**OBAT: Jurnal Riset Ilmu Farmasi dan Kesehatan**
**Vol. 2 No. 4 Juli 2024**
e-ISSN: 3031-0148, p-ISSN: 3031-013X, Hal 147-153
DOI: https://doi.org/10.61132/obat.v2i3.533
*Available Online at:* https://journal.arikesi.or.id/index.php/OBAT

# The Relationship Between Pregnant Women Hair Loss And Ferritin Levels And Vitamin D3 In Salah Al-Din Governorate

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***Abstract.*** *The purpose of the current study was to look into the connection between hair loss in the first and second trimesters of pregnancy and the levels of vitamin D3 and ferritin in blood serum of pregnant at Tikrit Hospital. The participants in the study varied in age from 22 to 38 years old, and the sample consisted of 50 pregnant women experiencing hair loss in the first and second trimesters of their pregnancy. A comparison group consisted of 30 pregnant women who did not experience hair loss. Every research participant had their serum levels of ferritin, vitamin D3, white blood cell counts, and platelet counts tested. When compared to women who did not experience hair loss during the first and second trimesters of pregnancy, Vitamin D3& ferritin levels were found to be significantly reduced in women who experienced hair loss throughout the first and second trimesters of pregnancy, compared to normal levels in woman who did not associated with hair loss but rather their variations were explained by the typical physiology of pregnancy .*

***Keyword:*** *Vitamin D3, pregnancy, Ferritin, Pregnant women, Hair loss, white blood cells.*

## Introduction

The pregnancy is a natural physiological condition that causes a pregnant woman's blood to change in many ways, including her heart, vision, hair, nails, and other body organs. Many serological changes are caused by fetal changes during pregnancy. Low amounts of vitamin and minerals, such as serum ferritin & vitamin D3, occur throughout fetal development, and this has a significant impact on body structure, including hair (Barrett et al., 2019) . A pregnant woman's body needs more vitamins and minerals than usual due to the growth of the fetus (Keats et al., 2021). Chemical changes associated with pregnancy cause low levels of iron and vitamin D3(Giourga et al., 2023). low iron levels associated with pregnancy have been linked to fetal malformations and growth retardation (Georgieff, 2023). In addition to acting as an antioxidant, iron is required for DNA synthesis and oxygen transport (Galaris et al., 2019). The body needs vitamin D3 to help absorb calcium from the intestines (Khazai et al., 2008). Is necessary for the growth of the fetal bones. A lack of vitamin D3 in the developing fetus is liked to a number of problems, including fetus bone fractures (Moon et al., 2021). Babies who are breastfed by mothers who have low vitamin D3 levels run the danger of having low vitamin B6 since the amount of vitamin D3 in them is dependent on the mothers vitamin level (Godfrey et al., 2023). Premature delivery, hair thinning, and respiratory problems in the unborn child are just a few of the pregnancy-related

*Received June 18, 2024; Revised June 29, 2024; Accepted July 08, 2024; Published July 11, 2024*
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consequences that can result from low vitamin D3 levels (Barbosa et al., 2024). Insufficient levels of vitamin D3 after birth might be a factor in increased hair loss and possible problems with bones (Mansur et al., 2022). Because vitamin D3 is necessary for the growth and maintenance of both existing hair follicles, a shortage in this nutrient is thought to contribute to hair loss. The body may not produce as much hair when it is deficient in vitamin D. reduced serum ferritin levels previously in a similar manner. Numerous issues following childbirth can have an impact on the heart, muscles, nails, and hair health, among other body systems (Almohanna et al., 2019). Pregnancy-related iron deficiency results in thinning hair because it inhibits the production of enough red blood cells to provide oxygen to different body tissues (Georgieff, 2020). The purpose of this research is to investigate the effects, both direct and indirect, of low blood ferritin & vitamin D3 levels in first –and second-trimester pregnant women .

## Materials and Methods

Thirty non- pregnant women, ages 22 to 38, and fifty pregnant women in the first and second trimesters of their pregnancies were included in this study. These women's samples were taken from the gynecology department of Tikrit hospital. Five milliliters of blood were drawn from every individual:

- First part: To estimate (Hb,WBC,PLT), it was put in a tube with anticoagulant (EDTA) .
- Two part: Using the ELISA kit found in [BIOLABO], It was put in a plastic tube devoid of anticoagulant to estimate ( ferritin, vitamin D3).

## Analytical statistics

Software called SPSS was used to do the statistical analysis. The t-test was employed to compute group differences and examine quantitative data. Comparing non-numeric and qualitative data was another use for the Chi-square test. When there were statistically significant differences between the groups under study, a P-value of less than 0.05 was deemed statistically significant.

**Table1:Shows the associations between several biological factors and hair loss in expectant, as well as a control group of expectant without hair loss.**

| Parameters | Groups | | P- value |
|---|---|---|---|
| | Control without hair loss Mean± SD | Control with hair loss Mean ± SD | |
| Pregnant period (Month) | 4.0000 ± 1.69967 | 3.6897 ± 1.62796 | 0.05* |
| Vitamin D (ng/mL)>30 | 30.5000 ± 5.81053 | 12.1314 ± 6.06972 | 0.05* |
| Ferritin (ng/mL)20-200 | 25.4600 ± 9.47877 | 11.6586 ± 2.53638 | 0.05* |
| Hb (g/dl )11-16 | 11.4000 ± 1.02089 | 10.5724 ± 1.49640 | 0.05* |
| WBC (*103 )/µl | 7.2400 ± 1.47136 | 8.4276 ± 3.40146 | 0.05* |
| PLT *103 )/µl | 182.4000 ± 62.88473 | 221.4483 ± 54.07969 | 0.05* |

**Table 2: Biochemical characteristics associated with hair loss in pregnant women.**

**Correlation**

| Parameters | Pregnant period (Month) | Vitamin D3 (ng/mL)>30 | Ferritin (ng/mL) (20-200) | Hb (g/dl) (11-16) | WBC (*103)/µl | PLT (*103)/µl |
|---|---|---|---|---|---|---|
| Pregnant period (Month) | 1 | -.375* | .271 | .161 | -.060 | .186 |
| Vitamin D (ng/mL)>30 | -.375* | 1 | -.095 | .005 | -.022 | -.125 |
| Ferritin (ng/mL)20-200 | .271 | -.095 | 1 | .387* | .286 | -.152 |
| Hb (g/dl )11-16 | .161 | .005 | .387* | 1 | -.086 | -.093 |
| WBC (*103)/µl | -.060 | -.022 | .286 | -.086 | 1 | -.055 |
| PLT (*103)/µl | .186 | -.125 | -.152 | -.093 | -.055 | 1 |

*. Correlation is significant at the 0.05 level (2- tailed).

**Table 3: Association between biochemical variables in pregnant women without hair loss**

**Correlation**

| Parameters | Pregnant period (Month) | Vitamin D3 (ng/mL)>30 | Ferritin (ng/mL)20-200 | Hb (g/dl) 11-16 | WBC (*103)/µl | PLT (*103)/µl |
|---|---|---|---|---|---|---|
| Pregnant period (Month) | 1 | -.646* | -.130 | -.474 | .342 | -.352 |
| VitaminD3 (ng/mL)>30 | -.646* | 1 | .395 | .810** | -.487 | -.046 |
| Ferritin (ng/mL)20-200 | -.130 | .395 | 1 | .472 | .197 | .239 |
| Hb (g/dl) 11-16 | -.474 | .810** | .472 | 1 | -.186 | .336 |
| WBC (*103)/µl | .342 | -.487 | .197 | -.186 | 1 | .267 |
| PLT (*103)/µl | -.352 | -.046 | .239 | .336 | .267 | 1 |

*. Correlation is significant at the 0.05 level (2- tailed).

**Rustles**

Study results indicate that pregnant women with hair loss significantly lower levels of vitamin D3,hemoglobin and ferritin than pregnant women without hair loss (P<0.05). The means of vitamin D3, ferritin, and hemoglobin were as follows: (12.131 ± 6.070), (11.659 ± 2.536),(10.572 ± 1.496), respectively, for women experiencing hair loss during pregnancy. As for expectant women who don't lose hair, the averages were: (30,500 ± 5,811), (25,460 ± 9,479), and (11,400 ± 1,021), respectively. The findings also revealed that pregnant women who experienced hair loss had significantly higher amounts of white blood cells and platelets than pregnant women who did not.

The averages were as follows: (8.428 ± 3.401) for white blood cells and (221.448 ± 54.080) for platelets in women with hair loss, compared to (7.240 ± 1.471) and (182.400 ± 62.885) respectively for women without hair loss (Table 1). A negative connection between vitamin D3, white blood cells, platelet and ferritin levels in pregnant women with hair loss also showed in results, and a positive relationship amid vitamin D3 and hemoglobin (Table 2). The results also showed that decreased intake of vitamin D3 and increased need for it during pregnancy lead to lower levels in the blood serum of pregnant women, causing multiple complications. Iron deficiency is common during pregnancy due to the increased need to transport oxygen to various tissues, and a reduction in ferritin causes tissues and hair follicles to receive less oxygen, which causes hair to thin and fall out. Other issues including low birth weight and fetal discomfort can result from low serum ferritin levels (Dragomir et al., 2024)(Vestergaard et al., 2023)(Kiely et al., 2021). According to this research, the higher energy needs of pregnancy and delivery resulted in an increase in white blood cell counts (Dockree et al., 2021)(Zhu et al., 2024). Stress, nausea, and vomiting are just a few of the numerous causes of elevated white blood cell counts (Aslan et al., 2022)(Kaur et al., 2014)(Saleh et al., 2020). Pregnant women have a number of hematological changes in their blood serum during pregnancy, including increased amounts of platelets and white blood cells (Table3).

**Discussion**

a pregnant woman's risk of developing iron deficit anemia is higher in the first & second trimesters of pregnancy. Low ferritin blood is major cause to the increased need for iron to support the increased blood volume, which must meet the needs of the tissues of the mother, placenta and fetus. Most pregnant women have low vitamin D3 levels, either due to diet, clothing, or sunscreen use (Saleh et al., 2020)(Georgieff, 2020)(Raut & Hiwale, 2022). Skin color and air pollution also affect the absorption of vitamin D3, because sunlight is necessary for its activation. Vitamin D3 contributes to the development and maturation of hair follicles by facilitating the synthesis of essential components (Bocheva et al., 2021) (Joshi et al., 2023). A deficiency, in vitamin D3 can disrupt the function of hair follicles leading to increased hair loss and hindered growth(Saini & Mysore, 2021)(Keene, 2022). This insufficiency is linked to alopecia areata, a condition that results in hair loss on the scalp and other parts of the body (Żeberkiewicz et al., 2020). Vitamin D3 deficiency can be caused by spending time and experiencing nausea, during pregnancy, which may result in a lack of nutrient rich foods (Aji et al., 2019). When there is an intake of vitamin D3 and an increased demand for it during pregnancy it can lead to decreased levels in the blood serum resulting in complications.

Iron deficiency is common in pregnant women due to the need for oxygen transport to different tissues during fetal development. A decrease in ferritin levels can lead to oxygenation of tissues and hair follicles resulting in hair thinning and loss. Insufficient serum ferritin levels may also contribute to issues like birth weight and fetal distress (Kiely et al., 2021)(Hansen et al., 2023). This research found that the white blood cell count increases during pregnancy and childbirth due to the body's energy demands (Dockree et al., 2021)(Zhu et al., 2024). Various factors like stress, nausea and vomiting can cause elevated white blood cell counts (Mank et al., 2024)(Aslan et al., 2022)(Dimitriadis et al., 2023). Pregnant women experience changes in their serum levels including increased clotting factors and platelet count (Yoon, 2019). The rise in platelet levels may be linked to alterations, in heart rate and cardiac output. During pregnancy certain transformations take place as part of the process although various medical conditions can worsen these alterations (Soma-Pillay et al., 2016).Our research uncovered a connection, between the levels of vitamin D3, serum ferritin and hair loss, among the women participating in the study.

**Conclusion**

In this study we discovered that the first and second trimester of the group of pregnant women who did not experience hair loss had normal levels of blood ferritin and vitamin D3 and other factors such as white blood cell and platelet counts that were not relevant. Hair loss, but rather changes related to pregnancy-related physiology.

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