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Estimating Some Biochemical Variables in the Blood of Pregnant Women

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Abstract

The study dealt with measuring some biochemical variables in the blood of pregnant women(blood glucose, albumin, uric acid, urea, calcium, phosphorus). The study included (65) blood samples from females whose ages ranged from (20-45) years, the categories under study were divided into three groups (Pregnant women G1, non-pregnant women G2, single women G3).

The results showed that the percentage of glucose in pregnant women G1 ranged between (152.9-143.143) and in non-pregnant women G2 (124.7-106.4) and in unmarried females G3 (133-86.3) (mg/dl), and also showed that the proportion of urea in pregnant women G1 It ranged between (4.1-4.21) and in non-pregnant women G2 (4.3-4.1) and in unmarried females G3 (2.4-1.9) (mmol/L), while the percentage of calcium in pregnant women was G1 (10.2-9.5) and in Non-pregnant women G2 (10.7-8.7) and in unmarried females G3 (11.7-9.7), while phosphorous was in pregnant women G1 (3.12-3.3), in non-pregnant G2 (3.6-3.1) and in unmarried females G3 (2.4-1.4) (mmol/L) and albumin in pregnant women G1 (5.3-4.71) and non-pregnant women G2 (5.4-4.13) and in unmarried females G3 (3.14-3.5) (gm/100 ml). As for the percentage of uric acid in the studied groups, it was in pregnant women G1 (5.7-5.1) and in non-pregnant women G2 (4.7-4.6) and in unmarried females G3 (3.4-2.4) (mg/dl).ss.

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Introduction

Pregnancy is a physiological phenomenon in which many functional and structural changes occur in the mother's body. These changes occur due to the fetus need for many requirements and numerous internal metabolic and hormonal changes occur during pregnancy as the metabolic processes in the mother's body are directed in a manner that meets the physiological state of pregnancy, including the needs of the fetus for the purpose of growth and development during childbirth [1].

Pregnant mother also needs high protein levels compared to non-pregnant women in order to meet the requirements of fetal growth; so that the weight represented by the fetus appears [2]. Gestational diabetes mellitus (GDM) is a complication of gestation that is characterized by impaired glucose tolerance with first recognition during gestation. It develops when β-cell of pancreas fail to compensate the diminished insulin sensitivity during gestation [3]. Uric acid is produced from the metabolism of proteins and some types of food containing purine. This acid is also transmitted from the liver to the kidneys through the blood to be filtered there and is excreted with urine products [4]. The normal rate of uric acid in females reaches (6.0-2.4) mg/dl [5], and hyperuricemia in pregnancy during pregnancy is considered to be a prevalent problem, as it affects pregnancy outcomes and causes pregnant hypertension (preeclampsia)[6].

Urea is formed inside the human body mainly in large and kidney cells, and may be produced in very small quantities in the tissues of the skin, muscles and brain cells [7]. Urea is the main means to get rid of excess nitrogen quantities than the body needs as more than 90% of Urea is excreted from the kidney cells and the remaining small part is excreted through the digestive system and skin [8,9].

Albumin is one of the proteins that are made by the liver, as it accounts for about 60% of the total proteins present in the blood. Albumin plays an important role in maintaining fluids and preventing them from escaping from the blood vessels. It contributes to feeding tissues and transporting many substances through different parts of the body, including hormones, vitamins, veins and calcium, and albumin is found within certain levels in the blood and there are a number of different conditions and health problems that may affect blood concentration [10]. The normal level of albumin in the blood is between 5.5-3.5 g/dl may differ slightly in different laboratories [11].

Calcium is one of the chemical elements necessary for living organisms and it is the most abundant mineral in the body and the body needs quantities Limited to building bone strengthening it, regulating muscle contractions, and maintaining proper communication between the brain and the rest of the body [12].

Methods

Collection of blood samples

56 blood samples were collected from females whose ages ranged

between (20-45) years. The studied groups were divided into three groups:

- The pregnant female group (G1) was represented by 30 samples.
- The group of married non-pregnant females (G2) was represented by 15 samples.
- The group of single women (G3) was represented by 11 samples.

The following diagnostic number was used to complete the research:

- LiNEAS glucose meter.
- Calcium measuring kit from the French company Biolabo.
- Phosphorous measuring kit from the French company Biolabo
- A kit for measuring uric acid from the French company Biolabo.
- LINEAR Urea Measurement Kit.

Statistical Analysis

Where appropriate, the data are presented as Means±SD. The relations between two variables were analyzed by simple regression using SPSS statistical software. The unpaired Student's t-test was used to ascertain relations between two groups. P<0.5 was considered statistically significant.

Results and Discussion

Table 1 shows the concentration of glucose in the blood of pregnant women compared to non-pregnant women, as it was observed that there was no significant difference in the blood of pregnant women while there is a significant difference between the two groups aboveat a probability level of (P > 0.05) when compared with the blood of non-married women, these results are consistent with the findings of Al-Rawi KF, et al. (2017) [13].

The samples under study were divided according to the age groups, for the samples of the first category (1a), which refers to the age group 20-34 years, and the second category (1b) ranges from 35-45 years, it is clear from Figure1a comparison of the concentration of glucose between groups Study for each age group. The high level of glucose among age group (1b) in all study groups at a probability level of (P > 0.05). The results showed a significant increase in pregnant women compared to the group of unmarried females.

This increase in glucose is due to the inability of pancreatic cells to produce insulin or decreased tissue sensitivity during pregnancy [14]. This rise in glucose occurs because insulin does not respond well to the presence of a placental stimulus that interferes with insulin sensitive receptors, which leads to high levels of sugar in the body, and this condition is symptomatic, and recovery is complete.

The results showed a significant increase in the concentration of phosphorus in the blood of pregnant and non-pregnant women compared to unmarried females at a probability level of (P > 0.05), while no statistical results were recorded with a difference in the level of phosphorus in pregnant women compared to non-pregnant women, and this is shown in Table 2.

Table 1: The average Glucose concentration in the blood of pregnant and non-pregnant women compared to unmarried females.

Status	No.	Blood Glucose concentration(mg / dL) (Mean ± SD)	P value
G1	30	144.7 ± 71.50	0.05
G2	15	114.44 ± 35.73	
G3	11	91.6 ± 21.22	

Table 2: The concentration of phosphorous in the blood of the studied groups.

Status	No.	Phosphorous concentration(mmol / L) (Mean ± SD)	P value
G1	30	3.2 ± 0.99	0.05
G2	15	3.3 ± 2.1	
G3	11	1.6 ± 0.52	

The study showed the phosphorous rate among the groups studied according to the age groups, as it was observed that there was no difference between the two groups in pregnant women, as well as the case in non-pregnant women, but it was found that there is a difference between the age groups of unmarried females at (P > 0.05), the phosphorous rate increased in the age group (2b) compared to the category (2a). As Figure 2a indicates the phosphorous rate in one group for the two age groups. While Figure 2b shows the phosphorous rate of the study groups for the two age groups, the statistical results for the age group (2a) showed that there were significant differences in the phosphorus rate among unmarried females compared to pregnant and non-pregnant women, which did not show a difference between them, and also the case for category (2b). However, the phosphorous rate for unmarried females is higher than class (2a).

The high level of phosphorus reflects the reabsorption of phosphates through the kidney tubes, which causes a decrease in phosphate excretion, as well as the effect of the flow of phosphates in the bloodstream from the food intake due to the availability of phosphates in a large number of food intake as well as the phosphate movement from the bone [15].

The apparent height of pregnant women (the study sample) due to the phosphorous-rich food may also be the case for the second group (non-pregnant), and most of them may be lactating women who must have good food and rich in minerals that help the fetus and child to grow.

The results showed a decrease in the level of calcium in pregnant and non-pregnant women compared to unmarried females at a probability level of (P > 0.05),while the statistical results did not record a difference in the level of calcium in pregnant women with non-pregnant women, and this is shown in Table 3.

Table 3: Calcium concentration in the blood of the studied groups.

Status	No.	Calcium concentration (mmol / L) (Mean ± SD)	P value
G1	30	9.8 ± 1.54	0.05
G2	15	9.6± 2.4	
G3	11	11.4 ± 1.3	

Our results are consistent with many studies, including Mahmood ES, et al. (2009), as it indicated that the low level of blood calcium concentration is due to the use of calcium in the process of building the fetal skeleton, as this decrease occurs as a result of an increased glomerular filtration rate [16].

Figures 3a and 3b refer to the calcium level in the study groups according to the age groups, as it appears from (3a) that there are no significant differences in the same group for the two age groups despite the low level in the age group (3b) and for each Study groups.

Figure 3b, as it is generally clear that there is a low level of calcium

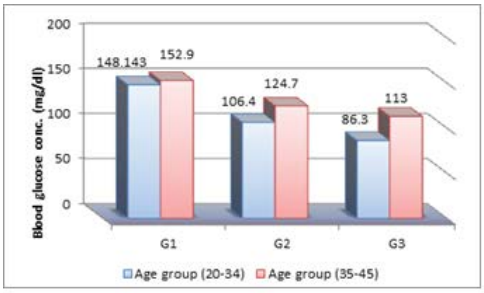

Figure 1a

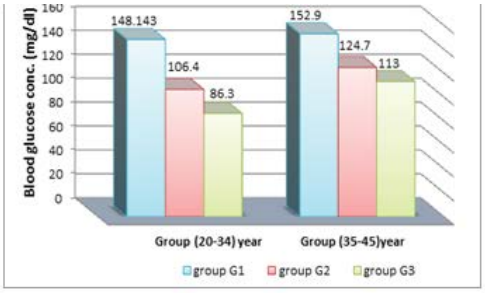

Figure 1b

Figure 1: Blood glucose concentration in pregnant and non-pregnant women compared to unmarried females by age groups. (a) Comparing the glucose concentration according to the age groups of the same study group; (b) Comparison of glucose concentration by age groups among the study groups.

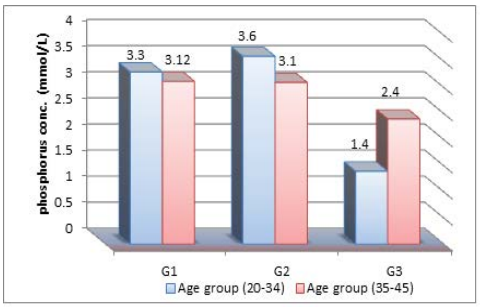

Figure 2a

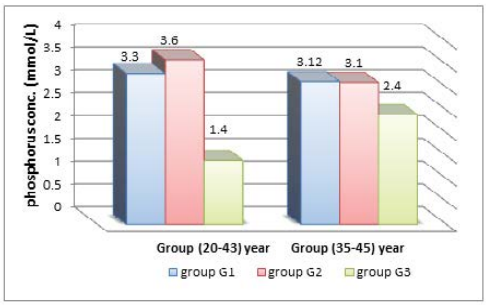

Figure 2b

Figure 2: The rate of phosphorous concentration in the blood of pregnant and non-pregnant women compared to unmarried females by age groups.(a) Comparing phosphorous concentration according to the age groups of one study group; (b) Comparing phosphorous concentration according to age groups among the study groups.

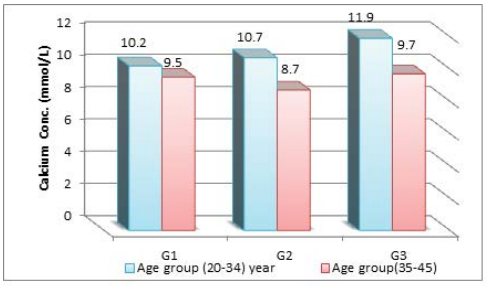

Figure 3a

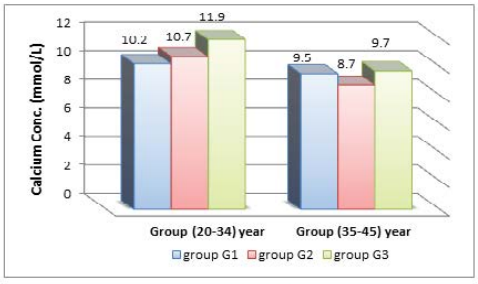

Figure 3b

Figure 3: The rate of Calcium concentration in the blood of pregnant and non-pregnant women compared to unmarried females by age groups.(a) Comparing Calcium concentration according to the age groups of one study group; (b) Comparing Calcium concentration according to age groups among the study groups.

in the age group (3b) compared to category (3a) and at all groups of the study, the high level of calcium was found in unmarried females for pregnant and non-pregnant women, while there were no differences between pregnant and non-pregnant women at a probability level of ($P > 0.05$), either for age group (3b), the results do not indicate significant differences, as the decrease was slight compared to the group of single women.

The low level of calcium is due to an increase in the calcium movement of the bones for women, leading to a decrease in the mineral density of the bones. Calcium reabsorption takes place by the renal tubes and thus a decrease in the excretion of calcium into the diuresis as a result of the low level of calcium hydration.

The reason for the change in the level of blood calcium concentration in pregnant women is due to the changes that occur during pregnancy and breastfeeding, which affect calcium metabolism, Bones, but during breastfeeding, there is a decrease in the level of estrogen and an increase in the level of the hormone PTHrP (protein-linked parathyroid hormone) that is related to the movement or dissolution of calcium from the bones leading to the occurrence of osteophosis and thus the risk of fractures [17].

Table 4 shows a high rate of albumin in the blood of pregnant women, as it was noticed that there was no significant change in its table in pregnant women compared to non-pregnant women, while it is clear from the results that the indicated figure indicates the rise in the level of albumin in the blood of pregnant women when compared with group G3 at a probability level of ($P > 0.05$). However, the results indicated that the albumin rate in all groups is approximately within the normal level that ranges between 3.5-5.5 g/100 ml.

Table 4: Albumin rate in the blood of the studied groups.

Status	No.	Albumin (g / 100 ml) (Mean ± SD)	P value
G1	30	5.03 ± 1.29	0.05
G2	15	4.82± 2.43	
G3	11	3.2±0.69	

Figures 4a and 4b indicate the rate of albumin in the blood of pregnant and non-pregnant women in addition to unmarried females by age groups, as Figure 4a shows a comparison of the level of albumin in one group for the two age groups as the results show High level in the age group (4b) and all study groups compared to the class (4a) at a probability level of ($P > 0.05$).

As for Figure 4b, it shows the comparison between the study groups for each age group, as the statistical results showed an increase in the level of pregnant women in both groups compared to unmarried females, and the change is slight or not calculated as a change between pregnant and non-pregnant women and in the two age groups.

The change in the level of albumin in the blood does not always indicate a pathological condition, as it may change as a result of taking some medications; insulin, steroids and growth hormones raise the level of albumin in the blood while birth control pills may reduce the level of albumin in the blood [18].

Albumin plays an important role in maintaining fluid balance in the body as it withdraws fluids to the cell in case it needs fluids and removes excess fluids from the cell. If there is an increase in albumin in the blood, the cells withdraw large amounts of fluid, which leads to cell swelling and swelling [19].

Table 5 shows the rate of Urea in the blood of pregnant women, as it was observed that there was a significant change in the blood of pregnant women compared with unmarried and unimportant females and it may be absent compared to non-pregnant women, i.e., there was a significant change between the two groups (G1 and G2) when compared With blood of non-married women (G3).

Urea elevation is a health condition that occurs due to the toxic effects of an abnormal rise in the concentration of nitrogenous substances in the blood. As a result of the kidneys' failure to flush waste through urine, the final products of protein metabolism accumulate in the blood, and in the normal position they are filtered during the passage of blood into the kidneys, and urea rise It is caused by any disorder that hinders kidney function or impedes the process of excreting urine from the body. Likewise, the higher level of urea than its normal limit is attributable either to increased urea production, or to a decrease in the disposal process, or to both things [20].

Table 5: Urea rate in the blood of the studied groups.

Status	No.	Urea (mmol / L) (Mean ± SD)	P value
G1	30	4.5± 1.67	0.05
G2	15	4±1.53	
G3	11	1.99± 0.50	

Figures 5a and 5b indicate the urea level in the study groups according to the age groups, as shown in Figure 5a compared to the level of urea in one group, the results showed that there is no significant differences between the two age groups despite the high level of urea in the age group (5b) and for all study groups**,** As for Figure 5b, it shows the comparison between the study groups for each age group, as it is clear in general the high level of urea in the age group (5b) compared to the category (5a) and at all groups of the study, as well as the low urea level in unmarried females for pregnant and non-pregnant women. There are no differences between pregnant and non-pregnant women.

The body afflicts a number of serious and chronic diseases due to dysfunction and healthy setbacks, of course affecting health and the ability of a person to work and produce. The cells get rid of their excreta with metabolism if the body is not rid of them quickly, they are deposited in the kidneys and cause great problems and damage to the health of the body, up to kidney failure from the reasons for that eating heavy salts with hard work, lack of movement or difficult sport, so the rate of urea increases By blood due to physical exhaustion or too much food that contains protein, mercury poisoning, creatinine foods or diseases such as urinary obstruction [21].

Table 6 shows the rate of uric acid in the blood of pregnant women, as the statistical results showed the presence of a significant change in the blood of pregnant women compared with unmarried and unimportant females compared to the non-pregnant group, as well as the clear difference in its level between the G2 group when compared with G3 .By the indicated figure, the increase in urea level is shown in the groups G1 and G2 compared to G3.

Despite this, most of the study samples have a level of uric acid within the normal level for women, which range from 2.4 – 6 mg/dl.

The presence of high levels of uric acid is usually associated with gout, a form of arthritis, however it can also be an important sign during pregnancy, as the high level of uric acid puts at risk of developing pregnant high blood pressure and diabetes, and may You are also more at risk of developing a serious condition called preeclampsia, and getting appropriate prenatal care to monitor this and other health indicators is vital to a pregnant woman and child's health [22].

The problem of high salts is one of the most common and occasional problems that may afflict a woman during pregnancy, as it appears as a result of an imbalance in the nutritional balance, and this problem occurs in the body because of the high uric acid for a pregnant woman.

Figures 6a and 6b indicate the rate of uric acid in the study groups according to the age groups. Figure 6a indicates a comparison of the level of uric acid in one group. The results showed that there were

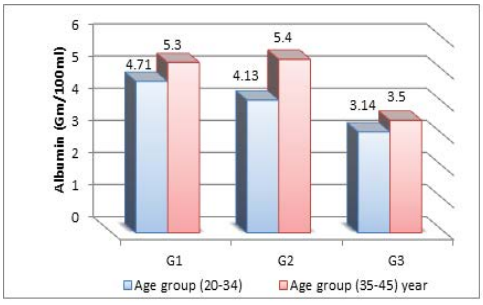

Figure 4a

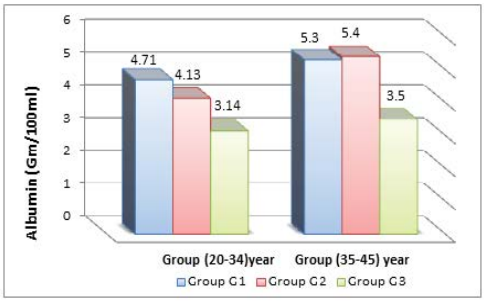

Figure 4b

Figure 4: Albumin concentration in the blood of pregnant and non-pregnant women compared to unmarried females, according to age groups.(a) Comparing Albumin concentration according to the age groups of one study group; (b) Comparing Albuminconcentration according to age groups among the study groups.

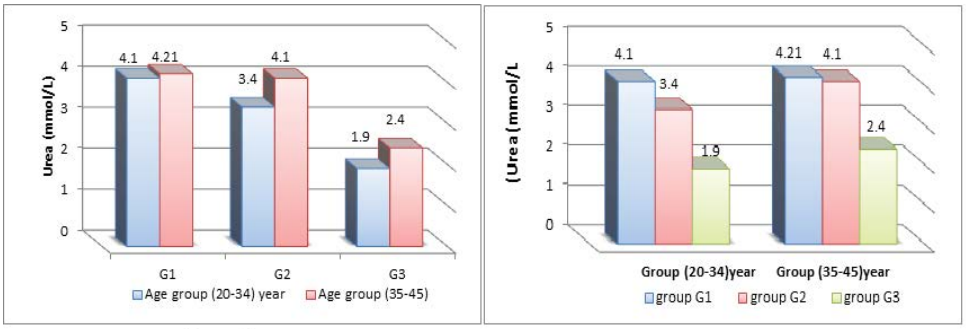

Figure 5a

Figure 5b

Figure 5: Urea concentration in the blood of pregnant and non-pregnant women compared to unmarried females, according to age groups.(a) Comparing Urea concentration according to the age groups of one study group. (b) Comparing Urea concentration according to age groups among the study groups.

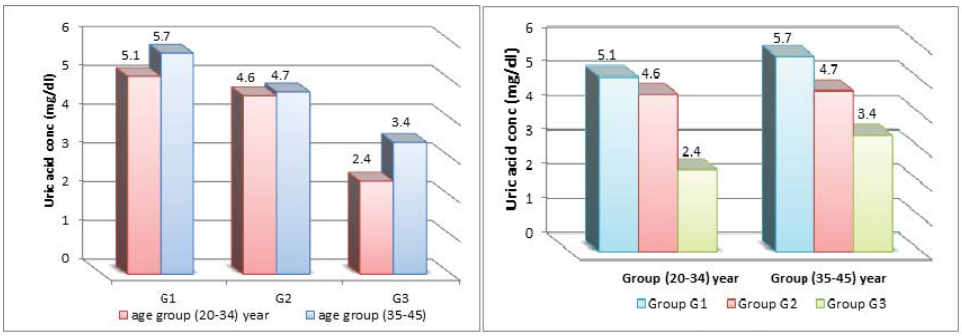

Figure 6a

Figure 6b

Figure 6: Uric Acid concentration in the blood of pregnant and non-pregnant women compared to unmarried females, according to age groups. (a) Comparing Uric Acid concentration according to the age groups of one study group; (b) Comparing Uric Acid concentration according to age groups among the study groups.

Table 6: Uric Acid rate in the blood of the studied groups.

Status	No.	Uric Acid(mg / dl) (Mean ± SD)	P value
G1	30	5.4± 1.29	0.05
G2	15	4.7±0.997	
G3	11	2.6± 0.851	

significant differences between the two age groups despite the high level of uric in the age group (6b) and for each of the study groups. Figure 6b shows a comparison between the study groups for each age group, as it is generally clear that the high level of uric in age group (6b) compared to category (6b) and in all study groups, as well as high level in pregnant and non-pregnant women compared to group G3 and the absence of differences Between G1 and G2.

Purine metabolism occurs in the body, and can also be consumed through the diet, as uric acid is formed as a result of this metabolism, and the kidneys usually excrete most of this acid through urine when there are excessive amounts of uric acid, the kidneys may not be able to remove it in a way Sufficient from the body, leads to the accumulation of the chemical (uric acid) in the blood [23].

High levels of uric acid can increase the chances of complications during pregnancy, and high levels of uric acid during the first twenty weeks of pregnancy are associated with a greater risk of diabetes, pregnancy and mild pregnancy syndrome, according to the results published in 2010 in the journal Hypertension and Pregnancy. Gestational diabetes develops in about 4% of pregnant women, according to the American Diabetes Association, in which case the body is unable to properly produce or use the hormone insulin to regulate blood sugar, and pregnancy poisoning is diagnosed when high blood pressure is caused. It occurs after the twentieth week of pregnancy, and the presence of protein in the urine is also an indication of this condition. Diabetes in an uncontrolled pregnancy may cause a high blood sugar level in the fetus as well, and a high level of glucose in the blood can enter the placenta, then it is Store excess glucose, which usually burns to obtain energy E, and fat on the body of the child, and this increases the risk of exposure to a number of health problems including difficulty breathing after birth and a greater chance of obesity or the presence of type 2 diabetes, and preeclampsia can lead to organ damage and complicated childbirth, If left untreated, it can also cause death to the mother and the baby.

The high levels of uric acid indicate a malfunction in the body, such as kidney disease, and if there are any health problems, so prevention must be maintained to maintain pregnancy in a low risk, and obesity is one of the factors that increase the chances of infection with high uric acid, so getting Having a healthy weight before pregnancy is ideal, and obesity also increases the risk of gestational diabetes, high blood pressure and pre-eclampsia [22].

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