IRON STATUS OF THE STUDENTS OF AYUB MEDICAL COLLEGE

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The concern about the iron status of an individual traditionally rotates around the finding of anemia. However, some recent studies are suggestive of many other symptoms of iron deficiency which can be present even before the iron deficiency anemia appears. The purpose of this study was to determine the iron status of the students of Ayub Medical College by determining serum ferritin that is the best investigation to determine the stored iron. We found that 8.42 % of the male students and 13.68 % of the female students were iron depleted, while just 4.2 J % males and 8.42 % females were anemic. This suggests that iron deficiency in absence of anemia is present in our students.

INTRODUCTION

Iron is a universal cofactor for mitochondrial energy generation and supports the growth and differentiation of all cell types. The regulation of systemic iron is through the proteins transferrin (iron mobilization) and ferritin (iron sequestration).[1] Normally the total body iron content is in the range of 2 gm in women and upto 6 gm in men which is divided into functional and storage compartments.[2] The physiologic importance of the storage iron is that it provides a rapidly available supply in the event of blood loss.'[1] High correlation have been demonstrated between serum ferritin and body iron stores as measured either directly by quantitative phlebotomy[4] or indirectly by iron absorption.[3] Ferritin functions not only as an intermediate during Hemoglobin synthesis, but also as storage protein for iron released during Hemoglobin denaturation.[6]

Serum ferritin is a useful and accurate measure of body iron stores particularly in an iron deficiency state not severe enough to produce microcytosis, hypochromia or anaemia or when haemoglobin and serum iron concentrations are normal.

A serum ferritin level of less than 12 pg/litre is diagnostic of iron deficiency.[8] According to Jacobs *et al* iron depletion is said to correspond with serum ferritin concentration <10 µg/1.

MATERIALS AND METHODS

This study was carried out at the Department of Physiology, Ayub Medical College, Abbottabad. A total of 234 students of first and second year were interviewed and were asked to fill in a questionnaire. After observing the exclusion criteria 95 male and 95 female students were included in the study. The exclusion criteria included history of chronic blood loss, recent trauma, recent blood donation and use of medicines known to interfere with iron metabolism. 5 ml of blood was collected from all the selected subjects. 2 ml blood (mixed with 3 mg EDTA) was used for determining haemoglobin by cyanmet haemoglobin method. Serum separated from the rest of the blood was stored at -20°C. It was later on used for determination of ferritin (by Enzyme - immunoassay). All glassware was carefully prepared to avoid contamination by iron using the method recommended by ICSH.[1011]

RESULTS

Our results are reported in tables 1-2. The table 3 shows the number and percentage of the male and female subjects who presented with levels of serum ferritin and hemoglobin which were below the accepted cutoff values.

Table-1: The mean serum ferritin and haemoglobin in the male students (n-95)

PARA METER	UNIT	RESULT (mean ± S.E)	RANGE
Serum Ferritin	ng/ml	79.34 ± 3.45	6.5-182
Hemoglobin	g/dl	14.6510.34	13-16.4

Table-2: The mean scrum ferritin and haemoglobin in the female students (n = 95)

PARAMETER	UNIT	RESULT (mean ± S.E)	RANGE
Serum Ferritin	ng/ml	54.3813.10	4.5-110
Hemoglobin	g/dl	12.7410.31	10.2-15.2

Table-3: Number of Males and females showing Serum ferritin and haemoglobin deficiency

PARA METER	CUTOFF LEVEL	MALES BELOW CUTOFF LEVEL	FEMALES BELOW CUTOFF LEVEL
Serum Ferritin	10 ng/ml	8 (8.42 %)	13 (13.68%)
Hemoglobin	Males: 14g/dl Females: 12g/dl	4 (4.21 %)	8 (8.42%)

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DISCUSSION

Considerations of the consequences of iron deficiency have traditionally focused on anaemia. Awareness of subtle symptoms of mild iron deficiency is increasing, but unsuspected iron deficiency is a persistent problem, especially among certain groups, such as menstruating women and milk-fed infants.[12] A variety of effects due to a deficiency in essential tissue iron have been demonstrated in animals which include increased catecholamine levels in children leading to abnormal behaviour[1] ,and impaired response of tri-iodothyronine to cold.[14] A number of metals as lead, cobalt and cadmium entering the body via the iron absorptive mechanism, are liable to reach the body tissues in excessive amounts in the state of iron deficiency.[15] Most importantly there is now-substantial evidence that iron deficiency has an adverse effect on brain function. In rats iron deficiency leads to disturbed enzyme function in the brain affecting cerebral serotonin metabolism and learning ability.[16]

Our study clearly indicates that in the study population the prevalence of iron deficiency is higher than that of anaemia. This iron deficiency is particularly alarming in the female population.

The magnitude of the problem seems to be significant in our population and the reason for that is probably lower iron status of our population as compared to the Western norms due to racial, environmental, parasitic and dietary factors.[1"19] Among the dietary factors the most important ones are low haem proteins in diet and high phytate content of the wheat flour.[20]

Our results indicate considerably lower prevalence of iron deficiency anaemia as compared with a 9 % reported by Afroz et al.,[21] in the students of Karachi Medical and Dental College and Zia Uddin Medical University. However, their study did not report the iron stores. The male to female differences in both the parameters studied are due to the physiological factors.

We suggest that further study to ascertain the magnitude of the problem and to correlate iron deficiency with the behavior of students and their academic results are needed.

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