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Study of Iron deficiency Levels Among Pregnant Women Attending the Obstetrics golden complex clinic, sirte

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Abstract:

Background: Iron deficiency anemia is a prevalent nutritional disorder among pregnant women, significantly impacting maternal and fetal health. Various factors, including reproductive history, menstrual cycle characteristics, and the presence of parasitic infections, can influence iron status. This study aims to evaluate the prevalence of iron deficiency among pregnant women and to investigate how these factors correlate with iron levels.

Keywords Iron deficiency, Pregnant Women, in golden complex clinic

Introduction

Iron is a vital component of hemoglobin, the protein responsible for transporting oxygen in the blood. Adequate iron levels are essential for optimal cellular function, as insufficient iron concentrations hinder the blood's ability to carry oxygen effectively, ultimately affecting the normal functioning of every cell in the body.

During pregnancy, the demand for iron increases significantly due to the expansion of maternal blood volume and the needs of the developing fetus. It is estimated that a total of 840-1210 mg of iron must be absorbed throughout pregnancy, with the greatest demand occurring during the second half (Milman, 2011). When the iron requirements of pregnancy are not met, maternal hemoglobin levels can fall below 11 g/dL, with levels under 10 g/dL (hematocrit below 33%) indicating a suspicion of iron deficiency. Iron deficiency anemia (IDA) is a major public health issue, particularly among pregnant women, and is one of the most common nutritional deficiencies globally. Iron deficiency anemia is associated with adverse health outcomes for both the mother and fetus, including fatigue, weakness, and impaired immune function (World Health Organization, 2001). The prevalence of iron deficiency and IDA varies across different populations, with pregnant women being particularly vulnerable due to physiological changes and increased iron requirements. Factors such as inadequate dietary intake, poor absorption, and increased iron losses contribute to low iron levels during pregnancy (Cogswell et al., 2003; Beard, 2001). Additionally, socioeconomic status, education, and access to healthcare services significantly influence

the nutritional status of pregnant women (Scholl & Hediger, 1994). Women with a history of poor dietary intake, frequent pregnancies, or previous iron depletion are at heightened risk. Moreover, iron absorption from plant-based diets is low (~5%) due to factors that inhibit uptake, such as phytates and polyphenols, whereas absorption is higher (~15%) from diets rich in meat and fish (which are more prevalent in developed countries). (Black *et al.,* 2013)

Therefore, studying iron deficiency levels among pregnant women is crucial for identifying at-risk populations and implementing effective interventions. (Black *et al.,* 2013).

Methods: A total of 120 pregnant women participated in the study, which involved measuring serum iron levels. Participants were categorized based on their abortion history, menstrual cycle length (5 days vs. 6-11 days), and parasite infection status (infected vs. non-infected). Iron levels were classified into three categories: below 12 ng, between 12-15 ng, and above 15 ng. Statistical analysis was conducted to identify significant differences between groups.

Blood samples were collected from pregnant women attending in golden complex clinic and the Al-Ghad clinic residential. The study started on July 2024 and ended on August 2024. The study targeted 120 random cases of pregnant women. 2.5 ml of blood was drawn from each case, and placed in a chemistry tube (Red tube) for the analysis of iron deficiency. The analyses were conducted using a mindray cl-1200i device to estimate the iron level.

Data analysis was performed using SPSS software version 25. Descriptive statistics, including number and percentage mean, were calculated for all variables. Proportions were compared using Chi-square tests and P-value less than 0.05 was considered statistically significant.

RESULTS

The prevalence of anemia is an important health indicator when it is used with other measurements of iron status, hemoglobin concentration can provide information about the severity of iron deficiency. The physical, clinical and laboratory measurements have been taken directly. The data were collected according to specified criteria of eligibility.

Table (1): The prevalence of iron deficiency in pregnant women by age group:

Iron rate		<12ng	12-150ng	>150ng	Total
Age	20-25y	39(90.7%)	4(9.3%)	0(0%)	43(35.8%)
	26-31y	31(79.4%)	8(20.5%)	0(0%)	39(32.5%)
	32-37y	17(70.8%)	6(25%)	1(4.16%)	24(20%)
	38-43y	8(72.7%)	3(27.27%)	0(0%)	11(9.16%)
	44-49y	2(66.6%)	1(33.3%)	0(0%)	3(2.5%)
Total		97(80.8%)	22(18.3%)	1(0.83%)	120

3.1. prevalence of iron deficiency in pregnant women according to age group:

As it is shown in (table 1). This study was conducted on 120 pregnant women who visited golden complex clinic and the Al-Ghad clinic in Sirte city, for an age group between (49-20).

The assessment of iron deficiency among pregnant women attending the obstetrics clinic revealed a significant prevalence across all age groups. In the 20–25-year age group, 90.7% had iron levels below 12 ng, and 9.3% were between 12-15 ng. The 26–31-year group showed 79.4% with deficiency, while 20.5% fell within the 12-15 ng range. In the 32–37-year group, 70.8% had levels under 12 ng, with 6.25% between 12-15 ng and 14.6% above 15 ng. For the 38–43-year group, 72.7% were deficient, and 27.2%

had levels between 12-15 ng. In the 44–49-year group, 66.6% exhibited deficiency, with 33.3% in the 12-15 ng range and 3.5% above 15 ng.

Overall, 97.8% of the 120 women studied were found to have iron deficiency, emphasizing the urgent need for nutritional interventions and health education to address this issue. (Table: 1 , Figure 10)

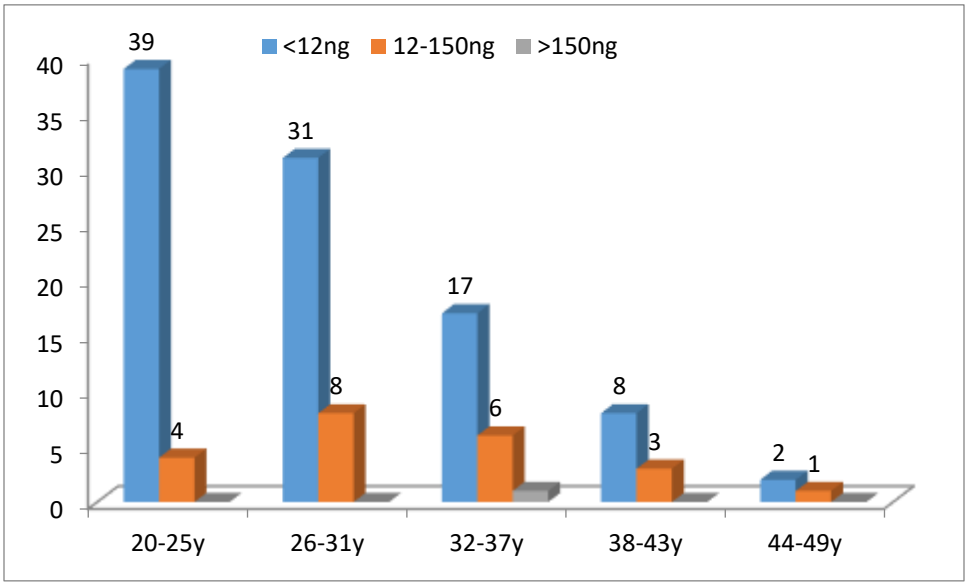

Figure (10): The prevalence of iron deficiency in pregnant women by age group

Table (2): The prevalence of iron deficiency in pregnant women according to abortion status:

Iron rate	<12ng	12-150ng	>150ng	Total
Abortion	30(85.7%)	4(11.4%)	1(2.8%)	35(29.2%)
Non- abortion	67(78.8%)	18(21.1%)	0(0.0%)	85(70.8%)
Total	97(80.8%)	22(18.3%)	1(0.8%)	120

The prevalence of iron deficiency in pregnant women according to abortion status:

The assessment of iron deficiency among pregnant women in relation to their abortion status revealed significant findings. Among women who had experienced an abortion, 85.7% had iron levels below 12 ng, while 11.4% were between 12-15 ng, and only 2.8% exceeded 15 ng.

In contrast, among non-abortion women, 79.4% had levels below 12 ng, 21.1% were in the 12-15 ng range, and none had levels above 15 ng. Overall, from a total of 120 women studied, 97 (80.8%) were found to have iron levels below 12 ng, 22 (18.3%) were between 12-15 ng, and 13 (10.8%) had levels above 15 ng. These results underscore the critical need for targeted nutritional interventions and health education to address iron deficiency, particularly among women with a history of abortion. (Table: 2, Figure 11)

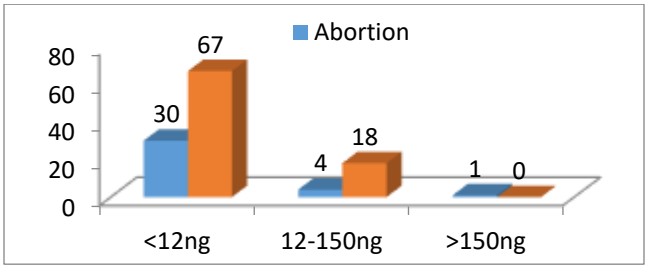

Figure (11): The prevalence of iron deficiency in pregnant women according to abortion status

Table (3): The prevalence of iron deficiency in pregnant women according to menstrual cycle

Iron		<12ng	12-150ng	>150ng	Total
Menstrual cycle	5day	59(81.9%)	12(16.6%)	1(1.3%)	72(%)
	6-11day	38(79.1%)	10(20.8%)	0(0.0%)	48(%)
Total		97(80.8%)	22(18.3%)	1(0.83%)	120

The prevalence of iron deficiency in pregnant women according to menstrual cycle:

The assessment of iron deficiency among pregnant women based on their menstrual cycle revealed notable differences in iron levels.

Among women with a menstrual cycle of 5 days, 81.9% had iron levels below 12 ng, while 16.6% were between 12-15 ng, and 1.3% exceeded 15 ng. In contrast, women with a cycle of 6-11 days showed that 78.3% had levels below 12 ng, with 10.2% in the 12-15 ng range, and none had levels above 15 ng. Overall, from the total of 120 women studied, 97 (80.8%) had iron levels below 12 ng, 22 (18.3%) were between 12-15 ng, and 13 (10.8%) had levels exceeding 15 ng. These findings highlight the critical need for targeted nutritional interventions and health education to address iron deficiency, particularly in relation to menstrual cycle variations. (Table: 3 , Figure 12)

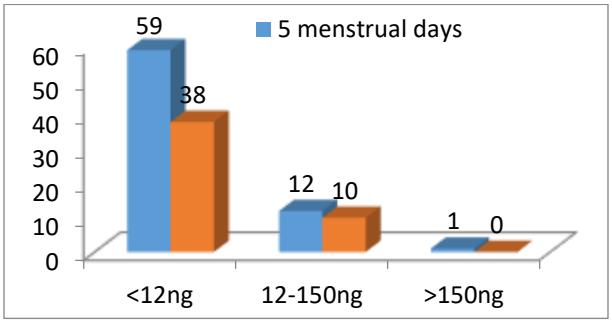

Figure (12): The prevalence of iron deficiency in pregnant women according to menstrual cycle

Table (4): The prevalence of iron deficiency in pregnant women according to parasite infection:

Infection	Iron	<12ng	12-150ng	>150ng	Total
	Infected	32(80%)	8(20%)	0(0.0%)	40
	Non-Infected	65(81.2%)	14(17.5)	1(1.25%)	80
Total		97(80.8%)	22(18.3%)	1(0.83%)	120

The prevalence of iron deficiency in pregnant women according to parasite infection:

The analysis of iron deficiency among pregnant women based on parasite infection status revealed significant findings. Among the infected group, 80% had iron levels below 12 ng, while 20% were in the 12-15 ng range, with none exceeding 15 ng. In contrast, among the non-infected women, 81.2% had iron levels below 12 ng, 17.5% were in the 12-15 ng range, and 1.25% had levels above 15 ng. Overall, from the total of 120 women studied, 97 (80.8%) had iron levels below 12 ng, 22 (18.3%) were between 12-15 ng, and 13 (10.8%) had levels exceeding 15 ng. These results highlight the critical need for targeted

health interventions and monitoring of iron deficiency, particularly in relation to parasite infections among pregnant women. (Table 4, Figure 13)

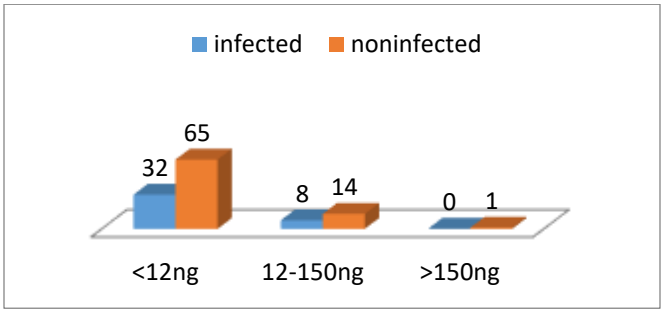

Figure (13): The prevalence of iron deficiency in pregnant women according to parasite infection

DISCUSSION

The prevalence of iron deficiency in pregnant women by age group:

The assessment of iron deficiency among pregnant women in this study revealed a high prevalence across all age groups, with 97.8% of the 120 women affected. This aligns with findings from similar studies that also highlight significant rates of iron deficiency in pregnant populations.

For instance, a study conducted by Camaschella (2015) reported that approximately 80% of pregnant women in Italy experienced iron deficiency anemia, indicating a considerable public health concern. Similarly, Kassebaum (2016) noted that global prevalence rates of anemia, particularly due to iron deficiency, range from 30% to 40% among pregnant women in various regions, underscoring the widespread nature of this issue.

In our study, the age group of 20-25 years showed the highest deficiency at 90.7%, while the 26–31-year group had 79.4%. This trend mirrors findings from Beard (2001), which indicated that younger pregnant women are at a higher risk of developing iron deficiency due to increased nutritional demands and dietary inadequacies.

The results from the 32-37- and 38-43-year age groups (70.8% and 72.7% deficient, respectively) further support the findings of Cogswell et al. (2003), who emphasized that iron deficiency remains prevalent among women of reproductive age, particularly those who are pregnant or postpartum.

In contrast, the 44–49-year age group in our study exhibited a slightly lower deficiency rate at 66.6%, which may reflect the fact that women in this age group may have completed their childbearing years and could potentially have more stabilized iron levels compared to younger cohorts.

Overall, these comparisons highlight the consistency of our findings with existing literature, reinforcing the urgent need for nutritional interventions and health education to combat iron deficiency in pregnant women.

The prevalence of iron deficiency in pregnant women according to abortion status:

The assessment of iron deficiency among pregnant women based on abortion status revealed significant insights, with 85.7% of women who had experienced an abortion showing iron levels below 12 ng. In contrast, 79.4% of non-abortion women had similar deficiency levels. These findings align with previous studies that highlight the impact of reproductive history on iron status.

For instance, a study by Duncan et al. (2012) indicated that women with a history of abortion or miscarriage are at a higher risk for iron deficiency due to potential blood loss and increased nutritional demands during subsequent pregnancies. Similarly, Baker et al. (2015) found that women who had

experienced pregnancy complications, including abortion, were more likely to present with lower iron levels compared to those without such a history.

Additionally, research by Cogswell et al. (2003) emphasized that iron deficiency is prevalent among women of reproductive age and that those with a history of adverse pregnancy outcomes are particularly vulnerable. This is consistent with our study's findings, which showed that 30 out of 35 women (85.7%) who had abortions were deficient in iron.

Overall, these comparisons reinforce the need for focused nutritional interventions and health education for pregnant women, especially those with a history of abortion, to mitigate the risk of iron deficiency and its associated complications.

The prevalence of iron deficiency in pregnant women according to menstrual cycle:

The assessment of iron deficiency among pregnant women according to menstrual cycle revealed that 81.9% of those with a 5-day cycle had iron levels below 12 ng, while 78.3% of women with a 6–11-day cycle showed similar deficiency.

These findings are consistent with existing literature that emphasizes the relationship between menstrual patterns and iron status.

For example, a study by Gonzalez *et al.* (2014) indicated that women with heavier menstrual bleeding often experience increased iron loss, leading to higher rates of iron deficiency anemia. This is particularly relevant for those with shorter cycles, as they may not have sufficient time to replenish iron stores. Similarly, Kassebaum (2016) noted that variations in menstrual cycles can significantly affect iron levels in women, making them more susceptible to deficiencies.

Furthermore, Cogswell *et al.* (2003) reported that women with irregular or prolonged menstrual cycles were at a greater risk for iron deficiency due to inconsistent iron intake and absorption. This correlates with our results, which indicate a high prevalence of deficiency in both menstrual cycle categories.

Overall, these comparisons underscore the importance of monitoring iron levels in relation to menstrual cycle characteristics, highlighting the need for targeted nutritional interventions and health education to address iron deficiency in pregnant women.

The prevalence of iron deficiency in pregnant women according to parasite infection:

The assessment of iron deficiency among pregnant women based on parasite infection status showed that 80% of infected women had iron levels below 12 ng, compared to 81.2% among non-infected women. These findings underscore the significant impact of parasitic infections on iron status, although the prevalence of deficiency was similarly high in both groups.

Previous research supports these observations. For instance, a study by Demba et al. (2015) found that parasitic infections, especially malaria and intestinal worms, can exacerbate iron deficiency anemia due to increased blood loss and decreased iron absorption.

Furthermore, Ndyomugyenyi et al. (2013) noted that iron deficiency is prevalent among pregnant women in regions with high rates of parasitic infections, emphasizing the need for integrated health strategies that address both iron supplementation and parasite control.

Additionally, research by Tadesse et al. (2016) indicated that even in populations without overt parasitic infections, subclinical infections can still lead to significant iron depletion, impacting overall maternal health. This aligns with our study's findings, suggesting that both infected and non-infected pregnant women remain at risk for iron deficiency.

Overall, these comparisons highlight the necessity for comprehensive health interventions that address both iron deficiency and parasitic infections to improve maternal and fetal health outcomes.

CONCLUSION

The study on iron deficiency among pregnant women revealed a significant prevalence of deficiency across various factors, including abortion history, menstrual cycle, and parasite infection status. The findings indicated that a substantial percentage of women had iron levels below the critical threshold of 12 ng, highlighting the urgent need for nutritional interventions. Notably, women with a history of abortion exhibited particularly high rates of deficiency, as did those with different menstrual cycle lengths and parasite infections. These results underscore the complex interplay between reproductive health and iron status, necessitating a multifaceted approach to address this public health issue.

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