Evaluation of Pregnant Knowledge and Adherence Regarding Supplemental Iron, Folic acid, Calcium, and Vitamins During Pregnancy

Walaa A. Karim[1], Ihsan S. Rabea[2], Hameeda H. Abdulwahid[3]

[1]Faculty of Pharmacy, University of Karbalaa, Karbalaa, Iraq.
[2]Department of Clinical Pharmacy, Faculty of Pharmacy, University of Kufa, Al-Najaf, Iraq.
[3]College of medicine, Warith Al Anbiyaa University, Karbalaa, Iraq.
*Correspondence to: walaaabood178@gmail.com

Abstract

Objectives: The aim of the present study is to evaluate the knowledge as well as the rate of adherence to supplement medications.

Methods: The cross-sectional study was carried out at a teaching hospital for obstetrics and gynecology in Karbala with 100 pregnant women at the second trimester, data were collected using two questionnaires, one about knowledge and other about adherence to micronutrient supplementation, laboratory tests were used to determine the levels of Hemoglobin and plasma level of calcium, and vitamin D.

Results: The overall adherence rate to supplement medication among pregnant women was low in spite of good knowledge score. Biochemical laboratory results showed more than half of participants were found to have haemoglobin Less than normal level. Most of participant confirmed to have deficiency of plasma 25-Hydroxy-vitaminD, and more than two third of them have normal calcium level.

Conclusion: The present study revealed that most pregnant women have a poor adherence to micronutrient supplementation, therefore there is a need for interventional strategies to optimize adherence.

Keywords: pregnancy, knowledge, adherence, IFA, micronutrient supplementation

Background

The requirement for nutrients rises throughout pregnancy as a result of the mother's physiological changes and the fetus's growth.[1] For pregnant women, WHO developed antenatal care (ANC) guideline to create evidence-based recommendations to enhance the quality of care for women and their newborns along the prenatal, intra partum, and postnatal continuum. Nutritional interventions are the first part involved in the guideline. To meet the needs of the mother and the baby throughout pregnancy, a healthy eating must include an adequate supply of protein, minerals, and vitamins these nutrients impact on the health of the fetus and pregnant mother.[2]

According to these interventions, WHO instructs daily iron and folic acid supplementation in pregnant women, with an elemental iron dosage of 30–60 mg, 400 micrograms of folic acid, daily calcium supplementation to lower the chance of preeclampsia in pregnant women who don't get enough calcium from their food, daily intake of vitamin B12 and other nutritional supplementation where necessary.

The use of nutritional supplements by pregnant women is influenced by several factors, like awareness, socioeconomic level, and access to antenatal care,[3-4] during pregnancy. The daily micronutrient needs of many pregnant women are not achieved and dietary supplements are used frequently around the world to solve these insufficiencies. Iron deficiency is the most prevalent micronutrient deficit known to influence maternal health, as a result of the higher iron requirements during pregnancy. Deficits in iron, folate, and vitamin A are linked to anemia. Iron deficiency is a frequent cause of anemia and approximately 40% of pregnancies worldwide are thought to be affected by, greatest in South-East Asia, Africa and the Eastern Mediterranean and lesser prevalence in Western Pacific, the Americas and Europe.[5] Mothers who are iron-deficient may experience: Low birth weight, preterm birth, and a greater chance of perinatal infant mortality.[6] Anemia is defined by: Hb less than 11.0 g/dl in the first trimester, less than 10.5 g/dl in the second and third trimesters, and less than 10.0 g/dl in the postpartum time.[7] The deficiencies in others requirements of supplements result in Adverse health outcomes on maternal health and fetus.[8] Ca deficiency induces weak fetal bone development[9] and also Future growth delays and an increased risk of osteoporosis in the kids are also brought on by insufficient calcium intake during fetal development.[10] A deficiency in vitamin D during pregnancy could induce preeclampsia, gestational diabetes, fetal growth retardation, and preterm birth.[11] Many studies conducted around the world shown that low levels of knowledge exist regarding supplements during pregnancy.[12-14] Regarding to medication compliance; 50% to 60% of patients do not adhere to their prescribed medications as instructed, particularly those with chronic illnesses.[15] According to the WHO, adherence is the degree to which the person's behavior, including medication use, agrees with approved medical professional's suggestions.[16] Reduced compliance for iron therapy among pregnant women in developing countries is directly related to inadequate awareness about anemia and a medical delivery system that is insufficient to meet the health demands for the entire human race[17] as well as many research showed low adherence rate regarding recommended supplements during pregnancy. The goal of this study is to assess knowledge and rate of adherence to supplement medications among pregnant women in Iraq; especially after several studies showed that patients' adherence to different medication is less than required.[18-20]

Materials and Methods

Study Design and Duration

This study was a cross-sectional study, within the time spans of October and December in 2022.

Study Population, and Sampling

Pregnant women attending obstetrics and gynecology teaching hospital in Karbala, who were at second trimester and took iron-folic acid supplement or any recommended supplements for pregnancy at least a month before the data collection. One hundred thirty-nine pregnant women were interviewed to participant in the study. Pregnant women were informed about the study and then asked to participate. One hundred of them underwent the biochemical tests required of them Those with chronic disease or had an obstetric emergence were not joined.

Study Variables and Tools for Getting Data

The dependent variables were a Biochemical test, knowledge, and adherence to iron, folic acid, calcium and other micronutrient supplementation, while those variables that are independent were the socio-demographic and obstetric characteristics.

Data was collected using a Questionnaires were predetermined and administered by an interviewer. The structured questionnaires were created in English then translated into the Arabic, knowledge questionnaire about requirement of supplements and its importance at pregnancy was taken from previous studies while MARS-5 questionnaire was used to assess the adherence of pregnant women toward supplements.

Data Management and Analysis

Information from the questionnaire and all test results from study groups samples were entered a data sheet and was assigned a serial identifier number. Multiple entries were used to avoid errors. The data analysis for this work was generated using SPSS version 28 and Excel 2016. Descriptive statistics were performed on the data of each group. Values were illustrated by n (%) for categorical, Scale variables were presented by mean ± standard deviation. Chi square was used to measure the association between categorical variables. Results of all hypothesis tests with P-values <0.05 (two-side) were regarded significant statistically.

Ethical Approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document number 178 dated 27/10/2022 to get this approval.

Results

Socio-Demographic and Obstetric Characteristics of Participants

A total of 100 women who are Pregnant were joined in this study, participants were divided into subgrouping based on age range using class interval table. The participants characteristics, laboratory values, and other clinical data of pregnant women groups were summarized in Table 1. Ages 21–30 had the highest involvement rate (63%), while those under the age of 20 had the lowest (15%). The descriptive table also shown the number of pregnancies, mostly of the participants were

Table 1. The frequency of demographic characteristics of studied

Variables	Groups	Frequency	Percentage%
Age groups	≤ 20 Years	15	15.0
	21–30 Years	63	63.0
	31–40 Years	22	22.0
Gravidity	One time	40	40.0
	2–4 times	44	44.0
	More than four times	16	16.0
Gestational age	Less than 20 weeks	71	71.0
	More than 20 weeks	29	29.0
Occupation	House wife	60	40.0
	Employee	40	60.0
Education level	Illiterate	7	7.0
	Primary school	17	17.0
	High school	29	29.0
	University	47	47.0

Table 2. The frequency of biomarkers of studied

Variables	Groups	Frequency	Percentage%
Calcium (total)	Normal	75	75
	Deficiency	25	25
Hemoglobin	Normal	15	15
	Deficiency	50	50
	Anaemia	35	35
25-OH vitamin D	Normal	16	16
	Deficiency	84	84

reporting to have 2–4 times previously. Furthermore, about 71% of the pregnancy women were in the early period of second trimester. Research questionnaire was also included the occupation and education level of the participants, about 60% of the participants were employee, 47% were reporting to have a Bachelor degree and only 7% were illiterate.

Biochemical Tests

The frequency of biomarkers level, mean level of each biomarker was divided into two groups Normal and Deficiency level based on the normal range of each marker. Results were indicated that more than two third of the participant 75% were having normal calcium level, half were found to have HB level insufficiency, 52% were suffering from anaemia, and 84% were confirmed to have Deficiency of Vitamin D (Table 2).

Knowledge and Adherence

Pregnant women were divided into two groups based on the knowledge questionnaire, a score of >10 has previously been used as good knowledge while a score ≤10 was intermediate/poor knowledge. Results were illustrated that Age groups, participants occupation and education level were shown to be significant effecting the knowledge of the participants, P-values ≤ 0.01 (Table 3).

Also, pregnant women were divided into two groups based on MARS-5, a score of ≥ 20 has previously been used as

Table 3. **The association of knowledge and the socio-demographic statuses of the participants**

Variables	Groups	Intermediate/ poor knowledge	Good knowledge	*P*-value
Age groups	≤ 20 Years	8	7	
	21–30 Years	24	39	0.01 [S]
	31–40 Years	2	20	
Gravidity	One time	15	25	
	2–4 times	15	29	0.672 [NS]
	More than four times	4	12	
Gestational age	Less than 20 weeks	23	48	
	More than 20 weeks	11	18	0.596 [NS]
Occupation	House wife	28	32	
	Employee	6	34	0.001 [S]
Education level	Illiterate	5	2	
	Primary school	9	8	
	Middle	10	16	0.005 [S]
	High school	2	1	
	University	8	39	

Table 4. **The association of adherence and the socio-demographic statuses of the participants**

Variables	Groups	Poor adherence	Good adherence	*P*-value
Age groups	≤ 20 Years	11	4	
	21–30 Years	32	31	0.211 [NS]
	31–40 Years	10	12	
Gravidity	One time	21	19	
	2–4 times	24	20	0.949 [NS]
	More than four times	8	8	
Gestational age	Less than 20 weeks	37	34	
	More than 20 weeks	16	13	0.781 [NS]
Occupation	House wife	39	21	
	Employee	14	26	0.003 [S]
Education level	Illiterate	5	2	
	Primary school	12	5	
	Middle	15	11	0.04 [S]
	High school	3	0	
	University	18	29	

Table 5. **Mean score of knowledge and adherence and mean level of biomarkers**

Variables	Mean ± SD
Knowledge	11.43 ± 2.69
Adherence	18.61 ± 4.35
Hemoglobin	10.53 ± 1.32
25-OH vitamin D	19.78 ± 15.08
Calcium (total)	8.99 ± 0.67

a good adherence, while < 20 was indicated to be a poor adherence. Regarding the association of adherence and participants' Socio-demographic statuses results were indicated that only participants occupation and education level were shown to be significant effecting the pre-Adherence of the participants, *P* values ≤ 0.05 (Table 4).

Table 5 demonstrated the overall score of Knowledge and Adherence of pregnant women regarding iron, folic acid, calcium and vitamin D supplements, the mean ± SD score were (11.43 ± 2.69) and (18.61 ± 4.35) respectively. While the mean level of the biomarkers (Hb, vitamin D and Ca) was 10.53 ± 1.32, 19.78 ± 15.08 and 8.99 ± 0.67 respectively.

Discussion

In the current study, 100 pregnant women were enrolled, with the majority of ages of 21–30 years and most of them were a house wife. Most participants had been pregnant more than once. The overall knowledge score was high with good knowledge about anemia during pregnancy, folic acid and its importance, iron supplement, and types of food that a pregnant woman needs. This goes along with previous study which showed there was a lot of knowledge about the role of dietary supplements throughout pregnancy[21,22] while it contravenes another study which showed lack of knowledge about anemia, iron-rich foods, and the importance of iron supplements through pregnancy.[14]

However, knowledge about supplemental calcium and vitamin D and their effects on maternal health and fetus development was poor. This is similar to the results shown by previous studies in two separated countries.[12-13] Adherence to recommended supplements was low, with forgetfulness, fear of side effects, low income, and lack of availability as reported reasons for non-adherence and these finding was in accordance with previous studies.[23-25] Poor adherence negatively affected levels of hemoglobin, calcium, and vitamin D in the body. Socio-demographic characteristics like age group, occupation, and education level were also associated with knowledge level of participants. Education level and Age group were also associated with a high level of knowledge of supplementing diet during pregnancy in previous studies.[26-27]

The iron-folic acid supplement was the most common medication has been prescribed to pregnant women while other supplements like calcium and vitamin D were rarely prescribed, and so adherence by pregnant women was poor.

Poor adherence to supplements medication affect the levels of hemoglobin, calcium and vitamin D in the body also, it was clear in biochemical results. the highest percentage of participant pregnant women have hemoglobin level lower than normal with one third of them suffering from anemia

(Hb < 10.5 g/dl) in addition to eighty-four percent have vitamin d deficiency and a quarter of pregnant women have calcium insufficiency. The study's limitations include being confined to a single place and does not reflect the entire population. These finding agree with WHO global database on anemia in 2019 as well as studies that were shown previously insufficient vitamin D level among pregnant women.[13, 28]

Conclusion

While in this study the pregnant women had a good knowledge about the nutrient and the importance of supplements during pregnancy, adherence to recommended supplementation like IFA, calcium, and vitamin D was low. This highlights the need for increased health education and guidance to improve adherence to antenatal care recommendations. Future studies should focus on identifying effect strategies to increase adherence to supplements during pregnancy, particularly for vulnerable populations with low income levels.

Competing Interests

According to the authors, no conflicts of interest exist.

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