

Iron Metabolism In Primary Volunteer Blood Donors In Uzbekistan

**Zulfiya Abdupattakhovna Ismailova, Zuxra Ibragimovna Ubaydullaeva,
The Republican Blood Center of Ministry of Health of the Republic of
Uzbekistan, Research – and - production enterprise "Blood products" of the
General Directorate of Health of Tashkent city Department.**

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The collected donor blood must meet not only biochemical and bacteriological standards, but also standards for indicators of iron metabolism, because the iron metabolism itself is one of the functions of the macrophage system, and the state of this system is very important for the quality of transfused blood components prepared from this donor blood. Thus, it is obvious that the analysis of iron metabolism in blood donors is fundamental and necessary. An analysis of literature shows that the current standards for iron metabolism were established back in 1988 (D.A. Settarova, 1988). Data on indicators of iron metabolism in blood donors after 11 years cited in the work of E.A. Romanova et al. [5] showed that the average level of iron metabolism in Russian donors has changed slightly.

The purpose of the work is to comprehensively study iron metabolism in primary volunteer blood donors, both men and women in terms of iron metabolism, to establish reference normative indicators of iron metabolism in blood donors for use in blood Service institutions of the Republic of Uzbekistan.

Materials and research methods

A total of 101 primary male blood donors and 94 primary female blood donors were examined. The total number of blood donors examined was 195. The total hemoglobin content was analyzed, determined by the hemoglobin cyanide method using the Hemoglobin diagnostic kits (LaChema, Czech Republic) with the analysis of the result on the MINIGEM-540 apparatus (Russia), serum iron by the

ferrosine method with photometric analysis of the result, serum transferrin using monospecific rabbit immune serum against donor transferrin (produced by RPE "Blood Products" State Institution of Health in Tashkent), the saturation of the total transferrin pool with iron was determined, as well as the content of ferritin in the blood serum was determined by turbidimetry on a biochemical analyzer "HITACHI-902" (Japan) using commercial sets" Ferritin " from Roshe (Switzerland). Statistical processing of the obtained data was carried out by methods of variational statistics.

Results and discussion

Table 1.

Distribution of indicators of total hemoglobin in blood donors-men and women

Blood donors	Level of Hb 130-135 g/l n (%)	Level of Hb 136-140 g/l n (%)	Level of Hb 141-145 g/l n (%)	Level of Hb >146 g/l n (%)
Men n -101	32 (31.7%)	51 (50.5%)	17 (16.8%)	1 (0.99%)
Blood donors	Level of Hb 120-125 g/l	Level of Hb 126-130 g/l	Level of Hb 131-135 g/l	Level of Hb >136 g/l
Women n – 94	20 (21.3%)	41 (43.6%)	22 (23.4%)	11 (11.7%)

As can be seen from the table 2, the largest number of certain indicators of total hemoglobin in the studied sample of blood donors of men was determined in the range of 136.0-140.0 g/l-50.5% of all certain values and further decreasing-in the range of 130.0-135.0 g/l-31.7% of all certain values of this indicator, in the range-141.0-145.0 g/l - 16.8% of all indicators and the level of hemoglobin above 145.0 g / l among the examined donors was detected only in 1 blood donor.

The greatest number of certain indicators of hemoglobin in the studied sample of blood donors of women was determined in the range 126.0-130.0 g/l 43.6% of all values of this index and then decreasing - in the range of 131.0-135.0 g/l and 23.4% of all defined values in the range of 120.0-125.0 g/l and 21.3% of all values and the hemoglobin level above 136.0 g/l was detected in 11.7% of the examined female donors. It is interesting to note that from the entire group of male blood donors examined, the indicator of total hemoglobin at the level of the lower normal limit in accordance with WHO recommendations (level 130.0 g / l) was detected only in 3 donors, i.e. in 2.97% of the examined donors, while in female blood donors, the total hemoglobin at the lower normal level in accordance with WHO recommendations (level 120.0 g / l) was detected in 3.19% of the examined donors and in 17.0% of the examined donors - for women, this indicator was determined near the lower limit of the norm in the range of 122.0 -124.0 g / l.

Table 2.

Distribution of iron indicators in blood donors-men and women

Blood donors	Donors with conditionally reduced iron levels, n (%)	Donors with conditionally normal iron levels, n (%)	Donors with conditionally high iron levels n (%)
Men (n-101)	< 19.35 umol/l 10 (9.9%)	19.35-28.85 umol/l 78 (77.2%)	> 28.85 umol/l 13 (12.9%)
Women (n-94)	< 16.3 umol/l 3 (3.2%)	16.30-25.30 umol/l 87 (92.5%)	> 25.30 umol/l 4 (4.3%)

The results obtained by the distribution of iron in the examined groups of blood donors-men and women show that the vast majority of specific values of this indicator are in the range of conventionally normal values and thus, with high

probability can be taken derived indicators as normative for the average iron content in the serum of blood donors, respectively for men and women.

In modern diagnostic practice, in monitoring the status of iron in the body of donors, an important place is given to such a marker of iron status as serum ferritin. Its informative significance is determined by the fact that between the protein in the blood serum and the amount of spare deposited iron in the body there is direct quantitative correlation, reflected in the fact that the content of ferritin in the serum of 1 ng/ml quantitatively correspond to 8-10 mg of iron reserve and therefore, determining the content of ferritin in blood serum is possible to determine the iron stores, moreover it is possible to monitor changes in the reserve fund of iron in the body.

According to our data, the average serum ferritin content of male blood donors is 102.89 ± 2.36 ng / ml in the range of this indicator from 60.89 ng / ml (min) to 159.41 ng / ml (max), the average serum ferritin content of female blood donors is 85.81 ± 1.56 ng/ml in the range of this indicator from 55.81 ng/ml (min) to 132.54 ng/ml (max). Given the above correlation between the content of ferritin in blood serum and iron stores it can be calculated that the reserves of iron in the body of examined men blood donors on average 823.1-1028.9 mg of iron and in the body of examined women donors on average 686.48-858.10 mg of iron.

Table 3.

Indicators of iron metabolism in blood donors of men and women

Blood donors	Stat.indicator	Hb g/l	Fe umol/l	Tf g/l	CST,%	ferritin ng/ml
Men	Min	130.0	15.2	2.78	20.2	60.89
	Max	145.0	37.5	3.40	53.4	159.41
	M $\pm$ m	137.1 $\pm$ 0.3	24.1 $\pm$ 0.36	3.03 $\pm$ 0.01	32.4 $\pm$ 0.61	102.89 $\pm$ 2.3

Women	Min	120.0	14.6	2.85	17.9	55.81
	Max	138.0	28.6	3.45	38.6	132.54
	M $\pm$ m	129.4 $\pm$ 0.4	20.8 $\pm$ 0.25	3.18 $\pm$ 0.01	26.7 $\pm$ 0.42	85.81 $\pm$ 1.56
p		<0.01	<0.001	<0.001	<0.001	<0.001

Thus, the obtained indicators of iron metabolism in blood donors-men and women allow us to recommend them as standard indicators for use in the program of ferrokinetic monitoring of the status of iron in the body of blood donors.

Summary: the study of indicators characterizing the status of iron in the body of primary blood donors-men and women in Uzbekistan, blood hemoglobin, serum iron, serum transferrin with iron saturation and serum ferritin, taking into account age. It is shown that these indicators can be used in ferrokinetic monitoring of the status of iron in blood donors in the institutions of the blood Service of the Republic of Uzbekistan.

Abstract: Indexes of iron status in organism of Uzbekistans primary blood donors-men and women-hemoglobin, serum iron, serum transferrin with iron saturation and serum ferritin is conducted. The conclusion is drawn of need of studying of a condition of metabolism of iron in blood donors for needs of blood service of Republic of Uzbekistan.

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