Estimation of Platelet Parameters and Liver Enzymes During the Ramadan Fasting among Healthy Subjects

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ABSTRACT

Background/aim: The aim of this study is to investigate Platelet Parameters and liver enzymes during the fasting in Ramadan month on among healthy subjects.

Materials and methods: Twenty eight subjects (20 female and 8 male) participated in this study. Blood samples from healthy subjects were collected before 5 days of the fasting of Ramadan month and 28th day of the fasting of Ramadan month. Platelet Parameters were analyzed by using fully automatic hematological analyzer and liver enzymes were analyzed spectrophotometer (Biolab kits).

Results: The study in female subject discovered no difference in MPV, PCT, ALT activity, and AST activity, while PLT count, PDW and LPCR decreased during the fasting of Ramadan month. In other hand, the study in male subject discovered a decrease in platelet parameters (PLT, MPV, PDW, PCT and LPCR), while ALT activity increased during the fasting of Ramadan month. Also this study in male subject discovered no difference in AST activity during the fasting of Ramadan month.

Conclusions: This study shows that fasting in the Ramadan month had effect on platelet parameters in males while had effect on PLT, PDW and LPCR in female health. This study shows fasting Ramadan had effect on ALT activity in male.

Key Words: Ramadan fasting, platelet counts, parameters related to platelet, liver enzymes.

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ÖZET

Amaç: Bu çalışmanın amacı Ramazan ayında oruç sırasında trombosit parametrelerini ve karaciğer enzimlerinin sağlıklı kişiler arasında incelenmesidir.

Yöntem: Çalışmaya yirmi sekiz (20 kadın ve 8 erkek) katılmıştır. Sağlıklı deneklerden alınan kan örnekleri Ramazan aylı oruçlarıdan 5 gün önce ve Ramazan aylı oruçlarının 28. gündünden önce toplanmıştır. Trombosit Parametreleri tam otomatik hematolojik analyzer ve karaciğer enzimleri spektrofotometre (Biolab kitleri) ile analiz edildi.

Bulgular: Kadın denekte yapılan çalışmadan MPV, PCT, ALT aktivitesi ve AST aktivitesi arasında fark bulunmamışken, Ramazan aylı oruçlarında PLT sayısı, PDW ve LPCR azaldığı, öte yandan erkek denekte yapılan çalışmada trombosit parametrelerinde (PLT, MPV, PDW, PCT ve LPCR) azalma görülmüştür, Ramazan aylı oruçlarında ALT aktivitesi artmıştır. Ayrıca erkek denekte yapılan bu çalışma, Ramazan aylı oruçlarında AST aktivitesinde hiçbir fark bulunmadı.

Sonuç: Bu çalışma Ramazan ayında oruç tutmanın erkeklerde trombosit parametrelerini etkilediyi, kadın sağlığında PLT, PDW ve LPCR’yi etkilediğini göstermiştir. Bu çalışma oruç Ramazan’ın erkeklerde ALT aktivitesi üzerinde etkili olduğunu göstermiştir.

Anahtar Sözcüklər: Ramazan oruç, trombosit sayışı, trombosit ile ilgili parametreler, karaciğer enzimleri.

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INTRODUCTION

The Fasting in Ramadan month is one of important worships in an Islamic religion. Religious Muslims should abstain sustenance and drink, intercourse, oral remedy, intravenous fluids and supplements in Ramadan month from sunrise to sunset every year in the different season according to a lunar calendar, also under difference condition around the world. Fast during the Ramadan month make a change of a lifestyle like time of sleep, quality and quantity of food, hours and time work etc. This altered lifestyle in Ramadan as a special month in each year might be an effect on multi-metabolism of the body [1], which could prompt to impact on physiology, which could be considered as a platelet Parameter. Also fasting during Ramadan leads to a change in liver enzymes activity due to the liver is the central organ for all major metabolic pathways.

However, there are few studies evaluated a change in Platelet Parameters during the fasting of Ramadan month in both genders while there are many studies evaluate some parameters related to platelet among the fasters in the Ramadan month [2-13]. In another hand, there are few studies evaluated activities of ALT and AST among the fasters in the Ramadan month [14-20]. The previous studies of Platelet Parameters and also Liver enzymes are controversial.

The methodologies in previous studies such as a compared before a fast Ramadan and during a fast of Ramadan month, measurement of these Parameters for each gender and also samples characteristics such as student and single are few. Therefore, the present study investigates the effect of Fasting during Ramadan month on of platelet Parameters and Liver enzymes in single student graduate.

METHODS

Subject

The target study was single females and males who are a student at the college of nursing. Their physical Activities during the month of Ramadan were a combination of writing an exam in college and study at their house. This Study was conducted in the month of Ramadan during June and July / 2016, and the average duration of fasting was around 16 hours a day. The mean climate temperature and humidity were 23°C and 22%, and 25.5°C and 21% during June and July respectively. There were no special nutritional regimens and recommendations during the whole study. To maintain a sample of homogeneity, all participants were chosen from the same living community, Rania city, Iraq, a student in the College of Nursing, so that the socioeconomic levels were highly similar. 28 subject (20 female and 8 male) students with age range from 19 to 23 years who were a fast during the Ramadan month were included in the current study. The detailed history of the age, gender, marital status, family history and drug history were taken from the subjects.

RESULTS

Subjects having any acute or chronic disease such as diabetes, hypertension, metabolic disorders or any medication, also pregnancy or lactation were excluded from the study.

4mL Blood samples were collected by venipuncture from forearm vein that Blood samples were from each volunteer before 5 days before the beginning of the Ramadan month and 28th day of the Ramadan month at a Physiology Laboratory in the nursing college during 4 pm.

**Estimation of platelet parameters**

2.5 mL Blood sample was poured into a tube containing K2EDTA. All samples were checked for clots, hemolysis and mixed well before analysis. The evaluation of platelet parameters (PLT, MPV, PDW, PCT, LPCR) were analyzed by system Swelab-Alfa automated hematology analyzer.

**Estimation of Liver enzymes**

The rest of 1.5 mL Blood sample was poured into another test tube. The test tubes were kept in slanting position till the formation of a clot. Centrifuging the blood at 3000 rpm for 5 minutes at room temperature, serum was separated to taken into a test tube. The serum stored at (-20 C) until analyzed as early as possible. Alanine Transaminase (ALT) activity and Aspartate Transaminase (AST) activity were determined in serum by spectrophotometer (Biolab kits).

**Ethical consideration**

This review was approved by the Ethical Committee of the College of Nursing, Iraq.

**Data analysis**

Statistical Package for Social Science (SPSS) V20 was used to Statistical analysis of the present study. Mean ± Std. Error (Standard Error) was expressed in this study. The comparison between a mean of the group in this study was performed by paired sample T-test. A significant value was taken P < 0.05 for all results.

**Table 1.** Difference of platelet parameters in Female

| Parameter | Unit | Time       | Mean   | Std. Error Mean | Sig.   |
|-----------|------|------------|--------|----------------|--------|
| PLT       | (10^9/L) | Pre-Ramadan | 148.1250 | 10.42222 | 0.036  |
|           |       | During Ramadan | 147.6250 | 15.38777 |
| MPV       | (FL)  | Pre-Ramadan | 9.7125  | 0.26011 | 0.073  |
|           |       | During Ramadan | 9.0125  | 0.15634 |
| PDW       | (FL)  | Pre-Ramadan | 12.0625 | 0.37793 | 0.005  |
|           |       | During Ramadan | 11.6125 | 0.26148 |
| PCT       | (%)   | Pre-Ramadan | .1400   | 0.00964 | 0.018  |
|           |       | During Ramadan | .1275   | 0.01306 |
| LPCR      | (%)   | Pre-Ramadan | 26.2250 | 1.85595 | 0.010  |
|           |       | During Ramadan | 22.2125 | 1.35376 |
DISCUSSION

Fasting during the Ramadan month has positively associated to be a reason for various major change morphological and biochemical in individuals. This study compared the platelet parameters and hepatic function before the fasting of Ramadan month and during fasting the Ramadan month. This study showed alteration in platelet parameters and liver enzymes such as PLT and PDW in both genders and also ALT in the male during the fasting of Ramadan month as compared with before fasting of the Ramadan month.

In this study, platelet counts decreased slightly during the fasting of the Ramadan month but this reduction was within the normal range in both genders. The previous studies found a statistically significant decrease in platelet count during the fasting of the Ramadan month (2, 5, 6). In contrast to the present finding, other studies have observed significantly an increase in platelet counts during the fasting of the Ramadan month (1, 7, 8).

However, some studies have shown no difference in the platelet counts during the fasting of the Ramadan month (4, 9, 10, 11, 12). Platelet counts decrease during Ramadan month due to a reduction in iron levels during Ramadan fasting month (2, 5).

Mean platelet volume (MPV) was no difference during the fasting of the Ramadan month as compared with the pre-Ramadan month in both genders. Also, another study has shown no statistical differences in MPV during Ramadan month in both genders during the fasting of the Ramadan month and after fasting of the Ramadan month (12). In contrast to this study, nasiri with colleagues found low MPV in during fasting the Ramadan month and increasing after fasting of the Ramadan month in both genders (13).

Platelet Larger Cell Ratio (LPCR) and platelet distribution width (PDW) decrease in both genders during Ramadan. In this study, the mean plateletcrit (PCT) decreased during Ramadan in a male while was no alteration during Ramadan in a female.

### Table 2. Difference of Liver enzymes in Female

| Parameter | Unit | Time          | Mean   | Std. Error Mean | Sig.  |
|-----------|------|---------------|--------|-----------------|-------|
| ALT       | IU/L | Pre-Ramadan   | 13.875 | 2.18122         | 0.328 |
|           |      | During Ramadan| 21.875 | 3.20051         |       |
| AST       | IU/L | Pre-Ramadan   | 19.025 | 1.91135         | 0.357 |
|           |      | During Ramadan| 14.800 | 2.27411         |       |

### Table 3. Difference of Platelet parameters in male

| Parameter | Unit | Time          | Mean   | Std. Error Mean | Sig.  |
|-----------|------|---------------|--------|-----------------|-------|
| PLT       | (10^9/l) | Pre-Ramadan   | 223.250| 15.86852        | 0.043 |
|           |      | During Ramadan| 205.250| 13.04342        |       |
| MPV       | (fL) | Pre-Ramadan   | 8.8050 | 0.46456         | 0.283 |
|           |      | During Ramadan| 8.8150 | 0.17863         |       |
| PDW       | (fL) | Pre-Ramadan   | 11.3650| 0.23286         | 0.000 |
|           |      | During Ramadan| 11.3250| 0.24888         |       |
| PCT       | (%)  | Pre-Ramadan   | .2090  | 0.01357         | 0.773 |
|           |      | During Ramadan| .1745  | 0.00983         |       |
| LPCR      | (%)  | Pre-Ramadan   | 23.4200| 1.32235         | 0.000 |
|           |      | During Ramadan| 20.3750| 1.31729         |       |

### Table 4. Difference of Liver enzymes in male

| Parameter | Unit | Time          | Mean   | Std. Error Mean | Sig.  |
|-----------|------|---------------|--------|-----------------|-------|
| ALT       | IU/L | Pre-Ramadan   | 11.375 | 3.60029         | 0.038 |
|           |      | During Ramadan| 21.3125| 3.09513         |       |
| AST       | IU/L | Pre-Ramadan   | 22.7500| 2.20187         | 0.449 |
|           |      | During Ramadan| 17.3250| 3.76595         |       |
Aspartate transaminase (AST) activity and Alanine transaminase (ALT) activity were no significant change in both genders except ALT activity increased in the male during the fasting of the Ramadan month. The previously published studies have found a decrease in activity of AST and ALT in Ramadan fasting [5, 14, 16, 17]. Another Study has demonstrated no change in activities of AST and ALT among 15 healthy male in the Ramadan month [2]. In another study showed a decrease in activity of ALT and an increase in activity of AST during the Ramadan as compared to pre-Ramadan [15]. Nobili and colleagues in their clinical pathological study among children reported improved activity levels of ALT significantly [18]. Some Researchers found statistically no change in both parameters after Ramadan fast [10, 19]. Sadiya and colleagues revealed no a significant change in both parameters during the Ramadan fasting month [20].

These controversial results may be due to dehydration, weather, nutrition style and Dietary habits during Ramadan. However, there is a scarcity of the studies that evaluate the platelet parameters such as MPV, PDW, PCT and LPCR during the fasting of Ramadan month. In this study, fasting in Ramadan month healthy was accompanied by significant and considerable effects on platelet during the fasting of Ramadan month. The previously published studies were no significant change in both genders except ALT activity increased in the male during the fasting of Ramadan month. The previously published studies have found a decrease in activity of AST and ALT in Ramadan fasting [5, 14, 16, 17]. Another Study has demonstrated no change in activities of AST and ALT among 15 healthy male in the Ramadan month [2]. In another study showed a decrease in activity of ALT and an increase in activity of AST during the Ramadan as compared to pre-Ramadan [15]. Nobili and colleagues in their clinical pathological study among children reported improved activity levels of ALT significantly [18]. Some Researchers found statistically no change in both parameters after Ramadan fast [10, 19]. Sadiya and colleagues revealed no a significant change in both parameters during the Ramadan fasting month [20].

Conflict of interest
No conflict of interest was declared by the authors.

REFERENCES

1. Ziaee V, Razaee M, Ahmadinejad Z, Shaihk H, Yousefi R, Yarmohammadi L, Bozorgi F, Behjati MJ. The changes of metabolic profile and weight during Ramadan fasting. Singapore Med J 2006; 47:409–14.
2. Ramadan J, Mousa M, Telahoun G. Effect of Ramadan Fasting on Physical Performance, Blood and Body Composition. Med Princ Pract 1995; 4:204–212.
3. Nematy M, Alinezhad-Namaghi M, Rashed MM, Mozdehifard M, Sajjadi SS, Akhlaghi S, Sabery M, Mohajeri SA, Shalaey N, Moohebat M, Norouzy A. Effects of Ramadan fasting on cardiovascular risk factors: a prospective observational study. Nutr J 2012; 11:69.
4. Attarzadeh Hosseini SR, Hejazi K, Nikroo H. The Effects of Ramadan Fasting and Physical Activity on Blood Hematological-Biochemical Parameters. Iran J Basic Med Sci 2013; 16:845-49.
5. Ramadan J, Telahoun G, Al-Zaid NS, Barac-Nieto M. Responses to exercise, fluid, and energy balances during Ramadan in sedentary and active males. Nutrition 1999; 15: 735-739.
6. Al-Hourani HM, Atoum MF, Akel S, Hijawi N, Awawdeh S. Effects of Ramadan Fasting on Some Haematological and Biochemical Parameters. JIBS 2009; 2: 103-108.
7. Sarraf-zadegan N, Atashi M, Naderi GH, Asgary S, Fatehifar M, Samarian H, Zarei M. The effect of fasting in Ramadan on the values and interrelations between biochemical, Coagulation and hematological factors. Ann Saudi Med 2000; 20: 377-381.
8. Attarzadeh Hosseini SR, Motahari Rad M, Hejazi K. The Effects of Ramadan Fasting and Physical Activity on Body Composition and Hematological-Biochemical Parameters. J Fasting Health 2014; 2: 96-103.
9. Aybak M, Türkoglu A, Sermet A, Denli O. Effect of Ramadan fasting on platelet aggregation in healthy male subjects. European Journal of Applied Physiology 1996; 73: 552-556.
10. Furuncuoğlu Y, Karaca E, Aras S, Yonem A. Metabolic, biochemical and psychiatric alterations in healthy subjects during Ramadan. Pak J Nutr 2007; 6:209-11.
11. Mohammed Z. The Influence of Ramadan Fasting on Some Hematological and Biochemical Parameters in Healthy Adult Males. Iraqi National J. for Nursing Specialties 2011; 24: 45 - 51.
12. Fararjeh M, AlJamal A, Faris MAI, Al-Kurd R, Khalil M, Al-Bustanji Y. Effect of intermittent fasting on lipid profile and hematological parameters in healthy volunteers in Jordan. Univers J Med Dent 2012; 1: 005-009.
13. Nasiri J, Mahmoudzadeh M,Kheiri S, Khoshdel A. The effect of Ramadan fasting on hematological parameters. Iran J Med Sci 2016; 4:145-151.
14. Elfert AA, Abousaif SA, Kader NAA, AbdelAal E, Elfert AY, Moez ATA, Elbatae H E, Kohla M S,Salah R A,Elbadry A A. A Multicenter Pilot Study of the Effects of Ramadan Fasting on Patients with Liver Cirrhosis. Tanta Medical Sciences Journal 2011;6:33-25.
15. Nasiri J, Kheiri S, Khoshdel A, Boroujeni AJ. Effect of Ramadan Fast on Liver Function Tests. Iran J Med Sci 2016; 5:459-460.
16. Unalacik M, Kara H, Baltaci D, Erdem O, Bucaktepe PG. Effects of Ramadan Fasting on Biochemical and Hematological Parameters and Cytokines in Healthy and Obese Individuals. Metab Syndr Relat Disord 2011; 9:156-61
17. Shawky S M, Zaid AM, Orabi SH, Shohgy KM, Hassan WA. Effect of Intermittent Fasting on Brain Neurotransmitters, Neutrophils Phagocytic Activity, and Histopathological Finding in Some Organs in Rats. IJRSS 2015;11 : 38-45
18. Nobili V1, Marcellini M, Devito R, Ciampalini P, Piemonte F, Comparcola D, Sartorelli MR, Angulo P. NAFLD in children: A prospective clinical pathological study and effect of lifestyle advice. Hepatology 2006; 2:458-65.
19. El-Mitwalli A, Zaheer AA, El-Salamhohamed MA, Elmenshawi E. The effect of Ramadan fasting on cerebral stroke: a prospective hospital-based study. Egypt J Neurol 2009; 1:51-56.
20. Sadiya A,Ahmed S,Siddieg H H,Bibas I J,Carlsson M. Effect of Ramadan fasting on metabolic markers, body composition, and dietary intake in Emiratis of Ajman (UAE) with metabolic syndrome. Diabetes Metab Syndr Obes 2011; 4: 409–416.