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Estimation of Calcium, Iron, Zinc and Some Antioxidants in the Serum of Pregnant Women in Samarra

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Abstract:

Pregnancy is a period of important physiological changes. The study dealt with 25 pregnant women at the age of (18-35) years and 20 non-pregnant women at the age of (18-35) from the city of Samarra. Blood samples were collected from pregnant women who visited Samarra General Hospital. The study found a significant decrease in the concentration of iron, calcium and zinc in the pregnant group compared to the control group at the probability level 0.01. The current study also examined some antioxidants in the serum of pregnant women compared to the healthy control group. A significant increase in albumin was observed in the pregnant group compared to the control group at the probability level 0.01. Also, uric acid increased in the pregnant group compared with the control group at the probability level 0.05. While catalase and total protein were not recorded in the pregnant group any significant differences compared with the control group. As for vitamin C, a significant decrease was observed in the pregnant group compared with the control group at the level of probability 0.01. Malone dimethyldehyde was increased in the pregnant group compared to the control group, at the likelihood level of 0.01

Key words

Iron, calcium, zinc, antioxidants, pregnant

Introduction:

Pregnancy is a period of important physiological changes characterized by the adaptation of the organism to the requirements and needs of the fetus (Mohamed *et al*., 2016) and a balance between food input and maternal stock (Tamaddon *et al*., 2014). Pregnant women undergo many internal metabolic and hormonal changes during pregnancy that have directed the metabolic processes in the female body in a manner that meets the physiological state of pregnancy, including the needs of the fetus for the purpose of growth and development until

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birth (Stuart & Christoph, 2002). It is these changes in the hematological and chemical parameters that reflect the physiological changes that are important in the events of complications throughout this period (Bijlani, 2004, p. 948; Al-Tawil, 2013) Pregnancy is one Physiological condition that lead to a change in the ratios of blood components such as hemoglobin concentration and white blood cell count (Simsek *et al*., 2015; Mustafa, & AL-Samarraie, 2020). The total volume of blood during pregnancy increases by approximately 40 - 50%, and the number of white blood cells increases while the increase in red blood cells 10 -15% that causes physiological anemia in pregnant women (Datta *et al*., 2010) The increase in the number of white blood cells continues and reaches its maximum rate at giving birth (Chandra *et al*., 2012).

Pregnancy is a physiological condition that coincides with the consumption of a large amount of oxygen to obtain energy requirements, and consequently an increase in oxidative stress due to an increase in the group of active oxygenated varieties (Brenner, 2004). With non-pregnant women (Dominguez-Salas *et al*., 2014), antioxidants are known as chemical compounds that are found in the diet in low concentrations. They can delay the appearance of oxidation through multiple mechanisms. One of these mechanisms stops oxidation by removing free radicals (Adiga & Adiga, 2009) and divides antioxidants into two parts. Antioxidants. Enzymatic and non-enzymatic antioxidants (Sheena, 2012; Mustafa, et al.,2020).

Work methods:

Collection of venous blood samples from Samarra General Hospital in Salah al-Din governorate, with 5 ml of each pregnant woman, and 1 ml of blood was put in a special test tube containing EDTA for blood tests while the other section was placed in plastic tubes with an airtight cover and free of anticoagulant. After that, the blood was left at a temperature of 25 ° C until coagulation, then the serum was separated using a centrifuge at a speed of 3000 rpm, after which the serum was withdrawn using a micropipette and the serum was placed in a test tube for biochemical and enzymatic tests that does not suffer from any type of chronic disease, and the pregnant woman does not take any kind of treatments.

The studied groups are divided into two parts:

1 -Pregnant group: The study included 30 samples according to month from the first month to the ninth month with an age group from 18 years to 35 years.

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2 -The healthy control group: The study included 20 samples with an age group from 18 years to 35 years.

Clinical chemical tests of serum: included the determination of the level of total protein in the serum (a kit from the French company Bio Labo). Determination of the level of albumin in the blood serum) a measurement kit from the Spanish company Bio Systems.

Estimation of catalase activity according to a method by Beers and his group and Bergmeye (Ogunyemi *et al*., 2012). Uric acid level determination) A measuring instrument from the Spanish company Bio Systems. Iron, zinc and calcium were measured by an atomic absorption device in the laboratories of the Faculty of Engineering - University of Tikrit.

Results and discussion

Table No. (1) shows the decrease in iron, calcium and zinc in the pregnant group compared to the healthy control group due to the pregnant woman's need for mineral elements and for the growth of the child during pregnancy.

Table No. (1) shows the concentration of iron, calcium and zinc in the serum of pregnant women compared with the control group

Elements	healthy Control group	Patients' group	p-volu
Fe (ppm)	(3.03395±0.056)	1.00515±0.072	0.01
Ca(ppm)	2.279 ± 0.041	1.762 ± 0.023	0.01
Zn(ppm)	0.1158±0.013	0.0757±0.006	0.01

Table No. (2) shows some biochemical variables in the serum of pregnant women with a number of changes in the values of these parameters. No significant change was observed in the rate of total protein concentration in the blood of pregnant women at a probability level $P \leq 0.05$ compared to the control group.

Table No. (2) shows some of the studied antioxidants in pregnant samples and control group samples

Parameter	**healthy Control group**	**Patients' group**	**p-volu**
Total protein (g/dl)	4.0±0.6	3.8±0.6	Ns

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Albumin (g/dl)	22.25±1.008	41.1±0.47	<0.01
Uric acid (mg/dl)	2.89 ± 1.2	3.6963± 1.8	<0.05
Catalase (IU/L)	67.6867± 20	65.0375 ±17	Ns
Vitamin C (mg/l)	0.668 ±0.110	0.361± 0.143	0.01
MDA(μmol/l)	2.795± 0.428	4.372± 1.21	0.01

The results of the current study are in agreement with (Birben *et al*., 2012), which found that there was no significant change in the concentration of total protein in the blood serum of pregnant women compared to the control group. In addition, there was a significant decrease in the albumin concentration rate in the blood of pregnant women at the probability level P≤ 0.05 compared with the control group, the pregnant group at the probability level P 0.05 compared with the control group. The results of the current study are in agreement with the findings (Fransen *et al*., 2012), which indicated a significant decrease in the concentration of albumin in the blood serum of pregnant women compared with non-pregnant women.

As for the enzyme catalase, it was found that there is a significant decrease in the blood serum of pregnant women, and as shown in (Table 2) at a likelihood level P≤ 0.05 compared to the control group. The results of the current study are consistent with the findings (Patil *et al*., 2007) Which indicated a significant decrease in the activity of the enzyme catalase in the blood serum of pregnant women. The activity of the enzyme catalase in the first trimester of pregnancy is higher than the second and third trimesters. The results of the current study, shown in Table No. (2) indicated a significant decrease in the concentration of uric acid in the blood serum of pregnant women compared to the control group. Uric acid in the blood serum of pregnant women in all stages of pregnancy. The results of the current study agree with the findings (de Oliveira & Burini, 2012).

The decrease in uric acid concentration during early pregnancy may be due to an increase in the volume of blood plasma during pregnancy that causes Haemodilution. The role of vitamin C in pregnancy indicates that changes in its concentration may affect susceptibility to endothelial infection by oxygen toxicity. This is consistent with the findings of (Amini *et al*., 2014) a decrease in the concentration of vitamin C at all stages of pregnancy. As for malone dimethydehyde, it increased in the pregnant group compared to the control group at the probability level 0.01. This is due to the fact that malone di aldehyde, a marker of lipid

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peroxidation, increased during pregnancy, and this indicates the ability of lipid peroxide to damage the cell membrane (Stockl *et al*., 2012).

Conclusions:

The study showed no significant change was observed in the rate of total protein concentration in the blood of pregnant women at a probability level $P \leq 0.05$ compared to the control group. In addition, there was a significant decrease in the albumin concentration rate in the blood of pregnant women compared with the control group, the pregnant group compared with the control group. As for the enzyme catalase, it was found that there is a significant decrease in the blood serum of pregnant women compared to the control group. The activity of the enzyme catalase in the first trimester of pregnancy is higher than the second and third trimesters. The results of the current study, indicated a significant decrease in the concentration of uric acid in the blood serum of pregnant women compared to the control group. Uric acid in the blood serum of pregnant women in all stages of pregnancy. The decrease in uric acid concentration during early pregnancy may be due to an increase in the volume of blood plasma during pregnancy that causes Haemodilution. The role of vitamin C in pregnancy indicates that changes in its concentration may affect susceptibility to endothelial infection by oxygen toxicity.

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