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Body fat mass and body mass index variations during and outside the Ramadan fasting period among young football players (under 19 years).

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Abstract

The objective of this study was to investigate the variations in body fat mass and body mass index (BMI) among under-19 male football players during and outside the Ramadan fasting period. For this purpose, we did an experimental method using TANITA BC-545N bioimpedance analyzer to measure body composition. A sample of 26 players from the Soca Annaba football club, note that the researcher was the team's coach during 2022-2023 season. Following the collection of the relevant data and subsequent statistical analysis using SPSS, we conclude, while height continued to increase due to ongoing growth, there were no significant negative effects on overall weight or BMI. However, a decrease in body fat mass was observed, potentially due to inadequate caloric intake, it is recommended to consume foods and drinks that provide the necessary nutrients to support performance, adaptation, and recovery.

I. Introduction :

Ramadan, mentioned in the Quran, is a one of the five fundamental pillars of Islam. Considered the holiest month by Muslims, Ramadan is a fast, it is observed during the ninth month of the Islamic lunar calendar. During this month of fasting and worship, Muslims are called upon to abstain from drinking, eating, smoking, and sexual relations (Soodeh R Jahromi, 2014), from dawn “when one can distinguish a white thread from a black thread” according to the Quran, until sunset. This time is dedicated to prayer and the recitation of the Quran. Athletes and specially footballers often face the challenge of balancing their energy intake with the demands of their intense training and matches (Lotfi S, 2010). Ramadan fasting can cause fluctuations in body mass index (BMI) and fat mass among footballers. The restricted eating times can lead to dehydration and fatigue, affecting their endurance and recovery (Slimani I, 2016).

According to (Al Jafar Rami, 2023) Ramadan Intermitting Fasting is associated with a reduction in body weight, body mass index, weight, waist circumference, hip circumference, fat mass, fat percentage and total body water. Most of these reductions are partially attributed to reduced fat mass and total body water. The reductions in these parameters appear to reverse after Ramadan.

Another study reported significant improvements in heart rate variability and physical fitness parameters after 4 weeks of walking football during Ramadan fasting in middle-aged males. Exercise training while fasting enhances physical fitness and cardiovascular autonomic balance, which might imply that walking football practice in a fasted state may contribute to exercise-induced cardio-protection. This study should prompt future investigations on the significance of ANS regulation during training exercises in a fasted state (Noureddine Kammoun, 2022).

Additionally, in the study conducted by (Ghazi Daradkeh, 2021) Ramadan

fasting leads to weight loss and body composition changes including fat mass and fat free mass. Dietary intake varies depending on age, sex, culture, and dietary behavior of participants.

An Algerian study aims to highlight the impact of fasting on the conditional capacities of young football players, between the fasting period and the post-fasting period (Ap). Based on all the physical parameters such as vertical jump, 30m sprint, Akramov specific coordination test, Bangsboo speed resistance test, and 3000m endurance, we can conclude that there are no negative effects on short-duration exercises, unlike resistance exercises (Slimani I, 2016).

Based on previous similar studies, it is assumed that Ramadan fasting leads to a reduction in body weight and body fat mass. This phenomenon is observed in footballers and athletes in general, although the changes are often temporary and may return to before-Ramadan levels after the fasting period ends.

II. Method and Materials :

2.1. Participants :

For the purposes of this study, we selected a sample of 26 players under the age of 19 year from the Soca Annaba club, which is affiliated with the Annaba regional football league. It should be noted that the researcher was at the same time the team's coach for the 2022/2023 season. The team's training sessions were conducted at the Tamrabet municipal stadium in Annaba, with a frequency of two to three sessions per week. During the Ramadan period, training sessions were scheduled prior to Iftar (the breaking of the fast), at 16 a.m., while outside of Ramadan, training occurred at 17 a.m.

2.2. Materials :

Anthropometric measurements were taken using a TANITA BC-545N bioimpedance scale. This scale, equipped with handles, can measure various

body segments. Twelve different parameters were obtained, and height was measured using a measuring tape.

Figure 1: TANITA BC-545N bioimpedance scale.

2.3. Design and Procedure :

The measurements were obtained on three occasions: one week before Ramadan, during the third week of Ramadan, and three weeks after Ramadan, all the measurements were taken one hour before training at the locker room, with the assistance of the team doctor.

2.4. Statistical Analysis :

For the statistical analysis, we calculated the mean and standard deviation. We then performed a t-test to determine if the variation between the three measurements of each variable was significant. We used IBM SPSS Statistics 22 for the analysis.

III. Results :

Table 1: Descriptive and analytical statistics of anthropometric measurements.

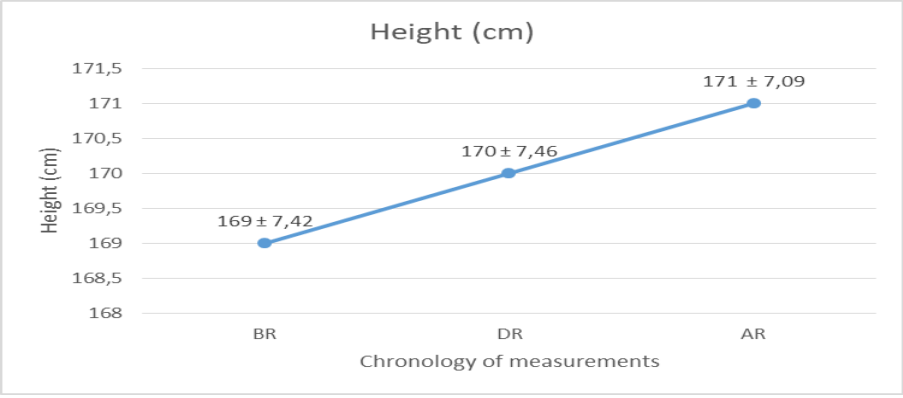
measurements	N	Descriptive statistics			T Student		
		Mean ± Standard Deviation			BR-DR	BR-AR	DR-AR
		BR	DR	AR			
Height (cm)	26	169±7,42	170±7,46	171±7,09	ns	*	ns
Weight (kg)	26	62,3±8,5	62,1±8,02	62,8±8,13	ns	ns	ns
BMI (kg/m²)	26	20,69±2,19	20,41±2,27	20,50±2,14	ns	ns	ns
BFM (kg)	26	8,21±3,55	7,76±2,89	7,84±2.90	*	*	ns

BMI: body mass index; BFM: body fat mass; BR: before Ramadan; DR: during Ramadan; AR: after Ramadan; ns: no signification; *: Significant difference P<0.05.

Table 1 shows the variations in anthropometric parameters before, during, and after the holy month of Ramadan. Statistical analysis was used to determine if these changes were significant.

III.1. Height:

Figure 2: The results of the statistical comparison of heights between the three measurement periods.



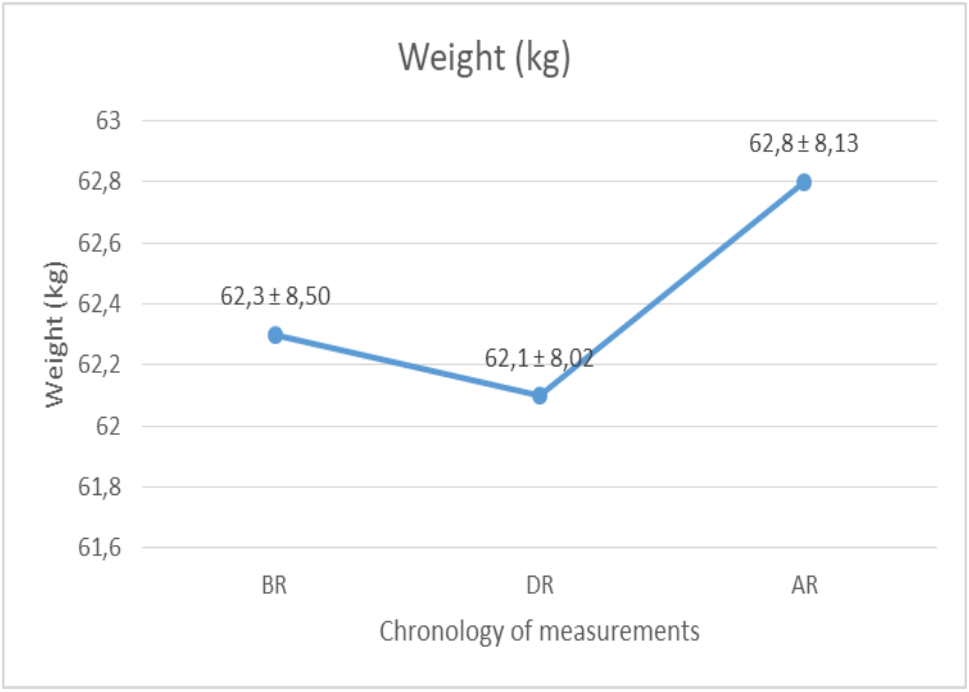
As illustrated in the graph (figure 2) and in table 1, there is a light increasing

in the height of players from the before-Ramadan measurement (169 cm) to the during-Ramadan measurement (170 cm), followed by a slight increase after-Ramadan (171 cm). However, no statistically significant difference was found between the before-Ramadan and during-Ramadan periods or between the during-Ramadan and after-Ramadan periods. However, a significant difference ($p < 0.05$) was observed between the before-Ramadan and after-Ramadan periods.

III.2. Weight:

Figure 3: The results of the statistical comparison of weights between the three measurement periods.

The data presented in the graph (figure 3) and in table 1, there was a modest

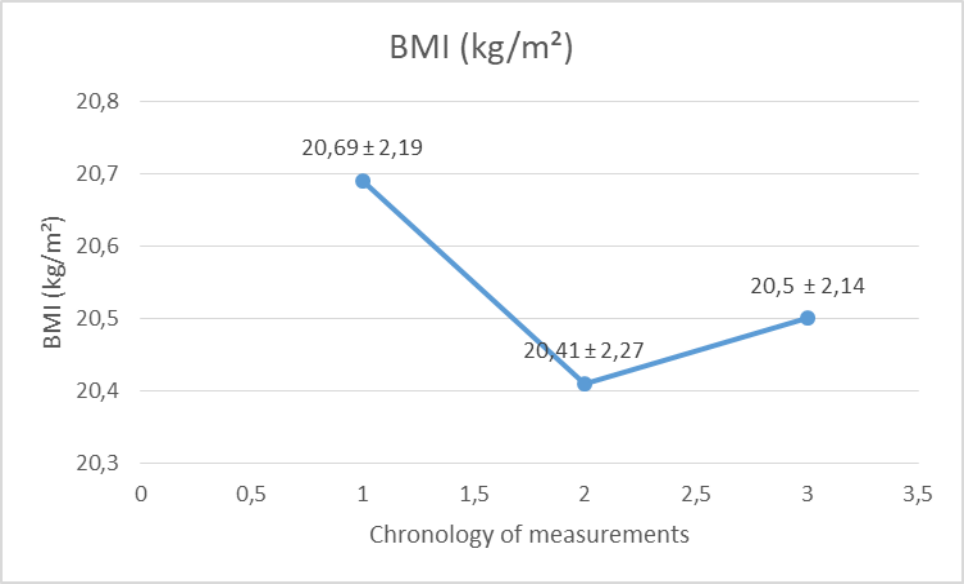


decrease in weight between before Ramadan (62.3 kg) and during Ramadan

(62.1 kg), followed by a small increase after Ramadan (62.8 kg). However, statistical analysis did not reveal any significant differences between the three measurement periods.

III.3. Body mass index (BMI):

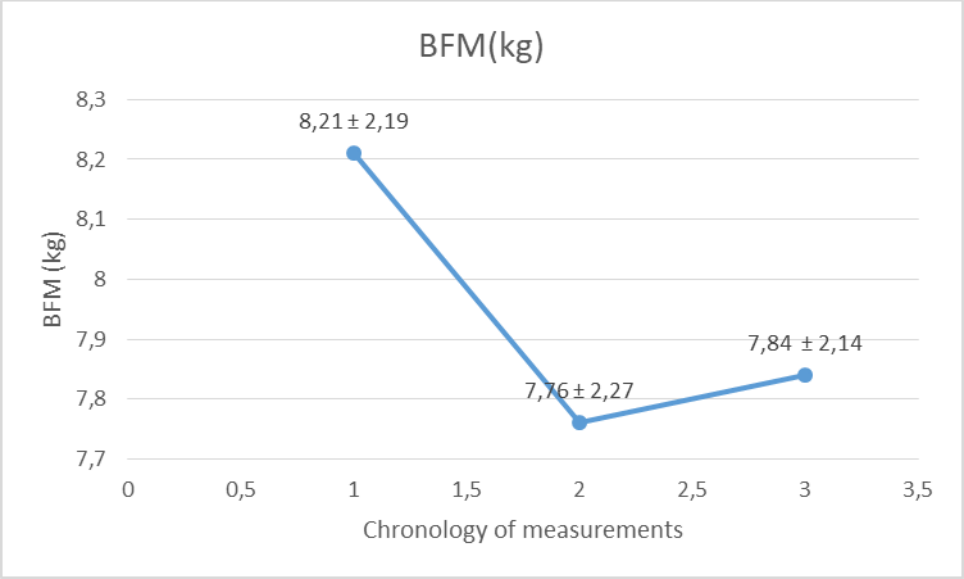
Figure 4: The results of the statistical comparison of BMI between the three measurement periods.



The graph (figure 4) and in table 1 shows a slight decrease in body mass index from the before-Ramadan measurement (20,69 kg/m²) to the during-Ramadan measurement (20,41 kg/m²), followed by a slight increase after-Ramadan (20,50 kg/m²). However, no statistically significant difference was found between the three measurement periods.

III.4. Body fat mass (BFM):

Figure 5: The results of the statistical comparison of BFM between the three measurement periods.



We can observe from the graph (figure 5) and in table 1 a decrease in body fat mass between the before-Ramadan (8.1 kg) and during-Ramadan periods (7.6 kg), followed by a slight increase after-Ramadan (7.7 kg). There was a statistically significant difference ($p < 0.05$) between the before-Ramadan and during-Ramadan measurements, as well as between the before-Ramadan and after-Ramadan measurements.

IV. Discussion :

Muslims abstain from food and drink consumption from sunrise to sunset. This change in meal schedule and frequency results in significant changes to the composition of the diet, such as energy and nutrient intake (Farhana Osman, 2020). These changes in dietary habits and their corresponding effects on body composition, like the increase in height observed during the three measurement periods is considered normal for players under 19 years old, as this is a period of adolescence characterised by growth in height and limb length (Chibane, 2010). The results align with those of the previous study (Al Jafar Rami, 2023).

Research findings have shown that a significant reduction in total body weight was achieved despite insignificant changes in total energy intake. This weight loss can be partly attributed to efficient use of body fat during Ramadan fasting (Ghazi Daradkeh, 2021). In this study although not statistically significant, there was a slight decrease in body weight during Ramadan, due to a lack of energy sources and reduced meal frequency to two meals per day: Iftar and Suhoor (Farhana Osman, 2020).

The observed decrease in BMI is consistent with the expected reduction in body weight, as supported by previous research (Al Jafar Rami, 2023).

Football players will try to maintain adequate glucose levels through the process of gluconeogenesis, which will gradually lead to a loss of fat mass, as indicated by our measurements. This finding is supported by the study of (Ghazi Daradkeh, 2021).

V. Conclusion

Ramadan fasting is characterized by daily abstinence from food and fluid intake from dawn to sunset. The objective of our study is to examine the variations in body mass index and body fat mass among under-19 football players during the before-Ramadan, during-Ramadan, and after-Ramadan periods. While height continues to increase progressively due to the players being in their growth phase, we did not find significant negative effects on weight or body mass index. However, a decrease in body fat mass was observed, potentially due to insufficient energy intake, leading the body to break down adipose tissue to meet energy demands. These findings are consistent with those of previous studies.

The present study suggests that Ramadan fasting is associated with a modest reduction in body weight and body fat mass. However, the observed growth in height during this period remained unaffected.

References

Al Jafar Rami, N. S. (2023). The impact of Ramadan intermittent fasting on anthropometric measurements and body composition: Evidence from LORANS study and a meta-analysis. *Frontiers in Nutrition*.

Chibane, S. (2010). les dimensions corporelles en tant que critère de sélection des jeunes footballeurs algériens de 15-16 ans (u17). *HAL open sciences*.

Farhana Osman, S. H. (2020). Effects of Time-Restricted Feeding during Ramadan on Dietary Intake, Body Composition and Metabolic Outcomes. *Nutrients*.

Ghazi Daradkeh, H. A.-M. (2021). Effect of Ramadan Fasting on Body Composition and Dietary Intake: A Prospective Study in the State of Qatar. *Journal of Nutrition & Food Sciences*.

Lotfi S, M. M. (2010). Effets du jeûne de Ramadan sur les performances physiques et la VO2 max chez les coureurs de demi- fond et les footballeurs. *Revue Scientifique S.T.A.P.S* .

Noureddine Kammoun, H. S. (2022). Effects of Walking Football During Ramadan Fasting on Heart Rate Variability and Physical Fitness in Healthy Middle-Aged Males. *American Journal of Men's Health*.

Slimani I, A. M. (2016). Impact du jeûne du ramadan sur les capacités conditionnelles des jeunes footballeurs. *Revue Scientifique Spécialisée en Sciences du Sport*.

Soodeh R Jahromi, M. A. (2014). Islamic fasting and multiple sclerosis. *BMC Neurology* .