

Evaluation of Hematological Indices Changes in Response to Ramadan Fasting

ALnazeer J Ali¹, Ibrahim A. Ali^{1*}, Bareeq Abdallah¹, GadAllah Modawe², Omer Abdelaziz Musa¹

1. Department of Physiology, Faculty of Medicine ,The National Ribat University, Khartoum ,Sudan.

2. Faculty of Medicine and Health Sciences ,Omdurman Islamic University , Omdurman, Sudan.

Abstract:

Introduction: Fasting in month of Ramadan is one of the five pillars of Islam. Fasting is obligatory for all adults and healthy Muslims during the day hours for the whole month every year. Effect of Ramadan on biochemical parameters is still a matter of debate. Several studies have reported the effect of Ramadan fasting on the values of certain hematological factors, and the impact of Ramadan fasting on various aspects of health, including lipid metabolism.

Objective: The study was aimed to assess the impact of fasting on hematological parameters among Sudanese healthy adults male.

Materials and Methods: An experimental study was conducted between 27 May and 26 June in 2017 (Ramadan of higrī year 1438) in Khartoum state (Algerif East). The study was carried out in 20 healthy Sudanese volunteer subjects of aged between 18 to 45 years and within the same life style, food intake and work. After informed written consent; all volunteers were asked to complete a medical tests involving history taking, weight, height, and blood pressure were measured with standard techniques. Five ml of venous blood was collected by a standard procedure from each participant under complete aseptic conditions and putted in a test tube containing an anticoagulant (Ethyl diamine tetra acetic acid/EDTA). Blood samples were taken in 2 separate sessions on 1st and 2nd day before Ramadan which represented the baseline and during the last 3 days in Ramadan At 10 pm. Blood samples were assessed for haemoglobin, Hematocrit, red blood cells count and indices, white blood cells count, differential white blood cells and platelets count. The data were analyzed using SPSS version (24).

Results: Hemoglobin and white blood cells significantly increased at the end of Ramadan (respectively=0.002, P=0.05). There was direct correlation between hemoglobin and hematocrit significantly (P=0.000).

Conclusion: There was significant increase in hemoglobin during Ramadan fasting, because most of the individual eating high or rich source of iron (high biological value protein) and rich source of vitamin C during Ramadan in comparison to other months of the year.

Key words: Fasting, RBCs, WBCs, Indices

Corresponding Author: Dr. Ibrahim Abdelrhim Ali, Email: hemamedicine@gmail.com/

Introduction

Ramadan is the holiest month in the Islamic calendar. Fasting in this month is one of the five pillars of Islam. Fasting is obligatory for all adults and healthy Muslims during the day hours for the whole month every year. The month occurs 11 days earlier every year due to the difference between the solar and lunar years, and may occur in any of the four seasons, making the length of fasting hours variable from 11-18 hours in different countries (1). Fasting of Ramadan is done by over 400 million of Muslims who spread across the globe; and live under various geographical, climatic, social, cultural and economic conditions. It is the month during which Muslims refrain from food, liquids and tobacco smoking during daylight hours and eat a main meal after sunset. Drinking and eating are allowed from sunset to dawn. It teaches Muslims self-restraint and remind them of the feelings of the impoverished. Effect of Ramadan on biochemical parameters is still a matter of debate. Energy intake usually decreases during Ramadan (2). Several studies have reported the effect of Ramadan fasting on the values of certain hematological factors (3-7) and the impact of Ramadan fasting on various aspects of health, including lipid metabolism (8,9). In one study, which examined the effect of Ramadan fasting on basic hematological parameters, that is, hemoglobin (Hb), packed cell volume (PCV), RBC numbers, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC)

the results showed that Hb, PCV, and RBC decreased, MCV, MCH, and MCHC did not. In another study WBC count was found to be significantly lower after Ramadan fasting in both groups (Saleh et al,2004).and showed significant improvement in the mean levels of hemoglobin. Saleh et al found that the changes of Hct during study was not significant ($P > .05$) but Hb decreased during first 15 days of Ramadan markedly ($P < .05$), and again increased at second half of the month. The study was aimed to assess the impact of fasting on hematological parameters among Sudanese healthy adults male.

Materials and Methods

This experimental study was conducted in Khartoum state-sudan, algerif east in 2017 when Ramadan fasting occur between May 27 and June 26 [higriyear 1438], blood samples were taken in 2 separate sessions on 1st and 2nd day before Ramadan which represented the baseline and during the last 3days in Ramadan. All the samples were performed at night. All subjects had almost the same life style, food intake and type of work. The samples were taken from 20 healthy subjects volunteered to participate in this study. Their age groups vary between 18-45yrs, the first stage all volunteers were asked to complete a medical test involving history taking, blood pressure height and weight assessment. For examining the parameters of this study 5ml of venous blood was obtained at laboratory from antecubital vein and was collected in a test tube containing an anticoagulant (Ethyl diamine tetra acetic acid/EDTA), 2 days before ramadan and the same

was repeated at the end of Ramadan. Blood samples were assessed for haemoglobin, red blood cells, white blood cells count, Hematocrit, MCV, MCH, MCHC, neutrophils, lymphocytes, Eosinophil, basophils and platelets. All data were expressed as Mean+ SEM .Paired t. test was used to compare hematological parameters changes before and during Ramadan fasting. The differences were considered significant when P

values were less than 0.05 all analysis was performed using the SPSS.

Results

Hemoglobin and white blood cells significantly increased at the end of Ramadan (respectively P=0.002, P=0.05) other factors not significantly changed, also there was direct correlation between hemoglobin and hematocrit significantly (P=0.000). As shown in table 1.

Table (1): Hematological indices before and after Ramadan fasting (n=20)

	Before	After	P. value
Platelets count	268.65 ±27.58	298.80±33.77	0.07
Hb	13.26 ±0.47	14.03±0.51	0.002
WBC	6.90 ±0.67	7.75±0.82	0.05
HCT	45.20 ±1.20	47.41±1.93	0.06
MCV	80.85 ±2.06	80.13±2.02	0.602
MCH	23.50 ±0.44	23.82±1.27	0.628
MCHC	29.40 ±0.44	29.68±0.96	0.558

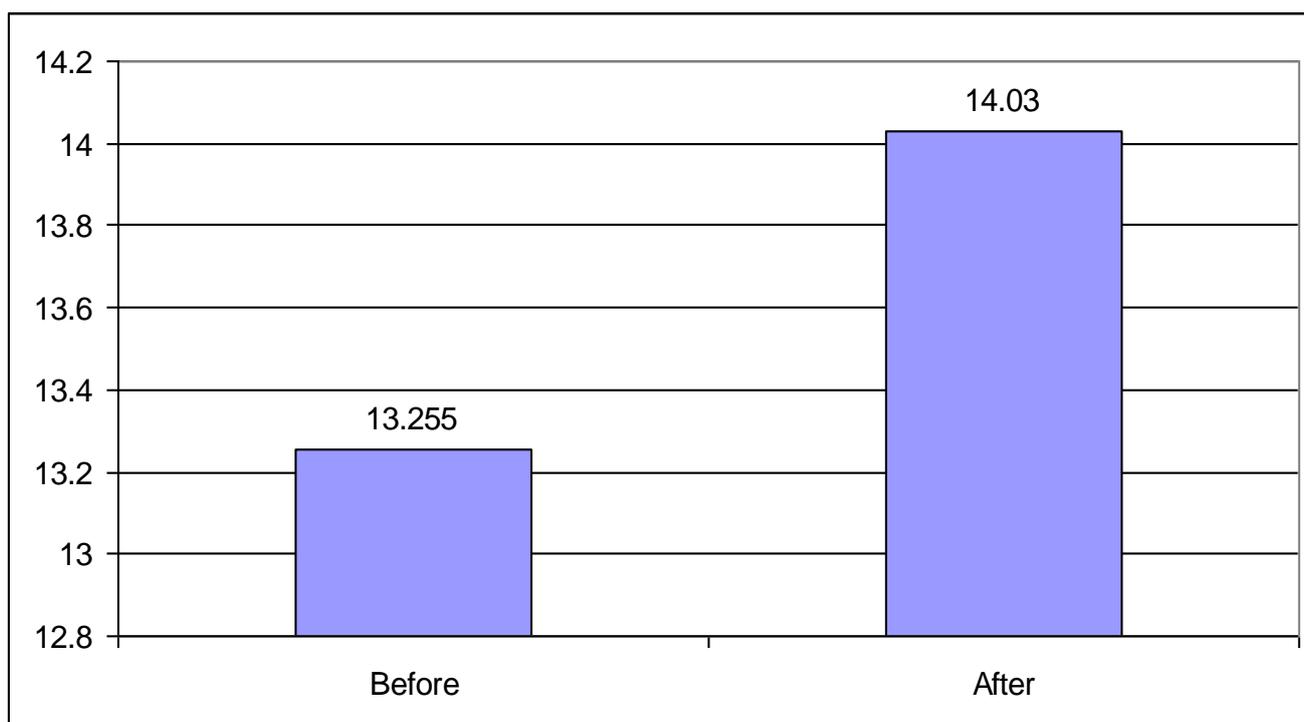


Figure (1) : Hb level before and after fasting Ramadan in adults male

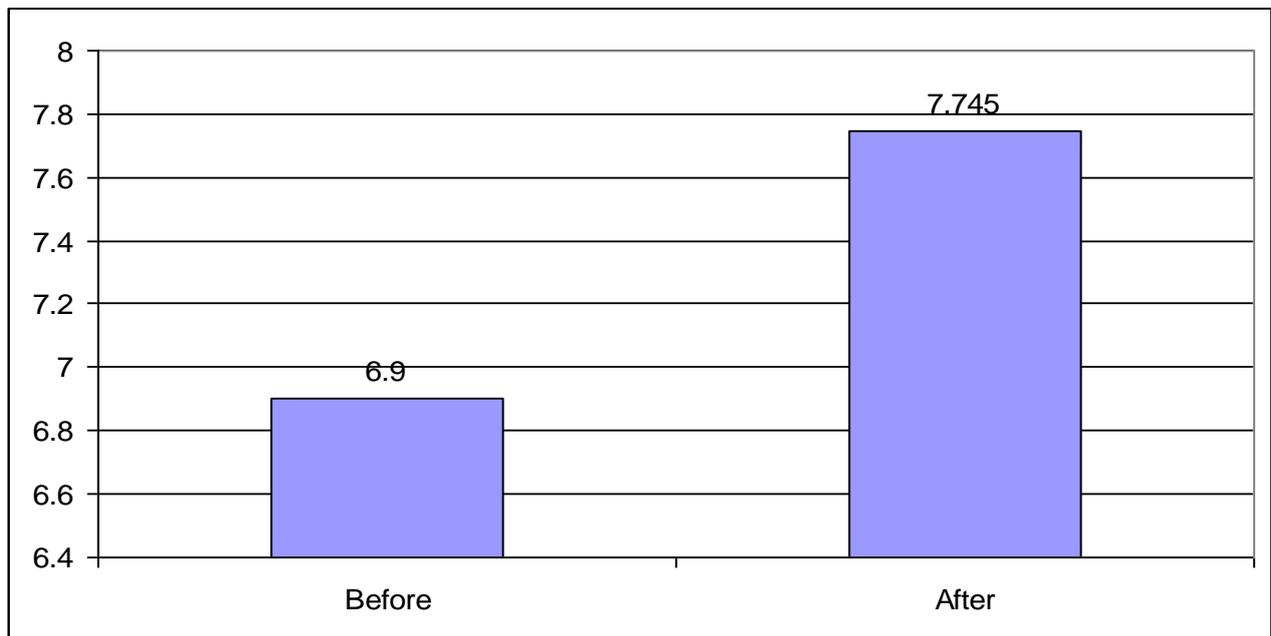


Figure (2): WBCs level before and after fasting Ramadan in adults male

Discussion

The hematological indices affected by many factor including fasting, dietary intake. The statistical association between the hematological indices and fasting was significantly changed, the result showed direct correlation between Hb and WBCS and Ramadan fasting (significantly increased). Also there was significantly direct correlation between Hb and HCT during Ramadan. Compared with other studies which showed: No significant changes were observed in haemoglobin, hematocrit, and red blood cell count values before and during Ramadan fasting. Platelets was decreased significantly during Ramadan compared to before Ramadan ($P= 0.002$).The WBC count was found to be significantly lower after Ramadan fasting in both groups, (Saleh et al.2004) noted significant improvement in the mean levels of hemoglobin. Indeed, Gharbi et al. (2003) found that eating behavior during

Ramadan could lead to an increase in BMI among people at risk of nutritional deficiency. Because most of the individual in my study eat high or rich source of iron eg; red meat and legumes (high biological value protein) and rich source of vitamin C which enhance absorption of iron during Ramadan in comparison to before Ramadan .As a result of that nutritional behavior during Ramadan Hb level significantly increased.

Conclusion: Based on the results of our research there was significant increase in hemoglobin during Ramadan fasting, because most of the individual eat high or rich source of iron (high biological value protein) and rich source of vitamin C during Ramadan in comparison before Ramadan .

References

1. Sakr AH. Fasting in Islam. *J Am Diet Assoc.* 1975; 67(1):17-21.

2. El-Hazmi MA, Al-Faleh FZ, Al-Mofleh IA. Effect of Ramadan fasting on the values of hematological and biochemical parameters. *Saudi Med J* 1987;8:171-6
3. Sliman NA, Khatib FA: Effect of fasting Ramadan on body weight and some blood constituents of healthy Muslims. *Nutr Rep Int* 1988; 38: 1299 -306.
4. Bilto YY. Effects of Ramadan fasting on body weight and the biochemical and haematological parameters of the blood. *Arab Gulf J Sci Res* 1998; 1-13.
5. Sarraf-Zadegan N, Atashi M, Naderi GA, Baghai AM, Asgary S, Fatehifar MR, et al. The effect of fasting in ramadan on the values and interrelations between biochemical, co- agulation and hematological factors. *Annals of Saudi Medicine*. 2000; 20(5- 6): 379
6. Al-Hader A, Abu-Farsakh N, Khatib S, Hasan Z. The effects of Ramadan fasting on certain biochemical parameters in normal subjects and in type II diabetic patients. *Ann Saudi Med* 1994;14:139–141.
7. Aksungar FB, Topkaya AE, Akyildiz M. Interleukin-6, C- reactive protein and biochemical parameters during pro- longed intermittent fasting. *Ann NutrMetab* 2007;51:88–95.
8. Gharbi M, Akrouf M, Zouari B (2003). Food intake during and outside Ramadan. *East. Mediterr. Health J.* 9(1-2): 131-140.