

# Does Ramadan Cause to Iron Deficiency in Pregnancy?

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## Abstract

**Objective:** We designed this study to evaluate whether or not Ramadan fasting causes iron deficiency in pregnancy.

**Methods:** There was not a significant difference between the serum levels of CRP before and after Ramadan in Group 1a-Group 1b and Group 2a-Group 2b. There was not a significant difference between Group 1a- Group 2a, Group 1b-Group 2b for serum CRP levels. There was a slight decrease in serum ferritin levels in all Groups, but this decrease was not statistically significant. The ferritin levels were similar in Group 1a- 2a, and Group 1b-2b. The haemoglobin levels was increased in all groups, but this increase was not statistically significant. The haemoglobin levels were also similar in Group 1a- 2a, and Group 1b-2b.

**Results:** This study was carried out in Obstetrics and Gynecology Department of Gaziantep University Hospital, between September 23th and October 23th in year 2006 (during Ramadan). Forty-one consecutive healthy women with uncomplicated pregnancies of 20 weeks or more who were fasting during Ramadan were included in the study group (Group 1). The control group (Group 2) consisted of 31 healthy pregnant women who were not fasting during the study period. Before and after Ramadan, we measured plasma C reactive protein levels (CRP), serum ferritin levels, and haemoglobin levels (Hb) in all patients. Any patients who had a sign of infections (elevated white blood cell, elevated CRP) excluded from the study to prevent the confusing ferritin elevations. The patients who had ferritin levels < 15 µg/L excluded from the study before Ramadan.

**Conclusion:** Ramadan does not cause a significant change in serum CRP, ferritin, and haemoglobin levels if enough iron supplementation provides in pregnancy.

**Keywords:** Ramadan, pregnancy, iron deficiency.

## *Gebe hastalarda ramazan demir eksikliğine neden olur mu?*

**Amaç:** Bu çalışma Ramazan ayında oruç tutmanın gebe hastalarda demir eksikliğine yol açıp açmadığını araştırmak için yapıldı.

**Yöntem:** Bu çalışma Gaziantep Üniversitesi Tıp Fakültesi Hastanesi'nde, Kadın Hastalıkları ve Doğum Anabilim Dalı'nda 23 Eylül-23 Ekim 2006 tarihleri arasında (Ramazan ayı süresince) gerçekleştirildi. Ramazan ayında oruç tutan 41 tane sağlıklı, 20. ve daha büyük gebelik haftasındaki gebeler çalışmaya alındı (Grup 1) Grup 1a 28 (2.trimester), Grup 1 b ( 3.trimester) oruç tutan hastalardan oluştu. Kontrol grubuna oruç tutmayan sağlıklı, 20. ve daha büyük gebelik haftasındaki gebeler alındı (Grup2). Grup 2a (2.trimester), Grup 2b (3. trimester) oruç tutmayan hastalardan oluşturuldu. Tüm hastaların Ramazan öncesi ve sonrası plazma C reaktif protein (CRP), serum ferritin ve hemoglobin (hb) seviyeleri ölçüldü. Bir enfeksiyon belirtisi olan (lökositoz, yüksek CRP) hasta ferritin yüksekliğinde karışıklığa neden olmamak için çalışmadan çıkarıldı. Ramazan öncesi ferritin seviyesi < 15 µg/L tespit edilen hastalar çalışmaya alınmadı.

**Bulgular:** Grup 1a-1b ve Grup 2a-2b'de Ramazan öncesi ve Ramazan sonrası CRP düzeylerinde önemli bir fark izlenmedi. Grup 1a ve Grup 1b ve Grup 2a-2b rasında serum CRP değerleri farksız bulundu. Tüm gruplarda ferritin değerlerinde hafif bir artış saptandı ancak bu artış istatistiksel olarak anlamlı değildi. Grup 1a ve 2a (2.trimester) ve Grup 1b-2b (3.trimester) arasında ferritin seviyeleri benzerlik gösterdi. Hemoglobin değerleri tüm gruplarda artış gösterdi ancak bu fark istatistiksel olarak anlamlı değildi. Grup 1a ve 2a (2.trimester) ve Grup 1b-2b (3.trimester) arasında hemoglobin düzeyleri açısından fark izlenmedi.

**Sonuç:** Gebelerde yeterli demir desteği yapıldığında, Ramazan serum CRP, ferritin ve hemoglobin değerlerinde önemli bir değişikliğe neden olmamaktadır.

**Anahtar Sözcükler:** Ramazan, gebelik, demir eksikliği.

## Introduction

Ramadan is the holiest month in the Islamic calendar and Muslims fast during this month.<sup>1</sup> Believers are commanded to abstain from food, drink and conjugal relationships from sunrise to sunset as a sign of restraint and introspection. The food and fluid intake are mainly nocturnal and usually, food frequency and quantity, sleep duration at night and daily physical activity are reduced. The food habits are not similar outside and during Ramadan in that the proportion of fat, protein and carbohydrate intake can differ during Ramadan. There is a tendency to consume foods and drinks that are richer in carbohydrates than those consumed during other months of the year.<sup>2</sup> The limitation in consumption of the meat and fresh fruit in daily diet causes iron deficiency in low socioeconomic group.<sup>3</sup> In this study, we aimed to show whether Ramadan causes iron deficiency by measuring serum ferritin and haemoglobin levels in pregnancy.

## Methods

This study was carried out in Obstetrics and Gynecology Department of Gaziantep University Hospital, between September 23th and October 23th in year 2006 (during Ramadan). Forty-one consecutive healthy

women with uncomplicated pregnancies of 20 weeks or more who were fasting during Ramadan were included in the study group (Group 1a and 1b). Group 1a consisted of 28 fasting pregnant patients in second trimester, Group 1b was also consisted of 13 fasting pregnant patients in third trimester. The control group (Group 2a and 2b) consisted of 31 healthy pregnant women who were not fasting during the study period. Group 2a consisted of 19 non fasting pregnant patients in second trimester, Group 2b consisted of 12 non fasting pregnant patients in third trimester. Before and after Ramadan serum ferritin, haemoglobin, and CRP levels measured in all patients. Ferritin was measured by immunochemiluminescent method by using Immulite 2000 autoanalyser and kits from (Diagnostic Products Corporation, Los Angeles, ABD). Ferritin levels of  $<15 \mu\text{g/L}$  is consistent with iron depletion and ferritin levels of  $<12 \mu\text{g/L}$  are associated with iron depletion anemia. Any patients who had ferritin levels  $<15 \mu\text{g/L}$  was excluded from the study before Ramadan.

Hb values were measured in Sysmex XT 2000 I automated hematology analyzer (Roche Diagnostics GmbH, Mannheim, Germany). Serum CRP levels were determined on a Behring BNA 100 nephelometrically (Dade, Behring Marburg, Germany).

Multivitamin (Materna, Wyeth), calcium 1 gr/day (Cal-D Vita, Roche) and iron (100 md/day) (Ferplex Fol, Abdi Ibrahim) supplementation were given to all subjects. All the subjects were advised to drink at least 2 liter water every night to prevent hypo-hydration and urinary tract infections.

## Results

Statistically Analysis: All comparisons in and between the groups was done by Simple Paired t-test. Sigma Stat 3.0 was used for statistical analysis. P value <0.05 was accepted as significant.

There was not a significant difference between the serum levels of CRP before and after Ramadan in Group 1a-Group 1b and Group 2a-Group 2b ( $p=0.71$ ,  $p=0.57$ ). There was not a significant difference between Group 1a-Group 2a, Group 1b-Group 2b for serum CRP levels ( $p=0.62$ ,  $p=0.71$ ). There was a slight decrease in serum ferritin levels in all Groups, but this decrease was not statistically significant. The ferritin levels were similar in Group 1a- 2a, and Group 1b-2b ( $p=0.57$ ,  $p=0.63$ ). The haemoglobin levels was increased in all groups, but this increase was not statistically significant. The haemoglobin levels were also similar in Group 1a- 2a, and Group 1b-2b ( $p=0.71$ ,  $p=0.67$ ) (Table 1).

## Discussion

During Ramadan, Muslims refrain from eating, drinking, smoking, and sexual relations from sunrise until sunset. The period in which the person fasts may vary depending on the geographical location of the country and the season of the year, and can be as long as 18

hours/day in the summer of temperate regions.<sup>2</sup> It has been established that a given nutrient ingested at an unusual time can induce different metabolic effects, and the Ramadan fasting provides an excellent opportunity to study the effects of the prolonged reduction of meal frequency on body metabolism.<sup>4</sup>

It has been showed that Ramadan fasting caused less weight gain and energy intake in second and third trimester in Turkish pregnant women. The percentage of protein (for first trimester) and carbohydrates (for all trimester) from total energy was higher in fasting group.<sup>5</sup> Another study has been showed that there is a tendency to consume foods and drinks that are richer in carbohydrates than those consumed during other months of the year.<sup>2</sup>

Nutritional anemias are considered to be one of the most common nutritional disorders of the world and are widespread in developing countries.<sup>6</sup> Less consumption of the meat and fresh fruits results in low dietary intake of iron especially in low socio-economic pregnant women.<sup>3</sup>

In healthy subjects, the plasma ferritin concentration is a biomarker for mobilisable body iron reserves. In general, ferritin levels of <30 µg/L indicate a low iron status, small or no iron reserves as verified by the absence of bone marrow haemosiderin. Ferritin levels of <15 µg/L is consistent with iron depletion and ferritin levels of <12 µg/L are associated with iron deficiency anemia.<sup>7,8</sup> In women with inflammatory of infectious disorders, plasma ferritin can be falsely elevated out of proportion with body iron reserves. If such conditions are suspected, plasma CRP should be measured as well, in order to assess the degree of inflammation. We

also measured CRP levels to prevent any elevation in ferritin levels due to infections.<sup>9</sup> It has been suggested that women with plasma ferritin of  $>70 \mu\text{g/L}$  do not need iron supplements; those with ferritin of  $30\text{-}70 \mu\text{g/L}$  should take  $30\text{-}40 \text{ mg}$  ferrous iron per day and those with ferritin of  $<30 \mu\text{g/L}$  should take  $80\text{-}100 \text{ mg}$  ferrous iron per day.<sup>8</sup> It has been reported that  $65 \text{ mg}$  ferrous iron / day from 20 weeks gestation was adequate to prevent iron deficiency anaemia in all women.<sup>10</sup> In our study, all patients' ferritin levels was slightly under  $30 \mu\text{g/L}$ , and gestational age was  $\geq 20$  weeks therefore; we supplemented  $80\text{-}100 \text{ mg}$  ferrous iron per day. It is also prevent to increase ferritin levels during the Ramadan.

## Conclusion

In conclusion, Ramadan fasting does not cause iron deficiency and does not change ferritin levels if enough iron supplementation provides in pregnancy.

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