



The assessment of iron and folic acid status in reproductive-age women

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Objective

To screen young women for iron and folic acid deficiency using diagnostic reference levels.

Methods

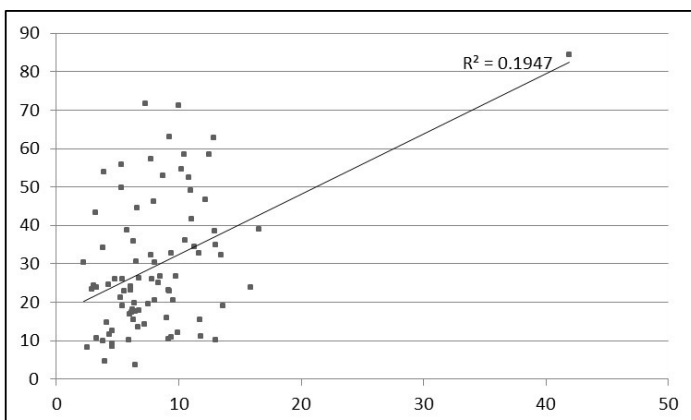
The research was carried out with the approval of the Local Ethical Committee (approval no. 917/16). The study population consisted of 98 European women of an average age of 26.0 ± 3.9 (20-35). All women participated in medical consultation and interview examination with the gynecologist. Blood samples were taken from a forearm vein after an overnight fast. Morphological parameters were assayed in whole blood and UIBC, folic acid, homocysteine and ferritin concentrations were assayed in serum using a biochemical analyzer. An inductively coupled plasma mass spectrometry (ICP-MS) technique was used to determine the levels of elements (Fe, Li, Mg, Ca, V, Co, Cu, Zn, As, Sr) in serum. Body composition was measured using BOD POD.

Results

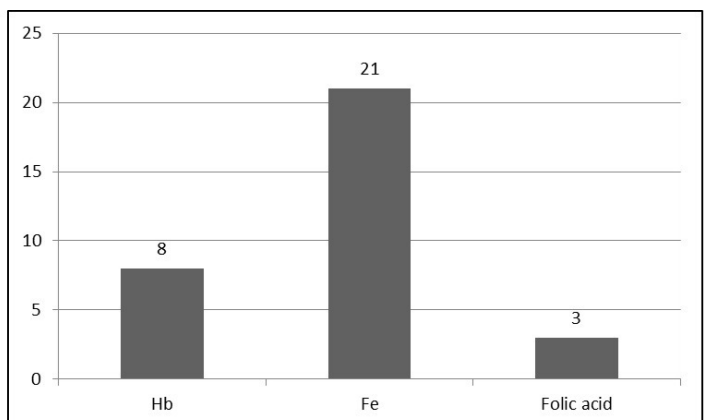
According to the current diagnostic norm it was found that 8% of women had a very low hemoglobin (Hb) concentration (<11.7 g/dl), 21% of women had a very low Fe concentration (<60 μ g/dl) and 3% of women had a very low folic acid level (<2.7 ng/ml). Hemoglobin concentration below the normal range was observed in younger women and low concentration of folic acid was found in women with higher BMI. Folic acid level negatively correlated with UIBC ($R=-0.26$), homocysteine ($R=-0.41$) and cobalt ($R=-0.27$) and positively with ferritin ($R=0.34$). The interaction between iron status and other minerals was not found.

Conclusion

In conclusion, deficit of iron (according to Hb level) and folic acid was observed in less than 10% of Polish population of young women. Obtained results showed that the iron and folic acid status in reproductive-age women were interrelated. This research was supported by a grant from the National Science Center, Poland (2015/17/B/NZ7/02952).



Correlation between serum folic acid and ferritin concentration in women.



Percentage of women below diagnostic norm for Hb (<11.7 g/dl), Ferritin (<0.6 μ g/ml) and folic acid (<2.7 ng/ml).

Table 1. Analysed parameters in women.

Parameter	Mean±SD	Median	Min-Max
Age (years)	26.0±3.9	26	20-35
BMI (kg/m ²)	21.4±2.6	21	16.5-30.8
FAT (%)	29.1±6.4	28.8	15.1-49.2
RBC (×10 ⁶ /μl)	4.4±0.3	4.4	3.7-5.1
HB (g/dl)	13.0±0.8	13.1	9.9-14.6
HCT (%)	38.0±2.1	38.3	30-42.5
PLT (×10 ³ /μl)	256.2±60.8	249	128-462
Fe (μg/ml)	1.0±0.4	1.0	0.1-2.3
UIBC (μg/dl)	257±105	243	42.1-552.8
Ferritin (μg/L)	35.6±21.5	32.2	10.1-62.8
Folic acid (ng/ml)	8.2±4.8	7.4	2.2-41.9
Homocysteine (μmol/L)	9.4±3.5	8.3	6.2-15.7
Li (μg/L)	2.3±7.1	1.0	13.1-50.7
Mg (μg/ml)	25.9±12.2	17.9	13.1-50.7
Ca (μg/ml)	144.5±75.4	92.7	68-291.4
V (μg/L)	1.1±0.3	1.0	0.6-2.4
Co (μg/L)	0.5±0.2	0.5	0.3-2.1
Cu (μg/ml)	1.1±0.4	1.0	0.6-2.3
Zn (μg/ml)	1.1±0.3	1.0	0.5-1.9
As (μg/L)	8.6±10.1	7.6	5.1-104.6
Sr (μg/L)	51.4±34.0	40.1	16.2-240.1

Min-minimum value; max-maximum value; SD-standard deviation; BMI –body mass index; Fat (% of fat mass); RBC-red blood cells; HGB-hemoglobin; HCT-hematocrit; PLT- platelets; UIBC-unsaturated iron binding capacity;