Journal of Medicine in Scientific Research

Volume 1 | Issue 1 Article 10

Subject Area:

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Recommended Citation

Abdelhaliem, Heba S. and El Gezrey, Hoda M. (2018) "Evaluation of nutrition intake of football players," *Journal of Medicine in Scientific Research*: Vol. 1: Iss. 1, Article 10.
DOI: https://doi.org/10.4103/JMISR.JMISR_13_18

Original Article

Evaluation of nutrition intake of football players

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Abstract

Introduction
Despite football being the most popular sport in Egypt, most players do not know their needed nutritional requirements. The metabolic rate and energy consumption increased dramatically in football players. Thus, nutrition plays a significant role in improving the performance and the quality of life for these players.

Objective
This study aimed to assess the nutritional status of 50 football players aged between 15 and 19 years in Gomhorya Club – Menoufia.

Participants and methods
Dietary intake was evaluated for 7 days by using dietary assessment tools (24-h recall). This data was used to determine energy, macronutrients, micronutrients, and fiber. The weight and height were measured.

Results
The results have shown that the football players had a high intake of energy and macronutrients. The protein intake was between 15 and 25%, fat 25 and 30%, and carbohydrate was between 60 and 65% of daily energy intake, and showed that they had a lower intake of vitamin D, calcium, and zinc.

Conclusion
The football players need to correct their food habits by using group nutrition education, and this will improve their health and performance.

Keywords: Adolescents, football, performance, sports nutrition

Introduction

A planned exercise program may lead to improvement of one's health. Many organizations have recommended exercise as a vital factor to enhance physical fitness and health in general. Proper nutrition and exercise are essential components for a healthy lifestyle, and health authorities recommend that [1].

Sports nutrition is a relatively new area of research that involves the application of nutritional principles to enhance sports performance. It is only recently that extensive research has been undertaken regarding specific recommendations to athletes [2].

Mang and Truswell [3] found that dietary practices during and before the competition can help to avoid energy depletion, dehydration, and electrolytes imbalance; on the other hand, they enhance recovery after the competition. The primary consideration for athletic nutritional requirements depends on body size, age, type of sport, training volume intensity, and frequency.

The nutritional plan for any football player should provide not only sufficient carbohydrates to fuel the training and competition, but also other nutritional requirements to achieve the changes in lean body mass, body fat, or growth. Therefore, players may need 5–7 g of carbohydrate per kg body mass during periods of moderate training and up to about 10 g/kg during intense training or match play [4]. Both carbohydrate

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Access this article online

Quick Response Code:

Website: www.jmsr.eg.net

DOI: 10.4103/JMISR.JMISR_13_18

How to cite this article: El Gezrey HM, Abdelhaliem HS. Evaluation of nutrition intake of football players. J Med Sci Res 2018;1:54-8.

and protein consumption are vital during the first hour after training to promote the recovery process (Metg and Bath, 2016) [18].

The variability in players sweating responses affects the player's hydration, so the monitoring result decides the nutritional strategy. The widespread of dietary supplements with no discrimination is strongly disapproved; therefore, supplements should only be advised by qualified sports nutrition professional [5]. Proper nutrition has much to offer players and match officials, including improved performance, better health, and enjoyment of a wide range of foods.

Aim

The aim of the study was to assess the nutritional dietary intake of some football players in Gomhorya Club – Menoufia.

Participants and methods

Sample

The sample included 50 adolescent football male players aged between 15 and 19 years.

Anthropometric measurements

Height was measured using the Raven monometer, with direct reading of height. Then, the following categories of height status were determined according to the World Health Organization (WHO) height for age (5–19 years old) *Z*-score growth chart reference by WHO [6].

Weight was recorded using the platform scale. The scale was standardized by known weight before the survey in each studied site and corrected according to the test [6].

Assessment of BMI for age: from 5 to 19 years old, the *Z*-score BMI was used for men. The following categories of weight status were determined according to the *Z*-score BMI released by WHO [6]:

(1) Overweight more than +1 SD.
(2) Obesity more than +2 SD.
(3) Thinness less than −2 SD.
(4) Severe thinness less than −3 SD.

Dietary assessment

Data on nutritional status had been collected using 24 h recall [7]. The energy and nutrient content of the 24 h was computed through the compiled food composition tables of the National Nutrition Institute of Egypt [8].

The dietary intakes of players were calculated as follows:

(1) Energy requirements were calculated according to the Food and Nutrition Board guidelines [9].
(2) Protein requirements were calculated as 1.7 g/kg body weight (BW), carbohydrate as 60% of total energy required, and fat by difference [10].
(3) Vitamins and minerals calculated according to the Recommended nutrients intakes (RNI) Recommended Dietary Allowances (RDA) [10].

Statistical analysis

Data were analyzed using the SPSS program (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics were done by mean, SD, and by cross tabulation [11].

Results

Anthropometric measurement for normal and overweight players

The data have shown that the sample was divided into normal and overweight according to the BMI for age. It could be noticed that 40 (80%) players were of average weight and 10 (20%) players were overweight. The mean weight of normal weight players was 65.42 ± 4.04 kg, and the mean weight of overweight players was 85.029 ± 7.04 kg. The mean height of normal and overweight players was 173.54 ± 3.97 and 175.81 ± 5.87 cm, respectively. Therefore, the mean of BMI of normal and overweight players was 21.084 ± 3.94 and 27.45 ± 2.65 receptively.

Energy and macronutrients

Table 1 represents player's energy and macronutrients intake: this included protein (animal and plant), fat (animal and plant), carbohydrates, fiber, ash and cholesterol per week, day and percentage from RDA. Table 2 shows the frequency distribution of nutrients intake percentage as compared with the standard RDA, 2010, among normal and overweight player samples.

Mineral

Data were tabulated as in Table 3 which shows the minerals content in player's diet per week, day, and percentage from RDA. Minerals included calcium, phosphorus, iron (animal and plant), sodium, potassium, zinc, and magnesium. Table 4 shows the frequency distribution of nutrients intake percentage as compared with the standard RDA, 2010, among normal and overweight players sample.

Fat-soluble vitamins

Table 5 represents fat-soluble vitamins (A, D, and E) intake for players. Table 6 shows the frequency distribution of nutrients intake percentage as compared with the standard RDA, 2010, among normal and overweight players' sample.

Table 1: Macronutrients intake for players

Categories	Mean±SD (weeks)	Mean±SD (days)	Percentage of RDA
Protein (plant)	218.9±7.31	31.27±1.04	103
Protein (animal)	515.5847±6.55	73.654±0.935	
Protein (total)	735.4453±3.74	105.063±0.534	
Fat (plant)	295.7526±5.24	42.25±0.748	100
Fat (animal)	438.4774±14.92	62.639±2.131	
Fat (total)	734.2311±5.099	104.89±0.728	
Carbohydrates	1492.43±7.82	213.2±1.117	34.08
Energy	22335±11.54	3190/71±1.648	127.64
Fiber	40.51±10.89	5.787±1.555	23.14
Ash	70.033±9.95	10.004±1.421	
Cholesterol	4108.80±19.89	586.971±2.841	195.66

Table 2: The intake of macronutrients as a percentage compared with the standard RDA, 2010, among normal and overweight players' sample

Nutrients intake	Normal (n=40) [n (%)]						Overweight (n=10) [n (%)]					
	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-125% RDA	>125% RDA	<25% RDA	25-50% RDA	50%-75% RDA	75%-100% RDA	100-125% RDA	>125% RDA
Protein (total)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)
Fat (total)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)
Carbohydrates	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)
Energy	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100.00)
Fiber	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Ash	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)	0 (0.00)	0 (0.00)
Cholesterol	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)

Table 3: Mineral intake for players

Categories	Mean±SD (weeks)	Mean±SD (weeks)	Percentage of RDA
Calcium	4030.95±14.31	575.85±2.044	48
Phosphorus	10929.49±9.64	1561.355±1.377	130
Iron (animal)	70.54±9.14	10.077±1.305	
Iron (plant)	107.45±8.22	15.35±1.174	
Iron (total)	177.99±9.15	25.427±1.307	171
Sodium	47000.65±50.54	6714.285±7.22	
Potassium	22507.32±15.86	3215.33±2.265	
Zink	76.59±4.95	10.941±0.707	91
Magnesium	2482.93±3.24	354.7±0.462	101

Table 4: The intake of mineral as a percentage compared with the standard RDA, 2010, among normal and overweight players' sample

Nutrients intake	Normal (n=40) [n (%)]						Overweight (n=10) [n (%)]					
	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-125% RDA	>125% RDA	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-125% RDA	>125% RDA
Calcium	0 (0.00)	7 (17.5)	33 (82.5)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10)	9 (90)	0 (0.00)	0 (0.00)	0 (0.00)
Phosphorus	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)
Iron	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	22 (55)	18 (45)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	6 (60)	4 (40)
Sodium	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100.00)
Potassium	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	13 (32.5)	27 (67.5)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (30)	7 (70)
Magnesium	0 (0.00)	0 (0.00)	0 (0.00)	9 (22.5)	19 (47.5)	12 (30)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10)	6 (60)	3 (30)
Zinc	0 (0.00)	0 (0.00)	1 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)	0 (0.00)

Table 5: The fat-soluble vitamins intake for players

Categories	Mean±SD (weeks)	Mean±SD (days)	Percentage of RDA
Vitamin A	36228.11±14.257	5175.44±2.03	517.5
Vitamin D	39.663±16.71	5.666±2.387	56.7
Vitamin E	238.78±3.053	34.11±0.436	341

Water-soluble vitamins

Table 7 represents the water-soluble vitamins (C and B complex) for players. Table 8 shows the frequency distribution of nutrients intake percentage as compared with the standard RDA, 2010, among normal and overweight players' sample.

Discussion

According to BMI for age, the data showed that the sample was divided into normal and overweight and these results agree with Bjelica *et al*. [12], who studied height, BW, and BMI of Montenegrin football players.

Results show that the consumed protein, fat, and cholesterol were higher than nonsports. These results agree with Conejos *et al*. [13], who found that the amount of total protein per day recorded 103% of RDA of protein (1.57 g/kg BW) for normal football players. For fat, the animal fat recorded the highest amount which was consumed by the player's group and the total fat recorded 100% of RDA of fat (1.53 g/kg BW). The amount of intake of carbohydrates and fiber for players were

Table 6: The intake of fat-solublevitamins as a percentage compared with the standard RDA, 2010, among normal and overweight players' sample

Nutrients intake	Normal ($n=40$) [n (%)]						Overweight ($n=10$) [n (%)]					
	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-25% RDA	>125% RDA	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-125% RDA	>125% RDA
Vitamin A	0 (0.00)	13 (32.5)	25 (62.5)	2 (5)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10)	5 (50)	4 (40)	0 (0.00)	0 (0.00)
Vitamin D	14 (35)	19 (47.5)	7 (17.5)	0 (0.00)	0 (0.00)	0 (0.00)	4 (40)	5 (50)	1 (10)	0 (0.00)	0 (0.00)	0 (0.00)
Vitamin E	0 (0.00)	0 (0.00)	0 (0.00)	2 (5)	1 (2.5)	37 (92.5)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10.00)	1 (10.00)	8 (80.00)

Table 7: Water-soluble vitamins intake for players

Categories	Mean±SD (weeks)	Mean±SD (days)	Percentage of RDA
Vitamin C	1312.09±7.81	187.44±1.115	312.4
Vitamin B1	11.20±9.66	1.6±1.38	145.45
Vitamin B2	31.12±6.14	4.445±0.877	342
Niacin	222.41±9.61	31.77±1.372	212
Vitamin B6	11.72±13.78	1.674±2.061	104.38%
Vitamin B12	33.03±14.43	4.718±2.06	236%
Folate	1668.91±12.79	238.415±1.827	119.21%

Table 8: The intake of water soluble vitamins as a percent compared with the standard RDA, 2010, among normal and overweight players sample

Nutrients intake	Normal ($n=40$) [n (%)]						Overweight ($n=10$) [n (%)]					
	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-125% RDA	>125% RDA	<25% RDA	25-50% RDA	50-75% RDA	75-100% RDA	100-125% RDA	>125% RDA
Vitamin C	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (7.5)	37 (92.5)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10)	9 (90)
Vitamin B1	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100)	0 (0.00)
Vitamin B2	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2 (5)	38 (95)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10)	9 (90)
Vitamin B6	0 (0.00)	0 (0.00)	24 (60)	16 (40)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	6 (60)	4 (40)	0 (0.00)	0 (0.00)
Vitamin B12	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	40 (100)	0 (0)	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (0)	10 (100)
Folate	10 (25)	2 (5)	28 (70)	0 (0.00)	0 (0.00)	0 (0.00)	3 (30)	0 (0.00)	7 (70)	0 (0)	0.00 (0)	0.00 (0)
Niacin	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (2.5)	39 (97.5)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (10)	9 (90)

lower than for a normal man. These results disagree with Brukes's study [14]. This study showed that the proposed 3–7 g/kg of BW per day as a reasonable target range for CHO intake for moderate training and competitive demands, increasing to 7–10 g/kg BW per day for intensive training or maximal glycogen refueling. However, the likelihood that the total CHO intake is sufficient to optimize glycogen synthesis and utilization is normal due to their higher energy intake. All the studies of male players have reported CHO intakes greater than 3 g/kg BW, and similar CHO intakes have been reported for tested sample players, ranging from 3.2 g/kg BW [15]. Very few studies have specifically evaluated the protein requirements of football players. The energy intake of players was higher than the normal RDA. This result agrees with Rosenbloom *et al*. [16] who found that the total energy per day recorded more than 120% of RDA in the same age for runners.

Data showed that the calcium intake of players was lower than normal, and phosphorus recorded 130% of RDA. These results agree with Conejos *et al*.[13] who found that the mean of phosphorus was higher than the calcium content; this led to malabsorption of calcium in bones and muscles of the players. The mean amount of zinc was low, and the major iron was plant iron. The tested diet contained a high amount of iron, sodium, and potassium. The obtained results showed that the players who played in this club might face many nutritional disorders such as hypertension, low immunity, and kidney function failure and reduced bone structure according to Rosenbloom *et al*. [16].

Players had a very high intake of vitamin A and deficient intake of vitamin D according to the National Academy of Science, Food, and Nutrition [17]. It has been discussed that lack of vitamin D for a long time may affect calcium absorption. Fat-soluble vitamins, when increased for an extended period, led to adverse side effects on the liver, muscle, and nerve functions which are known as hypervitaminosis [5].

Water-soluble vitamin intake for players was higher than normal. These results agree with Conejos *et al*. [13], who

showed that the high amounts of these vitamins are safe and effective for swimmers.

Conclusion

The football players need to correct their food habits by using the nutrition education program, and this will improve their health and performance.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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