

# Evaluation of Nutrition Knowledge of Professional Football Players

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## Abstract

**Background:** Adequate knowledge of nutrition is believed to influence the performance of endurance athletes. **Objectives:** To assess the level of nutrition knowledge among football players in Benghazi. **Subjects and Methods:** Following ethical approval, a cross-sectional study was conducted involving 101 football (soccer) players ( $25 \pm 5$  years of age) from seven clubs of the first and second divisions. The height (cm) and weight (kg) were recorded for each player. A questionnaire composed of three sections was filled out by each participant. It included questions concerning personal data, general nutrition, and specific knowledge concerning the appropriate foods to consume before, during, and after exercise. **Results:** The mean body mass index was  $24 \pm 2$  kg/m<sup>2</sup>. Fifty-seven percent of the participants were below the university level of formal education. Furthermore, 75% reported that they never received any formal education related specifically to nutrition. In addition, 70% had no knowledge of the concept of the food pyramid, and only 18% of the players communicated with dietitians either during season or off-season. Only 22% answered correctly the questions about which foods are appropriate to consume before and after exercise. Noticeably, 81% of the participants did not correctly identify the contents of the nutrient to be consumed during exercise. **Conclusions:** The study revealed an alarming lack of nutrition knowledge among professional football players in Benghazi. The results highlight the need to establish specific programs for nutrition education for the players to enhance their knowledge in this critical area and positively influence their dietary habits and ultimately improve their physical performance. It is also important to emphasize the role of qualified dietitians in athletic clubs.

**Keywords:** Diet, exercise, nutrition education, professional footballers, soccer

## INTRODUCTION

Healthy food choices and adequate nutrition nutrient are essential for supporting training and enhancing the physical performance of professional athletes.<sup>[1]</sup> Macronutrients provide the metabolic substrates necessary for producing the energy required for skeletal muscle contraction and cardiac work, while the micronutrients support the metabolic reactions involved in energy production and gas transport in the circulation.<sup>[2]</sup> Football is a demanding sport for both aerobic and anaerobic energy. It requires football players to exercise repetitively at high intensities using large muscle groups for periods of several seconds to several minutes for the duration of a match (90 min) or longer. Metabolically, athletes depend to a certain extent on their endogenous glycogen stores in the liver and skeletal muscles. Aside from heredity and training, it has been acknowledged that no single factor plays a greater role in optimizing physical performance than diet.<sup>[3]</sup> Thus, an

adequate nutrient intake is essential to support training and enhance athletic performance.

Inadequate nutrition knowledge is likely to lead to unhealthy dietary habits, poor nutrition, and inadequate physical performance. Physical activity, especially in the context of formal training and athletic competition, increases the daily energy requirements which depend on the type, intensity, and duration of the activity.<sup>[4]</sup> For endurance athletes, the quality of food and/or drink consumed before, during, and after exercise is of great importance. Thus, the proper nutrition knowledge and the practices related to the nature and amount of food/drink consumed and the timing of its consumption are

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of substantial significance in relation to the performance of football players. For this reason, sports nutrition education is crucial for all athletes to understand proper fueling before, during, and after sporting events and to avoid illness and injury.<sup>[5]</sup>

The majority of athletes are poorly informed with respect to healthy nutrition practices and continue to make inappropriate daily dietary choices.<sup>[6,7]</sup> Many studies report that specific nutritional recommendations have been developed for footballers. These guidelines aimed to enhance physical performance during training and competition, improve and accelerate recovery, achieve and maintain an optimal body weight and physical condition, and minimize the risk of injury and illness.<sup>[8]</sup>

There are currently no published data concerning nutrition knowledge of Libyan footballers in spite of the large number of clubs involving athletes of different age groups throughout the country. The aim of this study was to assess the nutrition knowledge of adult football players in the first and second divisions in Benghazi.

## SUBJECTS AND METHODS

### Design

A cross-sectional study was conducted involving 114 footballer players ( $25 \pm 5$  years of age) belonging to seven different clubs of the first and second divisions. The study was approved by the research committee of the authorization of the Faculty of Public Health, University of Benghazi. A written informed consent was obtained from each participant before the study. The height (cm) and weight (kg) of each participant were recorded at the beginning of the study.

### Subjects

One hundred and fourteen athletes participated in the study. They were recruited from seven local clubs: al Ahly, Al-Nasr, Al Sawed, Shamal Benghazi, Al Tahadi, Al Najma, and Benghazi al-Jadida. The main characteristics of the participants are shown in Table 1.

### Data collection

A questionnaire was distributed to all participants, who were asked to answer all questions without any interference. The questionnaire covered four domains: personal data (e.g., age, level of formal education), general nutrition knowledge (e.g., knowledge about food pyramid, history of contact with dietician), nutrition knowledge of precompetition, during competition, and postcompetition meals (e.g., timing, type, and form of nutrients consumed just before, during, and just after the competition).

### Data analysis

The data collected were categorized based on the previously reported headings on spreadsheets for further statistical analysis. Descriptive statistics (mean, standard deviation, and percentages) was calculated.

**Table 1: Demographic and physical characteristics, levels of formal education, and the status of nutrition knowledge of participants**

Parameters	Percentage	
Formal education level		
Illiterate or primary	6	
Preparatory	12	
Secondary	39	
University	43	
Parameters	Mean $\pm$ SD	
Physical characteristics		
Age (years)	25 $\pm$ 5	
Height (cm)	175 $\pm$ 12	
Weight (kg)	74 $\pm$ 9	
BMI	24 $\pm$ 2	
Knowledge and practices	Yes (%)	No (%)
Do you adhere to special nutrition system while participating in exercises during the season?	28	72
Do you communicate with dieticians?	22	78
Have you attended sports nutrition lectures previously?	3	97
Do you have knowledge about the food pyramid?	28	72

SD: Standard deviation, BMI: Body mass index

## RESULTS

### Physical characteristics and general knowledge

As shown in Table 1, the physical characteristics (mean  $\pm$  standard deviation) of the participants were age (years) =  $25 \pm 5$ , height (cm) =  $175 \pm 12$ , weight (kg) =  $74 \pm 9$ , and body mass index =  $24 \pm 2$ . Regarding the level of formal education, 57% of the participants were below the university level. Furthermore, 72% of the participants reported that they do not adhere to any special nutrition system while participating in training or competition. Markedly, 78% had no communication with dieticians, only 3% attended formal nutrition lectures, and 72% had no knowledge of the concept of the food pyramid [Table 1].

### Precompetition nutrition

Ninety-three percent of the participants indicated correctly that the precompetition meal should be consumed 3 h before the beginning of competition [Table 2]. However, only 14% indicated that the precompetition meal should consist of solid food.

### During competition nutrition

Sixty-seven percent of the participants indicated correctly that the nutrients consumed during competition should come in liquid form, but only 11% indicated that these nutrients should consist of carbohydrates and minerals [Table 2].

### Postcompetition nutrition

Sixty-one percent of the participants correctly indicated that the postcompetition meal should be consumed within 4 h after

**Table 2: Knowledge of the timing and nature of the meal before and during competition meal**

Time of intake before competition (h)	
3	93
7	4
10	3
Meal composition during competition	
Carbohydrates and minerals	11
Carbohydrates and proteins	21
Carbohydrates and fat	1
Carbohydrates and vitamins	59

Results are expressed as percentage of responses

**Table 3: Knowledge of the timing and nature of the postcompetition meal**

Time of intake	
Immediately	24
Within 4 h	61
After 4 h	11
Type of nutrients	
Carbohydrates	42
Protein	47
Fat	5

Results are given as percentages of responders

the end of competition [Table 3]. Regarding the nature of the postcompetition food, 47% of the participants chose protein, 42% carbohydrates, and 11% fat [Table 3].

## DISCUSSION

This study aimed to assess the nutrition knowledge among adult footballers at Benghazi. The participants were  $25 \pm 5$  years old, an age group that is supposed to be at least at the university level in terms of formal education. However, 57% were below university level. As expected, this relatively low level of formal education was associated with a low level of knowledge in general and exercise-specific nutrition.

In addition, 75% or more of the participants neither consulted with dieticians nor attended lectures focused specifically on sports nutrition. Thus, nearly three-quarters of the participant athletes had nutrition supervision or guidance from qualified dieticians. These findings are in agreement with previous studies reported that young athletes have poor understanding of the principles of sports nutrition and do not adhere to dietary recommendations appropriate for sports.<sup>[9-11]</sup> Furthermore, Zinn *et al.* (2005) found that rugby coaches were inadequately prepared to convey nutrition advice to athletes, a finding which is considered alarming.<sup>[12]</sup> Registered dieticians and nutrition-specialized physicians are the only health professionals qualified to assess and address dietary and nutrition problems both at the level of individuals as well as the wider public health level.<sup>[13]</sup>

Our results point to an alarming level of ignorance in the area of nutrition, particularly as it relates to sports. This is in agreement

with published research indicating that nutrition knowledge of elite athletes and their coaches is inadequate.<sup>[14]</sup> In this context, Nikolaidis *et al.*, 2014, suggested that it is important for athletes to have better nutrition knowledge which would result in better dietary choices enhancing physical fitness and delaying the fatigue.<sup>[15]</sup>

In accordance Ormsbee *et al.*, (2014) and Zawila *et al.*, 2003, concluded that carbohydrate consumed in meals and/or snacks during the 1-4 hours pre-exercise would be able to increase body glycogen stores, particularly liver glycogen levels that have been depleted by the overnight fast. Furthermore, the presence of complex carbohydrates in the gut can provide a constant source of glucose during exercise.<sup>[3,16]</sup> In our study, only 11% of the participants indicated that carbohydrates and minerals are the appropriate nutrients to consume during competition.

Recently, Anderson *et al.* concluded that footballers can consume considerable amounts of carbohydrates before and after competition to enhance carbohydrate availability and provide optimum rates of muscle glycogen replenishment.<sup>[17]</sup> Furthermore, protein intake should be distributed throughout the day. In the present study, 93% of the participants indicated that the proper time for consuming the precompetition meal is 3 h before the beginning of competition. This indicates a high level of awareness of benefit of the proper timing of the precompetition meal. A well-timed carbohydrate precompetition meal ensures adequate glycogen stores and optimal performance.<sup>[18,19]</sup>

Only 14% of the participants in the present study knew that the precompetition meal should consist of solid food indicating a low level of nutrition knowledge among our players. However, for those athletes having difficulties with solid food intake or digestion, liquid meals including carbohydrate-rich drinks are recommended. Regarding fluid intake before endurance competitions, it is absolutely necessary to maintain an adequate level of hydration. To this end, it is recommended to consume 500 ml of fluid 2 h before the event followed by 125–250 ml 15–30 min before the event.<sup>[20,21]</sup>

For endurance events such as a football (soccer) match, the aim of nutrition strategy during exercise is to conserve muscle glycogen and to maintain blood glucose and electrolytes levels. Only 11% of the participants in the present study indicated that carbohydrates and minerals are the proper nutrients to consume during competition despite the fact that two-thirds of the participants correctly indicated that such nutrients should be in liquid form. Clearly, the 11% figure indicates poor nutrition knowledge.

After an endurance event, there is a need to restore glycogen stores and replace fluid and electrolyte losses.<sup>[18]</sup> Less than half of the participants in the present study indicated that carbohydrates and proteins are the recommended constituents of the postcompetition meal. This is another indication of the low level of nutrition education and knowledge among our athletes.

It is estimated that rate of glycogen replenishment following exercise is only about 5% per hour.<sup>[16]</sup> Carbohydrate intake

during the first 4–6 h after exercise at a rate of 1–1.2 g/kg/h can help maximize glycogen restoration and shorten recovery time. Liquid or semisolid foods of moderate or high glycemic index are advised postcompetition. A carbohydrate-rich meal should be consumed approximately 2 h following the postevent food intake later.<sup>[20,21]</sup> With respect to fluid intake, at least 500 ml should be consumed during the first 2 h after the competition, and fluid intake should be continued at regular intervals to replace fluid losses.

## CONCLUSIONS

The importance of optimal nutrition and healthy dietary habits for optimal athletic performance is well established. Therefore, it is critical that athletes acquire the necessary nutrition knowledge. Our survey of professional football players in Benghazi indicates a low level of nutrition knowledge whether in general or with regard to which nutrients should be consumed before, during, and after competition. This observation points to the urgent need to establish educational programs for the athletes in Benghazi focusing specifically on sports nutrition. Such programs should take into account the fact that most of these athletes are below university level in terms of formal education. In addition, the role of qualified dietitians in sports clubs should be emphasized.

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## Author's contribution

All authors contributed to the conception of the study, data collection analysis and drafting and revision of the manuscript. All authors approved the final version of the manuscript before its submission.

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## Conflicts of interest

There are no conflicts of interest.

## Compliance with ethical principles

The study was approved by the Faculty of Public Health, University of Benghazi in Libya.

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