

(P<0.05) (9.3±3.8 K. A. U/ 100 ml) (8.8±2.7 K.A.U/100ml)
 (20.8±2.8 K. A.U/100 ml) ALP

Creation kinase

(2.78± 0.33gm/dL)

(P < 0.05) (3.5 ± 0.24 gm/ dL)

(3.05 ± 0.3gm/dL)

Introduction

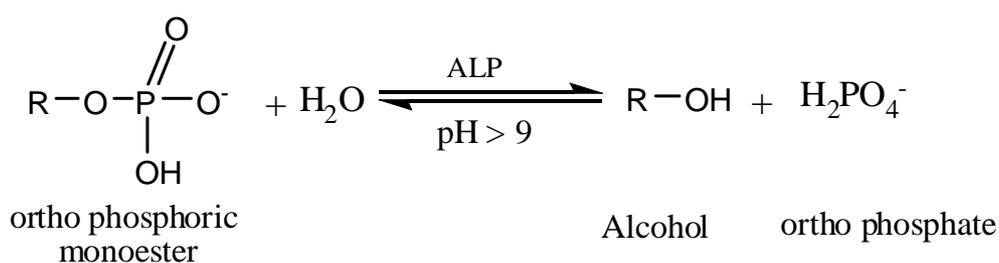
Pregnancy is a natural physiological statement that is accompanied with hormonal and metabolic changes⁽¹⁾. It occurs after any menstrual cycle, which witnesses ovulation⁽²⁾, because the metabolic state for the mother becomes ready to supply protection necessary needs for the fetal⁽³⁾. The natural pregnancy continues usually (282 days), or about 40 weeks⁽²⁾, that is why the pregnancy is divided into three periods called trimesters⁽⁴⁾ :

❖ *The first trimester includes the first twelve weeks*

❖ *The second trimester is from the first twelve weeks to the twenty eight weeks*

❖ *The third trimester is from the twenty eight weeks to the time of delivery.*

The alkaline phosphatase (ALP) are a group of enzymes which hydrolyze phosphates at high pH. They are present in most tissue but are in particularly at high concentration in osteoblasts of bone the hepatobiliary tract, the intestinal wall, the renal tubules and the placenta⁽⁵⁾. ALP is a family of dimeric metallo enzymes⁽⁶⁾. And requires Mg⁺² and Zn⁺² for stability and maximum activity. ALP are a group of non specific phosphatase that catalyze the reaction below:



Phosphatase splitting off of phosphoric acid from certain mono phosphoric ester, a reaction of considerable importance in several body processes⁽⁷⁾, both increase and decrease of plasma ALP are of clinically important. Creatine kinase (CK) plays an important role in the energy.

Storing mechanism of tissue by catalyzing the reversible reaction between Creatine and ATP to form creatine phosphate and ADP.

CK is distributed in various organs, the enzyme prevent the rapid depletion of ATP by providing⁽⁸⁾.

Thus determination of CK is an aid in diagnosing muscular dystrophy and other disease of the skeletal muscles, myocardial infarction, hypothyroidism, renal disease⁽⁹⁾.

Albumin (69000 dalton) is the major protein of human plasma (3.44 g/dL) and makes up approximately 60% of the total plasma protein. About 40% of albumin is present in the plasma, and the other 60% is present in the extra cellular space. The liver produces about 12g of albumin per day, representing about 25% of total hepatic protein synthesis and half its secreted protein. Albumin is initially synthesized as a pre-proportion its signal peptide is removed as it passes into the cisternae of the rough endoplasmic reticulum, and a hexapeptide at the resulting amino terminal is subsequently cleaved off farther along the secretory pathway. The synthesis of albumin is depressed in a variety of disease, particularly those of the liver⁽¹⁰⁾.

Methods:

The activity of Alkaline phosphatase was measured spectrophotometrically at 510nm using kits supplied by biomerieux^(11, 12), the concentration of Albumin was measured spectrophotometrically at 630nm using kits supplied by Randox⁽¹³⁾. Also the activity of the creatine kinase was measured

spectrophotometrically at 560 nm using kits supplied by Randox^(14,15).

Subjects:

Blood samples were collected from 60 pregnant women and 30 controls during 25 days. The subjects were divided into three groups:

1. G_1 (The first twelve weeks), $n=30$
2. G_2 (Twenty eight weeks to term), $n=30$
3. G_3 (non pregnant women (control group)), $n=30$

Statistical analysis

The data were analyzed by using student's t-test. All data were expressed as mean \pm SD. Statistical computations were calculated using SPSS v10 for windows software

Results and Discussion

Alkaline phosphate activity (ALP)

Table (1) shows the activity of ALP in the pregnant women (first trimester) and in controls. The levels of ALP were observed to be 9.3 ± 3.8 K.A.U/100ml in controls and 8.8 ± 2.7 K.A.U/100ml in the pregnant women in the first trimester. There was no significant alteration in ALP levels in the G_1 group compared with the control group (G_3) (Figure (1)).

Table (1): Activity of ALP, CK and Albumin in the pregnant women (The first twelve week) and control group.

No.	ALP K.A.U/100ml	T_{test}	CK U/L	T_{test}	Albumin gm/dl	T_{test}
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		Mean \pm SD		Mean \pm SD		Mean \pm SD	
G1	30	8.8 \pm 2.7	P>0.05	168.3 \pm 25.3	P>0.05	3.05 \pm 0.3	P>0.05
G3	30	9.3 \pm 3.8		162.6 \pm 22.8		3.5 \pm 0.24	

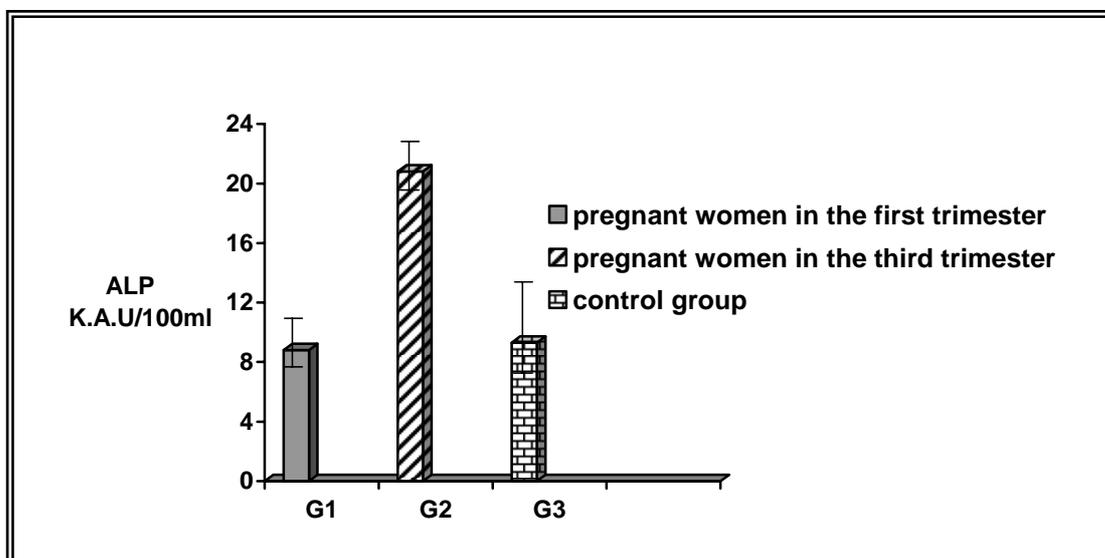


Figure (1): Activity of the enzyme ALP in the pregnant women and control

The levels of serum ALP were significantly higher ($P < 0.05$) in the pregnant women in the third trimester group (20.8 \pm 2.8 K.A.U/100ml) compared with the control group (9.3 \pm 3.8) (Table (2) and Figure (1)), and the first trimester group (8.8 \pm 2.7 K.A.U/100ml) (Table (3) and Figure (1)). The placenta produces ALP in

the third trimester of pregnancy, this increase is related to iso-enzyme Alkaline phosphate produces from the placenta, ALP placenta synthesis in placenta and secreted in the blood cycle after (12week) pregnancy^(15,16). This result is similar to those obtained by Iloola⁽¹⁷⁾.

Table (2): Activity of ALP, CK and Albumin in the pregnant women (twenty- eight weeks to term) and control group .

	No.	ALP K.A.U/100ml Mean \pm SD	T_{test}	CK U/L Mean \pm SD	T_{test}	Albumin gm/dl Mean \pm SD	T_{test}
G2	30	20.8 \pm 2.8	P<0.05	167 \pm 22.0	P>0.05	2.78 \pm 0.33	P<0.05
G3	30	9.3 \pm 3.8		162.6 \pm 22.8		3.5 \pm 0.24	

Table (3): Activity the enzyme ALP, CK and albumin in the pregnant women (the first twelve weeks) and (twenty – eight weeks to term)

	No.	ALP K.A.U/100ml	T_{test}	CK u/l	T_{test}	Albumin gm/dl	T_{test}
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		Mean \pm SD		Mean \pm SD		Mean \pm SD	
G1	30	8.8 \pm 2.7	P<0.05	168 \pm 25.3	P>0.05	3.05 \pm 0.3	P>0.05
G2	30	20.8 \pm 2.8		167 \pm 22.0		2.78 \pm 0.33	

Creatine Kinase Activity (CK)

The activities of CK in the pregnant women in the first trimester and in controls were 168.3 \pm 25.3 U/L and 162.6 \pm 22.8 U/L respectively (Table (1)). It was also found that women in the second group have

normal value of serum CK (167 \pm 22.0 U/L) as shown in Table (2). There was no significant difference (P>0.05) in level of CK between controls and the pregnant women in the first or third trimester (Table (3) and Figure (2)).

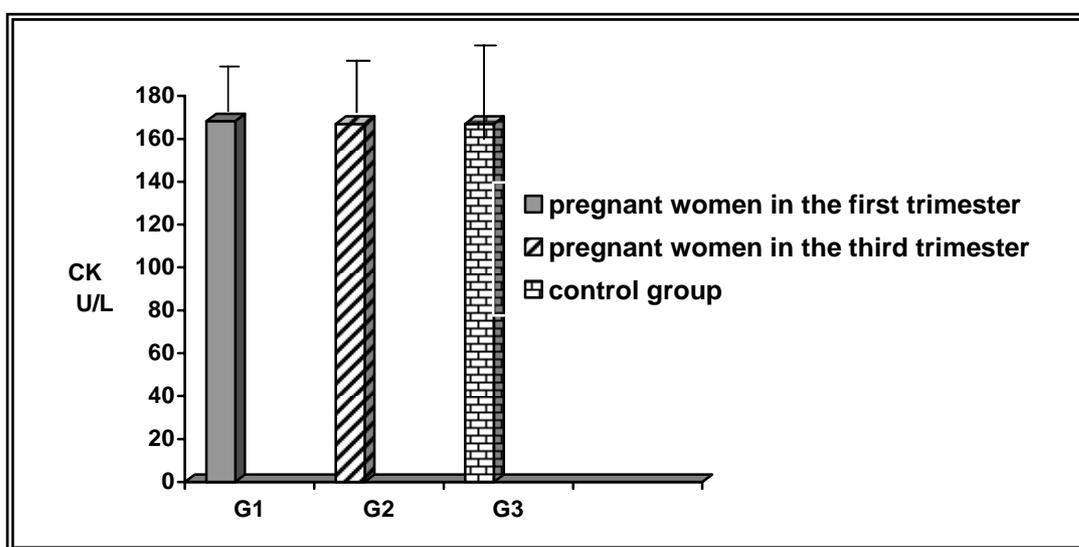


Figure (2): Activity of the enzyme CK in the pregnant women and control group

Concentration of Albumin

The concentration of albumin was measured in the pregnant women during different periods of pregnancy. Table (1) and Figure (3) demonstrate the levels of albumin in the pregnant women in the first trimester and in controls. The concentration of serum albumin in the pregnant women of the first trimester (3.05 \pm 0.3 gm/dL) had a normal value and did not differ significantly

(P>0.05) compared to controls (3.5 \pm 0.24 gm/dL). Albumin levels were lower in the third trimester group (2.7 \pm 0.33 gm/dL) than in the control group (P<0.05) (Table (2) and Figure (3)). The decrease in the concentration of albumin during pregnancy is due to the change in albumin metabolism also due to dilution result fluid retention . These results aggress with that of pual *et al* (18).

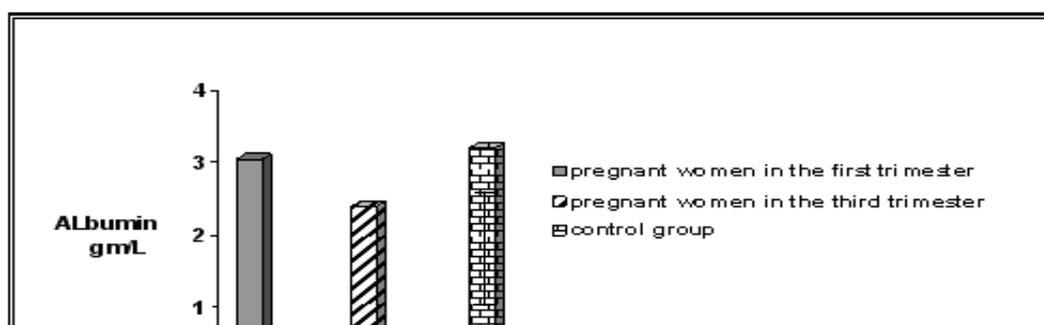


Figure (3): Concentration of the Albumin in the pregnant women and control group**Conclusion**

Women in the third trimester of pregnancy have high alkaline phosphatase (ALP) activity and low concentration of serum albumin compared with the women in the first trimester of pregnancy and controls.

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