

# RAMADAN INTERMITTENT FASTING EFFECT ON FOOTBALLERS

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## INTRODUCTION

Given the high level of sporting competition that occurs at an international level there is a need for equitable competition among athletes. The international fair play committee recognizes the importance of a level playing field for international athletes and states that “*fair play calls for the greatest understanding of the social environment of competitors and of different cultures*” (<http://www.fairplayinternational.org/what-is-fair-play->, last visit: December 27, 2022). More specific to football, the Fédération Internationale de Football Association (FIFA) promotes fair play, diversity, and anti-discrimination in the spirit of competition and cultural inclusion (<https://digitalhub.fifa.com/m/6363f7dc616ff877/original/wg4ub76pezwcxsaaj98-pdf.pdf>, last visit: December 27, 2022). However, despite awareness around the need for equitable competition, it is likely that some athletes may experience disadvantages in competition due to cultural practices. When considering that certain religious practices may significantly influence the everyday

life of high-level football players, it becomes apparent that the fairness of competition may be influenced. During the holy month of Ramadan, which is based on a lunar cycle calendar, Muslim athletes fast from dawn to sunset for 29-30 consecutive days every year. Observing RIF means not being allowed to eat or drink during the daytime hours and replenishing oneself only during dark hours. The last possible meal before dawn is called *Suhoor* and the fasters complete/close their daily fast at sunset with *Iftar*. In this context, recent international sports competitions have not taken into consideration Muslim athletes who observe RIF during these sporting events. The 2012 London Olympics and the 2014 FIFA World Cup overlapped with the month of Ramadan and no notable change in the competition schedules were observed. Fasting Muslim athletes competed in a fasted state. The overlap of timing with RIF and high-level sports competition may create a challenge for healthy adult Muslims competing in these events. Importantly, as the lunar cycle month of Ramadan shifts on the Gregorian calendar over a cycle of

33 years, depending on the time of the year (season) and geographical location (latitude positioning), the length of the daily fast can vary drastically from relatively short fasting periods of less than 12 hours, to extremely long fasting durations of 20 hours or more. It is much easier to fast during the short days of the cold winter than during the long and hot summer days. When it comes to the management of the athletes' daily life, both changes to patterns around eating and sleeping among Muslim athletes during-Ramadan may impose challenges.

Football is the most practiced sport globally and has also been reported as the most scientifically studied sport. Physical demands while playing football can be observed in many ways, specifically the cardiovascular system. During a match, professional senior football players often cover the equivalent of over 10 km at various levels of effort<sup>1</sup>. A 2022 systematic review of the literature<sup>2</sup> has examined the influence of RIF on footballers across various performance measures, physiologic parameters, and rate of injury. In order to



## Illustration

perform these physical demands, players must prepare their bodies with adequate nutrition, hydration, and rest – each of which is altered while practicing RIF.

Within the past years, the football competitions held internationally during the summer months have overlapped with the month of Ramadan. Examples include the 2019 UEFA Champions League and Europa League finals when several players were fasting and voiced concerns with maintaining their prior level of performance while practicing RIF. The latter cases have been garnering media attention in Europe where the football calendar does not take into consideration Ramadan specificities. Since 2012, and for the next 25 years or so, Ramadan will fall during the football competitive season of most of the global northern hemisphere countries. As most of the Muslim-majority countries are located in this hemisphere, in addition to many Muslim footballers playing in Muslim-minority countries, it is the responsibility of all involved parties to not only understand the challenges around performance that footballers face while practicing RIF, but also make appropriate accommodations during training/competition.

## THE EFFECT OF RAMADAN INTERMITTENT FASTING ON FOOTBALLERS' PHYSICAL PERFORMANCE AND INJURIES

Over the years, there has been significant research performed around the influence that RIF has on footballers, specifically considering physical performance as well as injury rates. Below, we report the main results of our group's systematic review on the topic<sup>2</sup>.

### Internal load

A number of studies have investigated the influence of RIF on peak heart rate through multiple tasks including the yo-yo intermittent recovery test (YYIRT-1), modified loughborough intermittent shuttle test, and 90-minute match. Within the current evidence we note two instances where the peak heart rate has decreased during-Ramadan when measured at the end of (i) the incremental running test, and (ii) the YYIRT1; when these test were performed in the evening (before *Iftar*).

Furthermore, studies that examined the rate of perceived exertion (RPE) through various testing measures found that it was higher during-Ramadan compared to before-Ramadan, especially when

considering activities that have higher physical demands.

### Running and sprinting

There have been a number of studies that have evaluated the influence of RIF on the results of the YYIRT1 with findings showing confounding results; while some groups demonstrated an increase in distance ran when comparing before-Ramadan distances to after-Ramadan distances, others reported a decrease, and some studies reported no change. When it comes to the time-of-day effect, the two studies on U-19 young soccer player showed that the YYIRT1 distance measured in the morning was not affected by Ramadan, while when assessed at the end of the afternoon, the performance was decreased at the fourth week of Ramadan, compared to before-Ramadan.

Similarly, studies examining sprint speed before- and after- Ramadan report conflicting findings with decreased power (increased sprint time), or improvements in sprint times following Ramadan.

### Jumping

A majority of studies looking at various jump heights found a decrease in jump

height during week four of Ramadan when compared to heights achieved before-Ramadan, particularly those performed in the evening just before *Iftar*. There was one investigation that reported higher vertical jump heights among those youth players that were not fasting compared to those that were fasting but without indicating significance and lacking information regarding the time-points of data collection.

#### *Match physical performance and field-specific tests*

Two studies have examined match physical performance during-Ramadan. Aziz et al<sup>3</sup>, studying sub-elite football players from Malaysia, reported significant decreases in high intensity distances for the first half, second half, and entire 90-minute match in the fourth week of Ramadan when compared to distances covered before-Ramadan. Of importance, those matches were played in hot and humid conditions. Unlike the latter conditions, Bezuglov et al<sup>4</sup> reported unaffected physical match performance in elite Russian senior football players in cold conditions. Another study showed that players had better scores related to a dribbling task before-Ramadan when compared to the fourth week of Ramadan when they moved at a less relative speed during match play.

#### *Wingate anaerobic test*

All studies that have investigated the impact of RIF on the 30-sec all-out cycle Wingate anaerobic test in football players have reported that there was a significant decrease in peak and mean powers observed during-Ramadan.

#### *Injury rates*

Conflicting evidence exists between studies examining injury rate during-Ramadan. One study reported that both overuse and non-contact injuries occurred at a greater rate during-Ramadan compared to other time points before- and after- Ramadan over the course of two consecutive seasons in one elite football team from Tunisia. Another study investigating football injuries showed no difference in injury when looking at Ramadan and non-Ramadan time-periods within the whole league of Qatar professional football. It is important to note that the likely explanation for the contradictory findings among these two studies is probably multi-factorial. For instance, when looking at when training and match play occurred, the study that found greater rates of injury was performed in a region where matches and training sessions were held both in the afternoon when players were still in a fasted state or in the evening after *Iftar* with players in a fed state. However, the study that found no effects of Ramadan on injury rates was performed with players exclusively training and playing after *Iftar*. In these conditions, players had proper nutrients and hydration prior to their efforts, in addition to being able to hydrate while training or playing.

#### *Sleep*

Sleep during-Ramadan in athletes was investigated using a variety of different tools, making it difficult to compare results uniformly. However, when looking at sleep duration during-Ramadan in footballers, comparing sleeping durations before-Ramadan and during the fourth week

of Ramadan, there was no significant difference. Daytime napping was shown to increase by tenfold in a single study that investigated this variable before-Ramadan and during the fourth week of Ramadan. Furthermore, when considering sleep efficiency and sleep quality, there is evidence to demonstrate both variables decreased in the fourth week of Ramadan compared to values before-Ramadan. Although, it appears that the flexibility in the athlete's day to day activities allows for more opportunity for daytime napping, this may not provide the sleep quality necessary for high-level football performance.

#### DISCUSSION

When considering the current research identifying significant findings that RIF has on physical performance variables, the effects were often negative. Specific physical performance variables that were negatively influenced by RIF according to the evidence on this topic include increased RPE, decreased peak power, and lowered peak heart rate.

#### *Timing of match play and match performance*

A more evident finding among studies that examined physical performance variables at different times of day during-Ramadan demonstrated a significant decline in performance in the late-afternoon/evening (before *Iftar*) when compared to morning sessions. This decrease in performance is not surprising given the absence of nutrients and hydration throughout the day. Not all studies examined the variables of interest at different times of day; however, those that



***Football players' religious beliefs and cultural differences should not be a source of inequity on the field.***



**TABLE 1**

Continent	League	Final Match Day
Asia	Saudi Professional League	16 May 2019
	UAE Arabian Gulf League	25 May 2019
Africa	Egyptian Premier League	27 May 2019
	Algerian Ligue: professional One	26 May 2019
	Moroccan Botole Pro Inwi	11 June 2019
	Nigerian Professional Football League	26 May 2019
Europe	English Premier League	12 May 2019
	German Bundesliga	18 May 2019
	Spanish La Liga	19 May 2019
	French Ligue One	24 May 2019

**Table 1:** Illustration of concomitance of Ramadan and football leagues. League end dates for the 2018-2019 season, when the holy month of Ramadan commenced on 05 May 2019. Leeds United.

**TABLE 2**

Year	First day of Ramadan	Last day of Ramadan
2011	1 August	30 August
2012	20 July	18 August
2013	9 July	7 August
2014	29 June	28 July
2015	18 June	17 July
2016	7 June	5 July
2017	27 May	25 June
2018	16 May	14 June
2019	6 May	3 June
2020	24 April	23 May
2021	13 April	12 May
2022	3 April	2 May
2023	23 March	22 April
2024	11 March	9 April
2025	1 March	30 March
2026	18 February	19 March
2027	8 February	9 March
2028	28 January	26 February
2029	16 January	14 February
2030	6 January	4 February

**Table 2:** The beginning and end of Ramadan month from 2011 to 2030.

did showed significant decreases in YYIRT<sub>1</sub> and jumping performances, peak heart rate, and increases RPE towards the end of the fasting compared to morning times. The relevance of these findings can be directly linked to the timing when a majority of competition occurs during high-level match play. With the demands of match play being greater than training and the timing of most matches being in the afternoon or evening, this creates an environment for Muslim players to perform at a lower level compared to earlier in the day. Further adding to the timing of match play, *Iftar* may very well occur during a match and players will often be obliged to break their fast at this time<sup>5</sup> leading to feasibility challenges and possible issues related to post-meal digestion during competition. In this context, anecdotal media reports have recently described/shown football players breaking their fast at pitch side taking advantage of a math break when one of their teammates was simultaneously treated by the medical team.

*Implications for northern hemisphere football leagues*

From 2010 to 2020, Ramadan has overlapped with elite international football competition schedules. The 2014 FIFA World Cup in Brazil was held from 12 June to 13 July, when that year's Ramadan month occurred from 28 June to 27 July. In 2018, the FIFA World Cup held in Russia began on the same day (14 June) as *Eid al-Fitr* (celebrations of the end-of-Ramadan). At that occasion, the opening match involved a Muslim-majority Saudi Arabia side, who had presumably been practicing RIF for the previous month, suffering a 5-0 defeat at the hands of the home team (although the anecdotal potential role of fasting on that score is impossible to judge). Mid-summer events over the last decade have introduced an imbalanced playing field in international competitions for elite Muslim footballers practicing RIF as part of their religious beliefs. In this context, the start of Ramadan occurred prior to the final match day for the 2018/2019 season in many top leagues in Europe (Table 1), and ever since, RIF will be more and more drifting towards the middle of the competitive seasons. Indeed, over the 2020-2030 decade, the month of Ramadan will continue to move nearer to the start of the Gregorian calendar (Table 2), posing many more challenges and questions for



### Illustration

governing bodies and domestic leagues to consider towards the fairness of considering or not, the Muslim fasting players who are part of the game.

There are an estimated 50 Muslim-majority countries globally<sup>6</sup>. Muslim footballers from Muslim-majority countries who practice RIF are likely to experience accommodations in both training and match play during-Ramadan in order to mitigate much of what has been discussed up to this point. For example, the Egyptian Premier League or Qatari "Qatar Stars League" shift match start times later in the day to ~22:00 local time so that *Iftar* can occur before the match and players can replenish nutrients and rehydrate for the forthcoming match effort. However, those fasting Muslim footballers training and competing outside of Muslim-majority countries during-Ramadan are likely to experience disadvantages compared to their teammates and competitors as those competitions organizers will probably not consider these players' needs into consideration<sup>4</sup>. Therefore, we believe that this topic deserves specific training attention of the technical and medical staff members supporting the Muslim footballers. These

key players' supporting staff, as the head coach and the team doctor would benefit from gaining more knowledge on the ways to support the fasting Muslim players in these specific conditions<sup>7,8</sup>.

There are few studies focusing on Muslim athletes in non-Muslim-majority countries<sup>4,5</sup>. A 2021 study of professional football players in Russia reported that Muslim footballers' physical match performances were not different in the third week of Ramadan compared to before-Ramadan<sup>4</sup>. Matches were played in the daytime, thus not accommodating to Muslim athletes in a fasted state who had not eaten for 9-14 hours prior to kickoff. Nonetheless, there were no significant declines in physical performance (total distance, high intensity distance, sprint distance, sprint count, maximal speed) in week three of Ramadan compared to before-Ramadan. In addition to the cold environmental playing conditions, it is generally accepted that the first week of Ramadan is the most difficult to adjust and that fitness parameters are affected immediately after-Ramadan starts<sup>9,10</sup>. It is then possible that by the third week of Ramadan, the players have adjusted to

the habit of fasting during daylight hours. Limitations to this study include the small sample size (n=13 Muslim athletes in the exposure group), and the small exposure size (only one match assessed during the third week of Ramadan). While real-world experimental settings such as an actual football match can be an advantage for data interpretation, it cannot control for factors that affect match-day physical performance, such as the opponent's style of play, the evolution of the score of the match, or the implications of the match. It is quite interesting that many laboratory-controlled studies have shown evidence of decreased performance during-Ramadan (as noted in Results above), but these deficits have not been so apparent in two pitch-based match studies<sup>4,5</sup>.

### *Supporting the fasting players*

The clinical staff supporting the fasting players could refer to the literature for material suggesting supporting ways/techniques<sup>7-10</sup>. There are several possible intervention strategies available for them including:

1. Avoiding the exposure to heat/humidity during the day to avoid dehydration,



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location, societal accommodations, period of the year, duration of the fast, environmental conditions and timing of the testing. It would also be of better ecological validity to perform studies investigating physical performance measures during competition that truly simulate the demands of the sport instead of controlled testing. Additionally, further studies are warranted concerning Muslim players observing RIF Ramadan in both Muslim-majority and non-Muslim majority countries.

#### CONCLUSION

The scientific studies on the Muslim footballers observing RIF during the holy month of Ramadan and its' impact on performance is reported in the current literature and will certainly continue to develop given the fact that timing of the competitive seasons for domestic football leagues in the northern hemisphere will be coinciding with Ramadan within the next two decades. The religious beliefs and cultural differences of athletes should not be allowed to create an unequitable playing field for footballers, deserving more attention from international sport governing bodies. Finally, it seems that "lab-based studies" reported decreases in football players' performance but that "match-based studies" seem to suggest coping strategies, of some sort mitigating performance deficits.

2. Nutrition and hydration strategies during the night-hours,
3. Optimizing sleep to ensure good recovery,
4. Body-cooling and mouth-rinsing strategies (while being aware of potential fluid swallowing risks and religious implications/rules),
5. Potential psychological preparedness/ training (as some players might suffer from a nocebo effect due to their negative perception and beliefs on the effect of Ramadan on sport),
6. Considering the social support around the players, and
7. Taking advantage of the players' spiritual beliefs and religious intelligence that could back a strong motivation while performing<sup>7</sup>.

#### FUTURE RESEARCH

To more accurately determine the influence of RIF on footballers going forward, significant work needs to be done to better standardize the methodology of studies investigating the effect of RIF on performance and injury rates. Considerable attention should be given to variables related training and competition such as: geographic

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