



ELSEVIER

Contents lists available at SciVerse ScienceDirect

# Transfusion and Apheresis Science

journal homepage: [www.elsevier.com/locate/transci](http://www.elsevier.com/locate/transci)

## A change in standard of minimum hemoglobin for male blood donors in Iran



Mahtab Maghsudlu\*, Soheila Nasizadeh, Hassan Abolghasemi, Sedigheh Amini Kafiabad, Farhad Razjou, Akram Aghamohamadi, Mohammad Reza Deyhim, Gilda Esmailifar

Iranian Blood Transfusion Research Center, High Institute for Research and Education in Transfusion Medicine, Iran

### ARTICLE INFO

#### Article history:

Received 9 October 2012

Accepted 25 April 2013

#### Keywords:

Blood donor

Hemoglobin

### ABSTRACT

**Background:** The minimum Hb for blood donation varies from nation to nation. This study assessed the impact of blood donation on donors' iron stores based on different Hb levels. An estimation of drop in the blood collection was made with the new suggested Hb cut-off value.

**Materials and methods:** 2017 male donors were studied. A questionnaire was filled out to gather demographic data, history of donation and risk factors of iron loss. Their blood samples were analyzed for RBC parameters, serum iron, TIBC, and ferritin level. The iron status of all first-time and regular donors was determined for each Hb level. The impact of changing the Hb cut-off value on annual blood collection was assessed.

**Results:** All of the regular donors with Hb levels <13.1 g/dL and 75% of those donors with Hb levels of 13.1–13.5 g/dL had abnormal iron stores. Iron deficiency dropped to 35% in donors with Hb levels of 13.5–14 g/dL. It was estimated that increasing the Hb cut-off from 12.5 g/dL to 13 g/dL or to 13.5 g/dL would cause a drop of 0.82% and 2.77% in the annual blood collection, respectively.

**Discussion:** A modification in the minimum Hb level for blood donation is necessary when Hb is used as the single criterion for screening donors. Increasing the minimum Hb level will lead to an increase in donor deferral; therefore a comprehensive donor retention program will be needed.

© 2013 Elsevier Ltd. All rights reserved.

### 1. Introduction

Donor selection criteria are set up to ensure blood safety as well as donor safety. One of the issues worthy of discussion in donor selection criteria is the Hb cut-off value. The minimum Hb for blood donation varies from nation to nation since normal Hb values depend on sex and race [1]; therefore, the acceptable Hb value for blood donation should be established by each country.

Presently the minimum acceptable Hb level in Iran for male as well as female donors is defined as 12.5 g/dL. The same value is used in the United States; however Eder et al. pointed out that the use of a hemoglobin cut-off 12.5 g/dL in both males and females is unsuitable [1]. The Council of Europe defines minimum Hb as 12.5 g/dL for women and 13.5 g/dL for men [2].

Based on data from the Statistics Committee of Iranian Blood Transfusion Organization in 2010 a total of 544,737 (22.4%) volunteers were deferred from blood donation; 39,500 (7%) of them were due to low Hb levels. 54% of the deferred donors with low Hb levels were female and 46% were male. The high percentage seen in men is largely due to the fact that more than 90% of Iranian blood donors are male. Several studies have been done in Iran

\* Corresponding author. Address: Iranian Blood Transfusion Organization, P.O. Box 14665-1157, Shahid Hemmat Highway, Next to Milad Tower, Tehran, Iran. Tel.: +98 21 88601565.

E-mail address: [m.maghsudlu@ibto.ir](mailto:m.maghsudlu@ibto.ir) (M. Maghsudlu).

focusing on Hb level and iron stores in female blood donors [3–6] which resulted in the implementation of a short term iron supplementation program for female blood donors since 2006 [7]. On the contrary the same issues in male blood donors have gained little attention.

This research evaluates the iron stores in regular male blood donors and compares them with that in first-time blood donors as a control group. The iron stores are studied based on different range of Hb intervals in order to study to minimum Hb level. Finally estimation is made of the drop in the blood collection if the acceptable Hb value is to be adjusted.

## 2. Materials and methods

### 2.1. Study design

The study was carried out at the Tehran Regional Blood Transfusion Center on 1,132 regular male blood donors and 1,017 first-time male blood donors as the control group. A definition for the terms first-time and regular donors were given according to IBTO standards:

- First-time donor is a donor who succeeds in donating blood for the first time.
- Regular donor is a donor who has donated twice or more within a period of 12 months.

Initially a questionnaire was filled out to gather information about demographic features, history of blood donations during the past 2 years, history of bleeding or surgery during the last year, and history of taking iron supplements. The number of blood donations as stated by the blood donor was then compared to that in the software database of blood donors. Donors were excluded from the study if there was a data mismatch, any source of iron loss, or administration of iron supplements. An informed consent was also obtained from participants.

A predonation blood sample (10 ml) was collected from all participants. The blood samples were then analyzed for RBC parameters, serum iron, total iron binding capacity (TIBC), and ferritin level. Hb electrophoresis was done solely for blood donors with a Hb level less than 13.5 g/dL and/or a MCV less than 80 fL in order to rule out genetic hemoglobinopathies. The donors who had a definite or possible hemoglobinopathy were excluded from the study.

The laboratory tests were then analyzed for depletion of iron stores and iron deficiency according to the following definitions [8]:

- Iron depletion: serum ferritin less than 20 µg/l with a Transferrin saturation equal to or more than 15%.
- Iron deficiency: serum ferritin less than 20 µg/l with a Transferrin saturation less than 15%.

### 2.2. Laboratory methods

Red blood cell parameters were measured with the Sysmex K-1000 cell counter (Kobe, Japan). Serum iron concentrations were measured with the photometric method by

Pars Azmoon kit (Karadj, Iran). TIBC was performed with sedimentary method with a Darman Kav kit (Isfahan, Iran). Serum concentrations of ferritin were measured by the IRMA method with an Immunotech kit (Prague, Czech Republic). Transferrin saturation was calculated using the advised method by the International Committee for Standardization Hematology.

### 2.3. Estimating the drop in blood collection

In order to evaluate the impact of changing Hb cut-off value on annual blood collection a formula was set up based on the following information.

#### 2.3.1. First-time and regular blood donor loss based on suggested Hb cut-off value

The percentage of first-time and regular blood donors that have Hb levels lower than the suggested cut-off value was obtained from the results of this study.

#### 2.3.2. Portion of each type of blood donor in annual blood collection

About 31.3% of annual blood units were collected from first-time blood donors and the remainder from repeated and regular blood donors (Statistics Committee of IBTO, unpublished, 2010).

#### 2.3.3. Average blood donations by regular and repeated blood donors in one year

The average number of blood donations by a regular and repeated blood donor is about 1.6 units each year (Statistics Committee of IBTO, unpublished, 2010).

It was assumed that deferred regular donors will not return within one year. Thus the percentages of first-time and regular blood donors having Hb levels lower than the suggested Hb cut-off were multiplied by 0.3 and 0.7 respectively. The average number of blood units donated by a regular and repeated blood donor was then multiplied by the percentage of blood donor loss. The following formula summarizes that stated above.

#### Annual blood collection drop

$$= (0.3 \times \text{Percentage of first time donors loss}) + (0.7 \times \text{Percentage of regular donors loss} \times 1.6)$$

### 2.4. Statistical analysis

The frequencies of demographic variables were calculated to describe the studied population. The frequency of iron depletion and iron deficiency among blood donors was then computed. Chi squared test was used to compare the iron status in first-time with that in regular blood donors. Finally the iron status of all first-time and regular blood donors for each Hb interval (using 0.5 g/dL intervals) was determined. All statistical analysis was carried out with SPSS software (SPSS 16.0, SPSS, Inc., Chicago, IL). A level of  $p < 0.05$  was considered significant.

Download English Version:

<https://daneshyari.com/en/article/6114226>

Download Persian Version:

<https://daneshyari.com/article/6114226>

[Daneshyari.com](https://daneshyari.com)