

# The association between anemia prevalence, maternal age and parity in term pregnancies in our city

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## Abstract

**Objective:** Although anemia is a quite common problem in all age groups and sexes in the world, it is particularly important in pregnant women as it may lead to poor maternal and perinatal outcomes. In this study, we aimed to determine anemia prevalence, the impact of parity on anemia prevalence and the severity of anemia in term pregnancies in our region.

**Methods:** A total of 426 pregnant women who admitted to Obstetrics and Gynecology Department of Fırat University between June 1, 2016 and December 31, 2016 and who were at 37 weeks of gestation and above without any additional pathologies such as preeclampsia, HELLP syndrome and placental abruption were included in the study. The demographic characteristics and hemoglobin values of pregnant women were evaluated retrospectively.

**Results:** The anemia prevalence was 18.7% in nulliparous patients and 21.9% in those with parity between 1 and 4, and it was 46.2% in grand multiparous patients. The severities of all diagnosed anemia cases were mild to moderate. Severe and very severe anemia was not found in any patient.

**Conclusion:** When compared to nulliparous patients, the prevalence of anemia is higher in multiparous and grand multiparous patients. Iron deficiency anemia is seen at a high rate despite preventive medicine activities.

**Keywords:** Term pregnancy, labor, anemia.

## Özet: İlimizde term gebeliklerde anemi sıklığı ve maternal yaş ile parite ilişkisi

**Amaç:** Anemi tüm dünyada her yaş grubunda ve cinsiyette son derece yaygın olarak izlenen bir sorun olmasına rağmen özellikle gebelerde kötü maternal ve perinatal sonuçlara neden olabilmesi açısından farklı bir öneme sahiptir. Bu çalışmada yöremizdeki term gebelerde anemi sıklığını, paritenin anemi sıklığına etkisini ve aneminin şiddetini tespit etmeyi amaçladık.

**Yöntem:** Çalışmaya 1 Haziran 2016 ile 31 Aralık 2016 tarihleri arasında Fırat Üniversitesi Kadın Hastalıkları ve Doğum Kliniğine doğum için başvuran 37 hafta ve üzerinde olan ve preeklampsi, HELLP sendromu, dekolman plasenta gibi ek patolojileri olmayan 426 gebe dahil edildi. Gebelerin demografik özellikleri ve hemoglobin değerleri retrospektif olarak incelendi.

**Bulgular:** Nullipar hastalarda anemi prevalansı %18.7, paritesi 1–4 arasında olanlarda %21.9, grand multipar hastalarda ise %46.2 olarak tespit edildi. Tanı konulan tüm anemiler hafif ve orta şiddette anemi şeklindeydi. Hiçbir hastada şiddetli ve çok şiddetli anemi tespit edilmedi.

**Sonuç:** Nullipar hastalar ile karşılaştırıldığında multipar ve grand multipar hastalarda anemi prevalansı daha fazladır. Demir eksikliği anemisi, önleyici hekimlik faaliyetlerine rağmen yüksek oranda görülmeye devam etmektedir.

**Anahtar sözcükler:** Term gebelik, travay, anemi.

## Introduction

Anemia develops during pregnancy in more than half of the women in the world.<sup>[1]</sup> Anemia is the condition where red blood cell count is lower than the number to meet the physiological needs of body in order to carry

sufficient amount of oxygen. In clinical practice, anemia is determined by measuring hemoglobin (Hb) or hematocrit (Htc) values in blood.<sup>[2]</sup> Beginning from the first trimester of pregnancy, the increase in plasma volume is followed up until 24–32 weeks of gestation.

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Although elevated red blood cell count accompanies it, this increase is relatively less and hemodilution-associated physiological anemia also develops. In 1968, the study group of World Health Organization (WHO) defined the values for the diagnosis of anemia for different populations, and these values defined for pregnant women still prevail today.<sup>[3]</sup> WHO advices to keep hemoglobin value above 11.0 g/dl, and below 10.5 g/dl during second trimester. Also, according to WHO guidelines, hemoglobin values between 10–10.9 g/dl are considered as mild anemia, between 7–9.9 g/dl as moderate anemia, below 7 g/dl as severe anemia, and below 4 g/dl as very severe.<sup>[4]</sup>

The most common type of anemia developing during pregnancy is iron deficiency anemia. In order to meet the needs and losses during pregnancy and labor, women need approximately 1130 mg total iron during this period.<sup>[5]</sup> Knowing that iron need increases during pregnancy is significant for follow-up purposes. While the iron need is 0.8 mg/day during first trimester, it reaches to 7.5 mg/day during third trimester.<sup>[6]</sup>

Anemia during pregnancy is significant since it may lead to severe complications in terms of maternal and perinatal outcomes. Various studies showed that anemia increases the risks for preterm labor, newborn with low birth weight and fetal mortality.<sup>[7,8]</sup> The association of severe anemia with poor maternal outcomes such as cardiac failure, hemorrhage and infection is known.

In order to prevent the complications which may develop due to anemia, which is a serious threat for maternal and newborn health, iron support program for pregnant women was initiated in Turkey in November 01, 2005. With this program, it was recommended to provide iron support to all pregnant women without exception, except the cases where iron cannot be administered, as the lack of iron stores is of high rates in Turkey and external iron support is already required during pregnancy.

With this study, we aimed to determine hemoglobin values, of term pregnant women who admitted to Obstetrics and Gynecology Department of Firat University, just before the delivery and therefore to identify the prevalence of anemia in term pregnancies in our region which may lead to serious maternal and newborn morbidity and mortality, and to determine the distribution of anemia according to parity and age.

## Methods

A total of 426 term pregnant women (at and above 37 weeks of gestation), who admitted to the Obstetrics and Gynecology Department of Firat University between June 1, 2016 and December 31, 2016, were included in the study. Age, number of gravidity and full blood count parameters at the time of entrance to the delivery room were retrospectively evaluated and recorded. Patients with hematological disease or prominent hemorrhage, preterm pregnant women, those with multiple pregnancies, and patients diagnosed with placental abruption, pre/eclampsia and HELLP syndrome were excluded from the study.

According to WHO recommendations, pregnant women with hemoglobin values below 11 g/dl were considered anemic and they were classified as mild (10–10.9 g/dl), moderate (7–9.9 g/dl), severe (below 7 g/dl) and very severe anemic (below 4 g/dl). Nulliparous cases were included in Group I, cases with parity between 1 and 4 were included in Group II and cases with parity above 5 were included in Group III and distribution of hemoglobin values according to parity was assessed.

In order to assess the impact of age on the prevalence of anemia, the pregnant women were classified into age groups which were 19-year-old and below (also known as adolescent pregnancy), 20–35-year-old and 35-year-old and above, and the prevalence of anemia was investigated in each age group.

For the statistical analysis, SPSS 21.0 (IBM Corp., Armonk, NY, USA) was used in the analysis of variables. Conformity of the data to normal distribution was evaluated by Shapiro-Wilk test, and variance homogeneity was evaluated with Levene's test. For the comparison of more than two groups according to the quantitative data, one-way ANOVA and Kruskal-Wallis H tests were used. For the comparison of categorical variables with each other, Pearson chi-square test was used. Quantitative variables were shown in the tables as mean  $\pm$  standard deviation / range (maximum–minimum) and median range (maximum–minimum), and categorical variables shown as n (%). The variables were analyzed via 95% confidence interval, and p value less than 0.05 was considered significant.

## Results

The ages of patients included in the study were between 18 and 44 years, and the mean age was  $30.0 \pm 6.1$  years. Of

**Table 1.** Comparison of age and hemoglobin values of patients between the groups.

	GI=Parity 0 (n=144)	GII=Parity 1-4 (n=269)	GIII=Parity >5 (n=13)	Total (n=426)	p value	Double comparison of groups		
	Mean±SD/ (Max-Min)	Mean±SD/ (Max-Min)	Mean±SD/ (Max-Min)	Mean±SD/ (Max-Min)		GI-I	GI-III	GII-III
Age	26.21±15.76/ (44-18)	31.75±5.42/ (42-18)	36.15±4.14/ (43-29)	30.01±6.17/ (44-18)	<0.001	<0.001	<0.001	<0.005
	Mean (Max-Min)	Mean (Max-Min)	Mean (Max-Min)	Mean (Max-Min)	p value	GI-I	GI-III	GII-III
Hemoglobin	12 (15-8)	12 (14-7)	11 (13-8)	12 (14-7)	0.036	0.020	0.010	0.391

GI: Group I, GII: Group II, GIII: Group III.

the pregnant women admitted for delivery, 2.6% (n=11) of them were below 19-year-old, 76.3% (n=325) of them were between 20 and 35 years old, and 21.1% (n=90) of them were above 35-year-old. Of these patients, 144 of them were nulliparous, 269 of them were multiparous and 13 of them were grand multiparous.

When Groups I, II and III were evaluated in terms of age and hemoglobin levels, it was found that there was statistically significant difference between Groups I and II and Groups I and III in terms of ages and Hb levels of cases ( $p<0.05$ ). While there was significant difference between Groups II and III in terms of the ages of cases, there was no statistically significant difference between Hb levels ( $p>0.05$ ). The relationship between ages and hemoglobin levels of Groups I, II and III are presented in **Table 1**.

Hemoglobin values were within normal limits in 81.3% of nulliparous cases, in 78.1% of cases with parity between 1 and 4, and in 53.8% of cases with parity above 5. The anemia incidence of nulliparous cases was 18.7% (n=27). In this group, 9.7% (n=14) of cases had mild anemia and 9.0% (n=13) of cases had moderate anemia. Of case with parity between 1 and 4, 21.9% (n=59) had anemia. In these cases, 12.6% (n=34) of them had mild anemia and 9.3% (n=25) of them had moderate anemia. In grand multiparous cases, anemia incidence was 46.2% (n=6). In this patient group, 7.7% (n=1) of the cases had mild anemia and 38.5% (n=5) had moderate anemia. Severe and very severe anemia was not found in any patient.

Anemia incidence was 18.2% in pregnant women who were below 19-year-old, which was considered as adolescent pregnancy. The severity of anemia in this group was mild. The anemia prevalence in pregnant

women between 20 and 35 years old was 18.7%. While 10.4% of anemic pregnant women had mild anemia, 8.3% of them had moderate anemia. Hb values were within normal limit in 81.3% of pregnant women in this age group. Anemia prevalence was 28.1% in pregnant women who were above 35-year-old. While 11.2% of anemic pregnant women had mild anemia, 16.9% of them had moderate anemia. Hb values were within normal limit in 71.9% of pregnant women in this age group. The distribution of ages and parities of cases according to their anemia severities is shown in **Table 2**.

## Discussion

In “2011 Global Anemia Prevalence” report of the World Health Organization, anemia prevalence during pregnancy was reported as 38%, and it is estimated that this rate corresponds to 32 million pregnant women in the world. The same report states that anemia prevalence during pregnancy is 17% in the USA, 28% in Turkey and 54% in India, and it exceeds 60% in many

**Table 2.** Evaluation of anemia levels according to age and parity of cases.

Status	Normal (Hb≥11) n (%)	Mild anemia (Hb 10-10.9) n (%)	Moderate anemia (Hb 7-9.9) n (%)	Severe anemia (Hb <7) n (%)
Nulliparous	117 (27.4)	14 (3.3)	13 (3.0)	-
Parity 1-4	210 (49.4)	34 (8.0)	25 (5.9)	-
Parity ≥5	7 (1.7)	1 (0.2)	5 (1.1)	-
≤19 years old	9 (2.1)	2 (0.4)	-	-
20-35 years old	265 (62.3)	34 (8.0)	27 (6.3)	-
>35 years old	64 (15.0)	10 (2.4)	15 (3.5)	-

Hb: Hemoglobin

African countries. The prevalence of severe anemia, which is more significant in terms of complications, is reported as 0% in the USA, 0.3% in Turkey, 1.3% in India and it reaches 2.8% in many African countries.<sup>[9]</sup>

Anemia is the most common hematologic disorder encountered during pregnancy. The most frequent reason for anemia during pregnancy is iron deficiency. It is known that many factors such as socioeconomic condition, education level, age, parity etc. affect the hemoglobin level of pregnant women. Many studies were performed on anemia in Turkey and the incidence was reported between 35 and 56%.<sup>[10,11]</sup>

Anemia prevalence was reported 50.3% in a study performed on term pregnant women in Eastern Black Sea Region.<sup>[12]</sup> In the study of Beştepe et al., anemia prevalence in Afyon city was found 29.4%.<sup>[13]</sup> In the study of Erdem et al. performed in Diyarbakır, the authors found anemia in 23.1% of the cases and they reported increased rate of iron deficiency anemia in women with high gravida and parity. While gravida was 3 and less in 26.7% of anemic patients, it was over 3 in 73.3%<sup>[14]</sup> of them. In their study, Karaoğlu et al. reported the prevalence of anemia in pregnant women living in Malatya as 27.2%.<sup>[15]</sup> In the study of Atabay et al. conducted on term pregnant women with low incomes, the authors reported anemia prevalence as 52.3%.<sup>[16]</sup>

According to the study of Pirinççi et al., anemia prevalence was 42.4% in pregnant women living in the city center of Elazığ.<sup>[17]</sup> In our study that we performed on anemia prevalence in pregnant women in our region after a period of 15 years, we found the prevalence 21.6% in term pregnant women. We revealed in our study that there was a significant decrease in the anemia prevalence within 15 years. The anemia prevalence in our region was below 28%, which was the rate stated for Turkey in “2011 Global Anemia Prevalence” report.

Although there are no distinct data on the threshold values indicating any increase in maternal morbidity and mortality, the data collected from India, Nigeria and many other regions show that maternal morbidity and mortality increase when Hb decreases to levels below 8 g/dl and 5 g/dl, respectively.<sup>[18]</sup> The lack of severe and very severe anemia in any of our patients in our study is a pleasing result. Since anemia during pregnancy may have adverse effects on maternal, fetal and newborn health, utmost care should be exercised for the diagnosis

and treatment of anemia in all pregnant women, especially in those with high rates of parity.

## Conclusion

Despite the availability of health policies for the prevention of anemia during pregnancy, iron deficiency anemia has a high prevalence. Our study is retrospective and limited number of cases is a restriction. Through wide prospective studies planned, more successful steps can be taken to prevent iron deficiency anemia during pregnancy by identifying failed steps in practices carried out to prevent iron deficiency and focusing on these failed steps.

**Conflicts of Interest:** No conflicts declared.

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