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The impact of Ramadan intermittent fasting on the quality of sleep and training regimen among athletes

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Abstract

This study aimed to investigate the effect of intermittent Ramadan fasting (RIF) on sleep quality among amateur athletes. Additionally, we assessed the effects of Ramadan training regimen (RTR) and we explored athletes' perceptions regarding it. The study sample consisted of 62 athletes from various disciplines. The Pittsburgh Sleep Quality Index (PSQI) was used to collect sleep quality data. In addition, a questionnaire was designed to examine RTR and athletes' perceptions of the effects of fasting on athletic performance. The results of this study indicate a decrease in the quality and quantity of sleep as well as changes in the content and quality of the training program. The results also suggest that athletes should understand the demands of Ramadan training and consider the potential impacts.

Keywords: *amateur athletes, Ramadan fasting, Sleep Quality, training regimen*

Introduction

Many Muslims worldwide celebrate the holy month of Ramadan every year for one month (Roky et al., 2001). Healthy adult Muslims must fast for 29-30 days from sunrise to sunset throughout Ramadan (A. Aziz et al., 2012). Fasting involves refraining from eating, drinking, and sexual activity. The fasting period varies according to geographical location and changing seasons; it increases in summer and decreases in winter (Zoughbie et al., 2022). The difficulty of fasting is also related to the period between suhoor and iftar meals. Ramadan brings about behavioral changes in lifestyle, physical activity, and psychological status (Alghamdi et al., 2020; Farooq et al., 2021), including sleep (BaHammam et al., 2014; Qasrawi et al., 2017). Previous studies have shown that sleep disturbances can occur during Ramadan, with a significant decrease in total sleep time (TST) observed. Bedtime is often delayed by 2–3 hours, leading to increased fatigue during the day (Bahammam, 2006). As a result, Muslim athletes often struggle with training and competing during Ramadan (Damit et al., 2014; A. R. Aziz, M. Y. H. Chia, C. Y. Low, G. J. Slater, W. Png, & K. C. Teh, 2012; Kirkendall et al., 2012), which can influence sports performance (Aziz et al., 2010), with physical performance being lower in the evening compared to the morning (Aloui et al., 2013). Physical performance remains stable before 7 a.m. but declines by 5 p.m. (Hamouda et al., 2012). However, no adverse effects have been noted following repeated short-term high-intensity exercise (Boukhris et al., 2019). It is, important to consider the significance of these effects as even minor changes can alter sports outcomes. In this context, Ramadan has been shown to have various significant physical effects, which can impact sports outcomes (Chaouachi et al., 2012). Moreover, Ramadan may coincide with different birth months and sports competitions, and training sessions are typically scheduled throughout the year regardless of athletes affiliation. Muslim athletes must continue to train and compete during Ramadan (Abaïdia et al., 2020). To the best of our knowledge, the effects of Ramadan fasting on amateur athletes have not been thoroughly explored. The primary goal of this study was to investigate the impact of Ramadan intermittent fasting (RIF) on the sleep quality of amateur athletes, while the secondary aim

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was to determine athletes' perceptions of the impact of RIF on athletic performance.

Materials and Methods

Experimental Approach to the Problem

This descriptive study examines the percentages and frequencies of all variables. The survey includes 44 questions divided into four sections: athlete demographics, Ramadan sleep quality, training regimen and athlete knowledge of the impact of Ramadan on sports performance. The demographic section includes open and multiple-choice questions (e.g., Sex, Age, country of residence, sports specialization). Section II, "Sleep Quality," includes Open questions such as "Bedtime" and "total sleep time. Part III, "Ramadan training regimen involves," Multiple-choice questions (e.g., training programs and exercise methods during Ramadan). In the last section," Athletes knowledge about the impacts of Ramadan sports performance includes open questions." We used Google Forms to create the current survey and translated it into Arabic and French in addition to the original English version. The questionnaire has been reviewed by college academics and sport scientist, and we have taken their feedback into account. The survey went live on social media on May 18, 2023. Responses were due from May 20, 2023, through July 24.

The Pittsburgh Sleep Quality Index

This self-rated questionnaire was designed and refined by (Buysse et al., 1989) to measure sleep quality, including subjective sleep quality, latency, duration, efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. A total value of 5 indicates poor sleep quality. This scale is widely used by academics and clinicians due to its reliability, as demonstrated by several researchers who have used various samples.

Participants

The study sample includes Muslim athletes from Algeria who fasted during Ramadan 2023. Participants had to meet the following criteria: (1) athletes who were 18 years old; (2) Muslim athletes who fasted during the month of Ramadan 2023; and (3) amateur athletes (not affiliated with professional clubs) who consistently trained during the month of Ramadan 2023. Participants were randomly recruited for this study, and although they were informed about the study procedures, they were not informed about its goals. Additionally, no participant's private email addresses or other private data were required. All surveys have been collected. Injured athletes (n = 10) and athletes under 18 (n = 3) were excluded from the study questionnaires. During Ramadan 2023 in Algeria, the fasting period ranged from approximately 15 to 45 minutes. The university ethics committee approved the study protocols before data collection.

Statical analyses

After collecting and classifying the data, we preformed statistical analysis using SPSS (version 26). Furthermore, we utilized Shapiro-Wilk test to determine the distribution of the data. Frequencies and percentages were used to provide descriptive statistics for evaluating the responses. Additionally, the same program was used to calculate the necessary scores for each component of the PSQI scale.

Table 1. Demographic data of respondents

Demographics	No. Of responses	No. Of responses %
Age group		
18–2O years old	21	34%
20–30 years old	28	48%
30–40 years old	13	13%
Over 40 years old		
Sex		
Female	6	10%
Male	56	90%
Discipline		
Soccer	33	52.23%
Hand Ball	3	4.84%
Volley ball	3	4.84%
Swimming	10	16.13%
Athletics	5	8.06%
Combat sports	5	8.06%
Basketball	3	4.84%
Experience		
1-3 y	17	27%
4-6 y	8	13%
6-9 y	17	27%
Over 10 y	20	32%
Location		
Algeria	62	100%

Notes: y; years; No: number.

Result

Participants

The data was collected automatically through a Google form once it was obtained. After removing inappropriate responses (e.g., from athletes under 18 years of age, incomplete responses, injured athletes), 62 male athletes aged 19–20 years (21%), 20–30 years (44%), and ≥ 31 years (35%). participated in this study. None of the athletes experienced any injuries or interruptions during the month of Ramadan. Most participants had over three years of training experience and had taken part in at least one competition during Ramadan 2023. The athletes had a variety of sports specialties, including football, athletics, basketball, swimming, and boxing, as detailed in the table 1.

Sleep quality

During Ramadan, athletes experienced a reduction in total sleep time to an average of 6.37±1.84 hours per night. This decrease was accompanied by an increase in insomnia symptoms and sleep disorders. On average, it took athletes between 15 and 55 minutes to fall asleep each night. Self-reported sleep quality, scores were distributed as follows: 13% very good, 61% fairly good, 20% fairly bad, and 7% bad. Athletes also reported taking daytime naps compared to their usual routines. It was noted that none of the athletes were using any sleep medications. Figure 1 and Table.2 illustrates the total PSQI scores.

Table 2. PSQI score

	Durring ramadan
Quality of sleep (Global PSQI score)	6.41±0.2O
Subjective sleep quality	1.1O±0.2O
Sleep latency	1.34±0.18
Sleep duration	0.63±0.37
Habitual sleep efficiency	0.78±0.75
Sleep disturbances	1.97±0.55
Use of sleep medication	0.08±0.18
daytime dysfunction over the last month	0.51±61

Training regimen

The training regimen during Ramadan is listed in Table.3, athletes reported lower overall performance compared to regular days. as well as a decrease in the average number of training sessions and competitions. Training schedules were adjusted during Ramadan, with 42% of athletes noting a change in training session content and 58% reporting no changes. In terms of training sessions, 5% trained in the morning, 8% in the afternoon, 66% in the evening, and 21% at night. Athletes stated that there was no increase in training intensity during Ramadan. and also reported a decrease in the total training volume.

Table 3. Athlete training regimen during the month of Ramadan

	No. Of responses	**No. Of responses %**
Decreased training volume during Ramadan		
Yes	46	74%
No	16	26%
number of training sessions during Ramadan		
1-3	39	63%
3-5	10	16%
over 5	13	21%
number of competitions during Ramadan		
1-3	45	73%
3-5	13	21%
Over 5	4	6%
Training quality alterations during Ramadan		
Yes	50	81%
No	12	19%
Timing of training sessions during the month of Ramadan		
The morning period	3	5%
Afternoon	5	8%
the evening period	41	66%
in the night	13	21%
Timing of training sessions before the month of Ramadan		

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Table 3. Athlete training regimen during the month of Ramadan

	No. Of responses	No. Of responses %
The Morning period	6	10%
Afternoon	5	8%
The evening period	48	77%
In the night	3	5%
Programming high-intensity training sessions during Ramadan		
Agree	40	65%
Disagree	22	35%

Athletes perception

Table 4 displays the athletes perceptions of Ramadan. Sixty nine percent of athletes reported being physically active during Ramadan, while 31% reported not being so. Furthermore, 48% of athletes believed that Ramadan affects sports performance and competition, while 52% reported that has no impact. Moreover, 31% of athletes had never received specific instructions from their coaches about training in Ramadan, while 59% received information about it. In terms of the likelihood of Ramadan affecting athletes' mental health, 48% do believe it does, while 52% do not.

Table 4. Athletes Perceptions and Beliefs on the Effects of Ramadan on Performance

	No. Of responses	No. Of responses %
Ramadan has an impact on athletes lifestyle		
Agree	29	47%
Disagree		
obtaining scientific instruction about engaging in sports during Ramadan		
Yes	39	63%
No	23	37%
Ramadan may have an impact on the psychological state of an athlete.		
Yes	30	48%
No	32	52%
Receive information on sports practice during Ramadan from the coach.		
Yes	43	69%
No	19	31%
Ramadan may have an impact on sports performance.		
Yes	18	29%
No	44	71%

Discussion

The current study examined the effects of intermittent Ramadan fasting on sleep quality, training regimen, and athletic performance. As well as knowledge and beliefs regarding the impact of Ramadan fasting in a sample of amateur athletes. Athletes reduced the quantity and quality of their sleep as their training volume decreased during Ramadan and experienced findings similar to those of previous studies (Romdhani et al., 2022). Alshobaili et al. showed a decrease in sleep quantity and quality and increased insomnia symptoms in athletes during Ramadan, possibly due to a later bedtime and more sleep during the day. Furthermore, smartphone use for an extended period before bedtime affects sleep time (Alshobaili et al., 2019). Religious rituals such as Tarawih, Tahajjud, and Ramadan nights, which are renowned in the Islamic community and last until late at night, may impact sleep quality. Excessive food consumption at night can disrupt circadian rhythms and hormone release (Trabelsi et al., 2022) leading to periodic chronobiological alterations that alter sleep rhythms and wakefulness (Trabelsi et al., 2022). Therefore, several studies have proposed taking daytime naps to compensate for lack of sleep (Hammouda et al., 2018). A 20-minute nap enhances the repeated sprint ability performance of judo athletes, and additionally, there was an improvement in the 20-meter sprint performance following a 30-minute nap. While there is no conclusive evidence regarding the effect of Ramadan fasting on sports performance, athletes physical performance deteriorates due to a lack of sleep (Marshall et al., 2016). Nevertheless, numerous studies show that increasing both the quantity and quality of sleep positively impacts performance. Athletes, in particular, require more sleep than non-athletes to adapt to physical efforts and facilitate recovery (Watson, 2017). It could range from 9 to 10 hours (Bird & Journal, 2013). Based on previous research, the current sample sleep quality and duration are approximately average compared to elite athletes. There is a difference in sleep quality between professional and amateur athletes; elite athletes may be more flexible in coping with sleep disorders. Several investigations have shown that professional athletes have poor sleep quality. This can be due to demanding training, competitive schedules, and professional and academic commitments (Watson, 2017). On average, elite athletes sleep for 6 hours and 30 minutes per night (Sargent et al., 2014), and more sleep hours are required to achieve both recovery and performance improvement. Overall, we cannot infer

that Ramadan was the main reason for the lack of sleep in our sample, as we did not assess the sleep quality among amateur athletes before Ramadan (Lipert et al., 2021). Athletes have reported a decrease in their training volume during Ramadan compared to regular times. This decline in training volume is linked to decreased performance during Ramadan (Meckel et al., 2008), while the change in the way of exercising could be attributed to athletes experience with training during Ramadan. It could also be related to specific misconceptions about the consequences of performance and fatigue during Ramadan. The athletes' preference for evening training as the majority of training sessions take place in the evening, accommodates this. In this context, Abaïdia et al., (2020), observed a decrease in performance on a repeated sprint test during the evening in Ramadan (A. R. Aziz, M. Y. H. Chia, C. Y. Low, G. J. Slater, W. Png, & K. C. J. C. i. Teh, 2012). It has been suggested that training between 8 and 10 a.m. is appropriate since the interval between Suhoor and training is brief, allowing the athlete to perform the exercises more effectively (Chamari et al., 2019). It is recommended that athletes perform training sessions one to two hours before breakfast in order to restore nutrients and fluids. Indeed, numerous studies have shown that maintaining training volume has no effect on performance or muscle activation during Ramadan (A. Aziz et al., 2012; Rebaï et al., 2013). Moreover, during Ramadan fasting muscle glycogen levels, decreased by 17–25%. As a result, during Ramadan athletes should aim for moderate performance and training, ensuring that the volume and intensity of exercise are appropriate. Sixty five percent of the athletes reported that high-intensity exercises should not be scheduled during Ramadan. To the best of our knowledge, only a few studies have attempted to investigate the impact of Ramadan fasting on high-intensity activities. Amateur athletes believe that scheduling such sessions leads to exhaustion and an inability to cope with the physical demands of training while Ramadan fasting (Aziz et al., 2011). There are no adverse effects on exercise intensity during high-intensity interval training sessions while fasting during Ramadan (Chtourou et al., 2012). During the evening of Ramadan, there is a reduction in anaerobic power and an increase in muscle fatigue compared to the pre-Ramadan period (Souissi et al., 2007). Based on previous findings, there seems to be a discrepancy in the power and short-term high-intensity activities between the evening and morning periods, and this difference is likely due to the availability of energy during the morning period (Mhenni et al., 2021). There is a variation in short-term maximal performance that can be decreased during Ramadan due to fasting. Furthermore, the training objectives and contents must be adapted to the specific characteristics of Ramadan. It is important to maintain physical abilities and performance, taking into consideration the temperature and humidity. While Ramadan can hinder performance even on regular days, it can also be used to strengthen other aspects such as game strategy, technical skills, and cognitive aspects. There needs to be more consistency in the athletes' responses regarding having scientific information on Ramadan sports practice; the majority of athletes did not receive proper training in this area, either from their coaches or reviewing scientific reports. Although it is essential to measure athletes cognitive aspects of the effects of Ramadan fasting, to the best of our knowledge, only one study has examined Muslim soccer players knowledge, beliefs, and attitudes around Ramadan. Athletes need more knowledge about the impacts of Ramadan fasting, and most respondents believe that Ramadan fasting harms football match performance.

Due to the limited number of respondents, the use of newly designed questionnaire which was not validated and standardized in the present study, the current study findings cannot be generalized. Nevertheless, one of the main advantages of the study was its focus on amateur athletes and the effort to design a questionnaire to assess athletes' perception and the effects of Ramadan fasting on training performance, which should be strandardized and validated in future studies.

Conclusion

In the current study, sleep quality was found to be poor among amateur athletes, with lower total sleep time and increased insomnia symptoms noted. Additionally, adjustments were made to training content, load, and schedules. Despite scientific research on the effects of Ramadan on sports performance, there was a lack of knowledge among the athletes regarding the potential impact of Ramadan fasting on their performance. Therefore, athletes require more guidance on the importance of sleep for athletic performance, as well as specific training methods and concepts that align with the unique requirements of Ramadan.

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