



Serum Iron, TIBC and Serum Ferritin in pregnant women suffering from Iron Deficiency Anemia

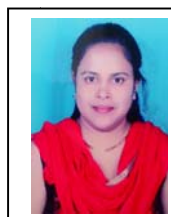
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Abstract:

Aim: To understand alterations in biochemical parameters in pregnant women suffering from Iron Deficiency Anemia. **Material and Method:** Study includes total 120 subjects attended the ANC clinic in one calendar month with age group of 20-35 years which further subdivided as **Group I (cases):** Includes 60 iron deficiency anemic pregnant women and **Group II (control):** Consists of 60 non anemic pregnant women. Informed consent was obtained from all the participants and venous blood samples were collected for measurement of serum levels of Iron, TIBC and Ferritin. **Result:** Serum Iron is significantly decreased ($p < 0.001$) in group-I (26.58 ± 5.91) as compared to group-II (67.95 ± 22.25), level of TIBC is significantly increased ($p < 0.001$) in group-I (625 ± 145.93) as compared to group-II (271.63 ± 51.97), Serum Ferritin is significantly decreased ($p < 0.001$) in group-I (17.95 ± 6.05) as compared to group-II (83.18 ± 33.88). **Conclusion:** These parameters will help the clinicians in appropriate management and prevention of the serious conditions related to iron deficiency.

Keywords: Iron Deficiency Anemia , Serum Iron, TIBC, Serum ferritin

Introduction:

Iron deficiency continues to be the leading single nutritional deficiency in the world, despite considerable efforts over decades to decrease its prevalence.^{1,2} Estimates from the WHO report that from 35% to 75% (56% on average) of pregnant women in developing countries and 18% of women from industrialized countries are anemic. It is estimated that Iron deficiency anemia accounts for

12.8% of maternal deaths during pregnancy and childbirth in Asia.³

Iron is an essential component of the hemoglobin without iron hemoglobin cannot be synthesized and red cells become microcytic and hypochromic.⁴ Iron deficiency anemia can be defined as a clinical condition characterized by reduction in hemoglobin concentration of blood below the normal for age, sex, and physiological condition.⁵ Recent studies suggest that maternal Iron deficiency anemia may be associated with postpartum depression and poor

Sr. No.	Study groups	Serum Iron μgm/dl Mean ± SD	TIBC μgm/dl Mean ± SD	Serum Ferritin μgm/dl Mean ± SD
1	Group-I (cases)	26.58 ± 5.91***	625 ± 145.93***	17.95 ± 6.05***
2	Group-II (control)	67.95 ± 22.25	271.63± 51.97	83.18 ± 33.88

performance on mental and psychomotor tests in offspring, most often pneumonia, urinary tract infection, endometritis, pregnancy induced hypertension, heart failure and pulmonary infraction.^{6,7} WHO has accepted up to 11 gm% as the normal hemoglobin level in pregnancy, therefore any hemoglobin level below 11 gm% should be considered as anemia. However in India and most of the developing countries the lower limit is often accepted as 10 gm%.

Serum studies are helpful in identifying Iron deficiency anemia. Serum iron level is less than 60μg/dl and serum total iron binding capacity (TIBC) is more than 400 μg/dl in Iron deficiency anemia. Serum ferritin is the best indicator of bone marrow stores of iron and has largely replaced bone marrow examination. Ferritin is a high molecular weight glycoprotein in circulation. A value less than 12 ng/ml indicates Iron deficiency anemia. The simplest and direct assay of Iron deficiency is the ratio of serum iron to the total iron binding capacity.

Materials and Methods:

Institutional ethical committee approved this study and verbal informed consent was also taken from the patients. Study consists of total 120 subjects who are further subdivided in to two groups, **Group I (cases):** Includes total 60 iron deficiency anemic pregnant women and **Group II (control):** Consists of 60 non anemic pregnant women. Following parameters were estimated a) Serum Iron: Ferrozine Method.⁸ b) Total Iron Binding Capacity: Ferrozine Method.⁸ c) Serum Ferritin: Latex

Enhanced immunoturbidimetry method.⁹ Statistical analysis was done using the unpaired T test.

Observations and Results:

Table 1: Mean of Serum iron, TIBC and Serum ferritin levels in study group I and II

*** p < 0.001 - Highly Significant when group-I is compared with group-II

Discussion:

Iron deficiency anemia is the most common single cause of anemia. It is the micronutrient deficiency most prevalent in the world. Pregnant women are at the high risk of iron deficiency anemia. Its prevalence is about 56%.¹⁰ Epidemiological studies have shown that iron deficiency anemia in pregnancy increases fetal and maternal mortality and morbidity. Improvement of health of pregnant women is important for the survival of mother as well as for good physical and mental health of fetus.

Most of the patients attending the ANC clinic in Tertiary care hospital were from poor socioeconomic status because of which they were having poor dietary intake of iron and so we were interested in measuring the activity of serum iron level in iron deficiency anemia.

The decrease in the serum iron level may be due to the decreased dietary intake of iron or increased demand of iron from fetus during pregnancy. High fetal demands for iron render for iron deficiency which is the most common cause of anemia in pregnancy.¹¹

Increased total iron binding capacity in iron deficiency anemia may be due the increased absorption of iron in gastrointestinal tract or increase in iron liberated from the mucosal cells to meet the body's need for iron. Elevated serum iron binding capacity and reduced serum iron levels were found in many subjects.¹²

It is observed that iron deficiency anemia is documented by decreased iron saturation. Ferritin

below 15ng/ml confirms the depletion of iron.¹³ Serum ferritin declined sharply until the 28th week of pregnancy but only slightly thereafter these data suggests at least one determination of serum ferritin concentration in pregnant women for a sufficient prophylaxis of iron deficiency anemia during pregnancy.¹⁴

Conclusion:

Iron deficiency anemia is one of the major complications of pregnancy. Our preliminary study in iron deficiency anemia shows alterations in certain biochemical parameters proportional to the severity of the anemia. In spite of the increasing knowledge and advances in the medical field iron deficiency anemia can be the cause of worry for the gynecologists. Serum iron, total iron binding capacity and ferritin levels might be helpful for the treatment of iron deficiency anemia. Therefore these parameters will help the clinicians in appropriate management, treatment and prevention of the serious conditions related to iron deficiency.

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