ARAŞTIRMA / RESEARCH

The Effect of Rational Iron Medication Use on Pregnancy Hemogram

Oral Demir İlacının Akılcı Kullanımının Gebelikte Hemogram Düzeyine Etkisi

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Geliş tarihi/Received: 01.10.2021
Kabul tarihi/Accepted: 23.06.2022

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Bu çalışma, 3. Uluslararası ve 4. Ulusal İstanbul Ebelik Günleri Kongresi (8 – 10 Ekim 2020)'nde sözel bildiri olarak sunulmuştur.

Abstract

Objective: This study aims to determine the rational use of oral iron drugs during pregnancy and the factors affecting the hemogram level.

Material and Method: The research was conducted at a hospital in Istanbul, Turkey between February 15 and 30 September 2019. This descriptive study was carried out with the participation of 303 low-risk pregnant women. All participants received oral iron supplements during pregnancy. The data were collected using the participant information form and Rational Medicine Use Scale.

Results: The mean age of the pregnant women was 30.58±5.63 years. 37.6% of the participants were found to have haemoglobin levels below 11g/dl before pregnancy, 19.5% in their first trimester, and 32.3% in their third trimester. A significant relationship was found between the first-trimester anemia status and the third-trimester haemoglobin and haematocrit levels (p=0.000). A significant relationship was observed between third-trimester haemoglobin and haematocrit values and regular use of oral iron medication, and compliance of fetus to gestational week (p=0.003; p=0.001). A significant relationship was detected between the education level of pregnant women, income status perception and the Rational Medicine Use Scale mean scores (p=0.000; p=0.028).

Conclusion: Regular use of oral iron medication during pregnancy has affected third-trimester haemoglobin and haematocrit levels and fetal development positively. Nurses and midwives should explain and emphasize the importance of the correct-rational use of iron drugs for pregnant women.

Keywords: Anemia, haemoglobin, iron-deficiency anemia, pregnancy.

Öz

Amaç: Bu çalışmada gebelikte oral demir ilaçlarının akılcı kullanımı ve hemogram düzeyini etkileyen faktörlerin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Araştırma, Türkiye'nin İstanbul ilinde bulunan bir hastanede 15 Şubat-30 Eylül 2019 tarihleri arasında yapılmıştır. Tanımlayıcı tipteki bu çalışma 303 düşük riskli gebenin katılımıyla gerçekleştirilmiştir. Tüm katılımcılar gebelik sırasında oral demir takviyesi almıştır. Veriler "Katılımcı Bilgi Formu" ve "Akılcı İlaç Kullanım Ölçeği" kullanılarak toplanmıştır.

Bulgular: Gebelerin yaş ortalaması 30,58±5,63 yıl idi. Katılımcıların %37,6'sının gebelik öncesi, %19,5'inin ilk trimesterde ve %32,3'ünün üçüncü trimesterde hemoglobin düzeylerinin 11g/dl'nin altında olduğu tespit edilmiştir. Birinci trimester anemi durumu ile üçüncü trimester hemoglobin ve hematokrit düzeyleri arasında anlamlı ilişki bulunmuştur (p=0,000). Üçüncü trimester hemoglobin ve hematokrit değerlerine göre oral demir ilacının düzenli kullanımı ile fetüsün gebelik haftası ile uyumu arasında anlamlı ilişki gözlenmiştir (p=0,003; p=0,001). Gebelerin eğitim düzeyi, gelir durumu algısı ile Akılcı İlaç Kullanım Ölçeği puan ortalamaları arasında anlamlı ilişki saptanmıştır (p=0.000; p=0.028).

Sonuç: Gebelikte düzenli oral demir ilacı kullanımı üçüncü trimester hemoglobin ve hematokrit değerlerini ve fetal gelişimi olumlu yönde etkilemiştir. Gebelere demir ilaçlarının doğru-akılcı kullanımının önemi hemşire ve ebeler tarafından anlatılmalı ve vurgulanmalıdır.

Anahtar Kelimeler: Anemi, hemoglobin, demir eksikliği anemisi, gebelik.

1. Introduction

Anemia is one of the most common hematological problems during pregnancy. In general, anemia is defined as a haemoglobin (Hb) concentration below 11 g/dl or a haematocrit (Htc) value below 33%. Iron deficiency anemia (IDA) is one of the most common acquired anemia forms in pregnancy. IDA is known to cause maternal and fetal complications (1-3).

Anemia in pregnancy is usually evaluated based on trimesters. The Center for Disease Control and Prevention (CDC) defined anemia as Hb values of under 11 g/dl and Htc values of under 33% for the first and third trimesters of pregnancy, and Hb values below 10.5 g/dl and Htc values below 32% in the second trimester (4,5). It is estimated that 38.2% of pregnant women in the world and 60% of pregnant women in developing countries are anemic (6). Depending on the regional and demographic characteristics in Turkey, the IDA prevalence in pregnant women is reported between 20% and 50% (2).

The main cause of IDA is low iron levels before pregnancy or increased iron requirement during pregnancy. The World Health Organization (WHO) recommends iron supplementation to all anemic and non-anemic pregnant women (6). The Turkish Ministry of Health offers iron supplementation to pregnant women under the Iron Supplementation Program for pregnant women (except when iron should not be supplemented) (7).

Oral iron supplementation during pregnancy is usually initiated in the second trimester. CDC recommends that all pregnant women receive an iron supplement of 30 mg/day (unless there is hemochromatosis). For women with low ferritin levels and anemia, it is recommended to increase iron supplementation from 30 to 120 mg daily (4). Also, it is recommended to take the iron drug with orange juice or 250 mg of vitamin C (5,8). It has been found that larger doses do not increase iron absorption, but they rather increase side effects. The most common side effects affecting pregnant women are nausea and constipation (9). When side effects occur, pregnant women stop using iron medication or start using it irregularly (4,10). In pregnant women, especially in the second and third trimesters, the need for iron is higher than the amount taken in the diet. Starting from the second trimester of all pregnant women in Turkey, 40-60 mg iron supplement daily (tablets, capsules, and suspension form) is recommended (7).

Rational use of drugs during pregnancy is important in terms of increasing the effectiveness of treatment and reducing the side effects of drugs. Rational drug use is the planning, execution, and monitoring process that ensures the effective, safe, and economical administration of drug therapy (11). In this process, health workers and individuals, especially physicians and pharmacists, have responsibilities. This study aims to determine the rational use of oral iron drugs in pregnancy and the factors affecting the level of hemogram.

2. Materials and Methods

2.1. Research Type

The research was planned as a descriptive study.

2.2. Research Population and Sample

The research was conducted at a hospital in Istanbul, Turkey. The hospital where the study was conducted has a capacity of 325 beds. This hospital, which has a perinatology clinic, provides care services to both low-risk and high-risk pregnant women.

The sample size was calculated before starting the research (12). The number of people in the universe (N=1600), the margin of error (t=0.5%), the frequency of occurrence of the event to be examined (p=0.5), the frequency of absence of the event to be examined (q=0.5), the sampling error (d=0.05), and the sample number was determined as n=310. A total of 341 pregnant women were interviewed considering data losses (10% data loss). Pregnant women without first trimester hemogram results (n:22) and with missing study forms (n:16) were excluded from the study. The data of 303 pregnant women were analyzed in the study. Hemogram values of the participants were obtained from their own laboratory results and recorded.

The study was carried out between February 15 and 30 September 2019. The sample of the study consisted of low-risk pregnant women who were in their thirty-third and above week of gestation, who used oral iron medicine and applied to the NST (non-stress test) unit. According to the CDC and WHO (4,6) an Hb value of <11g/dl in the third trimester is defined as anemia of pregnancy. In pregnant women, especially in the second and third trimesters, the need for iron is higher than the amount taken in the diet. Low-dose iron supplementation is recommended starting from the first trimester to reduce the prevalence of maternal anemia (13). In accordance with the current Prenatal Care Management Guidelines (2018), it is recommended that iron supplementation be given throughout pregnancy from the beginning of the 4th month (second trimester) of pregnancy (7). Both the criteria mentioned above and the iron increase in the need in the third trimester increase the importance of the rational use of iron medication. Primiparous and multiparous pregnant aged 18-45 years, with a single pregnancy, over the thirty-third gestational week, and taking oral iron supplements were included. Those who have any medical and obstetric complications (chronic systemic disease, bleeding, etc.), those who do not reach haemogram values before pregnancy and during pregnancy, and those who do not want to participate in the study were excluded.

2.3. Data collection Tools

The data were collected using the participant information form and Rational Medicine Use Scale (RMUS). Participant information forms were filled in 10-15 minutes by face-to-face interviews.

Participant Information Form: All forms used in the study were prepared by the researchers using the literature (2,6,10). Demographic variables such as the participant's age, education level, income level, family structure, etc. were recorded (12 questions). Same time obstetric characteristics and variables related to current pregnancy; number of pregnancies, number of births, body weight before and during pregnancy, nausea and vomiting during pregnancy, pre-pregnancy anemia,

pre-pregnancy folic acid use and iron supplementation and regular use of iron medication were recorded (21 questions). This form consists of 33 questions in total. Hemogram values of the participants were obtained from their own laboratory results and recorded.

Rational Medicine Use Scale (RMUS). This scale evaluates the rational medicine use of individuals. The validity and reliability study of the scale was conducted by Demirtaş et al. in 2018. There are a total of 21 items in the scale consisting of 10 true and 11 false propositions. The answers to the scale are scored on three levels (Yes: 2 points, I do not know: 1 point, No: 0). Items 2, 5, 6, 9, 10, 13, 15, 16, 17, 19, 20 of the scale are inverse propositions and scored inversely. The scores that can be obtained from the scale range from 0 to 42. The predictive value for the scale was determined as 34 points, and those who scored 35 points and above are also considered as having knowledge of rational drug use. The Cronbach's alpha coefficient of the scale was 0.789 (14). A Cronbach's alpha coefficient between 0.60 and 0.80 indicates that the scale is moderately reliable, and between 0.80 and 1.00 indicates that the scale is highly reliable (15,16). Cronbach's alpha coefficient of the scale was 0.573.

2.4. Statistical Analysis

The SPSS 21.0 (Statistical Package for the Social Sciences) demo package program was used to evaluate the data. The data which did comply with normal distribution were analyzed with the parametric Independent Sample t-test and one-way ANOVA. Mean (min-max), standard deviation, frequency and percentage values were calculated. A Chi-square test was performed for the analysis of categorical variables. The results were evaluated in a 95% confidence interval and a significance level of $p<0.005$.

3. Results

3.1. Participants' Characteristics

According to the findings, the mean age of the participants was 30.58±5.63 years, their mean weight before pregnancy was 66.85±14.97 kg, their mean body mass index (BMI) was 25.46±5.44, and their mean total weight gain during pregnancy was 11.65±6.12 kg. 16.8% of the pregnant women were high school graduates, 23.8% lived in extended families, 31.7% had unplanned pregnancies, 26.7% were having their first pregnancies, and 36% were nulliparous. The Hb levels of 37.6% before pregnancy, 19.5% in their first trimester and 32.3% in their third trimester were found to be below 11g/dl (Table 1).

3.2. First-Trimester Anemia Status According to Pregnant Individual Characteristics

A statistically significant difference was found between first-trimester anemia status and family structure of pregnant women, anemia before pregnancy, and third-trimester Hb levels (p=0.002). No statistically significant difference was found between first-trimester anemia status and income perception of pregnant women, stomach and constipation problems, nausea and vomiting, fatigue/weakness, the pregnancy number, the number of births, and iron medication use before pregnancy (p>0.005) (Table 1).

Table 1. First-trimester anaemia status according to individual characteristics (n:303)

Individual characteristics	1st Trimester Anaemia						χ^2; p
	Anaemia (n:59)		No Anaemia (n:244)		Total		
	n	%	n	%	n	%	
Income status perception							
Income < outgoings	19	21.8	93	90.2	112	112.0	2.801
Income = outgoings	36	30.8	122	127.2	158	158.0	0.246
Income > outgoings	4	6.4	29	26.6	33	33.0	
Family structure							
Nuclear	39	45.0	192	186.0	231	231.0	3.912
Extended	20	14.0	52	58.0	72	72.0	0.048
Stomach problem							
No	53	52.4	216	216.6	269	269.0	0.003
Yes	6	6.6	28	27.4	34	34.0	0.956
Constipation problem							
No	22	26.3	113	108.7	135	135.0	1.566
Sometimes	37	32.7	131	135.3	168	168.0	0.211
Nausea and vomiting during pregnancy							
No	16	15.2	62	62.8	78	78.0	0.011
Yes	43	43.8	182	181.2	225	225.0	0.918
Fatigue/tiredness							
No	27	25.7	105	106.3	132	132.0	0.144
Yes	32	33.3	139	137.7	171	171.0	0.704
Pregnancy number							
First pregnancy	13	15.6	67	64.4	80	80.0	0.468
≥ 2 pregnancy	46	43.4	177	179.6	223	223.0	0.494
Birth number							
No birth	18	21.2	91	87.8	109	109.0	2.577
1-2 birth	38	32.9	131	136.1	169	169.0	0.276
≥3 birth	3	4.9	22	20.1	25	25.0	
Anaemia before pregnancy							
No anemia	18	36.8	171	152.2	189	189.0	30.041
Anaemia	41	22.2	73	91.8	114	114.0	0.000*
Iron medication use before pregnancy							
No	11	6.8	24	28.2	35	35.0	2.797
Yes	48	52.2	220	215.8	268	268.0	0.094
3rd Trimester Hb							
< 11 g/dl	30	42.7	102	89.3	132	132.0	9.884
≥11 g/dl	68	55.3	103	115.7	171	171.0	0.002*
1st Trimester Hb Mean (min-max)			12.0 (8.4-15.3)				

χ^2: Chi square test, *p<0 .005

3.3. Third-Trimester Hb and Htc Levels According to Iron and Vitamin Use

A statistically significant difference was determined between the third trimester Hb and Htc values and the regular use of the iron medication (p=0.004; p=0.006), fatigue/tiredness (p=0.001; p= 0.008), and the compliance of the fetus with the gestational week (p=0.003; p=0.001).

No significant difference was observed between the third trimester Hb and Htc values and the use of folic acid and iron medication before pregnancy, the use of folic acid in the first trimester, the week of taking iron medication, and the timing of taking the iron medication (p>0.005) (Table 2).

Table 2. Third-trimester Hb and Htc level according to iron and vitamin use (n: 303)

Use of iron and vitamins	n	3rd Trimester Hb Mean (Min-Max)	3rd Trimester Htc Mean (Min-Max)
Folic acid and multivitamin use before pregnancy			
No	199	11.2 (7.7-13.8)	33.9 (25.1-40.7)
Yes	104	11.4 (8.2-14.7)	34.6 (25.8-44.8)
t; p		1.230;0.220	1.955;0.052
Iron medication use before pregnancy			
No	35	11.0 (7.7-13.5)	33.3 (25.1-40.7)
Yes	268	11.4 (8.2-14.7)	34.2 (25.8-44.8)
t; p		1.077;0.282	0.681;0.496
Folic acid use in the first trimester of pregnancy			
No	31	11.0 (8.6-13.7)	33.3 (27.1-41.3)
Yes	272	11.3 (7.7-14.7)	34.2 (25.1-44.8)
t; p		1.975;0161	2.962;0.086
The week of oral iron initiation during pregnancy			
Not remember	7	10.9 (8.6-12.4)	33.2 (27.1-38.7)
< 12 weeks	177	10.3 (7.7-14.7)	34.2 (25.1-44.8)
12-20 weeks	74	11.2 (8.8-12.9)	33.8 (27.2-38.9)
>20 weeks	45	11.5 (8.9-13.5)	34.3 (28.9-40.7)
F; p		0.847;0.469	0.690;0.559
Regular use of the oral iron medication during pregnancy			
Yes	246	11.4 (7.7-14.7)	34.3 (25.1-44.8)
No	57	10.9 (8.2-12.9)	33.2 (25.8-39.1)
t; p		2.996;0.004*	2.783;0.006*
Time to take oral iron medication			
Hungry	191	11.3 (7.7-14.0)	34.3 (25.1-40.3)
With food	93	11.3 (8.2-14.7)	34.0 (25.8-44.8)
As for mind	19	11.1 (95-13.0)	33.3 (29.5-39.0)
F; p		0.472;0.624	1.134;0.357
Fatigue/tiredness			
No	132	11.5 (8.7-14.0)	34.6 (27.5-41.3)
Yes	171	11.1 (7.7-14.7)	33.7 (25.1-44.8)
t; p		3.390;0.001*	2.683;0.008*
Compliance of fetus with gestational week according to ultrasonography			
Compatible	211	11.3 (7.7-14.7)	34.1 (25.1-44.8)
Ahead	61	11.0 (8.2-13.7)	33.3 (25.8-39.5)
Behind	31	11.8 (8.9-13.8)	35.7 (28.9-40.7)
F; p		5.956;0.003*	6.781; 0.001*
3rd Trimester Hb-Htc Mean (min-max)		11.35 (7.7-14.7)	34.17 (25.1-44.8)

F: One-way ANOVA test, t: Student's t-test, *p <0 .005

3.5. Comparison of Some Variables of Pregnant Women with RMUS Score

A statistically significant difference was found between the education levels, income status perception, and family types of pregnant women and the RMUS score averages (p=0.000; p=0.028; p=0.005). There was no statistically significant association between RMUS point averages and number of pregnancies, number of births, and planning status of pregnancy. In addition, there was no statistically significant association between pre-pregnancy folic acid-multivitamin use, pre-pregnancy iron drug use, regular iron drug use during pregnancy, and obtaining information about drug use and the mean RMUS score. In the study, no statistically significant association was observed between pregnant women with and without anemia in the third trimester with respect to the mean RMUS score (p>0.005) (Table 3).

Table 3. Comparison of RMUS score and some variables of pregnant women (n:303)

Some variables	n	RMUS Mean±SD	(Min-Max)	F;t; p
Education level				
Primary school	72	22.8±4.1	15.0-33.0	7.734
Middle school	51	22.2±3.8	16.0-35.0	0.000*
High school	91	20.9±3.9	16.0-32.0	
University	89	20.4±2.1	16.0-26.0	
Income status perception				
Income < outgoings	12	21.9±3.9	15.0-33.0	2.543
Income = outgoings	158	21.4±3.5	16.0-35.0	0.080
Income > outgoings	33	20.3±2.9	17.0-31.0	
Family structure				
Nuclear	231	21.1±21.1	15.0-33.0	2.700
Extended	72	22.5±22.5	16.0-35.0	0.007*
Pregnancies number				
First pregnancy	80	21.2±3.3	15.0-31.0	0.806
Two and over pregnancy	223	21.5±3.7	15.0-35.0	0.421
Births number				
No birth	109	21.4±3.5	15.0-32.0	0.231
1-2 birth	169	21.4±3.6	16.0-35.0	0.794
≥3 birth	25	21.9±3.8	15.0-29.0	
Planning status of pregnancy				
Planned	207	21.4±3.7	15.0-35.0	0.448
Unplanned	96	21.6±3.3	15.0-32.0	0.626
Using folic acid-multivitamin before pregnancy				
No	199	21.5±3.7	16.0-33.0	0.512
Yes	104	21.3±3.5	15.0-35.0	0.609
Using iron medication during the pre-conceptional period				
No	35	22.0±4.1	16.0-33.0	0.869
Yes	268	21.4±3.5	15.0-35.0	0.386
Regular use of iron medication during pregnancy				
Yes	246	21.5±3.6	15.0-35.0	0.129
No	57	21.4±3.8	16.0-32.0	0.897
Obtaining information from the healthcare professional about the use of the drug				
No	121	21.6±3.6	15.0-32.0	0.580
Yes	182	21.3±3.6	15.0-35.0	0.562

F: One-way ANOVA test, t:Student's t-test, SD: Standard deviation

RMUS: Rational Medicine Use Scale, *p <0 .005

4. Discussion

In general, anemia is defined as a Hb concentration below 11 g/dl or a Htc value below 33 (1-3). According to the findings of this study, the Hb levels of 19.5% of the pregnant women in their first trimester and 32.3% in their third trimester were below 11g /dl. A statistically significant association was found between the first-trimester anemia status and the third-trimester Hb level. In a study of non-anemic women in the first trimester of pregnancy, 42% were iron deficient (17). Baştürk et al. (18) determined the incidence of anemia in pregnant women to be 32.5%. Pulatoğlu et al. (19) stated that the rate of anemia in pregnant women was 19.8%, and 44% of them received iron supplementation. While selective iron use was more common in the anemic group (47.1%), routine iron use was more common in the non-anemic group (29.3%) (19). Karaoglu et al. (20) identified the incidence of anemia as 21.2% in the first trimester and 37.5% in the third trimester, Vural et al. (2) identified it as 11.9% in the first trimester and 33% in the third trimester, and Kabalcioglu Bucak et al. (21) identified it as 33.3% in the second trimester and 22.2% in the third trimester. Morasso et al. (22) found the incidence of anemia in pregnant women to be 17.4% and 35.8% in the first and third trimesters, respectively. Tan et al. (23) stated that 19.8% of women were diagnosed with anemia and 13.9% with IDA. They stated that the prevalence of anemia and IDA peaked in the eighth pregnancy month (24.0% for anemia and 17.8% for IDA). Ngimbudzi et al. (2021) (24) stated that 16.3% of the women included in the study had normal hemoglobin (51.9% moderate anemia, 24.4% mild anemia and 7.2% severe anemia). One study (2017) (24) showed that the overall prevalence rate of iron deficiency anemia in pregnant women was (76.7%). Iron deficiency anemia was most prevalent in the second trimester (45.7%) as compared to first (16.1%) and third (38.2%) trimester pregnancy (25). Women who were frail before pregnancy and had severe nausea or vomiting during pregnancy have been shown to have a higher risk of anemia and IDA (23). In most studies, the prevalence of anemia increased in the third trimester. It has been reported that high iron transfer to the fetus in the last weeks of pregnancy was associated with increased anemia in the third trimester (2). Nurses and midwives should explain to pregnant women that the effect of the iron medication is dependent on regular use of the drug.

A statistically significant association was found between first-trimester anemia status and anemia before pregnancy (Table 1). The fact that most women are anemic increases the importance of iron supplementation in the pre-conceptional and gestational periods (2,26). It is stated that dietary measures are insufficient to reduce the frequency of IDA before birth, and 30-40 mg oral iron supplements taken from early pregnancy to delivery prevent IDA. Detecting patients with anemia in the preconception period and/or delaying pregnancy until optimal Hb levels are reached will lower this rate (1,27).

A statistically significant association was determined between the third trimester Hb and Htc values and the regular use of the iron medication (Table 2). Haider et al. (28), in a systematic review and meta-analysis study, found that iron medication increases maternal Hb concentration by 4.59 g/dl on average and significantly reduces the risk of anemia. Aranda et al. (29) reported that 36% of women had insufficient iron levels before pregnancy. Sloan et al. (30) stated that the effect of iron supplementation was directly related to the dose, and a significant benefit occurred at doses of more than 91 mg per day. Screening anemia before and during pregnancy, starting iron supplements early, regular use of the drug increases the success of anemia treatment.

The most common symptom in anemia is fatigue. A significant association was found between fatigue/weakness and Hb and Htc levels in the third trimester (Table 2). In the literature, an increase in fatigue and a decrease in work and daily life performances have been reported in pregnant women with IDA (31). As pregnancy progresses, iron gradually increases due to fetal growth and the need reaches its maximum in the third trimester. This may cause increased fatigue and weakness in pregnant women with anemia.

Post-hoc LSD test was performed after one-way analysis of variance (ANOVA) to determine between which subgroups the third trimester Hb value differed with fetal gestational week. As a result of the test, a significant correlation was found between fetuses that were compatible with fetuses lagging behind according to gestational week and fetuses that were ahead, in favor of fetuses that were behind in terms of gestational week. In addition, a significant correlation was found between the third trimester Htc value of fetuses lagging behind by gestational week and the Htc value of fetuses leading by gestational week in favor of fetuses lagging behind according to gestational week ($p>0.01$) (Table 2). Vural et al. (2) found low birth weight rates significantly higher in pregnant women with Hb <10g/dl in their first and second trimesters. Aranda et al. (29) stated that iron supplementation before pregnancy had a positive effect on birth weight. Moghaddam Tabrizi and Barjasteh (32) described severe anemia affected neonatal birth weight in the third trimester, Ren et al. (33) reported that low Hb concentration in the first trimester affects low birth weight and intrauterine growth retardation, Wang et al. (34) stated that administration of iron supplements before the 20th gestational week improves fetal weight in women with very high Hb levels (>14.5 g/dl). In their systematic review and meta-analysis study, Haider et al. (28) found that the improvement in Hb levels due to prenatal iron use increased the birth weight of the fetus. Bencaiova and Breymann (35) did not find a negative relationship between maternal and perinatal outcomes of pregnant women with mild anemia who were taking iron supplements. However, they stated that severe maternal anemia, especially in the first trimester, was associated with low birth weight and intrauterine growth restriction. Smith et al. (36) determined a relationship between moderate and severe anemia and SGA live birth rates in pregnancy. Nair et al. (37) stated that anemia is a risk factor for low birth weight, independently of trimester during pregnancy. In this study, the Hb and Htc values were observed to affect the compliance of the fetus with gestational weeks. To reduce the low birth weight rate, pregnant women should be given iron support according to the degree of anemia and nutritional counseling should be provided.

Nowadays, it is estimated that more than half of all drugs are unnecessarily prescribed, and about half of patients are not using drugs correctly. Akıncı et al. (38) stated that one third of the patients did not know about the use of prescription drugs. prescription drugs.

According to Şendir et al. (39), the patients stopped using the drug when they thought that they had recovered. Ekenler and Koçoğlu (40) observed that individuals do not use drugs rationally and that the rate of quitting the drug before the specified time is high (77.3%). Education level is important in gaining awareness of rational drug use (11). There was a statistically significant difference in the RMUS score averages between the education levels of pregnant women (Table 3). Demirtas et al. (14) found that women with university education had higher RMUS scores. The study's this finding by Demirtaş et al. (14) support the conclusion. Education level of pregnant women affected rational drug use.

Although pregnant women are informed about iron supplements, only 36% are reported to receive regular oral iron supplementation (2). In this study, no difference was found in the RMUS score averages between the women who used iron regularly during pregnancy and who did not (Table 3). In studies, the rate of compliance with iron supplementation recommended during pregnancy was determined as 55.3% (41), 43.1% (42), and 65.9% (43). It is stated that pregnant women who receive adequate information and counseling on iron supplementation use iron drugs more rationally and adapt better to supportive treatment (44,45).

According to the third trimester Hb value, the mean RMUS score of pregnant women with and without anemia was similar (Table 3). If the score obtained from the scale is 35 points or more, it is considered that women have knowledge of rational drug use. This result shows that pregnant women use iron drugs rationally. Bian et al. (2015) reported that a high level of education has a direct effect on rational drug use (46). In the study, it was thought that the mean RMUS averages of anemic and non-anemic (according to Hb values) pregnant women in the third trimester were similar, and other factors were effective in the similarity of the result.

5. Conclusion and Recommendations

As a result of the study, one-fifth of pregnant women in the first trimester and one out of every three women in the third trimester were anemic. Family structure and pre-pregnancy anemia status of pregnant women affected first-trimester anemia status. First-trimester anemia status affected third trimester Hb and Htc levels. Regular use of iron affected third trimester Hb and Htc levels. Third trimester Hb and Htc levels affected fatigue/weakness and compliance of the fetus to gestational week. The level of education and family types of pregnant women and the RMUS were effective in the mean score. As a result, anemia, which poses a risk for maternal and fetus/newborn health, should be prevented, and treated before pregnancy. Considering the level of education and family type to be effective in medication use, midwives and nurses should explain to women the importance of regular use of iron medication.

6. Contribution to the Field

Iron medications are given to prevent anemia and to protect mother and fetus, and to improve maternal and fetus health during pregnancy. According to this study, the condition of anemia before pregnancy and in the first trimester affected the level of the third-trimester Hb. The education level of women has affected rational medication use. Regular use of oral iron medication during pregnancy has affected third trimester Hb and Htc values and fetal development positively. It has been observed once again how important it is for women to use iron drugs regularly before and during pregnancy. Regular and rational use of iron drugs positively affects maternal, fetal, and newborn health. Nurses and midwives play an active role in the use of drugs at the right time and in the right dose. The importance of regular and rational use of iron pills should be explained to pregnant women by nurses and midwives.

Ethical Aspect of Study

To conduct the study, ethical approval from the ethics committee (Decision of the ethics committee: Date 06/02/2019 /No:21), and the permission from the institution was obtained. Also, before starting the study, written consent was obtained from the participants who agreed to participate in the study.

Acknowledgments

Patient consent forms were completed and signed by all women.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Authorship Contribution

Concept: ZB, YDM; **Design:** ZB; **Supervision:** ZB, YDM; **Funding:** ZB, YDM; **Materials:** No; **Data Collection/ Processing:** ZB, YDM; **Analysis/Interpretation:** ZB; **Literature Review:** ZB; **Manuscript Writing:** ZB; **Critical Review:** ZB, YDM.

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