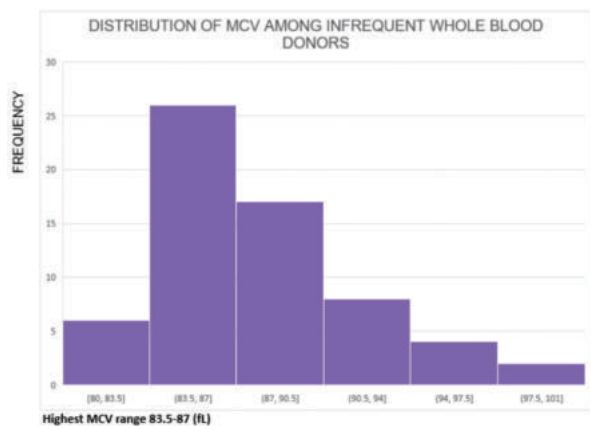


Figure 1

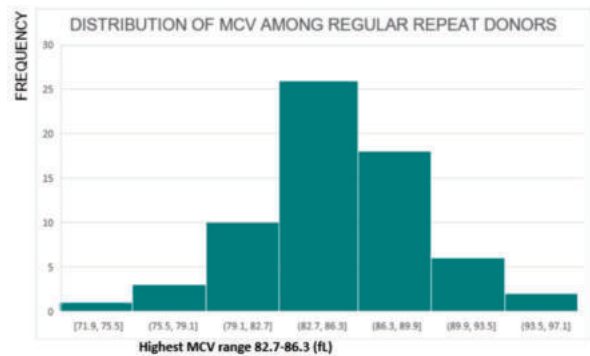


Figure 2

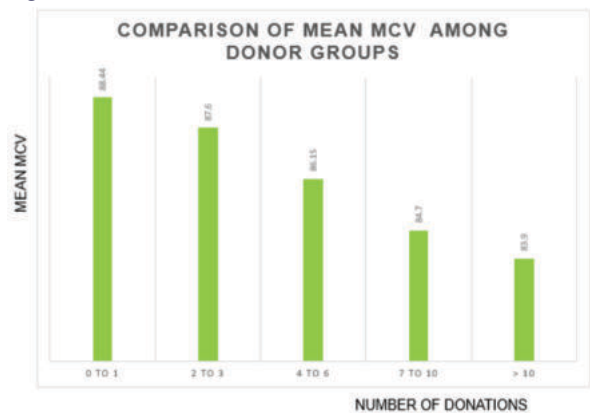


Figure 3