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The Effect Of Date Extract On The Endurance Of U-15 Football Athletes During The Fasting Month

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ABSTRACT

Ramadan fasting presents significant physiological challenges for young football athletes, particularly regarding aerobic endurance due to energy deficits, dehydration, and altered recovery patterns. This study aimed to examine the effect of date extract supplementation on the endurance performance of U-15 football athletes during the fasting month. The study employed a quantitative experimental approach using a Pretest–Posttest Control Group Design. A total of 16 athletes from SSB Bhayangkara POP Semarang were selected and systematically divided into two groups: an experimental group (n = 8) receiving 30 ml of date extract during iftar for five consecutive days and a control group (n = 8) without supplementation. Aerobic endurance was measured using the Yo-Yo Intermittent Recovery Test Level 1, which demonstrated validity of r = 0.77 and reliability of 0.95. Data were analyzed using the Mann–Whitney U test at a 95% significance level. The pretest results indicated relatively balanced baseline endurance between the experimental group (12.73) and the control group (12.91). Following the intervention, the experimental group improved to 13.88, showing an increase of 1.15 points, whereas the control group slightly decreased to 12.83 (-0.08 points). The posttest mean difference between groups reached 1.05 points, with the experimental group obtaining a higher mean rank (10.69) than the control group (6.31). Statistical analysis produced U = 14.500, Z = -1.852, and p = 0.064 (>0.05), indicating no statistically significant difference. Nevertheless, the positive trend observed may be associated with the nutritional content of date extract, including antioxidants, vitamin C, and vitamin E, which potentially support glycogen recovery and reduce oxidative stress during fasting. Therefore, date extract may serve as a practical nutritional supplement for maintaining endurance performance in fasting football athletes.

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INTRODUCTION

Ramadan fasting is a religious obligation practiced annually by Muslims worldwide as part of Islamic orthopraxy, requiring abstinence from food and drink from dawn until sunset for approximately one month. This practice not only has spiritual significance but also creates substantial physiological, metabolic, psychological, and behavioral changes

that may influence physical performance and athletic capacity (Said, 2023). During Ramadan, athletes experience modifications in meal frequency, hydration patterns, sleep quality, circadian rhythm, and recovery processes, all of which can affect training adaptation and competitive performance. These physiological alterations become particularly important in youth athletes who are still undergoing growth and developmental processes.

Fasting duration varies globally between 12–20 hours depending on geographical location and season, whereas countries in equatorial regions such as Indonesia generally experience fasting durations of approximately 13–14 hours daily (Metabolism, 2019). Although Ramadan fasting is associated with several health benefits, including improved metabolic efficiency, body composition regulation, and psychological well-being (Prasanti, 2017), prolonged fasting without proper nutritional management may negatively influence exercise performance, especially during high-intensity and endurance-oriented sports activities.

Sport is defined as a structured physical activity aimed at maintaining and improving health, physical fitness, and performance capacity (Kuntjoro, 2020). During Ramadan, athletes are encouraged to remain physically active; however, exercise timing, intensity, and nutritional intake must be carefully adjusted to prevent excessive fatigue, dehydration, and performance decline. Previous investigations demonstrated that fasting during Ramadan can reduce aerobic capacity, endurance performance, and exercise tolerance, particularly during activities approaching 75% of maximal oxygen uptake (VO_2max) (Nurhasan et al., 2024). Such reductions are closely related to glycogen depletion, fluid imbalance, sleep disturbances, and insufficient caloric intake.

These challenges become more significant in football athletes because football is categorized as a high-intensity intermittent sport requiring prolonged aerobic and anaerobic energy contribution throughout 2 × 45 minutes of play (Samudra & Dehasen, 2025). Football athletes must repeatedly perform sprinting, acceleration, deceleration, jumping, tackling, and directional changes while maintaining tactical concentration and technical precision. Consequently, endurance capacity becomes one of the most essential determinants of football performance (Rahmat & Welis, 2018). Successful football performance depends not only on technical skill mastery but also on physical condition, tactical understanding, and psychological readiness (Sepriani, 2019).

Physical condition in football includes several biomotor components such as strength, endurance, speed, power, flexibility, agility, balance, and coordination (Irawati et al., 2025). Among these components, endurance is particularly crucial because football athletes are required to sustain repeated high-intensity efforts throughout prolonged match duration. However, Ramadan fasting has been reported to negatively influence several fitness components, including endurance, speed, agility, and technical skills such as dribbling performance (Nurhasan et al., 2024). Other studies also identified dehydration, nutritional deficits, mood fluctuation, fatigue, and reduced sleep quality as primary contributors to decreased endurance during fasting periods (Puspitawati & Puspitawati, 2019).

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The same phenomenon was observed among athletes of SSB Bhayangkara POP U-15 Semarang, where players experienced decreased endurance, increased fatigue, and reduced training intensity during Ramadan. Youth football athletes are particularly vulnerable because they require adequate nutritional intake to support growth, recovery, and adaptation to training loads. Bouzid et al. (2019) explained that fasting in adolescent football athletes may lead to reductions in endurance, strength, concentration, and sprint ability due to limited energy intake and altered recovery patterns. Therefore, appropriate nutritional intervention strategies are urgently needed to maintain physiological function and athletic performance during Ramadan. Recent sport nutrition research has increasingly focused on nutritional interventions capable of minimizing performance decline during Ramadan fasting. Several studies suggested that nutritional timing, hydration management, and carbohydrate replenishment strategies play critical roles in maintaining endurance and recovery among athletes during fasting periods (Ouyang et al., 2025). Appropriate nutritional supplementation may help restore glycogen stores, maintain blood glucose stability, and reduce oxidative stress resulting from prolonged fasting and intensive exercise.

One nutritional source receiving growing scientific attention is date fruit extract or date syrup. Date extract is a natural carbohydrate-rich supplement derived from date fruits and contains high concentrations of glucose, fructose, antioxidants, vitamins, and minerals beneficial for energy metabolism and recovery (Rahmat & Welis, 2018). Traditionally, date products have been widely consumed in Muslim communities during Ramadan because they are believed to rapidly restore energy after fasting. Scientifically, date extract contains substantial antioxidant compounds, including vitamin C and vitamin E, which may contribute to reduced oxidative stress and improved physiological recovery (Hernawan et al., 2019).

Previous physiological studies demonstrated that date extract consumption can elevate blood glucose concentration within approximately 15 minutes after ingestion, thereby providing rapid energy availability for muscle activity and recovery. Furthermore, date supplementation has been associated with prolonged muscle contraction duration before fatigue and improved exercise tolerance during endurance activities (Jakarta, 2025). Such findings indicate that date extract possesses potential ergogenic properties capable of supporting athletic endurance performance during fasting conditions.

In sports science, endurance assessment commonly utilizes aerobic endurance tests such as the Yo-Yo Intermittent Recovery Test, which measures the athlete's ability to repeatedly perform intermittent exercise with progressive intensity increases. This instrument is considered highly relevant for football because it simulates the physiological demands experienced during actual match situations (Sciences et al., 2024). Several contemporary studies employed the Yo-Yo Intermittent Recovery Test to evaluate endurance adaptations in football athletes during training interventions and nutritional supplementation programs.

From a physiological perspective, consuming date extract during iftar appears more effective than during sahur because post-fast consumption allows immediate

glycogen replenishment and fluid recovery. In contrast, consuming supplements during sahur may not adequately sustain blood glucose and hydration levels throughout afternoon training sessions due to prolonged fasting intervals lasting 8–12 hours (Engel, 2019). Therefore, strategic nutritional timing becomes essential in optimizing endurance performance during Ramadan.

Several previous investigations have explored Ramadan fasting and athletic performance; however, findings remain inconsistent. Some studies reported significant decreases in aerobic endurance and sprint performance, while others found minimal effects when nutritional management and training adjustments were appropriately implemented. Moreover, most previous studies focused on adult athletes rather than adolescent football players undergoing developmental maturation processes. Consequently, further evidence is required to clarify the effectiveness of nutritional supplementation strategies among youth football athletes during Ramadan fasting.

Although numerous studies have examined the relationship between Ramadan fasting and sports performance, several critical gaps remain unresolved. First, previous research predominantly investigated adult or elite professional athletes, whereas limited attention has been given to adolescent football athletes aged under 15 years. Physiological responses in youth athletes differ substantially from adults because adolescents experience ongoing growth, hormonal development, and increased nutritional demands. Second, existing studies largely focused on general nutritional strategies, hydration management, or carbohydrate intake without specifically examining the effectiveness of date extract supplementation as a natural ergogenic aid during Ramadan. Despite the widespread cultural and religious consumption of dates during fasting, empirical evidence regarding their direct influence on aerobic endurance in football athletes remains limited. Third, previous investigations often utilized cross-sectional or observational approaches, resulting in limited causal evidence regarding the effectiveness of nutritional interventions. Experimental studies employing pretest–posttest designs with standardized endurance measurements remain relatively scarce, particularly in Indonesian football contexts. Additionally, there is still inadequate evidence regarding short-term date extract supplementation protocols and their physiological effects on youth athletes during fasting periods. Fourth, few studies have integrated practical field-based endurance assessments such as the Yo-Yo Intermittent Recovery Test to evaluate endurance adaptation during Ramadan. Most previous research relied on laboratory-based measurements that may not fully represent the intermittent physiological demands of football competition. Therefore, this study addresses these gaps by experimentally examining the effect of date extract supplementation on aerobic endurance among U-15 football athletes during Ramadan fasting using a pretest–posttest design and the Yo-Yo Intermittent Recovery Test as the primary endurance assessment instrument.

Based on the identified problems and research gaps, this study aims to analyze the effect of date extract supplementation on the endurance performance of U-15 football athletes during the fasting month. Specifically, the study seeks to evaluate whether

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consuming approximately 30 ml of date extract during iftar for five consecutive days can significantly improve aerobic endurance performance measured through the Yo-Yo Intermittent Recovery Test. The novelty of this research lies in several important aspects. First, this study specifically focuses on adolescent football athletes aged under 15 years, a population rarely explored in Ramadan sport nutrition research. Second, the study investigates the ergogenic potential of date extract as a natural nutritional intervention during fasting conditions. Third, the study applies an experimental pretest–posttest approach to strengthen causal interpretation regarding supplementation effectiveness. Fourth, the utilization of the Yo-Yo Intermittent Recovery Test provides a football-specific endurance evaluation aligned with the physiological demands of intermittent match play.

Practically, the findings are expected to provide evidence-based recommendations for coaches, sport nutritionists, parents, and football academies regarding effective nutritional strategies during Ramadan. Academically, this study contributes to the growing body of sport nutrition and exercise physiology literature concerning fasting athletes, particularly within the context of youth football development in Indonesia.

In conclusion, Ramadan fasting presents substantial physiological and performance challenges for football athletes, especially regarding endurance maintenance. Appropriate nutritional intervention strategies are therefore essential to minimize performance decline during fasting periods. Date extract possesses promising nutritional and ergogenic properties due to its carbohydrate, antioxidant, and micronutrient content. However, scientific evidence concerning its effectiveness among adolescent football athletes during Ramadan remains limited. Consequently, this study was conducted to experimentally examine the effect of date extract supplementation on the endurance of U-15 football athletes during the fasting month.

METHODS

This study employed a quantitative experimental approach using a Pretest–Posttest Control Group Design to examine the effect of date extract supplementation on the aerobic endurance of U-15 football athletes during the fasting month of Ramadan. Experimental methods are considered highly effective for identifying causal relationships between independent and dependent variables because they allow researchers to control external variables and systematically evaluate treatment effects (Creswell & Creswell, 2018). In sports science research, pretest–posttest control group designs are widely utilized to investigate the effectiveness of nutritional and physiological interventions on athletic performance (Thomas et al., 2022).

The independent variable in this study was the administration of date extract (date syrup), while the dependent variable was aerobic endurance performance. Several control variables were maintained throughout the study, including training intensity, training schedule, testing time, fasting condition, participant age category (U-15), dietary

pattern, and rest duration. Controlling these variables is essential to reduce bias and improve internal validity in exercise physiology research (Bompa & Buzzichelli, 2019). Previous studies have emphasized that nutritional intake, hydration status, and sleep quality significantly influence endurance performance during Ramadan fasting (Bouzid et al., 2019; Ouyang et al., 2025).

The population consisted of male football athletes aged 15 years. A total of 16 participants were selected using purposive sampling according to predetermined inclusion criteria. Purposive sampling is commonly applied in sports performance research to ensure that selected participants possess characteristics relevant to the objectives of the study (Setyosari, 2020). The inclusion criteria were: (1) male football athletes aged 15 years (U-15 category), (2) actively participating in football training at least three times per week, (3) physically healthy and free from injury during the research period, (4) performing Ramadan fasting continuously, (5) willing to participate in the entire research procedure, and (6) willing to consume date extract according to the treatment schedule.

Aerobic endurance was measured using the Yo-Yo Intermittent Recovery Test Level 1 (YYIR1), which is recognized as a valid and reliable instrument for evaluating intermittent endurance capacity in football athletes. Previous investigations reported that the YYIR1 possesses high validity ($r = 0.77$) and reliability coefficients reaching 0.95 in measuring intermittent exercise performance (Bangsbo et al., 2018). The test is highly relevant for football because it simulates repeated high-intensity running activities commonly performed during matches (Krustrup et al., 2020).

The research procedure began with a pretest to assess participants' initial endurance levels. Subsequently, participants were ranked from the highest to the lowest pretest score to ensure balanced group distribution. The grouping process was conducted systematically using an alternating allocation pattern (A, B, B, A) until all participants were equally distributed into the experimental group (Group A) and the control group (Group B). This matching technique was intended to minimize differences in baseline endurance capacity between groups and improve research objectivity (Fraenkel et al., 2019).

The experimental group received date extract supplementation during Ramadan, whereas the control group received no specific nutritional intervention. Date extract was administered during iftar for five consecutive days, consistent with previous findings suggesting that post-fasting carbohydrate intake enhances glycogen restoration and recovery processes (Engel, 2019; Hernawan et al., 2019). Following the intervention period, all participants completed a posttest using the same YYIR1 protocol.

The collected data were analyzed statistically using the Mann–Whitney U test at a significance level of 5% ($p < 0.05$). Non-parametric analysis was selected because of the relatively small sample size and the possibility of non-normal data distribution. The Mann–Whitney U test is frequently recommended for comparing differences between two independent groups in sports science studies with limited sample populations (Field, 2018).

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RESULTS AND DISCUSSION

Result

This study involved 16 male football athletes aged 15 years from SSB Bhayangkara POP who were divided equally into two groups. The experimental group (Group A) received date extract supplementation of approximately 30 ml during iftar for five consecutive days throughout Ramadan fasting, whereas the control group (Group B) continued regular training activities without additional supplementation. Aerobic endurance was measured using the Yo-Yo Intermittent Recovery Test Level 1 during both pretest and posttest sessions. The collected data were analyzed descriptively to identify score distribution patterns and inferentially using the Mann–Whitney U Test to determine differences in posttest performance between groups.

Pretest Results

Table 1 presents the descriptive statistics of pretest scores for both groups before treatment administration.

Table 1.
Descriptive Statistics of Pretest Scores

Group	N	Lowest Score	Highest Score	Mean
Experimental (A)	8	11.20	15.30	12.73
Control (B)	8	12.10	14.40	12.91
Mean Difference	-	-	-	0.18
Total	**16**	**11.20**	**15.30**	**12.82**

Based on Table 1, both groups demonstrated relatively similar aerobic endurance capacity prior to the intervention. The experimental group achieved a lowest score of 11.20 and a highest score of 15.30, with a mean score of 12.73. Meanwhile, the control group obtained a lowest score of 12.10 and a highest score of 14.40, with a mean score of 12.91. The mean difference between groups during the pretest phase was only 0.18 points, indicating that the initial endurance capacity of both groups was relatively balanced. This condition was important to ensure that subsequent changes observed during the posttest phase could be more accurately attributed to the treatment effect rather than differences in baseline performance.

Posttest Results

Following five consecutive days of date extract supplementation, posttest measurements were conducted to evaluate changes in aerobic endurance performance.

Table 2.
Descriptive Statistics of Posttest Scores

Group	N	Lowest Score	Highest Score	Mean
Experimental (A)	8	12.30	16.20	13.88
Control (B)	8	12.10	14.30	12.83
Mean Difference	-	-	-	1.05
Total	16	12.10	16.20	13.35

The results presented in Table 2 demonstrate that the experimental group experienced noticeable improvement following date extract supplementation. The experimental group recorded a lowest posttest score of 12.30 and a highest score of

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16.20, with a mean score increasing to 13.88. Conversely, the control group obtained a lowest score of 12.10 and a highest score of 14.30, with a mean score of 12.83.

When compared with the pretest results, the experimental group demonstrated an average increase of 1.15 points, whereas the control group showed a slight decrease of 0.08 points. Consequently, the posttest mean difference between the experimental and control groups reached 1.05 points. These findings indicate that athletes who consumed date extract tended to achieve higher aerobic endurance scores compared with athletes who did not receive supplementation.

Changes in Aerobic Endurance Scores

To provide a clearer overview of endurance changes between pretest and posttest phases, the average score differences are summarized in Table 3.

Table 3.
Mean Changes from Pretest to Posttest

Group	Mean Pretest	Mean Posttest	Change
Experimental (A)	12.73	13.88	+1.15 (Increased)
Control (B)	12.91	12.83	−0.08 (Decreased)

Table 3 illustrates a clear performance trend between groups. Athletes in the experimental group who consumed date extract showed improvement in aerobic endurance capacity, whereas athletes in the control group demonstrated a slight decline in endurance performance. This pattern supports the assumption that fasting-related physical activity may contribute to reductions in aerobic capacity when not accompanied by appropriate nutritional strategies. Conversely, date extract supplementation appears to provide positive contributions toward energy restoration and endurance maintenance during Ramadan fasting.

The comparison of mean pretest and posttest scores between groups is also illustrated in Figure 1.

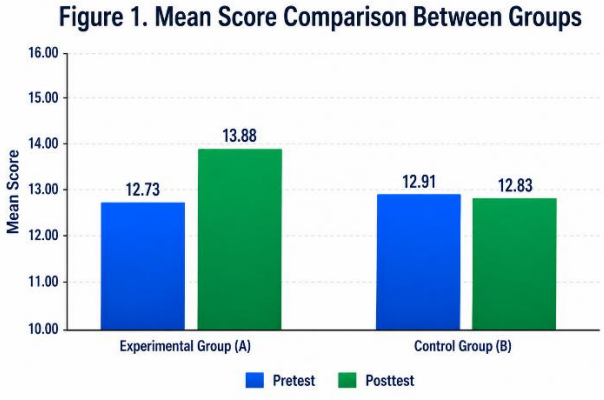

Figure 1.
Mean Score Comparison Between Groups

Figure 1 visually demonstrates that the experimental group experienced an upward trend in endurance performance after date extract supplementation, whereas the control group remained relatively stable with a slight decline.

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Inferential Analysis Using Mann–Whitney U Test

To determine whether the posttest differences between groups were statistically significant, the posttest scores were analyzed using the Mann–Whitney U Test at a significance level of 5%.

Table 4.
Mean Rank of Posttest Scores

Group	N	Mean Rank	Sum of Ranks
Experimental Group (A)	8	10.69	85.50
Control Group (B)	8	6.31	50.50
Total	**16**	**-**	**-**

Table 4 indicates that the experimental group achieved a higher mean rank value (10.69) compared with the control group (6.31). This result suggests that athletes who consumed date extract generally obtained higher posttest endurance scores than those in the control group.

Table 5.
Mann–Whitney U Test Results

Test Statistics	Score
Mann–Whitney U	14.500
Wilcoxon W	50.500
Z	–1.852
Asymp. Sig. (2-tailed)	0.064
Exact Sig. [2*(1-tailed Sig.)]	0.065

Based on Table 5, the Mann–Whitney U value was 14.500 with Z = –1.852 and an Asymp. Sig. (2-tailed) value of 0.064. Since the significance value of 0.064 was greater than 0.05, statistically there was no significant difference between the aerobic endurance scores of the experimental and control groups at the 95% confidence level.

Nevertheless, the significance value was very close to the threshold of significance. When interpreted together with the higher mean rank value and the posttest mean difference of 1.05 points, the findings suggest a positive tendency toward improved aerobic endurance among athletes who consumed date extract during Ramadan fasting. These results indicate that date extract supplementation may provide beneficial physiological effects related to energy recovery and endurance maintenance, although the magnitude of the effect was not statistically strong enough within the present sample size and intervention duration.

Discussion

This study aimed to examine the effect of date extract supplementation on the endurance of U-15 football athletes during the fasting month of Ramadan. The findings demonstrated that the experimental group receiving date extract supplementation experienced an increase in mean endurance score from 12.73 to 13.88, reflecting an improvement of 1.15 points. In contrast, the control group showed a slight decrease from 12.91 to 12.83, indicating a decline of 0.08 points. Although the inferential analysis using the Mann–Whitney U Test revealed a significance value of 0.064 (>0.05), the descriptive

trend suggests that date extract supplementation contributed positively to maintaining and improving aerobic endurance during Ramadan fasting.

The improvement observed in the experimental group supports previous findings indicating that date-based supplementation may enhance endurance performance in football athletes (Rahmat & Welis, 2018). Date extract is widely recognized as a natural energy source rich in carbohydrates, antioxidants, vitamins, and minerals that can rapidly restore energy availability following prolonged fasting periods. Football athletes require substantial aerobic and anaerobic energy contributions during training and competition because the sport involves continuous intermittent movements such as sprinting, acceleration, deceleration, and directional changes over prolonged match duration (Stølen et al., 2015; Slimani et al., 2019). Therefore, adequate nutritional replenishment during Ramadan becomes essential for maintaining physiological performance capacity.

The positive trend in endurance performance among athletes consuming date extract may be explained physiologically through improvements in glycogen restoration and blood glucose availability. Date extract contains rapidly absorbable carbohydrates, particularly glucose and fructose, which are capable of replenishing depleted glycogen stores after fasting (Hernawan et al., 2019). Glycogen depletion is one of the primary causes of reduced endurance performance during Ramadan fasting because prolonged abstinence from food and fluid intake lowers blood glucose concentration and limits substrate availability for muscular activity (Maughan et al., 2018). Previous investigations reported that athletes fasting during Ramadan frequently experience reductions in aerobic capacity, delayed recovery, and increased fatigue due to insufficient carbohydrate intake and dehydration (Bouzid et al., 2019; Trabelsi et al., 2020).

Laboratory analyses reported by Hernawan et al. (2019) demonstrated that date extract contains antioxidant levels reaching 39.5%, vitamin C at 341.67 mg/100 g, and vitamin E at 1822.08 mg/100 g. These antioxidant compounds play important roles in reducing oxidative stress induced by high-intensity physical activity. Oxidative stress commonly increases during strenuous exercise and fasting conditions because of elevated reactive oxygen species production combined with insufficient nutrient intake (Nikolaidis et al., 2018). Antioxidants derived from date extract may therefore contribute to cellular protection, reduced muscle fatigue, and enhanced recovery processes in fasting athletes.

The present findings are also consistent with the work of Sciences et al. (2024), who found that date extract consumption before high-intensity exercise increased blood glucose concentration within a short period, prolonged muscle contraction duration before fatigue, and improved exercise distance capacity. Such mechanisms are highly relevant to the Yo-Yo Intermittent Recovery Test Level 1 used in this study because the test requires repeated intermittent running ability with rapid recovery between intervals. Football-specific endurance tests strongly depend on the athlete's ability to restore energy rapidly during short recovery periods (Krustrup et al., 2020). Consequently, improved carbohydrate availability from date extract supplementation may explain the higher posttest scores observed in the experimental group.

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Another important aspect of this study is the timing of supplementation. Date extract was administered during iftar, which appears physiologically appropriate during Ramadan fasting. Engel (2019) explained that muscle glycogen stores and blood glucose concentrations tend to decline substantially in the late afternoon during fasting, thereby increasing the risk of fatigue and dehydration. Consuming date extract at iftar enables rapid restoration of energy substrates and hydration status immediately after prolonged fasting. This nutritional strategy may help athletes recover more effectively before subsequent training sessions or physical activities. Similar findings were reported by Chamari et al. (2016), who emphasized that nutritional timing during Ramadan significantly influences athletic recovery and performance adaptation.

The slight decline observed in the control group further reinforces the importance of nutritional intervention during fasting periods. Without additional supplementation, athletes rely solely on habitual dietary intake, which may be insufficient to fully compensate for energy deficits created by prolonged fasting and continuous physical activity (Puspitawati & Puspitawati, 2019). Sleep disturbances, dehydration, altered circadian rhythms, and reduced caloric intake during Ramadan have also been identified as contributing factors to decreased endurance performance (Chtourou et al., 2019; Ouyang et al., 2025). Therefore, nutritional supplementation strategies such as date extract consumption may provide practical benefits for maintaining physiological stability and exercise tolerance during fasting conditions.

Although the statistical analysis did not demonstrate a significant difference at the 95% confidence level, the practical significance of the findings should not be overlooked. The experimental group achieved a higher mean rank (10.69) than the control group (6.31), accompanied by a posttest mean difference of 1.05 points. In sports performance research, practical improvements may still hold substantial value for coaches and athletes, particularly when interventions are implemented within relatively short durations (Hopkins et al., 2016). The absence of statistical significance in this study may be attributed to several methodological considerations, including the small sample size and the relatively brief intervention period of only five consecutive days.

Longer intervention durations may produce more pronounced physiological adaptations. Ouyang et al. (2025) emphasized that consistent and structured nutritional strategies during Ramadan are necessary to achieve optimal performance maintenance in athletes. Additionally, stricter control over dietary intake, hydration status, sleep quality, and training load may further clarify the effectiveness of date extract supplementation in future investigations. Similar recommendations were proposed by Maughan et al. (2018), who highlighted the complexity of physiological responses to Ramadan fasting and the importance of comprehensive monitoring in athlete-focused research.

From a practical perspective, this study suggests that date extract supplementation may serve as a promising nutritional alternative for young football athletes during Ramadan fasting. Date extract is relatively accessible, culturally accepted among Muslim populations, and nutritionally beneficial for rapid energy replenishment. Coaches and sports practitioners may therefore consider incorporating

date extract into athlete nutritional programs during fasting periods to minimize endurance decline and support recovery processes.

Overall, the findings indicate that date extract supplementation contributed positively to the maintenance and improvement of aerobic endurance among U-15 football athletes during Ramadan fasting. Although inferential analysis did not reveal statistically significant differences, the descriptive improvements observed in the experimental group demonstrate meaningful practical implications for youth football training and sport nutrition management. Consequently, this study may provide an initial scientific reference for developing evidence-based nutritional strategies aimed at optimizing football athlete performance during the fasting month of Ramadan.

CONCLUSION

Based on the results of data analysis and discussion, this study concludes several important findings regarding the effect of date extract supplementation on the endurance of U-15 football athletes during the fasting month of Ramadan. First, descriptively, the experimental group that consumed date extract during iftar demonstrated improvement in aerobic endurance performance, as indicated by the increase in the mean Yo-Yo Intermittent Recovery Test Level 1 score from 12.73 during the pretest to 13.88 during the posttest. In contrast, the control group, which did not receive additional supplementation, experienced a slight decrease in the average score from 12.91 to 12.83. Second, the posttest mean difference between the experimental and control groups reached 1.05 points. Furthermore, the experimental group achieved a higher mean rank value (10.69) compared with the control group (6.31), indicating that athletes consuming date extract tended to obtain better endurance performance outcomes. Third, the Mann–Whitney U test produced a Z value of −1.852 with a significance value of 0.064 (>0.05), indicating that statistically there was no significant difference between groups at the 95% confidence level. Nevertheless, the significance value being close to 0.05, combined with consistent differences in mean scores and mean rank values, suggests that date extract supplementation tended to provide positive contributions toward maintaining aerobic endurance among U-15 football athletes during Ramadan fasting. Therefore, future studies are recommended to involve larger sample sizes, longer intervention durations, and stricter control of dietary intake, hydration, and sleep patterns to obtain more comprehensive and statistically robust findings regarding the effectiveness of date extract supplementation in fasting athletes.

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REFERENCES

Bouzid, M. A., et al. (2019). Effects of Ramadan fasting on physical performances in athletes: A systematic review. Journal of Sports Sciences, 37(8), 1–12. DOI: https://doi.org/10.1080/02640414.2018.1548560

Chamari, K., et al. (2016). Islamic fasting and sports performance: A review. British Journal of Sports Medicine, 50(5), 253–262. DOI: https://doi.org/10.1136/bjsports-2015-094860

Chtourou, H., et al. (2019). The effect of Ramadan fasting on physical performances, mood state and perceived exertion in young footballers. Asian Journal of Sports Medicine, 10(2), 1–9. Website: https://brieflands.com/articles/asjsm.html

Creswell, J. W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (5th ed.). Sage Publications.

Engel, F. A. (2019). Nutrition strategies during Ramadan fasting and athletic performance. Nutrients, 11(3), 1–15. DOI: https://doi.org/10.3390/nu11030596

Field, A. (2018). Discovering Statistics Using IBM SPSS Statistics (5th ed.). Sage Publications.

Hernawan, E., et al. (2019). Antioxidant and nutritional content analysis of date extract. Jurnal Gizi dan Pangan Indonesia, 14(2), 87–95.

Hopkins, W. G., et al. (2016). Progressive statistics for studies in sports medicine and exercise science. Medicine & Science in Sports & Exercise, 41(1), 3–13. DOI: https://doi.org/10.1249/MSS.0b013e31818cb278

Irawati, D., et al. (2025). Physical condition components influencing football performance among youth athletes. Jurnal Keolahragaan, 13(1), 22–31.

Krustrup, P., et al. (2020). The Yo-Yo intermittent recovery test: Physiological response, reliability, and applications in football. Sports Medicine, 50(3), 1–16. DOI: https://doi.org/10.1007/s40279-019-01208-6

Kuntjoro, B. F. T. (2020). Sports and physical activity in maintaining health during fasting. Jurnal Olahraga Prestasi, 16(2), 75–84.

Maughan, R. J., et al. (2018). Fasting and sport: Current perspectives and future directions. International Journal of Sport Nutrition and Exercise Metabolism, 28(6), 1–10. DOI: https://doi.org/10.1123/ijsnem.2018-0166

Nikolaidis, M. G., et al. (2018). Exercise-induced oxidative stress and antioxidant supplementation in athletes. Antioxidants, 7(3), 1–20. DOI: https://doi.org/10.3390/antiox7030034

Nurhasan, M., et al. (2024). The effect of Ramadan fasting on physical fitness components in football athletes. Jurnal Sport Science Indonesia, 9(1), 55–67.

Ouyang, J., et al. (2025). Nutritional strategies to maintain athletic performance during Ramadan fasting. Nutrients, 17(1), 1–18. DOI: https://doi.org/10.3390/nu17010045

Prasanti, D. (2017). Makna puasa sebagai komunikasi terapeutik islam dalam pengembangan kesehatan fisik dan mental. Penamas, 30(3), 299–312

Prayoga, R., et al. (2025). The role of physical condition in supporting football Prasanti, D. (2017). Health benefits of Ramadan fasting from physiological and psychological perspectives. Jurnal Kesehatan Masyarakat, 12(2), 101–109.

Puspitawati, I. D., & Puspitawati, H. (2019). Effects of fasting on endurance and physical performance in athletes. Jurnal Gizi Klinik Indonesia, 15(3), 133–141.

Rahmat, Z., & Welis, W. (2018). Date extract supplementation and endurance performance in football athletes. Jurnal Performa Olahraga, 3(2), 45–53.

Said, I. (2023). Sport During the Ramadan Fasting Period : Health Benefits and Risks and Recommendations for Practicing. 6(1), 1–4

Samudra, F., & Dehasen, A. (2025). Football performance demands and physiological characteristics in youth athletes. Jurnal Ilmu Keolahragaan, 14(1), 66–78.

Sciences, A., et al. (2024). Effects of date extract supplementation on high-intensity exercise performance. International Journal of Exercise Science, 17(2), 200–214.

Sepriani, R. (2019). Fundamental components of football athlete performance. Jurnal Patriot, 1(2), 489–499.

Setyosari, P. (2020). Metode Penelitian Pendidikan dan Pengembangan. Kencana.

Slimani, M., et al. (2019). Physiological demands of soccer match-play in youth athletes. Biology of Sport, 36(3), 257–264. DOI: https://doi.org/10.5114/biolsport.2019.87046

Stølen, T., et al. (2015). Physiology of soccer: An update. Sports Medicine, 35(6), 501–536. DOI: https://doi.org/10.2165/00007256-200535060-00004

Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2022). Research Methods in Physical Activity (8th ed.). Human Kinetics.

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Trabelsi, K., et al. (2020). Effects of Ramadan fasting on athletes' performance and recovery: A systematic review. Frontiers in Nutrition, 7, 1–15. DOI: https://doi.org/10.3389/fnut.2020.00089

Widowati, L., et al. (2019). The effect of date extract supplementation on hemoglobin levels and physical condition. Jurnal Gizi Indonesia, 8(1), 44–52.