



Pregnancy and Physiological Factors Contributing to Anemia across the Three Stages of Pregnancy in Zliten

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الحمل والعوامل الفسيولوجية المساهمة في فقر الدم في المراحل الثلاثة من الحمل في مدينة زلiten

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Abstract

Anemia is a condition where your blood lacks enough healthy red blood cells to deliver oxygen efficiently. During pregnancy, your body requires extra iron to generate red blood cells for both you and your developing baby. In collaboration with gynecologists, we have gathered samples from the project-targeted patients and performed blood tests (CBC) on expectant mothers at each of the three stages of pregnancy. At the 5% significance level, there is no statistically significant variation in hemoglobin levels across the trimesters, according to the p-value (0.086), which is higher than the generally accepted significance level of 0.05. The p-value is around 0.05, though, indicating that there may be a pattern worth looking into more thoroughly, particularly if clinical or practical significance is taken into account.

Keywords: Anemia, hemoglobin, pregnant, risk factors, trimesters, immune system

الملخص

فقر الدم هو حالة يفتقر فيها الدم إلى ما يكفي من خلايا الدم الحمراء السليمة لتوصيل الأكسجين بكفاءة أثناء الحمل، يحتاج جسمك إلى كمية إضافية من الحديد لتوليد خلايا الدم الحمراء لك ولطفلك النامي. و بالتعاون مع أطباء أمراض النساء، قمنا بجمع عينات من المرضى المستهدفين بالمشروع وأجرينا فحوصات الدم (CBC) للأمهات الحوامل في كل مرحلة من مراحل الحمل الثلاثة. عند مستوى الدلالة 5/، لا يوجد اختلاف كبير إحصائيًا في مستويات الهيموجلوبين عبر المراحل الثلاثة ، وفقًا للقيمة الاحتمالية (0.086)، وهي أعلى من مستوى الدلالة المقبولة عمومًا وهو 0.05. ومع ذلك، فإن القيمة الاحتمالية تبلغ حوالي 0.05، مما يشير إلى أنه قد يكون هناك نمط يستحق النظر فيه بشكل أكثر شمولاً، خاصة إذا تم أخذ الأهمية السريرية أو العملية في الاعتبار.

الكلمات الدالة: فقر الدم، الهيموجلوبين، الحامل، عوامل الخطر، الثلث الأخير من الحمل، الجهاز المناعي.

1. Introduction

Anemia is a condition where your blood lacks enough healthy red blood cells to adequately carry oxygen. During pregnancy, your body requires extra iron to generate red blood cells for both you and your developing baby (Georgieff, 2020). The following is a summary of the variables that may cause anemia in expectant mothers: The body utilizes iron stores to produce red blood cells, so if your iron levels are low before becoming pregnant or if you don't eat enough iron-rich foods during your pregnancy, you're more likely to develop an iron deficiency, which is the most common cause of anemia in pregnancy, Dietary factors include eating too little iron-rich foods such as fish, chicken, beans, lentils, and dark leafy greens; too much calcium supplementation can also affect the body's ability to absorb iron (Annan et al., 2021). Blood Loss: Pregnancy-related hemorrhage, even in tiny amounts, can exacerbate iron insufficiency, Heavy menstrual cycles before to pregnancy can also reduce iron storage, multiple Pregnancies: Having twins, triplets, or more children dramatically raises your requirement for iron, although this is not a comprehensive list, teenagers and women who become pregnant with closely spaced pregnancies are more likely to experience iron deficiency, if you are diagnosed with anemia, it's crucial to speak with your doctor to find out the cause (Annan et al., 2021). A complete blood count (CBC) measures your levels of hemoglobin and hematocrit, which can assist identify anemia. The oxygen-carrying protein in red blood cells is called hemoglobin. The proportion of red blood cells in your blood is called your hematocrit (An et al., 2021). The oxygen that red blood cells (RBCs) carry to your tissues is what keeps your body functioning. RBC count and other indices reflecting hemoglobin concentration and size are measured by the CBC, White blood cells, or WBCs, are immune system components that aid in the defense against illness. In addition to counting WBCs overall, the CBC also distinguishes between other WBC subtypes, including neutrophils, lymphocytes, monocytes, eosinophil's, and basophils (An et al., 2021). Anemia during pregnancy can have serious effects on both the mother and the baby. In the first trimester, anemia can lead to a deficiency in the delivery of



Pregnancy and Physiological Factors Contributing to Anemia

oxygen and nutrients to the fetus, hindering its normal growth and development. It can also increase the risk of early miscarriage and preterm birth, and raise the likelihood of health issues such as cardiovascular diseases in the mother. It is essential to regularly monitor iron and vitamin levels during pregnancy to ensure the needs of both the fetus and the mother are met (An et al., 2021).

1.1. Effects of Anemia on Pregnant Women in the First Trimester

Anemia during pregnancy, especially in the first trimester, is a significant health concern that can affect both the mother and the developing fetus. Here are some detailed effects and considerations (Means, 2020).

1.1.1. Impact on the Mother:

1) Fatigue and Weakness:

Anemia reduces the number of red blood cells, leading to a decreased oxygen supply to the body's tissues. This can cause excessive tiredness and weakness, impacting the mother's daily activities and overall well-being (Bhadra & Deb, 2020).

2) Increased Risk of Infections:

A weakened immune system due to anemia can make pregnant women more susceptible to infections, which can complicate pregnancy and affect the health of the mother and fetus (Chen et al., 2020).

1.1.2. Impact on the Fetus:

1) Impaired Fetal Growth and Development:

Adequate oxygen and nutrient delivery are crucial for fetal growth and development. Anemia can compromise this supply, potentially leading to intrauterine growth restriction (IUGR) and low birth weight (Obeagu & Obeagu, 2024).

2) Increased Risk of Preterm Birth:

Severe anemia has been linked to an elevated risk of preterm birth, which can result in various health complications for the newborn, including respiratory distress syndrome and developmental delays (Saito-Benz et al., 2020).

3) Higher Risk of Birth Defects:

Deficiencies in essential nutrients, such as iron and folic acid, can increase the likelihood of birth defects affecting the brain and spinal cord (neural tube defects) (Fischer et al., 2017).

1.2. Problem of the study

- Numerous factors during pregnancy might lead to anemia associated to pregnancy as nutritional intake has a significant effect on hemoglobin levels.
- Major physiological changes, during pregnancy lead to anemia.

1.3. Objective of the study

- Finding risk factors for anemia during pregnancy and examining how they affect each of the three stages of pregnancy.
- Comprehending Physiological Alterations Determine any possible risk factors that may occur in a certain trimester and be linked to these changes.

2. Materials & Methods

Blood sample was taken from. Al-qaraway Hospital for Women and children and the houriat complex for golden clinics were the intended sites for sample collection, and permission to do so was acquired from the college. We got the go-ahead to practice. In collaboration with gynecologists, we have gathered samples from the project-targeted cases and performed complete blood counts (CBC) in a medical laboratory in Zliten Medical Center, sample was drawn for each stage of 49 pregnant, the laboratory give the result of HB to all stages of pregnant, they used sysmax counter of CBC to find the result of the three stages of pregnancy. The study aimed to assess the prevalence of anemia and the nutritional health of expectant mothers. The trial runs December 2023 and September 2024.

2.1. Research Design

This study was designed using an analytical survey methodology.

2.2. Study Population and Sampled

For pregnant women, a sample was taken and CBC blood tests were performed for all three pregnancy stages. The medical laboratory in Zliten Medical Center collected samples and gave the results. The study aimed to assess the prevalence of anemia and the nutritional health of expectant mothers. 49 pregnant women in each stage collected between the ages of 18 and 40 took part in the study.

2.2.1. Side Title:

Factors causing anemia in pregnant women along with the way how they affect the stage of pregnancy.

3. Results & Discussion

All three groups (group 1, group 2, and group 3), both the Kolmogorov-Smirnov and Shapiro-Wilk tests suggest that the data are normally distributed since all p-values are above the 0.05 threshold (Table 1 and Figure 1).



Pregnancy and Physiological Factors Contributing to Anemia

Table 1. Tests of Normality

		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
HB in levels of trimester	group1	.088	49	.200 [*]	.979	49	.516
	group2	.081	49	.200 [*]	.981	49	.598
	group3	.085	49	.200 [*]	.972	49	.291

* This is a lower bound of the true significance.

a. Lilliefors Significance Correction

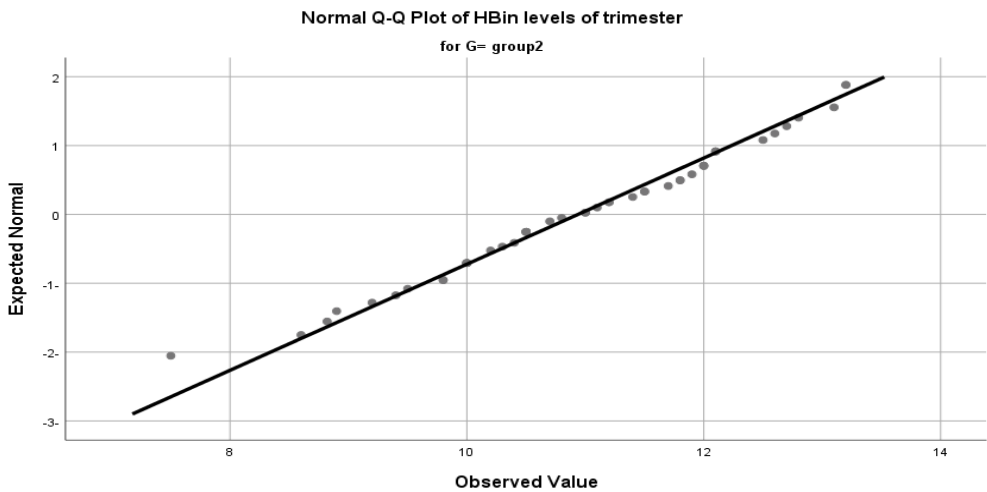


Figure 1. Normal distribution

The **p-value** for the ANOVA test is **0.086**, which is **greater than 0.05** (Table 2). This means that the difference in hemoglobin (HB) levels between the trimesters is **not statistically significant** at the 5% significance level. While there is some variation between the groups (as indicated by the F-value of 2.497), this variation is not large enough to conclude that the HB levels differ significantly across the three trimesters.

Table 2 . ANOVA table

HB in levels of trimester	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.007	2	4.504	2.497	.086
Within Groups	259.764	144	1.804		
Total	268.771	146			

3. Discussion

The average percentage of hemoglobin values was close because the hemoglobin percentage results in the three phases were equal based on the sample selection. According to the doctor who followed up on these instances, the chosen group was taking medication supplements and maintaining a balanced diet. As a result, the current study disagreed with Alawaini et al. (2020). Anemia among pregnant women in the northwest of Libya. GSC Biological and Pharmaceutical. The level of anemia was very high; it was found that 72% of pregnant women. Out of this, 66.6%, 30.5%, and 2.9% were mild, moderate, and severe anemia, respectively.

4. Conclusion

The study's conclusion is that, at the 5% significance level, there is no statistically significant change in hemoglobin levels across the trimesters because the p-value (0.086) is higher than the generally accepted significance level of 0.05. The absence of statistically significant variations can be explained by the cases' adherence to the recommendations of their specialized physicians about the use of dietary and pharmacological supplements. The p-value, however, is quite near to 0.05, indicating that there may be a trend worth pursuing additional research, particularly when taking clinical or practical significance into account.

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Pregnancy and Physiological Factors Contributing to Anemia

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