



Research Article

Effect of anemia on pregnant women during the first week in Samarra city

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Abstract

This study deal with the effect of pregnancy on the biochemical blood characteristics, where blood samples were collected from pregnant women during the three stages of pregnancy and from married women who were not pregnant as a control group. A woman. As for married women who are not pregnant, they reached (10) women, their ages ranged between (15-40) years. The results of this study showed that blood components were affected by a pregnancy, so the number of platelets decreased significantly during the three stages of pregnancy compared with married women who were not pregnant at a significant level (<0.01). The results also showed a significant decrease in the concentration of hemoglobin in the blood, the number of red blood cells and the proportion of the volume of pressurized blood cells during the three stages of pregnancy compared with married women who were not pregnant at a significant level ($P < 0.01$).

Keywords Anemia, Pregnancy, Hemoglobin RBC, MCV

Introduction

Sex hormones show wide changes during pregnancy, especially estrogens and progesterone, which gradually increase to reach their maximum concentrations in the last three months of pregnancy. The anatomical result of pregnancy, represented by the rise of the uterus to its maximum height and its pressure on the diaphragm, affects many visceral organs, especially the lungs, heart, and stomach, leading to disruption in the activity of these organs (Guyton & Hall, 2006)

Materials and working methods

Hematological Parameters

A quantity of blood was drawn in the amount of 8 ml for each sample, then 3 ml of the drawn blood was taken and placed in

test tubes containing the anticoagulant substance EDTA for the purpose of examining hematological variables.

The Mandari apparatus was used to measure blood images

Red blood cell count

Table 1 shows that there were significant differences in the number of red blood cells for pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group at a significant level $P < 0.01$. It was at a rate of $(4.287 \pm 0.493) 10^6 / \text{mm}^3$,

$(3.793 \pm 0.412) 10^6 / \text{mm}^3$ and $(3.182 \pm 0.462) 10^6 / \text{mm}^3$ respectively for the three stages of pregnancy compared with married non-pregnant women as a control group, which was at a rate of $(4.332 \pm 0.53) 10^6 / \text{mm}^3$.

Table 1. The level of red blood cell count of pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group

| Totals by week | BMI Standard |
|----------------|--------------------|
| 4 week | A 4.287 ± 0.493 |
| 8 week | B 3.793 ± 0.412 |
| 12week | C 3.182 ± 0.462 |
| Control | A 4.332 ± 0.53 |

*Different letters perpendicularly mean that there are significant differences at the level $P < 0.01$

The values are expressed as the mean ± standard error

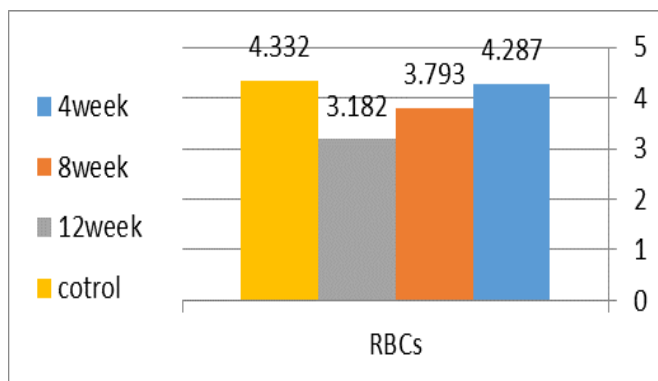


Fig. 1 The level of red blood cell count of pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group

When estimating the number of red blood cells in pregnant women during the three stages of pregnancy compared to the control group, it is noted that there is a significant decrease in the number of red blood cells, especially in the second and third stages of pregnancy. The red blood cells are getting bigger and bigger, and this is what was matched by the results of the study conducted by [Messino \(2020\)](#), who indicated a decrease in the number of red blood cells as a result of anemia during pregnancy, malnutrition, and the fetus's need for iron and hemoglobin to form its circulatory system, as [Telle \(1999\)](#) indicated to iron deficiency during pregnancy. The pregnancy period is a result of the low number of red blood cells and this leads to a decrease in the level of bilirubin in the liver. Another explanation for the decrease in the number of white blood cells with the progression of pregnancy is the lack of production of the hormone Erythropoietin, which is responsible for the production of blood cells, to increase blood circulation and to meet the kidneys' need for oxygen ([Guyton & Hall, 2006](#)). The results of the study conducted by [Barron \(1992\)](#) also

coincided with the results of the current study in the decrease in the number of blood cells as a result of a pregnant woman's infection with one of the diseases, which leads to attacking and breaking the blood cells, including HELLP disease, whose symptoms appear during pregnancy, namely hemolysis, high liver enzymes, and low blood platelets. Where red blood cells break down, especially in the last stage of pregnancy ([Guyton & Hall, 2020](#)).

Hemoglobin concentration

[Table 2](#) shows that there were significant differences in the concentration of hemoglobin in the blood of pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group at a significant level $P < 0.01$. It was at a rate of (11.58 ± 8.11) g / 100 ml, (10.41 ± 7.53) g / 100 ml, and (10.12 ± 9.22) g / 100 ml respectively for the three stages of pregnancy compared with married women who were not pregnant as a control group, which was at a rate of (11.58 ± 8.11) g / 100 ml.

± 6.32 (11.63 g / 100 ml).

Table 2. Hemoglobin concentration of pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group

| Totals by week | Hemoglobin concentration |
|----------------|--------------------------|
| 4 week | a 11.58 ±8.11 |
| 8 week | b 10.41 ±7.53 |
| 12week | b 10.12 ±9.22 |
| Control | a 11.63 ± 6.32 |

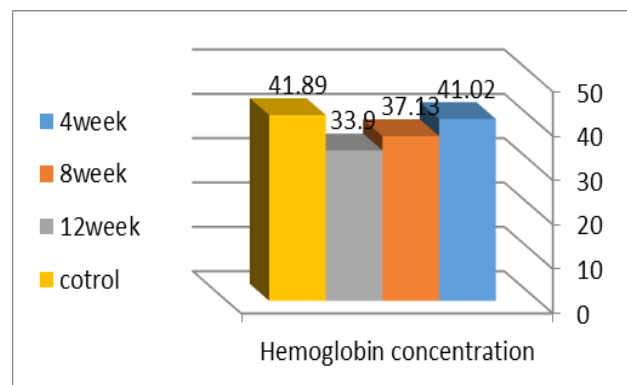


Fig. 2 Hemoglobin concentration of pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group

A significant decrease was observed when measuring hemoglobin concentration of pregnant women during the

three stages of pregnancy compared with the control group, especially in the second and third stages of pregnancy. This leads to a decrease in the concentration of hemoglobin in the blood, which leads to a dilution of the blood in the volume of blood plasma studies also indicated a decrease in hemoglobin concentration during pregnancy due to iron deficiency, as it is used in the production of red blood cells. Decreased hemoglobin, and defects in the liver during pregnancy lead to hemolysis and the breakdown of red blood cells, and consequently, a decrease in hemoglobin concentration, in addition to high activity of liver enzymes and a decrease in the number of blood platelets (Squires, 2006). The researcher Mishra and his group (2005) pointed out that the decrease in hemoglobin in the blood is a result of the imbalance in the amount of iron in the body, as the body loses more than it produces due to the increased needs of the fetus, especially in the last stage of pregnancy and the mother's loss of many minerals, carbohydrates, proteins, and vitamins. Therefore, the pregnant woman must be given tablets containing It contains iron in addition to eating foods rich in this mineral to help the body balance and self-homeostasis, and this is what the reports of the World Health Organization (2003) indicated in modifying the diet of the pregnant mother because the hemoglobin level at 11g/100ml is considered an indicator of anemia in the pregnant woman. While the study conducted by Scanlon and his group (2000) did not agree with our results, as they indicated that the concentration of hemoglobin in the blood during pregnancy was more than 14.4 g/100ml, causing pre-eclampsia or pre-eclampsia, and the results of (Miller & Hanretty, 1997) are not. Identical to our current study the high concentration of hemoglobin in the blood of pregnant women due to dehydration leads to the concentration of blood components, which causes a rise in the value of hemoglobin in the blood.

Volume percentage of compressed blood cells

Table 3 shows that there were significant differences in PCV volume level for pregnant women during the three pregnancy stages compared with married non-pregnant women as a control group at a significant level $P < 0.01$. It was at a rate of (41.02 ± 2.16) %, $(37.13 \pm 3.17\%)$ and $(33.97 \pm 3.11\%)$, respectively, for the three stages of pregnancy, compared with married women who were not pregnant as a control group, and it was at a rate of $(41.89 \pm 3.22)\%$.

When estimating the level of pressurized blood cells volume in pregnant women during the three stages of pregnancy compared with married women who are not pregnant as a control group, it is noted that there is a significant decrease, especially in the second and third stages of pregnancy. It depends on the number of red blood cells, and this study is consistent with the results of the researcher Allen (2010) that pregnancy leads to a change in the blood parameters and their decrease, including a decrease in the number of red blood cells and iron deficiency, and consequently a decrease in hemoglobin in the blood and a decrease in the percentage of pressurized blood cells. Hellwing agrees with our current

study in that the volume of blood plasma increases during pregnancy and the size of red blood cells increases and their number decreases, and thus the proportion of compressed blood cells decreases, so there is a dilution in the blood Hemodilution.

Table 3. The percentage of the volume of pressurized blood cells for pregnant women during the three stages of pregnancy compared with married women who are not pregnant as a control group

| Totals by week | PCV% |
|----------------|-------------------|
| 4 week | a 41.02 ± 2.16 |
| 8 week | b 37.13 ± 3.17 |
| 12week | c 33.97 ± 3.11 |
| Control | a 41.89 ± 3.22 |

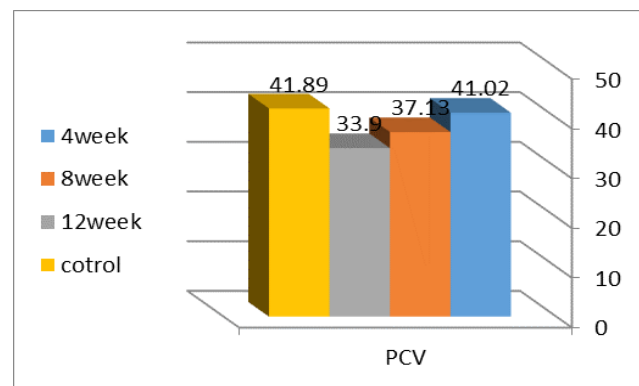


Fig. 3 Percentage of CDW of pregnant women during the three stages of pregnancy compared with married non-pregnant women as a control group

The researcher Suzuki (2006) pointed out that hemolysis resulting from the breakdown of red blood cells leads to a decrease in the volume of compressed blood cells, and that this hemolysis is a symptom of ELLPH that affects pregnant women during pregnancy, especially in the last stage of it.

Conclusion

The decrease in the number of platelets, hemoglobin in the blood, the number of red blood cells and the percentage of the volume of pressurized blood cells during the three stages of pregnancy compared with married women who are not pregnant as a control group, and the decrease increases with the progression of pregnancy months.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The author declares that the work has consent for publication.

Funding support

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Ethical Considerations

The study was approved by the institutional ethical committee

References

Allen, L. A., Felker, G. M., Mehra, M. R., Chiong, J. R., Dunlap, S. H., Ghali, J. K. & Adams Jr, K. F. (2010). Validation and potential

mechanisms of red cell distribution width as a prognostic marker in heart failure. *Journal of cardiac failure*, 16(3), 230-238.

Guyton, A. C., & Hall, J. E. (2006). *Medical physiology*. Gökhan N, Çavuşoğlu H (Çeviren), 3.

Hall, J. E., & Hall, M. E. (2020). *Guyton and Hall textbook of medical physiology e-Book*. Elsevier Health Sciences.

Messino, P. J., Kharrazi, H., Kim, J. M., & Lehmann, H. (2020). A method for measuring the effect of certified electronic health record technology on childhood immunization status scores among Medicaid managed care network providers. *Journal of biomedical informatics*, 110, 103567.

Miller, F. W., & Hanretty, P. K. (1997). Placental development and physiology. *Obstetrics Illustrated. 5th ed. Philadelphia: Churchill Livingstone*.

Squires Jr, R. H., Shneider, B. L., Bucuvalas, J., Alonso, E., Sokol, R. J., Narkewicz, M. R. & Hynan, L. S. (2006). Acute liver failure in children: the first 348 patients in the pediatric acute liver failure study group. *The Journal of pediatrics*, 148(5), 652-658.

Suzuki, K., Peake, J., Nosaka, K., Okutsu, M., Abbiss, C. R., Surriano, R. & Laursen, P. B. (2006). Changes in markers of muscle damage, inflammation and HSP70 after an Ironman Triathlon race. *European journal of applied physiology*, 98(6), 525-534.

Telle, H. R., Steinmeyer, G., Dunlop, A. E., Stenger, J., Sutter, D. H., & Keller, U. (1999). Carrier-envelope offset phase control: A novel concept for absolute optical frequency measurement and ultrashort pulse generation. *Applied Physics B*, 69(4), 327-332.

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