

Effect of Ramadan Fasting on Body weight, BMI and Lipid Profile Parameters among BNYS Students: A Pre-post Observational Study

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Abstract

Background

Ramadan is characterised by daily abstinence from food and fluids between dawn and sunset for approximately one month. During this period, individuals experience changes in eating schedules, meal frequency, fluid intake, sleep patterns, and daily activities. Such changes may influence body weight, body mass index (BMI), and circulating lipid concentrations. However, reported metabolic responses to Ramadan fasting vary across populations.

Aim

To determine the changes in anthropometric measurements and lipid profile parameters among BNYS students before and after Ramadan fasting.

Methods

We conducted a prospective observational study with pre–post assessment among 20 BNYS students who observed Ramadan fasting throughout the study period. The participants included 10 females and 10 males. Body weight and BMI were assessed before and after Ramadan. Blood samples were analysed for total cholesterol, triglycerides, HDL-C, LDL-C, and VLDL-C at both time points. The pre- and post-fasting values were statistically compared using an appropriate paired test. Statistical significance was considered at $p < 0.05$.

Results

Significant changes were observed in all assessed parameters following Ramadan fasting. TC decreased from 173.55 ± 7.49 mg/dL to 142.45 ± 6.53 mg/dL, representing a mean reduction of 31.10 mg/dL (17.92%) ($W = 0$, $p < 0.001$). TG decreased from 149.05 ± 7.97 mg/dL to 133.30 ± 7.22 mg/dL, a reduction of 15.75 mg/dL (10.57%) ($W = 0$, $p < 0.001$). LDL-C decreased from 98.00 ± 8.35 mg/dL to 74.60 ± 6.49 mg/dL, representing a reduction of 23.40 mg/dL (23.88%) ($W = 0$, $p < 0.001$), while VLDL-C decreased by 1.70 mg/dL (7.68%) ($W = 0$, $p < 0.001$). HDL-C increased from 44.95 ± 2.14 mg/dL to 46.15 ± 2.60 mg/dL, representing an increase of 1.20 mg/dL (2.67%) ($W = 15$, $p < 0.001$).

Body weight decreased by 4.95 kg (9.11%), and BMI decreased by 2.47 kg/m² (9.11%); both changes were statistically significant ($W = 0$, $p < 0.001$).

Conclusion

Ramadan fasting was associated with significant improvements in body weight, BMI and the lipid profile among the participating BNYS students. The observed reductions in TC, TG, LDL-C, VLDL-C, body weight and BMI, together with an increase in HDL-C, suggest favourable short-term changes in selected cardiometabolic parameters. However, the findings should be interpreted cautiously because of the small sample size and absence of a non-fasting control group.

Keywords: Ramadan fasting; time-restricted fasting; body weight; body mass index; lipid profile; cholesterol; triglycerides; HDL-C; LDL-C; VLDL-C; BNYS students.

1. Introduction

Ramadan is a holy month observed by Muslims globally, during which fasting is practised from dawn to sunset. Throughout the fasting period, individuals avoid both food and drink, making Ramadan fasting different from several other fasting methods that may allow water intake. Food and fluid consumption are limited to the non-fasting hours, mainly after sunset and before dawn. The number of fasting hours differs across regions and seasons because it depends on daylight duration. Owing to these features, Ramadan fasting is often viewed as a distinctive form of time-restricted eating that produces changes in both physiological functions and daily behaviours.¹⁻⁵

The month of Ramadan brings noticeable modifications in routine lifestyle patterns. Normal eating schedules are reorganised, and many people reduce their meals from three or more per day to two main meals: Suhoor, taken before dawn, and Iftar, taken after sunset. This altered pattern of food intake may lead to changes in caloric consumption, nutrient quality, hydration, sleep timing, circadian rhythm, physical activity, and other daily habits. These factors may affect energy regulation, body composition, fluid balance, and metabolic activity. Therefore, researchers have frequently examined Ramadan fasting in relation to anthropometric outcomes, particularly body weight and body mass index, as well as biochemical markers such as lipid profile.^{1-5, 10-14}

Among the commonly evaluated outcomes of Ramadan fasting are body weight and BMI. Previous studies have shown that some individuals experience mild weight reduction during or immediately after Ramadan. This may be related to shorter eating windows, fewer meals, or reduced total energy intake. However, weight changes during Ramadan are not consistent in all populations. They may depend on several factors, including initial body weight, age, gender, food selection, level of physical activity, cultural dietary customs, duration of daily fasting, and the amount and type of food consumed during night-time meals. Moreover, weight loss observed during Ramadan may not always be maintained, as some individuals regain weight after returning to their usual dietary routine.^{1-8, 10-14}

Apart from body weight, Ramadan fasting may also modify lipid metabolism. Variations in eating time, energy intake, dietary fat, sleep pattern, and activity level can influence blood lipid levels, including lipoprotein cholesterol. Several studies have reported positive lipid responses during Ramadan, such as

decreased total cholesterol, triglycerides, and LDL cholesterol, with an increase in HDL cholesterol. Conversely, other studies have observed no meaningful change or even unfavourable shifts in lipid values.¹⁻¹⁴

Differences in research findings may be due to variations in the participants and study methods. Participant-related factors such as age, sex, health condition, body composition, dietary pattern, fasting duration, climate, cultural food practices, and physical activity may influence the results. In addition, methodological differences, including sample size, length of follow-up, timing of blood collection, and whether assessments are performed before, during, or after Ramadan, may contribute to the lack of uniform findings. Hence, more studies are needed to clarify how Ramadan fasting affects body measurements and lipid parameters in defined population groups.¹¹⁻²⁰

Although many researchers have explored the metabolic impact of Ramadan fasting, the available evidence is still not conclusive. While some studies suggest improvements in body weight, BMI, and lipid profile, others show little or no significant change. These inconsistencies indicate the importance of studying Ramadan fasting among different communities and specific population groups.

Young adults represent a suitable group for such investigation because Ramadan may considerably affect their food habits, academic schedule, sleep routine, and physical activity. Students of Bachelor of Naturopathy and Yogic Sciences may be particularly relevant, as they are generally exposed to concepts related to diet, lifestyle modification, yoga, and natural approaches to health. Assessing anthropometric and biochemical parameters in this group may help provide a better understanding of the metabolic effects of Ramadan fasting in young adults.

There is limited information on the effects of Ramadan fasting among specific local, age-based, and educational groups. Since dietary customs, environmental conditions, cultural practices, and daily routines differ from one community to another, findings from previous studies may not be applicable to all populations. Therefore, this study is designed to assess the effect of Ramadan fasting on body weight, BMI, and lipid profile among BNYS students.

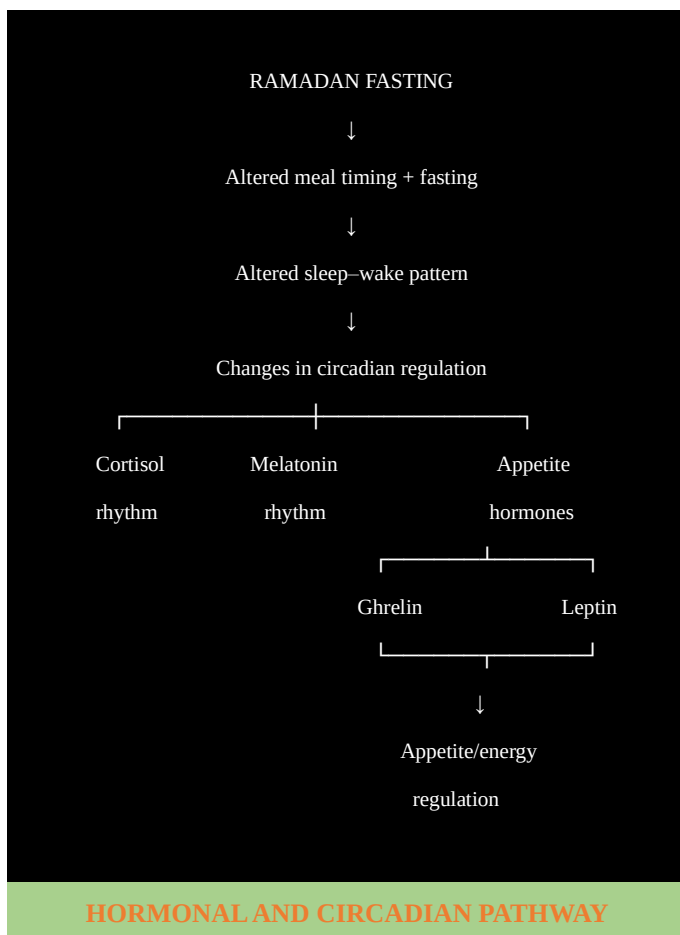


Fig. 1: Hormonal and circadian pathway during Ramadan fasting

PHYSIOLOGICAL CHANGES DURING RAMADAN FASTING

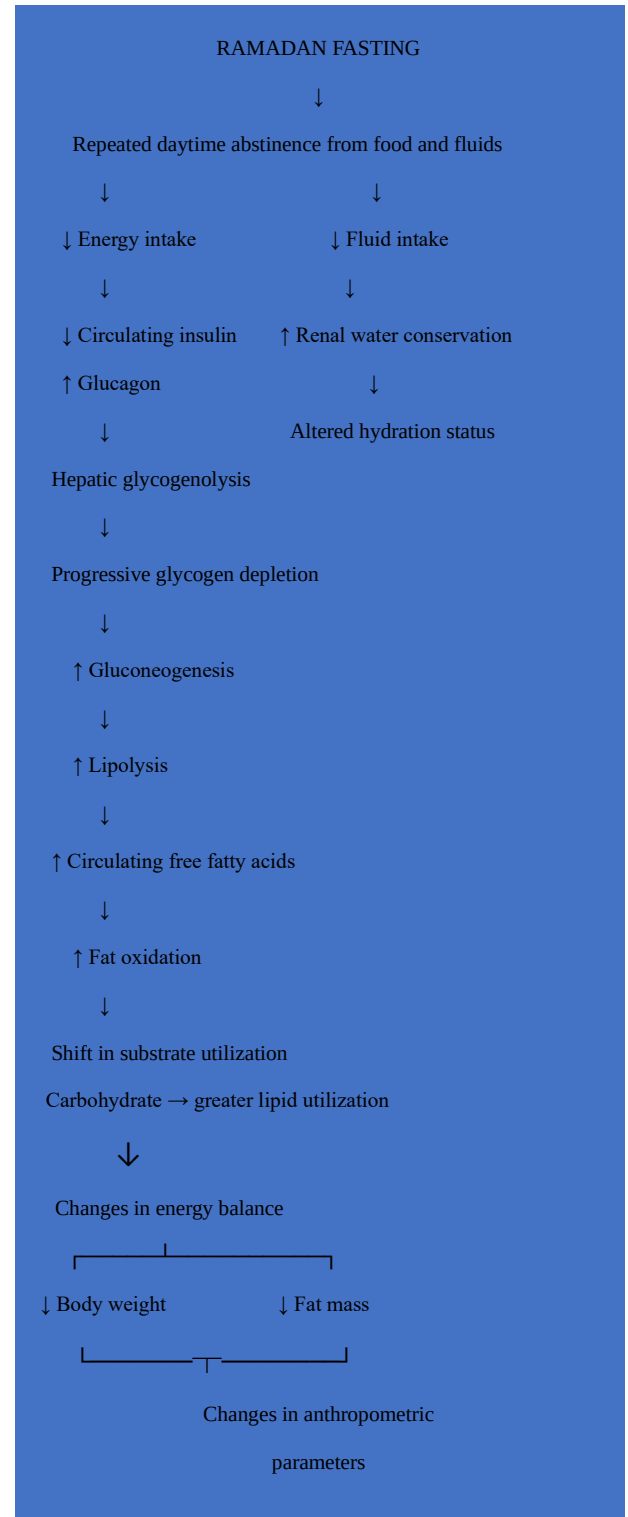


Fig. 2: Physiological changes during Ramadan fasting

Aim

To assess changes in selected anthropometric and lipid profile parameters among BNYS students following Ramadan fasting.

Objectives

1. To determine the change in body weight between the pre- and post-Ramadan assessments.
2. To compare BMI before and after the Ramadan fasting period.
3. To determine the change in total cholesterol following Ramadan fasting.
4. To assess changes in serum triglyceride concentrations following Ramadan fasting.
5. To compare HDL-C concentrations before and after Ramadan fasting.
6. To assess changes in LDL-C concentrations following the fasting period.
7. To compare VLDL-C concentrations before and after Ramadan fasting.

Methodology**Study Design**

A prospective observational study using a pre–post assessment design was undertaken to examine changes in anthropometric and lipid profile parameters during the Ramadan fasting period.

Study Participants

The study participants were BNYS students who observed Ramadan fasting throughout the study period. A total of 20 students participated in the study, comprising 10 females and 10 males.

Study Setting

The study was carried out among BNYS students of Government Nature Cure and Yoga Medical College and Hospital, Mysuru, Karnataka, India.

Study Period

The study commenced with the baseline assessment conducted on 11 March 2024 and concluded with the post-fasting assessment on 13 April 2024. These assessments corresponded to the period before and after the Ramadan fasting period, respectively.

Eligibility Criteria**Inclusion Criteria**

1. Were enrolled in the BNYS programme;
2. Observed Ramadan fasting during the study period;
3. Were willing to participate in the study; and
4. Provided informed consent.

Exclusion Criteria

1. Did not complete the Ramadan fasting period;
2. Had a medical condition that could substantially affect body weight or lipid profile;
3. Were using medications or supplements that could influence lipid metabolism; or
4. Failed to complete either the baseline or follow-up assessment.

Study Variables

The study assessed anthropometric and biochemical variables at two time points: before Ramadan fasting and after completion of the fasting period.

Anthropometric Measurements

1. Body weight, recorded in kilograms (kg).
2. Body mass index, expressed as kg/m².

Biochemical Measurements

The lipid profile consisted of:

1. Total cholesterol (mg/dL)
2. Triglycerides (mg/dL)
3. HDL-C (mg/dL)
4. LDL-C (mg/dL)
5. VLDL-C (mg/dL)

Study procedure

All 20 participants attended their regular academic classes throughout the Ramadan fasting period and participated in a routine one-hour yoga class each day. They maintained their usual dietary practices at home throughout the study, with no prescribed dietary modification or supplementation. Participants were asked to maintain their usual food intake and lifestyle routines during the study period.

Data Collection Procedure

Baseline data were obtained before the participants began the Ramadan fasting period. Anthropometric measurements and biochemical investigations were repeated after Ramadan. The same assessment procedures were followed at both time points to improve consistency between measurements.

We measured body weight using a standard weighing instrument and calculated BMI from the recorded weight and height. Blood samples were collected following standard laboratory procedures, and lipid profile parameters were analysed using established laboratory methods.

Statistical Analysis

The analysis included 20 participants. Continuous variables were expressed as mean $\pm$ standard deviation (SD). Pre- and post-intervention values were compared using the Wilcoxon signed-rank test because of the small sample size and non-normal distribution observed in some paired differences. A two-tailed p-value <0.05 was considered statistically significant.

Results

All the parameters were compared between pre-fasting and post-fasting. Total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL), very-low-density lipoprotein cholesterol (VLDL), Body weight, and Body mass index (BMI) decreased significantly following the Ramadan fasting period. High-density lipoprotein cholesterol (HDL) also increased significantly after Ramadan fasting.

Parameter	Pre-fasting Mean $\pm$ SD	Post-fasting Mean $\pm$ SD	Mean Change	Wilcoxon w	% Change	p-value
TC (mg/dL)	173.55 $\pm$ 7.49	142.45 $\pm$ 6.53	-31.10	0	-17.92%	<0.001
TG (mg/dL)	149.05 $\pm$ 7.97	133.30 $\pm$ 7.22	-15.75	0	-10.57%	<0.001
HDL (mg/dL)	44.95 $\pm$ 2.14	46.15 $\pm$ 2.60	+1.20	15	+2.67%	< 0.001
LDL (mg/dL)	98.00 $\pm$ 8.35	74.60 $\pm$ 6.49	-23.40	0	-23.88%	<0.001
VLDL (mg/dL)	22.12 $\pm$ 1.42	20.42 $\pm$ 1.21	-1.70	0	-7.68%	<0.001
Weight (kg)	54.35 $\pm$ 2.92	49.40 $\pm$ 2.54	-4.95	0	-9.11%	<0.001
BMI (kg/m²)	27.12 $\pm$ 1.20	24.65 $\pm$ 1.03	-2.47	0	-9.11%	<0.001

Table: Pre- fasting and post-fasting comparison of parameters

A total of 20 participants were included in the analysis. Significant pre- to post-fasting changes were observed in all assessed anthropometric and lipid-profile parameters following the Ramadan fasting period.

Total cholesterol decreased from 173.55 $\pm$ 7.49 mg/dL at baseline to 142.45 $\pm$ 6.53 mg/dL post-fasting, representing a mean reduction of 31.10 mg/dL (17.92%) (Wilcoxon W = 0, p < 0.001). Triglyceride levels decreased from 149.05 $\pm$ 7.97 mg/dL to 133.30 $\pm$ 7.22 mg/dL, corresponding to a mean reduction of 15.75 mg/dL (10.57%) (W = 0, p < 0.001).

LDL-C decreased from 98.00 $\pm$ 8.35 mg/dL to 74.60 $\pm$ 6.49 mg/dL, representing a mean reduction of 23.40 mg/dL (23.88%) (W = 0, p < 0.001). Similarly, VLDL-C decreased from 22.12 $\pm$ 1.42 mg/dL at baseline to 20.42 $\pm$ 1.21 mg/dL post-fasting, corresponding to a mean reduction of 1.70 mg/dL (7.68%) (W = 0, p < 0.001).

In contrast, HDL-C increased significantly from 44.95 $\pm$ 2.14 mg/dL to 46.15 $\pm$ 2.60 mg/dL, representing a mean increase of 1.20 mg/dL (2.67%) (W = 15, p < 0.001).

Anthropometric parameters also demonstrated significant reductions. Body weight decreased from 54.35 $\pm$ 2.92 kg to 49.40 $\pm$ 2.54 kg, representing a mean reduction of 4.95 kg (9.11%) (W = 0, p < 0.001). BMI decreased from 27.12 $\pm$ 1.20 kg/m² to 24.65 $\pm$ 1.03 kg/m², corresponding to a mean reduction of 2.47 kg/m² (9.11%) (W = 0, p < 0.001).

Overall, Ramadan fasting was associated with statistically significant reductions in total cholesterol, triglycerides, LDL-C, VLDL-C, body weight, and BMI, together with a statistically significant increase in HDL-C.

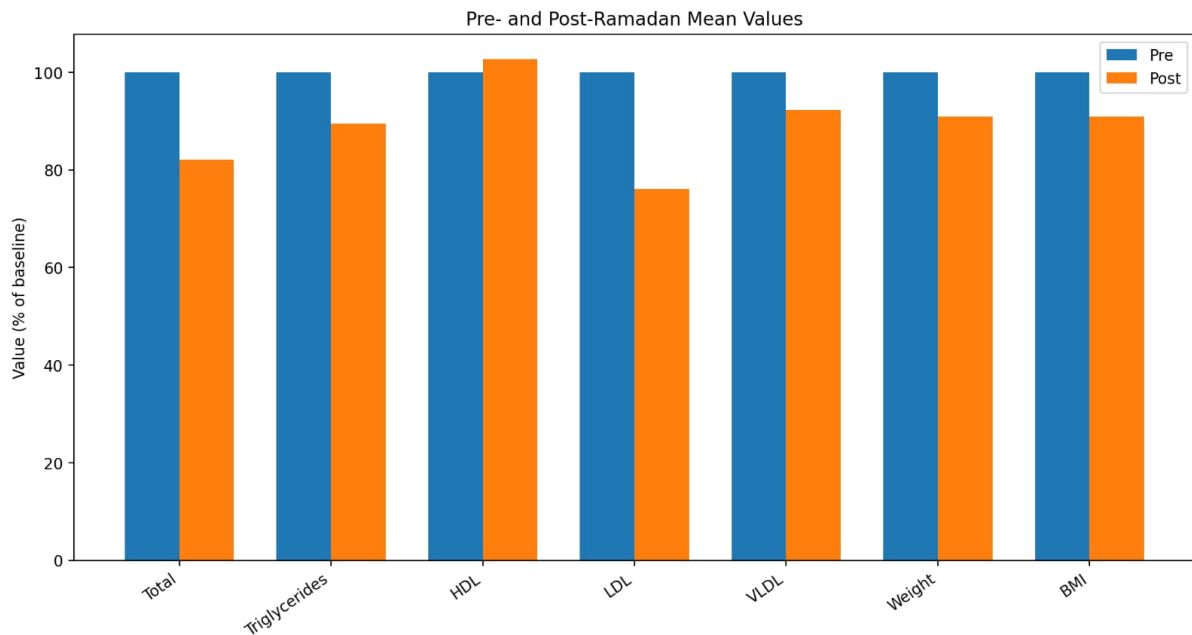


Figure 3. Pre- and post-Ramadan fasting comparison of anthropometric and lipid-profile parameters among BNYS students (n = 20).

Discussion

The present study evaluated the changes associated with Ramadan fasting on anthropometric and lipid-profile parameters among 20 BNYS students. Significant reductions were observed in total cholesterol (TC), triglycerides (TG), LDL-C, VLDL-C, body weight and BMI, while HDL-C increased significantly after the fasting period ($p < 0.001$ for all parameters).

In the present study, TC decreased by 17.92%, TG by 10.57%, LDL-C by 23.88%, and VLDL-C by 7.68%, whereas HDL-C increased by 2.67%. These findings are broadly consistent with systematic reviews reporting favourable changes in selected lipid parameters following Ramadan fasting, particularly reductions in LDL-C and increases in HDL-C. However, previous studies have also reported variability in TC and TG responses, suggesting that dietary intake, baseline metabolic status and lifestyle factors may influence the outcome. [10,21,22]

Body weight and BMI decreased by 9.11% following Ramadan fasting. This finding is consistent with systematic reviews and meta-analyses reporting reductions in body weight and BMI during Ramadan fasting. The magnitude of weight loss, however, varies between populations and may be influenced by dietary intake, physical activity and baseline BMI. [3,2,23]

The observed changes may be related to alterations in meal timing, energy intake, substrate utilisation, and body weight during the fasting period. Nevertheless, the present study had a small sample size and a single-group pre-post design without a non-fasting control group. Therefore, these findings indicate an association with Ramadan fasting rather than a definitive causal effect.

Overall, Ramadan fasting was associated with favourable short-term changes in lipid profile, body weight and BMI among the study participants. Further studies with larger samples, control groups and

detailed assessment of dietary intake and physical activity are required to confirm these findings and determine their long-term significance.

Strengths and limitations

Strengths: The study employed a paired pre–post design and assessed objective anthropometric and lipid-profile parameters. The use of an appropriate non-parametric paired statistical test strengthened the analysis.

Limitations: The small sample size ($n = 20$), absence of a non-fasting control group, observational design, and short follow-up limit the generalizability and causal interpretation of the findings. In addition, dietary intake, physical activity, sleep, and hydration were not quantitatively assessed or controlled. Therefore, the long-term effects of Ramadan fasting could not be determined.

Summary Of Findings

The study included 20 BNYS students and compared anthropometric and lipid-profile parameters before and after Ramadan fasting.

The principal findings were:

1. Total cholesterol: decreased by 17.92%
2. Triglycerides: decreased by 10.57%
3. LDL-C: decreased by 23.88%
4. VLDL-C: decreased by 7.68%
5. HDL-C: increased by 2.67%
6. Body weight: decreased by 9.11%
7. BMI: decreased by 9.11%

All seven pre–post comparisons were statistically significant ($p < 0.001$).

These findings indicate a statistically significant short-term change toward a more favourable lipid profile accompanied by reductions in body weight and BMI following Ramadan fasting.

Conclusion

In this pre–post observational study of 20 BNYS students, Ramadan fasting was associated with significant reductions in total cholesterol, triglycerides, LDL-C, VLDL-C, body weight and BMI, along with a significant increase in HDL-C.

The findings suggest that Ramadan fasting may be associated with favourable short-term changes in anthropometric and lipid-profile parameters in this study population. However, because of the small sample size, lack of a control group and absence of detailed dietary and lifestyle monitoring, the findings should be interpreted as an association rather than evidence of a causal effect. Larger controlled studies with standardised assessment of dietary intake, physical activity, sleep, hydration and longer-term follow-up are warranted.

References

1. Motiwala Z, Sarker P, Hliebov O, et al. Effect of Ramadan fasting on blood lipid profile among populations in the South Asia region: a systematic review and meta-analysis. *Cureus*. 2025;17(6): e86309. doi:10.7759/cureus.86309.
2. Sadeghirad B, Motaghipisheh S, Kolahtooz F, Zahedi MJ, Haghdooz AA. Islamic fasting and weight loss: a systematic review and meta-analysis. *Public Health Nutr*. 2014;17(2):396–406.
3. Fernando HA, Zibellini J, Harris RA, Seimon RV, Sainsbury A. Effect of Ramadan fasting on weight and body composition in healthy non-athlete adults: a systematic review and meta-analysis. *Nutrients*. 2019;11(2):478.
4. Gharbi M, Aouidet A, Mars M, et al. Effects of Ramadan fasting on cardiovascular risk factors: a prospective observational study. *Nutrition Journal*. 2012.
5. Unalacak M, Kara IH, Baltaci D, Erdem O, Erten Bucaktepe PG. Effects of Ramadan fasting on biochemical and hematological parameters and cytokines in healthy and obese individuals. *Metabolic Syndrome and Related Disorders*. 2011;9(2):157–161. doi:10.1089/met.2010.0084.
6. Trabelsi K, Shephard RJ, Boukhris O, et al. Effects of Ramadan fasting on athletes' hematological indices: a systematic review. *Tunis Med*. 2019;97(10):1104–1113.
7. Attarzadeh Hosseini SR, Hejazi K, et al. The effects of Ramadan fasting and physical activity on blood hematological-biochemical parameters. *Iranian Journal of Basic Medical Sciences*. 2013.
8. World Health Organisation. BMI is a simple index of weight-to-height used to classify nutritional status in adults.
9. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol*. 2008;61(4):344–349.
10. Faris MAI, Jahrami H, Alsibai J, Obaideen AA. Does four-week consecutive, dawn-to-sunset intermittent fasting during Ramadan affect cardiometabolic risk factors in healthy adults? A systematic review, meta-analysis, and meta-regression. *Nutrition Research*. 2021.
11. Al-Jafar R, et al. (2023). The impact of Ramadan intermittent fasting on anthropometric measurements and body composition: Evidence from LORANS study and a meta-analysis. *Frontiers in Nutrition*, 10, 1082217.
12. Fernando HA, et al. (2019). Energy Metabolism and Intermittent Fasting: The Ramadan Perspective. *Nutrients*, 11(5), 1192. This is particularly useful for explaining glycogen depletion, fat oxidation, energy expenditure and hormonal changes.
13. Roky R, et al. (2004). Physiological and chronobiological changes during Ramadan intermittent fasting. Useful for explaining cortisol, melatonin, body temperature, glycemia and hydration-related physiological changes.
14. Karras SN, et al. (2022). Effects of Time-Restricted Feeding and Ramadan Fasting on Body Weight, Body Composition, Glucose Responses, and Insulin Resistance: A Systematic Review of Randomized Controlled Trials. *Nutrients*, 14(22), 4778. Useful for discussing glucose metabolism and insulin resistance while emphasizing the limitations of the Ramadan-specific RCT evidence.
15. Cho Y, et al. Effects of intermittent fasting and energy-restricted diets on lipid profile: A systematic review and meta-analysis. *Nutrition*. 2019/2020. This meta-analysis reported significant reductions in TC, LDL-C and TG, with no significant effect on HDL-C.

16. Liu D, et al. Calorie Restriction with or without Time-Restricted Eating in Weight Loss. *New England Journal of Medicine*. 2022; 386:1495–1504. DOI: 10.1056/NEJMoa2114833.
17. Moon S, et al. Intermittent Fasting and Obesity-Related Health Outcomes: An Umbrella Review of Meta-analyses of Randomized Clinical Trials. *JAMA Network Open*. 2021. The review included lipid outcomes including LDL-C, HDL-C, TC and TG.
18. Lessan, N., & Ali, T. (2019). Energy metabolism and intermittent fasting: The Ramadan perspective. *Nutrients*, 11(5), 1192. <https://doi.org/10.3390/nu11051192>.
19. Patterson, R. E., Laughlin, G. A., LaCroix, A. Z., et al. (2022). Intermittent fasting and human metabolic health. *Annual Review of Nutrition*, 42, 371–393.
20. Fernando, H. A., Zibellini, J., Harris, R. A., Seimon, R. V., & Sainsbury, A. (2020). Effects of time-restricted feeding during Ramadan on dietary intake, body composition and metabolic outcomes: A systematic review and meta-analysis. *Nutrients*, 12(8), 2478. <https://doi.org/10.3390/nu12082478>.
21. Mirmiran P, Bahadoran Z, Gaeini Z, Moslehi N, Azizi F. Effects of Ramadan intermittent fasting on lipid and lipoprotein parameters: An updated meta-analysis. *Nutr Metab Cardiovasc Dis*. 2019;29(9):906-915. doi: 10.1016/j.numecd.2019.05.056.
22. Kul S, Savaş E, Öztürk ZA, Karadağ G. Does Ramadan fasting alter body weight and blood lipids and fasting blood glucose in a healthy population? A meta-analysis. *J Relig Health*. 2014; 53:929-942.
23. Aydın S, et al. Effects of Ramadan and non-Ramadan intermittent fasting on body composition: a systematic review and meta-analysis. *Nutrients*. 2021.