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Impact of Ramadan Fasting on Anthropometric measures and Lipid Profile in Iraqi Adults

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Abstract

Background: Ramadan fasting is a unique form of intermittent fasting characterized by abstinence from food and drink from dawn to sunset. Its effects on anthropometric parameters and metabolic health remain an active area of research. Objective: To evaluate the short-term effects of Ramadan fasting on body weight and lipid profile in apparently healthy Iraqi adults.

Methods: A total of 58 volunteers (30 men and 28 women; mean age 40 ± 9 years) were enrolled in a pre–post observational study conducted in Basra, Iraq, during Ramadan 2025. Anthropometric measurements and fasting venous blood samples were collected 1–3 days before Ramadan and during the last 5 days of fasting. Lipid profile parameters (total cholesterol, LDL-C, HDL-C, triglycerides, and VLDL-C) were measured using standardized enzymatic kits and spectrophotometry. Data were analyzed using paired-samples t-tests. Results: Ramadan fasting was associated with significant reductions in total cholesterol (210.9 ± 69.9 vs. 183.5 ± 62.7 mg/dL, $p < 0.01$), LDL-C (120.2 ± 68.2 vs. 94.9 ± 60.5 mg/dL, $p < 0.01$), triglycerides (153.6 ± 87.9 vs. 117.1 ± 60.1 mg/dL, $p < 0.01$), and VLDL-C (30.7 ± 17.6 vs. 23.5 ± 12.1 mg/dL, $p < 0.01$). HDL-C showed a non-significant change (65.9 ± 15.5 vs. 66.2 ± 15.5 mg/dL, $p = 0.87$). The TG/HDL ratio shows a significant reduction (2.97 ± 2.540 vs. 1.88 ± 1.244 , $p < 0.01$). Participants experienced modest, non-significant weight reduction (−0.74 ± 2.1 kg, $p = 0.082$).

Conclusion: Ramadan fasting led to favorable improvements in lipid profile and minor weight reduction among Iraqi adults. While these findings suggest potential cardiovascular benefits, further controlled studies with larger sample sizes and long-term follow-up are warranted.

Keywords:

Ramadan fasting, lipid profile, cholesterol, body weight, Iraq

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Introduction:

Intermittent fasting is a time-restricted feeding that is based on religious and spiritual traditions [1]. The fasting in Ramadan is the abstinence from food and drinks from sunrise to sunset, typically between 12 and 22 hours of fasting depending on geographical region and season [2].

Accordingly, the changes in the diet quantity and quality, and alterations in meal timings during Ramadan fasting may have a considerable effect on the body composition and metabolic profiles [3].

Ramadan fasting has been shown to affect circulatory levels of biomarkers that are related to vascular and metabolic disorders like lipid profile [4]. Intermittent Fasting can be regarded as an energy deficit protocol that contributes to the improvement of the lipid profile by energy deficit and/or reduction of body weight [5]. A previous study reported a significant elevation in the level of high-density lipoprotein- cholesterol (HDL-c) and a reduction in low-density lipoprotein-cholesterol (LDL-c) after 28 days of Ramadan [6]. Another study among diabetes mellitus type II reported decreased total cholesterol (TC), triglyceride (TG), and LDL-C, as well as increased HDL-C levels after fasting in Ramadan [3]. Interestingly, in recent years, there has been an increasing interest in the effects of Ramadan fasting on weight management, metabolic health, and chronic disease risk, with a lot of research being performed in the last few decades [7].

Intermittent fasting has gained a successful reputation recently in providing significant changes in general health. Potential benefits include weight loss, fat loss, and a reduction in the risk of some diseases associated with abnormal metabolism of lipids, like obesity, atherosclerosis, diabetes mellitus, fatty liver, lipid storage diseases, and others [8]. Few studies have examined the effect of Ramadan fasting in Iraqi adults; the present study aims to evaluate the effects of fasting during Ramadan on health, as represented mainly by body weight changes and lipid profile.

Materials and methods:

This study was conducted in March 2025 on fifty-eight apparently healthy volunteers (male and female) who were fasting for a mean period of 14 hours a day during the 29 days of the month of Ramadan in Basra, Iraq. The exclusion criteria were pregnancy and being unable to continue fasting for more than 7 days.

Fasting blood samples were collected at the beginning of the study (1–3 days before Ramadan) and again after 25–29 days. Five milliliters of venous blood were collected and then centrifuged at 3000 r/min. The resulting serum was kept in a deep freeze at -20°C for lipid profile analysis. The lipid profile was determined using a spectrophotometer.

Serum cholesterol was measured using a kit from Diamond (Jordan). Serum triglycerides were measured with a kit from Biometrix (France). High-density lipoprotein was assessed using an HDL kit from Randox (USA) [9, 10, 11].

Body weight and height were measured in an overnight fasting state (without shoes and in light clothes with the same scale). BMI was determined as weight in kg divided by height in meters squared.

All participants were informed about the purpose of the study and provided information about their dietary habits and physical activity; they were requested not to change them throughout the study. The ethics committee in the College of Pharmacy / University of Basrah approved this study.

Data were entered and analyzed by the Statistical Package for Social Sciences (SPSS) version 20.0 for Windows to identify within-group differences (before and after Ramadan). Paired-samples t-tests were used.

Data were expressed as mean ± SD, and a P-value < 0.05 was considered statistically significant.

Results:

Fifty-eight persons were enrolled into this study (30 men and 28 women) with an average age of 40± 9.14 years (41.83± 9.64 in men and 39.93±8.64in women, p=0.433). There was no significant difference between men and women in BMI (27±2.933 vs 26.5±3.254, p= 0.503), Table 1.

As shown in Table 2, there was a significant decrease (P<0.01) in the concentration of serum cholesterol from 210.93 (mg/dl) to 183.50 (mg/dl). Total serum triglycerides were significantly decreased (P<0.01) from 153.59 to 117.14 (mg/dl), VLDL and LDL were significantly lower (P<0.01) at the end of Ramadan, 23.48 and 94.92 (mg/dl) respectively, while serum HDL concentration showed a non-significant increase (P> 0.01) from 65.92 to 66.16(mg/dl). The participants lost 0.74+ 2.109 Kg of their baseline body weight (P =0.082).

Table-1: general characteristics of study participants

	Men(n=30)	**Women(n=28)**	**p-value**
Age(years)	41.83±9.649	39.93±8.645	0.433
Weight(Kg)	82.83±12.991	73.72±15.481	0.018
BMI (Kg/m^2)	27± 2.933	26.5±3.254	0.503

Data are presented as mean ± SD.obtained from paired sample t-test ,P < 0.05 was considered statistically significant.BMI = Body mass index

Table-2: change in lipid profile of fifty-eight Iraqi subjects in Ramadan

	Before	**After**	**P-value**
Total cholesterol(mg/dl)	210.93±69.95	183.50±62.659	< 0.01
LDL (mg/dl)	120.16±68.24	94.92±60.523	< 0.01
HDL (mg/dl)	65.92±15.512	66.16±15.456	0.874
TG(mg/dl)	153.59±87.87	117.14±60.094	< 0.01
VLDL (mg/dl)	30.72±17.575	23.48±12.053	< 0.01

Data are presented as mean ± SD. obtained from a paired sample t-test, P < 0.05 was considered statistically significant. TG = Triglycerides; HDL = High-density lipoprotein; LDL = Low-density lipoprotein; VLDL = Very-low-density lipoprotein.

Table-3: Triglyceride-to-HDL Ratio Before and After Short-Term Fasting

Variable	**Baseline**	**Post-fasting**	**p-value**
TG/HDL ratio	2.97±2.540	1.88±1.244	< 0.01

Data are presented as mean ± SD.obtained from paired sample t-test,P < 0.05 was considered statistically significant. TG = Triglycerides; HDL = High-density lipoprotein.

Table-4: change in body weight and BMI of fifty-eight Iraqi subjects in Ramadan

	Before	**After**	**P-value**
Body weight	78.45 ± 14.844	77.72±14.986	> 0.82
BMI	26.77± 5.066	26.53±5.114	> 0.12

Data are presented as mean ± SD.obtained from paired sample t-test ,P < 0.05 was considered statistically significant. BMI = Body mass index

Discussion

This study demonstrated that Ramadan fasting was associated with significant improvements in lipid profile, including reductions in total cholesterol, LDL-C, triglycerides, and VLDL-C. These findings are consistent with previous studies reporting favorable lipid modifications during Ramadan fasting [12, 13]. The observed decrease in LDL-C and triglycerides may be explained by reduced hepatic cholesterol synthesis and enhanced lipolysis during fasting[13,14]. While HDL-C showed a slight, non-significant increase, this result aligns with prior reports that Ramadan fasting exerts variable effects on HDL depending on dietary intake and genetic background [14,15]. Mechanisms explaining the effect of fasting on lipid metabolism

Fasting influences lipid metabolism through several physiological pathways. During fasting, insulin levels decrease while glucagon increases, promoting lipolysis and the release of free fatty acids from adipose tissue. These fatty acids become the primary energy source, increasing hepatic β-oxidation and reducing triglyceride concentrations [16,17]. Lower insulin levels also down-regulate hepatic lipogenesis and very-low-density lipoprotein (VLDL) production, contributing to reductions in serum triglycerides and LDL-c [16,19]. Additionally, fasting can trigger a "metabolic switch," characterized by enhanced fatty-acid oxidation and ketone-body production, activation of lipid-oxidation regulators (e.g., PPARα, PGC-1α), and altered lipoprotein synthesis — changes that collectively support clearance of atherogenic lipids and may support HDL maintenance or modest increase [17]. Clinical and meta-analytic data from recent years corroborate these effects: intermittent-fasting diets have been associated with decreases in total cholesterol, LDL, triglycerides, and, in some cases, improved HDL or LDL/HDL ratio [16,17]. Together, these mechanisms help explain the favorable changes observed in the lipid profile following short-term fasting.

The triglyceride-to-HDL ratio (TG/HDL-C) is a well-recognized marker of insulin resistance and cardiovascular risk. A reduction in this ratio reflects improved lipid metabolism, enhanced triglyceride clearance, and improved HDL function. In our study, the decline in TG/HDL-C ratio after short-term fasting suggests a favorable shift toward reduced cardiometabolic risk, consistent with evidence that fasting lowers triglycerides and may improve HDL levels through enhanced fatty-acid oxidation and improved lipoprotein dynamics [21].

Participants in this study lost about 0.74 kg on average, and their BMI slightly decreased. Although this was not significant, even small changes in weight can have a positive impact on metabolism and overall health. Previous research has shown that weight changes during Ramadan are often transient, with partial regain after the fasting month [19, 20]. However, fasting still provides a temporary metabolic improvement that can improve insulin sensitivity and fat metabolism, even if the weight loss is not drastic [3].

Reduction in body weight and BMI is associated with improved general health and cardiometabolic outcomes. In this study, decreases in BMI after short-term fasting were correlated with reductions in triglyceride levels, indicating that fasting-induced weight loss contributes to improved lipid metabolism and reduced cardiovascular risk.

While the results are encouraging, it's important to consider some limitations. First, there was no control group, which makes it hard to separate the effects of fasting from other lifestyle changes.

Second, diet and activity levels were not strictly monitored, meaning some changes

could have been due to factors like increased physical activity or different food choices. Finally, this study only looked at short-term effects—it would be interesting to see if these benefits last beyond Ramadan. Future research should focus on how different fasting patterns compare, such as alternate-day fasting or the 16:8 intermittent fasting method. It would also be useful to study how people maintain their metabolic improvements after Ramadan.

Overall, this study reinforces the idea that fasting—especially Ramadan fasting—can be beneficial for heart health and metabolism. The reductions in LDL cholesterol, total cholesterol, and triglycerides suggest that fasting may be a natural way to support a healthy heart. While the weight loss was moderate, it still points to the potential for fasting as part of a healthy lifestyle.

However, long-term studies are needed to understand how these benefits can be maintained over time. We also confirm that none of the authors have any conflicts of interest (financial, personal, political, or academic) related to this manuscript.

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أثر صيام شهر رمضان على القياسات الجسمية ومستوى الدهون في الدم لدى البالغين العراقيين

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الملخص

الخلفية: يُعد صيام شهر رمضان شكلاً مميزًا من أشكال الصيام المتقطع، حيث يمتنع الأفراد عن تناول الطعام والشراب من الفجر حتى غروب الشمس ولاتزال تأثيراته على القياسات الجسمية والصحة الايضية موضع اهتمام بحثي متزايد.

الهدف: تقييم التأثيرات قصيرة الأمد لصيام شهر رمضان على وزن الجسم ومستوى الدهون في الدم لدى بالغين عراقيين أصحاء ظاهريًا.

تصميم الدراسة ومكانها: أُجريت هذه الدراسة بوصفها دراسة رصدية من نوع قبل–بعد في مدينة البصرة، العراق، خلال شهر رمضان المبارك لعام 2025

شملت الدراسة 58 متطوعًا، منهم 30 رجلًا و28 امرأة، بمتوسط عمر بلغ 40 ± 9 سنوات

تم جمع القياسات الأنثروبومترية وأخذ عينات الدم الوريدي بعد الصيام في فترتين زمنيتين قبل شهر رمضان بمدة تتراوح بين 1–3 أيام وخلال الأيام الخمسة الأخيرة من شهر رمضان

تم قياس دهون الدم، والتي شملت الكوليسترول الكلي (Total Cholesterol) البروتين الدهني منخفض الكثافة (LDL-C) البروتين الدهني مرتفع الكثافة (HDL-C) الدهون الثلاثية (Triglycerides) البروتين الدهني منخفض الكثافة جدًا (VLDL-C) وذلك باستخدام أطقم إنزيمية قياسية، وبالاعتماد على تقنية القياس الطيفي الضوئي(Spectrophotometry)

تم تحليل البيانات باستخدام اختبار (t) للعينات المترابطة (Paired-Samples t-test)، مع اعتماد مستوى دلالة إحصائية مناسب لتقييم الفروق قبل وبعد شهر رمضان

النتائج: ارتبط الصيام خلال شهر رمضان بانخفاضات ذات دلالة إحصائية في كل من: الكوليسترول الكلي (٢١٠,٩ ± ٦٩,٩ مقابل ١٨٣,٥ ± ٦٢,٧ ملغم/دل، $p < ٠,٠١$) , البروتين الدهني منخفض الكثافة (LDL-C) (١٢٠,٢ ± ٦٨,٢ مقابل ٩٤,٩ ± ٦٠,٥ ملغم/دل، $p < ٠,٠١$) , الدهون الثلاثية (١٥٣,٦ ± ٨٧,٩ مقابل ١١٧,١ ± ٦٠,١ ملغم/دل، $p < ٠,٠١$) , البروتين الدهني منخفض الكثافة جدًا (VLDL-C)(٣٠,٧ ± ١٧,٦ مقابل ٢٣,٥ ± ١٢,١ ملغم/دل، $p < ٠,٠١$) في المقابل، لم يُظهر البروتين الدهني مرتفع الكثافة (HDL-C) تغيرًا ذا دلالة إحصائية (٦٥,٩ ± ١٥,٥ مقابل ٦٦,٢ ± ١٥,٥ ملغم/دل، $p = ٠,٨٧$) ,كما أظهر معدل الدهون الثلاثية إلى البروتين الدهني مرتفع الكثافة (TG/HDL) انخفاضًا ذا دلالة إحصائية (٢,٩٧ ± ٢,٥٤٠ مقابل ١,٨٨ ± ١,٢٤٤، $p < ٠,٠١$). ولوحِظ حدوث انخفاض طفيف وغير ذي دلالة إحصائية في وزن الجسم (−٠,٧٤ ± ٢,١ كغم، $p = ٠,٠٨٢$).

الاستنتاج: يسهم صيام شهر رمضان في تحسين ملحوظ في دهون الدم مع انخفاض بسيط في وزن الجسم لدى البالغين العراقيين، مما يشير إلى فوائد محتملة على صحة القلب والأوعية الدموية.

الكلمات المفتاحية

صيام رمضان، دهون الدم، الكوليسترول، وزن الجسم، العراق