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Prevalence and Risk Factors of Iron deficiency anemia among pregnant women in AL-Marj area

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ABSTRACT

Iron deficiency (ID) is the leading single nutrient deficiency in the world. The study was aimed to estimate the prevalence of iron deficiency anemia (IDA) among pregnant women in the Al-Marj area and assessing the knowledge and behaviors of pregnant women in the direction of this disease. The study was conducted between November 14 and December 15, 2017, and the sample consisted of 100 women aged between 19 and 44 years.

The percentage incidence of iron deficiency anemia was 34%. Anemia was more prevalent among pregnant women in the third trimester of pregnancy compared to the second-trimester of pregnancy. The prevalence rate among city inhabitants was higher than that found among village inhabitants. The younger age group (≤24) shows the highest prevalence (50%) among the IDA group. The increase in the number of pregnancies was found to be correlated with IDA.

The study showed an average level of knowledge regarding the IDA definition of anemia. Knowledge of symptoms associated with IDA and the importance of iron supplements was found to be high in both groups. However, weak knowledge of the causes and the impact of IDA on maternal and fetal health and iron-rich food sources was found and absorbed. There were also positive levels of behavior among pregnant women on many related variables that had a clear effect on iron deficiency anemia. With the exception of iron supplementation, it was observed that a large proportion did not regularly take iron supplements.

In conclusion, due to the lack of a strategy for primary health care, which is reflected in the prevalence of IDA among pregnant women in the AL-Marj study community, there is an urgent need for more health education and awareness programs in this regard.

***Keywords**: haemoglobin, Iron-deficiency anaemia، pregnancy، serum ferritin.*

عوامل الانتشار والخطر لفقر الدم بسبب نقص الحديد بين النساء الحوامل في منطقة المرج

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الملخص

يعتبر نقص الحديد هو السبب الرئيسي لنقص المغذيات في العالم. هدفت الدراسة إلى تقييم مدى انتشار فقر الدم الناجم عن نقص الحديد (IDA) بين النساء الحوامل في منطقة المرج وأيضا تقييم معرفة وسلوكيات النساء الحوامل في اتجاه هذا المرض. وأجريت الدراسة في الفترة ما بين 14 تشرين الثاني (نوفمبر) و 15 كانون الأول (ديسمبر) 2017، وتألفت العينة من 100 امرأة تتراوح أعمارهن بين 19 و 44 سنة. بلغت نسبة الإصابة بفقر الدم بسبب نقص الحديد 34٪. كان فقر الدم أكثر انتشارًا بين النساء الحوامل في الثلث الثالث من الحمل مقارنة بالثلث الثاني من الحمل. كان معدل الانتشار بين قاطنات المدينة أعلى مما هو موجود بين قاطنات القرية. تظهر الفئة العمرية الأصغر (24) أعلى معدل انتشار (50٪) .بالنسبة لـ IDA .تم العثور على أن الزيادة في عدد حالات الحمل مرتبطة بـ.IDA في مجموعة الدراسة.

أظهرت الدراسة مستوى متوسط من المعرفة فيما يتعلق بتعريف IDA لفقر الدم. تم العثور على معرفة الأعراض المرتبطة بـ IDAوأهمية مكملات الحديد عالية في كلا المجموعتين. ومع ذلك، تم العثور على ضعف أسباب وتأثير IDA على صحة الأم والجنين ومصادر الغذاء الغنية بالحديد واستيعاب المعرفة. كانت هناك أيضًا مستويات سلوك إيجابية بين النساء الحوامل على العديد من المتغيرات ذات الصلة التي كان لها تأثير واضح على فقر الدم الناجم عن نقص الحديد. باستثناء مكملات الحديد، لوحظ أن نسبة كبيرة لا تتناول مكملات الحديد بانتظام.

في الختام، نظرًا لعدم وجود استراتيجية للرعاية الصحية الأولية، وهو ما ينعكس في انتشار IDA بين النساء الحوامل في مجتمع دراسة المرج، هناك حاجة ملحة لمزيد من برامج التثقيف الصحي والتوعية في هذا الصدد.

كلمات مفتاحية: نقص الحديد، الانيميا، الهيموقلوبين.

INTRODUCTION

Iron Deficiency Anemia (IDA) is one of the most common types of anemia، also called iron deficiency anemia. It is caused by a defect in the production of hemoglobin and red blood corpuscles، which causes hemoglobin. In iron deficiency، the size of the blood cells is smaller than normal، which is known as small-blooded anemia (Dallman 1992; WHO 2014). Iron deficiency anemia is one of the most common medical complications during pregnancy، mainly because of the expansion of plasma size without the normal expansion of the hemoglobin mass of the pregnant، many women begin pregnancy with a little anemia and in pregnancy a mild anemia can quickly become more severe; thus، it needs immediate treatment or treatment (Beard 2000; Bridget 2005).
It is estimated that an average amount of 840 - 1210 mg of iron needs to be absorbed over the course of pregnancy (Beard 2000). The need for iron increases in the second half of pregnancy، when iron needs are not met (Sahar et al.، 2014). According to the American Centers for Disease Control (CDC)، if Hb levels in the first and second trimester are less than 11 grams per deciliter، in the third trimester less than 10.5 grams per deciliter and Hct fewer than 33 percent is anemia، iron deficiency is suspected (Rangan & Blight 1996).

Due to the fetus's need for important nutrients، including iron and vitamins، the production of red blood cells during pregnancy increases to provide nutrients for the fetus. Hemoglobin deficiency leads to a deficiency in providing the fetus with sufficient oxygen to carry out vita processes during its growth، which may reduce fetal development (Legget et al.، 1990).
Iron deficiency anemia is usually diagnosed during a routine blood test، which includes a complete blood count (CBC). Low hemoglobin concentration refers only to anemia; it does not reveal the cause of anemia. Iron deficiency in the tissue can be demonstrated by measuring serotonin ferritin (SF). Serum levels of ferrite decrease in proportion to the decrease in iron stock and changes will appear before the hemoglobin level decreases (Bridget 2005).

Oral iron supplements are the most common method of treatment، and the dose depends on the severity of the condition. It consists of iron salts، either alone or in combination with folic acid. Iron is included in ferrous sulphate and iron gluconate (Legget et al.، 1990). There is no need for supplements in the first half because the demand is still low and supplements can be taken several

times a day. This is considered healthy during pregnancy.

Method:

The study was designed to estimate the prevalence of iron deficiency anemia and to explore and evaluate the knowledge and practices of pregnant women attending antenatal care at Al Marj Teaching Hospital، government clinics، private clinics، and clinics in some villages in Al Marj area due to iron deficiency anemia. The study sample included all pregnant women in the second and third trimester of pregnancy (total 100; 34 second trimester، 66 third trimesters) at age (44-19) years، who attended pregnancy follow-up in AL- Marj area (100; 73 cities، 27 villages). (Table 1) Distribution of study samples in Al-Marj area.

Statistics methods: The questionnaire data and blood measurements were analyzed using the spss program. Frequencies and percentages were calculated and a chi-square test was performed to check the significance of iron deficiency anemia. Correlations were considered significant if the significance level was ($p<0.05$).

Table 1: Distribution of study samples in Al-Marj area

Name of Health Center	Number of cases
Al-Marj Teaching Hospital	4
Al - Marj Specialist Hospital	4
Alryada Hospital	9
Al - Razi Center	5
Clinic No. (1) district of Imam Malik 5	5
Clinic lmst shifa	9
Al Manara Clinic	5
Almustaqbal Clinic	5
Al Tayseer Clinic 5	5
Al - Fayrouz Clinic	7
Alhilal al'ahmar Clinic	10
Al Amal Clinic	6
Al - Shaheed Abdul Razek Al - Zarani Clinic	4
Al - Shaheed Ahmed Ghariani Clinic	7
El Shaheed Salama El Darouki Clinic	6
Al - Salayadah Health Center	3
Albinya Health Center 3	3
Takns Village Hospital	1
Al - Marwa Clinic	2

A specially designed questionnaire was used. The questionnaire was divided into three main areas: personal and medical data، knowledge and behaviors of pregnant women towards iron deficiency anemia. The values of both hemoglobin (g/dl) and serotonin values (ng/ml) were obtained from the medical files of pregnant women after obtaining approval from them and

informing them of the objective of the study and filling out the personal data in the questionnaire and answering the questions for research purposes only.

The questionnaire data and blood measurements were analyzed using the (spss) program. The frequencies and percentages and the chi-square test were investigated to investigate the importance of the various variables and the prevalence of iron deficiency anemia. The correlations were significantly observed if the significance level was significant ($p < 0.05$).

Results and discussion:

The data in Table 3 showed that of the 100 cases، 34 pregnant women had iron deficiency anemia at a total prevalence rate (34%) (Figure 1) of which 61.7% were in the third trimester and 38.2% were in the second trimester (figure 2). Low levels of hemoglobin or hematocrit during the first and second trimester due to increased blood volume among pregnant women who do not take iron supplements، Hb and Hct levels remain low during the third trimester (Scholl et al.، 1992; Jiji & Rajagopal 2014).

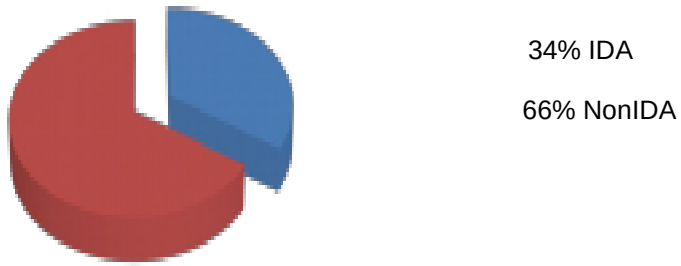


Figure 1: Rate of IDA prevalence among pregnant women among the study population and in the third and third trimester pregnancy stage among the study population

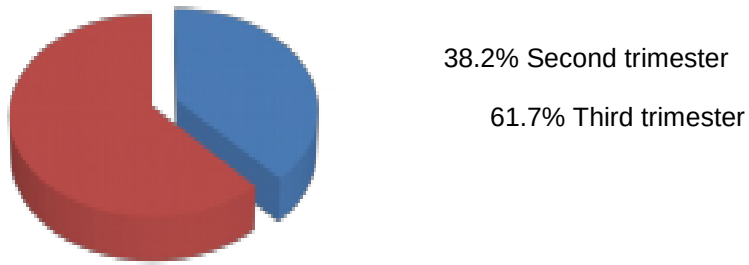


Figure 2: the rate of IDA prevalence at the second and third trimester stage of the study population

A higher IDA prevalence rate was found among residents in the city، 28 out of 73 (37.8%) receiving similar health services compared with 6 out of 27 (17.6%) among rural

residents. (Figure 3). The differences in prevalence were not significant (P = 0.131 at α = 0.05). (Table 3)

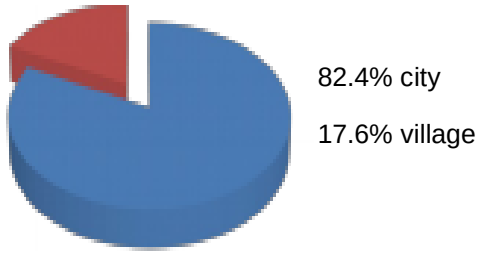


Figure 3: IDA prevalence rate among residents in the city and village

The younger age group (≤24) in our study showed the highest incidence of IDA (17 out of 34; 50%). This is in line with previous reports suggesting that in younger age groups، women are at greater risk of IDA development because of the need to meet the body's dietary needs for growth as well as nutrition during pregnancy (CDC 2005). Differences in prevalence rates among different age groups were statistically significant = at α = 0.05)

The data in Table 3 also showed no clear correlation between the mean spacing between pregnancy and IDA. A high prevalence rate was found among participants with a median spacing of loads of 3 years (79.4% versus 20.6% for those with an average spacing of 3 years or more). Our findings therefore correlate with earlier reports that women with longer periods of birth are more likely to avoid anemia. Women with a history of poor nutritional status، close pregnancies، twin pregnancies، or excessive vaginal bleeding may be at risk of IDA during pregnancy (Dallman 1992). No clear correlation was found between IDA and birth weight at birth.

The previous and current use of iron supplements appeared to have had no effect on the condition، and the reason for this observation may be either because participants did not comply with the dose or other absorption-related problems. It is important to note that some participants reported non-compliance due to side effects of iron tablets due to high dose. Burning stomach، vomiting and constipation were among the most common side effects. Other factors، including diets and health practices for pregnant women، should also not be excluded.

Table 3: Iron deficiency anemia and personal and medical data for the study population:

Variables		IDA		Non IDA		P-value
		No.	%	No.	%	
Place of residence	**City**	28	82.4	45	37.8	0.131
	Village	6	17.6	21	31.8	
Age (years)	**≤24**	17	50	7	10.6	0.000
	25-29	6	17.6	10	15.5	
	30-34	5	14.7	16	24.2	
	≥35	6	17.6	33	50	
Monthly income	**<500**	6	17.6	11	16.7	0.840
	500-1000	22	64.7	40	60.6	
	>1000	6	17.6	15	22.7	
Years of education	**<16**	14	14.2	30	45.4	0.683
	≥16	20	58.8	36	54.4	
Age at first pregnancy/y	**15-17**	2	5.88	4	6.06	0.001
	18-20	15	44.1	8	12.12	
	21-23	7	20.6	8	12.12	
	≥24	10	29.41	46	69.7	
Number of pregnancies	**≤3**	31	91.1	56	84.8	0.373
	≥4	3	8.82	10	15.15	
Spacing/y	**<3**	7	20.6	11	16.7	0.629
	≥3	27	79.4	55	83.3	
Birth weight of last baby/Kg	**<3**	27	79.4	48	72.7	0.465
	≥3.5	7	20.6	18	27.3	
Stage of pregnancy	**2ndtrimester**	13	38.2	21	31.8	0.521
	3rdtrimester	21	61.7	45	68.2	
Previous use of iron supplements	**Yes**	22	64.7	53	80.3	0.088
	No	12	35.3	13	19.7	
Current use of iron supplements	**Yes**	28	82.35	52	78.8	0.673
	No	6	17.6	14	21.21	
Dose of iron supplements	**≤1**	24	70.6	49	74.24	0.697
	≥2	10	29.4	17	25.7	
Number of visits	**<4**	28	82.35	55	83.3	0.902
	>4	6	17.6	11	16.7	

Knowledge of iron deficiency anemia among the study population:

The data in the variant (4a - 4b - 4c - 4d) represent a set of questions that were asked to assess the knowledge of respondents in the current study. The IDA group of participants showed an average level of knowledge regarding the definition of poverty. Knowledge of symptoms associated with IDA was also found to be high and this is evident from its findings. A low level of knowledge was also found among participants with IDA on the causes of poverty.

Table (4a): Knowledge towards IDA among study population

Variables		IDA		Non IDA		P-value
		No.	%	No.	%	
Q1. What's anemia?						
Poor Nutrition	**Yes**	10	21.4	37	56.06	0.001
	No	24	70.5	21	31.8	
	Don't know	0	0	8	12.12	
Iron deficiency	**Yes**	18	52.9	38	57.5	0.831
	No	15	44.1	27	40.9	
	Don't know	1	0.29	1	15.15	
Low Hb level	**Yes**	20	58.8	50	75.75	0.084
	No	13	38.2	12	18.18	
	Don't know	1	0.29	4	6.06	
Q2. Symptoms of anemia						
Fatigue	**Yes**	17	50	44	66.6	0.191
	No	16	47	19	28.78	
	Don't know	1	0.29	3	1.5	
General weakness	**Yes**	18	52.9	46	69.69	0.233
	No	15	44.1	18	27.27	
	Don't know	1	0.29	2	1.5	
oss of appetite	**Yes**	16	47	23	34.84	0.490
	No	17	50	41	62.2	
	Don't know	1	0.29	2	3.03	
Dizziness and fainting	**Yes**	22	64.7	37	56.06	0.273
	No	8	23.5	25	37.87	
	Don't know	4	11.76	4	6.06	

Headache	**Yes**	14	41.17	42	63.6	0.043
	No	17	50	23	34.8	
	Don't know	3	8.82	1	15.15	
Pallor of face، lips and nail beds	**Yes**	15	44.1	48	72	0.009
	No	16	41.2	16	24.24	
	Don't know	5	14.7	2	3.03	
Q3. Causes of anemia						
Poor nutrition	**Yes**	22	64.7	47	71.2	0.703
	No	10	29.4	17	25.7	
	Don't know	2	5.9	2	3.03	
Multiple pregnancies، and spacing	**Yes**	14	41.7	39	59.1	0.040
	No	20	58.8	23	67.6	
	Don't know	0	0	4	6.06	
Age at pregnancy	**Yes**	5	14.7	22	64.7	0.139
	No	73.5	38	38	57.6	
	Don't know	4	11.7	6	9.1	
Bleeding during pregnancy	**Yes**	10	29.4	37	56.06	0.011
	No	24	70.6	29	43.9	
	Don't know	0	0	0	0	

Knowledge about iron supplementation and its effect on maternal and fetal health was also high and poor knowledge of the impact of anemia on women's health could be observed.

Table (4b): Knowledge towards IDA among study population

Variables		**IDA**		**Non IDA**		**P-value**
		No.	**%**	**No.**	**%**	
Q4. Importance of iron supplements						
Woman health	**Yes**	22	64.7	30	45.45	0.141
	No	12	35.3	34	54.5	
	Don't know	0	0	2	30.03	
Prevent anemia	**Yes**	22	64.7	50	75.7	0.494
	No	11	32.35	15	22.7	
	Don't know	1	2.9	1	1.5	

Baby's health	**Yes**	25	37.5	42	63.6	0.513
	No	9	26.5	23	34.8	
	Don't know	0	0	1	1.5	
Q5. Impact of anemia in women						
Preterm birth	**Yes**	9	26.5	18	27.3	0.473
	No	23	67.6	39	59.1	
	Don't know	2	5.88	9	13.6	
Low birth weight	**Yes**	11	32.35	28	42.4	0.602
	No	21	61.7	34	51.5	
	Don't know	2	5.9	2	3.03	
Complications during delivery	**Yes**	23	67.6	23	65.15	0.969
	No	10	29.4	21	31.8	
	Don't know	1	2.9	4	3.03	
Fetal death	**Yes**	14	41.2	32	48.5	0.580
	No	18	52.9	28	42.42	
	Don't know	2	5.9	6	9.1	

A low level of knowledge was also found among the IDA group of the study community with regard to iron-rich foods، including both hemic and non-heme iron sources. The knowledge about the importance of the use of iron tablets after meals and their impact on the reduction of heartburn and vomiting is at a high level. Knowledge about the role of fruit juice in improving the absorption of iron at a low level، iron absorption is inhibited by tea and coffee، but enhanced by ascorbic acid found in orange juice Fresh fruit (Bothwell 2000). The knowledge about the use of antacids and their effect on reducing iron absorption was low.

Table (4c): Knowledge towards IDA among study population

Variables		**IDA**		**Non IDA**		**P-value**
		No.	**%**	**No.**	**%**	
Q6. Iron-rich food sources						
Red meat	**Yes**	18	52.9	47	71.2	0.109
	No	14	41.2	14	21.21	
	Don't know	2	5.9	5	7.57	
Vegetables	**Yes**	25	73.5	50	75.7	0.518
	No	9	26.5	14	21.21	

	Don't know	0	0	2	3.03	
Fruits	**Yes**	15	44.1	31	46.9	0.371
	No	18	52.9	35	53.03	
	Don't know	1	2.9	0	0	
Eggs	**Yes**	10	29.4	16	24.24	0.743
	No	23	67.6	49	74.24	
	Don't know	1	2.9	1	1.5	
Fish	**Yes**	10	29.4	22	33.3	0.824
	No	23	67.6	42	63.6	
	Don't know	1	2.9	2	3.03	
Legumes	**Yes**	12	35.3	29	43.9	0.606
	No	20	58.8	35	53.03	
	Don't know	2	5.9	2	3.03	
Chicken	**Yes**	7	20.6	29	43.9	0.020
	No	27	79.4	34	54.5	
	Don't know	0	0	3	4.5	
Liver	**Yes**	30	88.2	60	90.9	0.673
	No	4	11.7	6	9.1	
	Don't know	0	0	0	0	
Q7. Iron supplements / absorption and side effects						
Use of iron after meal decreases heartburn and vomiting	**Yes**	18	52.9	28	42.42	0.407
	No	14	41.2	36	54.5	
	Don't know	2	5.9	2	3.03	
Tea، coffee، and milk reduce iron absorption	**Yes**	30	88.2	54	81.8	0.640
	No	4	11.8	11	16.6	
	Don't know	0	0	1	1.5	
Fruit juice increase iron absorption	**Yes**	16	47.05	32	40.9	0.956
	No	16	47.05	31	53.03	
	Don't know	2	5.88	3	6.06	
Anti-acids reduce iron absorption	**Yes**	13	38.2	28	42	0.050
	No	18	52.9	38	57.6	
	Don't know	3	8.8	0	0	

It was clear that maternal health centers did not play an educational role in iron deficiency anemia and that the media were the main source of information. A positive attitude was noted regarding the importance of visits to maternal and child health centers.

It is important to note that there is an average level of knowledge، for all aspects related to IDA، among the IDA group of the study population.

Table (4d): Knowledge towards IDA among study population:

Variables		IDA		Non IDA		P-value
		No.	%	No.	%	
Q8. Source of information about anemia						
Maternal care centers	**Yes**	3	8.8	4	6.06	0.510
	No	27	79.4	58	87.9	
	Don't know	4	11.76	4	6.06	
Leaflets	**Yes**	6	17.6	13	19.7	0.423
	No	28	82.3	50	75.7	
	Don't know	0	0	3	4.5	
Lectures	**Yes**	16	47.05	30	45.4	0.450
	No	18	52.9	33	50	
	Don't know	0	0	3	4.5	
Q9. Importance of regular visits to MCH centers	**Yes**	31	91.2	57	86.4	0.483
	No	3	8.82	9	26.5	
	Don't know	0	0	0	0	

Behaviorality of iron deficiency anemia among the study population:

Several questions were asked to evaluate the practice of sample samples towards IDA (Table 5). With regard to the intake of foreign substances during pregnancy، the results showed that 41.17% were practicing this practice in the IDA group. Research suggests that women with leukemia tended to lower hemoglobin levels at birth and found a link between severe anemia in iron deficiency and a desire for non-food items.

A relatively low rate appears to be practiced especially when taking those who have reported repeated use of tea. This practice reflects a high level of knowledge about tea intake and its role in inhibiting iron absorption. Iron absorption inhibitors include polyphenols (in some vegetables)، tannins (in tea)، pitates (in bran) and calcium (in dairy products) (Bothwell 1995). good practice has been found in the use of fruit juice with meals to improve iron absorption from its source is

non-hemi. Taking iron tablets on an empty stomach make absorption as much of the iron as possible but may experience stomach upset، depending on the dosage. Taking iron supplements with or after meals reduces gastric upset but also reduces iron absorption by up to a third (Xiong et al. 2003). The use of dietary supplements after meals is another good practice reported by the study community. The use of anti-iron acids with iron supplements may make iron supplements less effective. Our data show that the use of antacid is limited. Iron deficiency is the most common among women with diets rich in calcium and dairy foods (Rangan & Blight 1996; Husni 2001). In our study، these results reflect unacceptable bad practices. Iron deficiency is the most common among people with a low intake of vegetables (Hoffman 1993).

Table (5): Behavior of anemia due to iron deficiency among the study population:

Variables		IDA		Non IDA		P-value
		No.	%	No.	%	
Q1. Eating of strange substances (pica)	**Yes**	14	41.17	29	43.9	0.651
	No	18	52.9	30	45.45	
	Sometimes	2	5.88	7	10.6	
Q2. Drinking tea with meal	**Yes**	8	23.5	20	30.30	0.761
	No	24	70.6	43	65.15	
	Sometimes	2	5.88	3	4.54	
Q4. Regular use of iron supplements	**Yes**	8	52.9	32	48.48	0.037
	No	24	70.6	33	50	
	Sometimes	2	5.88	1	15.15	
Q5. Use of iron supplements after eating	**Yes**	27	79.4	56	84.8	0.722
	No	5	14.70	8	12.12	
	Sometimes	2	5.88	2	3.03	
Q3. Use of iron supplements with fruit juice	**Yes**	23	67.6	46	69.7	0.198
	No	8	23.5	19	28.8	
	Sometimes	3	8.82	1	15.15	
Q6. Use of three regular meals	**Yes**	30	88.2	54	81.8	0.504
	No	3	8.8	10	15.15	
	Sometimes	1	2.9	2	3.03	
Q7. Use of anti-acids	**Yes**	11	32.35	32	48.5	0.300
	No	20	58.8	30	45.45	
	Sometimes	3	8.82	4	6.06	
Q8. Use of iron supplements with milk	**Yes**	16	47.05	37	56.16	0.364

or with any kind of milk products	**No**	16	47.05	25	37.8	
	Sometimes	2	5.88	4	6.06	
Q9. Eating red meat، liver، chicken، fish، eggs، legumes، fruits، vegetables etc...	**Yes**	28	82.3	49	74.24	0. 416
	No	5	14.7	14	21.21	
	Sometimes	0	0	3	4.5	

Conclusion:

Anemia during pregnancy is likely to continue during long-term lactation. Iron storage again takes time، iron stores are depleted. For this reason، it is important to prevent the development of anemia during pregnancy. The prevalence rates of iron deficiency anemia found in this study are similar to those found in similar countries abroad. Iron deficiency anemia needs attention to require a clear set of guidelines for recognition and management as there are no approved strategies to educate pregnant women about the risk of anemia. More reliance on hemoglobin and serum ferritin levels in the blood as a screening tool for pregnant women in the second and third trimester. Iron-rich diets are the cornerstones of any approach to the prevention or treatment of anemia. Diet is the cheapest and safest option for iron supplementation. It is essential that doctors and other health professionals pay more attention to teaching pregnant women dietary habits as part of a holistic approach to health promotion. It is important to encourage women to register early before and during pregnancy، as well as to attend post-natal monitoring during breastfeeding for close supervision and effective follow-up.

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