

A qualitative and quantitative assessment of adolescent football players' nutrition in Northwest region of Algeria.

Mazouz Ghaouti

(istaps) University- Tisemssilt (algeria) mazouzghaouti@gmail.com

ARTICLE INFORMATION	ABSTRACT
ORIGINAL RESEARCH PAPER RECEIVED : 15/07/2022 ACCEPTED : 27/09/2022 PUBLISHED: 01/12/2022 KEYWORDS : Diet quality- Adolescent Football players-	In this study, we aimed to assess the nutrition of adolescent football players aged 13-18 years in Northwest region of Algeria (Saïda state), the study sample consisted of 309 young football players aged 13 to 18 years old, who were chosen in a quota random manner. The study used the descriptive approach through a cross-sectional study, Several tests and measurements were used after had been validated, we analyzed the data collected using the statistical program (SPSS.22) and other helping computer programs. The researcher reached a set of conclusions, where the most important was that adolescent football players still tend to follow an unbalanced diet that was associated with a state of total daily energy deficit. The researcher came out with several recommendations, including the need to pay attention to the nutritional status of the adolescent football player, and to try to find ways to promote proper nutrition in sports clubs by adopting the policy of training centers.
Auteur correspondant : Mazouz Ghaouti e-mail: mazouzghaouti@gmail.com doi.org/10.5281/zenodo.15270899	

1. Introduction

Adolescence is a time of rapid growth and development. It is estimated that during this period , adolescents acquire 50% of their adult weight, 20% of their adult height, and 45% of their adult skeletal mass. These rapid growth and developmental rates during adolescence exerts a profound effect on energy and nutrient needs. Deficient intakes may delay physical development, impede growth and muscle development, and affect cognitive performance. Furthermore, it is well known that strenuous physical activity, or sports training, places additional stress on adolescents by augmenting the already existing high nutritional demands of rapid growth during adolescence, as a result this regular sports training has been shown to increase energy and protein requirements (Aissa, Ben mouhamed, & Samir, 2020) ,and may increase the need for certain micronutrients, particularly those important for growth (e.g., folate, iron, zinc, and copper).

So, If dietary intake does not meet the nutrient requirements of the practiced exercise and competition, then sports training has the potential to negatively impact the growth and biological maturation of the adolescent athlete. Because of the large number of children and adolescents involved in practicing football regularly in our state Saida as well as in all over Algeria (Balboul, Chehat , & Noureddine, 2021), and the potential impact that this sport may have on their nutrient requirement, it seems critical to study and analyze the nutrition of this special and important category of our society. This paper will summarize the most important results from researches in the area of sports nutrition as it pertains to adolescent athletes. Particular attention will be given to the nutritional status and nutrient requirements of adolescent athletes.

The problem posed in our survey is the relatively, unstudied impact of regular intense training (practicing Football) on increasing the nutritional needs in terms of both quantity and quality for adolescent footballers (Alghannam, 2013). And we believe that this should be taken into consideration, since it is very important to determine the short- and long-term effects of training on diet sufficiency, which is no different from that of ordinary or sedentary people (Aissa, Ben mouhamed, & Samir, 2020). It has already been established that Teenage football players need healthy and sound nutrition as a solid ground, both for sporting excellence and for good long-term health and growth (Hima Bindu Malla, 2017).

So, from the previously mentioned ideas we can pose the following questions:

- Does the daily food intake of the adolescent football players (aged 13 to 18 years) in Saida cover the nutritional needs recommended by the competent health authorities (RDA)? (from the quantitative perspective).
- Does the prevailing diet of these players meet the specific requirements of good nutrition quality for an active and young growing person? (from the quantitative perspective).

. The study's methods and procedures:

The researcher used a descriptive approach, using the cross-sectional survey method.

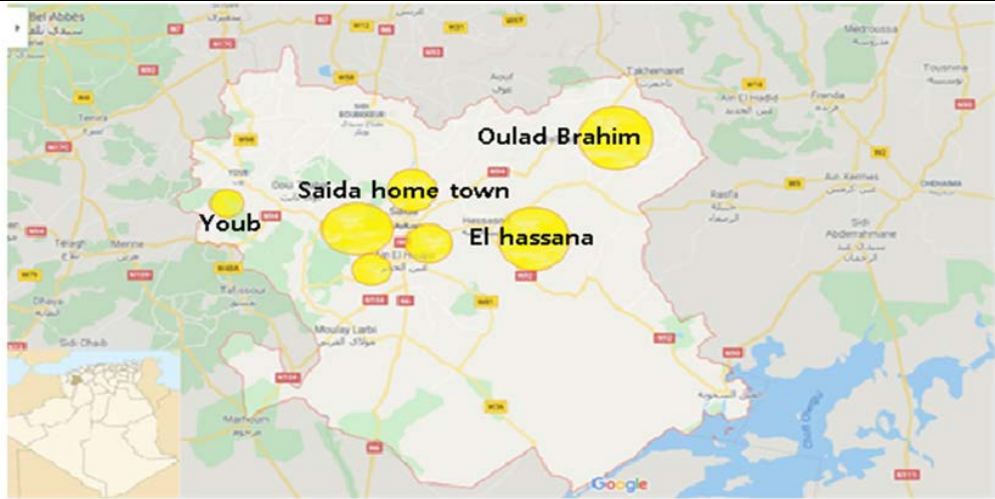
.1. Participants :

The study population consisted of young football players aged 13-18 years who practiced competitive football and followed regular specialized training (at least three times per week) in the administrative district of Saida State during the 2021/2022 season. Their number reached (903) players representing 11 local teams, who were active in various levels of national competitions, according to the official records of the Regional Football league in Saida.

The study sample consisted of a total of 309 young players (All male, whose ages ranged between 13 and 18 years) chose randomly from 5 different football clubs in Saida.

As we can see on the map (Fig.1.), the study was carried out in the geographical district of Saida state, and tests and measurements were applied in various football fields of the clubs within the state.

Figure..1. A map of the geographical district of Saida state, on which the towns of the studied sample were highlighted with yellow circles.



2. The study tools for data gathering:

For data collection, we used the measurements described in the following Table.

Table.1. tools for data gathering used in the study		
Variable	Objective	Tools of measurement or test
Nutrition of adolescent football players from the quantitative perspective.	Measuring the amount of food consumed by the study sample	Diet recall questionnaire form 24 hours by instructed interview
Nutrition of adolescent football players from the qualitative perspective.	Measuring the quality of nutrition consumed by the study sample	HEI or Healthy Eating Index (USA secretary of agriculture and USDA)

2.1 An explanation of diet recall questionnaire form 24 hours by instructed interview:

2.1.1. Purpose

To obtain detailed information about all foods and beverages consumed on a given day.

2.1.2. Description

A 24-hour dietary recall (24HR) is a structured interview intended to capture detailed information about all foods and beverages consumed by the

respondent in the past 24 hours, most commonly, from midnight to midnight the previous day. A key feature of the 24HR is that, when appropriate, the respondent is asked for more detailed information than first reported. For example, a respondent reporting chicken for dinner or a sandwich for lunch would be asked about the preparation method and type of bread. This open-ended response structure is designed to prompt respondents to provide a comprehensive and detailed report of all foods and beverages consumed.

2.2. An explanation of the Healthy Eating Index (HEI. version 2015)

2.2.1. Purpose:

The Healthy Eating Index (HEI. version 2015) is a tool of measurement used for determining the quality of diet consumed by the participants in this study.

2.2.2. Description:

-What is the Healthy Eating Index (HEI)–2015?

The HEI is a tool designed to measure diet quality—that is, how closely an eating pattern or mix of foods matches the Dietary Guidelines for Americans’ recommendations.

-How is the HEI organized?

The Index has 13 components, each of which reflects an important aspect of diet quality. Nine components focus on adequacy (foods we should eat enough of to get the nutrients we need and for overall good health). Four components focus on moderation (dietary components that should be limited or consumed in small amounts).

-How does the HEI–2015 scoring work?

For each component, the HEI–2015 designates a certain amount as the standard (the best possible). A maximum score—5 or 10 points depending on the component—is given to amounts that meet the standard. Amounts that don’t meet the standard get fewer points, with zero being the minimum score.

Adding up all the components, an ideal overall score would be 100. and from referring the actual score of the diet being assessed to the overall score we can have Three different evaluations of diet quality. Therefore, if the score is higher or equal to 80 points, it means that the quality of the diet is good (good nutrition), if the score is between 79 and 50 points means that the quality of the diet needs to be improved; And if the score is less than 50 points, then we judge the quality of the diet as poor.

Table.2. System of scoring in The Healthy Eating Index (HEI, version 2015)

Components	Maximum Scores	Standard for Maximum Scores ³	Standard for Minimum
Adequacy			
Total Fruits ⁴	5	≥0.8 cup	No Fruits
Whole Fruits ⁵	5	≥0.4 cup	No Whole Fru
Total Vegetables ⁶	5	≥1.1 cup	No Vegetabl
Greens & Beans ⁶	5	≥0.2 cup	No Greens and I
Whole Grains	10	≥1.5 oz	No Whole Gra
Dairy ⁷	10	≥1.3 cup	No Dairy
Total Protein Foods ^{6,8}	5	≥2.5 oz	No Protein Fo
Seafood & Plant Proteins ^{6,8}	5	≥0.8 cup	No Seafood & Plant
Fatty Acids ⁹	10	(PUFAs + MUFAs)/SFAs > 2.5	(PUFAs + MUFAs)/S
Moderation			
Refined Grains	10	≤1.8 oz	≥4.3 oz
Sodium	10	≤1.1 g	≥2.0 g
Added Sugars	10	≤6.5% of energy	≥26% of ener
Saturated Fats	10	≤8% of energy	≥16% of ener

¹ Scoring standards are expressed as cup and ounce equivalents from the MyPyramid Equivalents Database (M) whereby 1 oz = 28.3 g and 1 cup = 225 mL. ² Intakes between the minimum and maximum standards are proportionately. ³ All standards represent amounts per 1000 kcal, except for Fatty Acids, Added Suga Saturated Fats. ⁴ Includes 100% fruit juice. ⁵ Includes all forms except juice. ⁶ Includes legumes (beans and

2.3.1. Reliability

In general, we found it very difficult to verify the reliability and the validity of the tool for measuring diet and translate it digitally, and since one of the main purposes of the current study was to determine the average amount of food consumed by the sample subjects as a group and not as individuals, the researcher tried to ensure the reliability of measurement through two procedures, the first is to increase the sample size as much as possible, and the second is to increase the number of measurements as much as possible, thus, instead of solely relying on one questionnaire to collect data about one day of food consumption, we gathered data from five different random days, one of these days was a weekend (Friday), so that relatively succeeded to obtain a better represent averages of the quantities of nutrients consumed by the study sample.

2.3.2 Validity

The researcher could obtain an acceptable degree of validity for his tools of measurement by relying on previous research that agreed on its sobriety and the strength of its methodological procedures carried out at the level of specialized international bodies such as the study of Soleimani and

others (Slimani & all, 2000), the study of Castel and his colleagues (Castel, Serra-Majem, & Ribas-Barba, 2015) and the Al-Saderi study (Al-Saderi, 1991, p. 142) and the adoption of the same measurement tool that these studies used in our current study, where they agreed with the opinions of the experts we interviewed on the use of food recall for the last 24 hours for its reliability and Its sincerity in giving a closer look to reality regarding the food consumption of samples similar to the sample of the current study. Many of these studies have verified the reliability and validity of the food recall method for the last 24 hours, as it proved that its results are largely consistent with the results of other methods in finding food consumption rates. for large samples.

Design and procedure :

Respecting the scientific protocol and recommendation, interviews and questionnaires were conducted by the researcher who took care of the process with the help and cooperation of the club's coaches before training sessions in the training fields of clubs; most of them took place during the winter and spring school holidays of the 2021/2022 academic year.

Accordingly to the purpose of the study, and through the previous step, we collected detailed information about the foods and beverages consumed by the participants, we obtained the total estimate amount for each specific food and beverage consumed, after that, we encoded all foods and nutrients according to the database of a computer program called Nutrisurvey, which was designed to perform biochemical analysis of foods (such as determining the amount of protein in A cup of milk in grams, for example), in order to determine the average amount consumed of macronutrients (carbohydrates, protein, fats), and micronutrients (vitamins and mineral salts) and to analyze or compare them with other data and evidence.

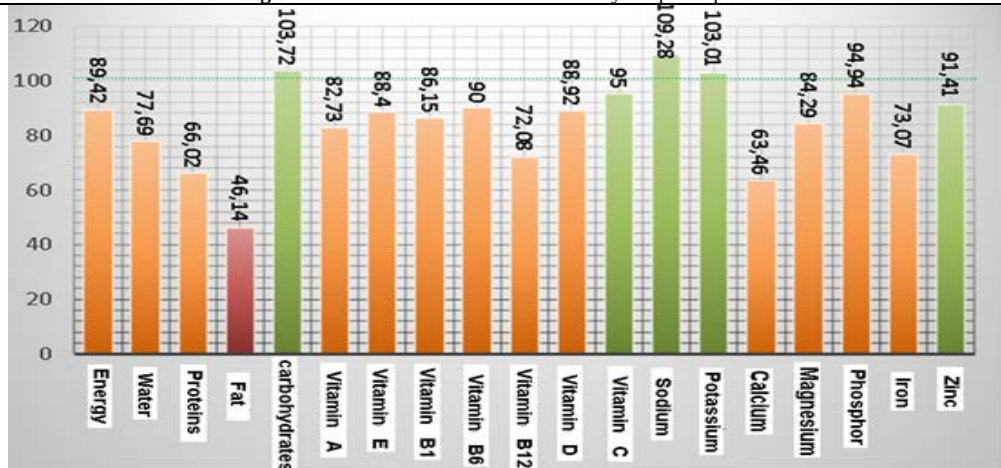
Results:

1. Findings related to the quantitative aspects of the adolescent football players' nutrition :

From figure.2. , it is clear to what extent the amount of nutrients consumed by the participants, negatively deviates from what is recommended. (which is represented by the green line on the figure). Among most deficient nutrients in the players' nutrition, we find Fat and proteins from the Macronutrients and Calcium, Vitamin B12 and Iron from Micronutrients. Thus, daily energy, proteins, and vitamins, especially vitamins A and B, and minerals, especially calcium and iron, are among the most important nutrients that are directly related to athletic performance

(Bangsbo, 2006) and health in general (BENJAMIN CABALLERO, 2005).

Fig.2. The amount of nutrients consumed by the participants



The amounts of nutrients in the diet of young football players are less than the recommended standard amounts (RDA) (Brouns, 2002), we note that the amount of energy is 9.10% less, and for proteins, the difference in percentage is 23.51%, while the amount of fat is also below the required rate by 39.47%, as well as the percentages of vitamin deficiency which ranged between 24.15 % and 10.10%, and the percentages of iron and calcium were lower by 18.18% and 14.7%, respectively.

From this, we can conclude that young football players aged between 13 and 18 years in Saida State (n = 309 players) follow a diet that does not meet the recommended amounts (quantities) of most nutrients. In the same way, we found that among the most important 19 nutrient types that were studied, only three nutrients reached the reference rate (Carbs, sodium, and potassium) according to many references such as (ACSM, 2008).

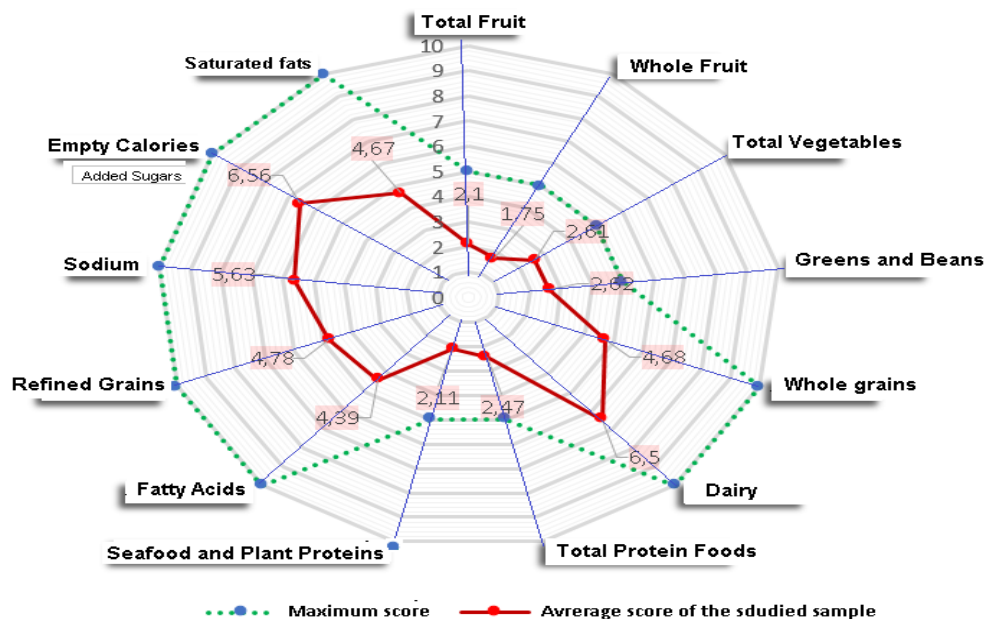
2. Findings related to the quantitative aspects of the adolescent football players' nutrition.

From figure.2. that shows the assessment of diet quality for young football players in Saida state aged 13-18 years, the overall scores ranged from 32 to 82% of the maximum, The mean scores for all HEI-2015 components were below the criteria (Basiotis PP, 2002) and (WHO, 2002). Dairy products (milk and its derivatives) were closest to the standards despite their insufficiency (6.5 /10, or 65%). The scores for vegetables, legumes, and whole grains were far from the norms (14-18 percent and 16-

18 percent, respectively). This means that young players were consuming far less than the recommended portions of vegetables, green beans and whole grains. On average, whole fruit (which includes 100 percent fruit juice) and total fruit, intake was significantly lower, and the protein food group as well as the seafood and vegetable protein group had the lowest score respectively. For the moderation groups, the empty calories intake (processed grains and added sugars) was the most consumed of these groups by the sample subjects.

Regardless of the amount of nutrients in it, quality of nutrients and their sources constitute an important health factor. When we talk about healthy and balanced nutrition in children and adolescents, there are food groups that they must be eaten , while there are other food groups that must be moderated or reduced in consumption (BENJAMIN CABALLERO, 2005).

Figure .3. Food groups consumption in the nutrition of the study participants (scores gained from the outputs of HEI)

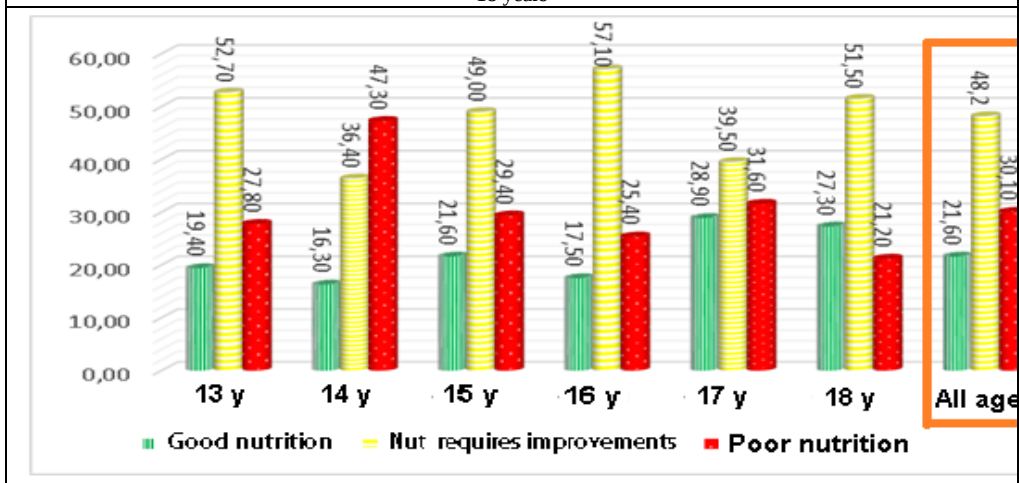


In this regard, we tried in this part of our study to evaluate the diet of a sample of young football players in terms of its availability on the different types of food groups, and we found that a large proportion of these youngsters do not follow a diet rich in quality, where poor nutrition quality was observed. Excessive consumption of some unhealthy food groups was

also observed.

In terms of the prevalence of poor nutrition quality we find that many studies reached similar results. In a survey conducted on a sample of schoolchildren in the Republic of Egypt, the researcher Nibal Abdel Rahman found weaker percentages than what we reached, as the category of good nutrition did not exceed 50%, while the remaining percentage was distributed among 95% on the two categories of nutrition that needs improvement and poor nutrition (Al-Ola, 2016), and in terms of the most consumed food groups, the results of our study differed with this study in that the group of cereals and legumes was the most consumed by Egyptian children and adolescents, other than the members of our study sample, which represented the group of milk and its derivatives, the most consumed group.

Figure .4. Scores of nutrition quality from the outputs of HEI in adolescent football players in Saida state aged 13-18 years



And from the previous figure, we note that most of the sample subjects (242 out of 309 players), which is equivalent to 79 percent of them, did not follow a diet that respects the recommended quality conditions, while 21% of the sample members follow a good diet, from the same chart we can confirm that the vast majority of the sample subjects, as their percentage reached 84%, need to enhance the quality of their nutrition and diet.

3. A summary of the main results

Based on the findings of the present study, the following conclusions could be arrived at :

- From the quantitative perspective, the daily food intake of the adolescent football players (aged 13 to 18 years) in Saida does not cover the nutritional needs recommended by the competent health authorities (RDA)
- From the quantitative perspective, the prevailing diet of these players does not meet the specific requirements of good nutrition quality.

Discussion

Since young soccer players generally train at a moderate to high intensity, the estimated average of daily energy demand for them is about 3,500 calories to 4,000 calories per training day (Rico-Sanz J. , 1998) (Reilly, 1979) where the additional energy requirements of the growth process are taken into account. many researches and studies confirm that football players who follow a proper diet are able to compete at a higher intensity, more effectively maintain technical ability, maintain mental focus, and continue to make sound decisions when fatigue occurs (Alghannam, 2013). However, the results of the current study agreed with the results of many previous studies, that dealt with the subject of nutritional intake of football players (Aissa, Ben mouhamed, & Samir, 2020) (Roy, 2002) (Brouns, 2002), that players still tend to follow an unbalanced diet that was associated with a state of total daily energy deficit, the fact that was clearly apparent on Figure .2. where the dietary recommendations designed to maintain performance as well as the overall health were not respected in the daily nutrition of the vast majority of participants in our study.

Many scientific sources also indicate that a persistent deficit in caloric intake in the daily nutrition of young players, especially in the period of growth and puberty, with the coexistence of relatively demanding physical activity such as football which requires an additional quantity of energy necessary to perform the physical effort associated with practising football for a long period of time, may result in an unhealthy of weight loss and this may negatively affect the level of performance as well as the general health status of the athlete.

With the aim of evaluating the quality of food consumed by the studied sample in the light of the quality recommended by the competent health authorities. The number of daily rations from food groups was evaluated according to the recommendations of the Center for Policy and Promotion of Healthy Nutrition of the US Department of Agriculture (Basiotis PP, 2002) , where it recommended a specific number of daily portions for different food groups according to age group and gender. For

this purpose, an index was created and developed to measure the quality of food consumed based on the availability of the diet of the studied sample to the scientifically established health and nutritional recommendations (Guenther, 2014) . The Healthy Eating Index is widely used in such studies across the world. A higher result of the index indicates an improvement in the quality of the pattern. Diet and success in following and applying the dietary reference recommendations (Rico-Sanz J. F.-B., 1998), Thus, It is clear that the nutrition of young football players involved in our study lacks the food sources of protein groups, vegetables, fruits and fatty acids. With regard to proteins, Mekhancha-dahel reported that protein malnutrition cases increased in Algerian children and adolescents. From 2.6% in 1987 to 5.45% in 1990 (Mekhancha-dahel, 2005), and in a comparison between the consumption of protein food groups per capita in developing countries (such as eggs, animal meat and fish) with its counterpart in developed countries, it was found that the latter consumes the equivalent of 12 times what it consumes the former (Laurence, 2005) .

The World Organization "FAO" also states in one of its statistics that the group of meat, eggs and fish constitutes only 3.73% of the daily energy intake for an individual in Algeria (FAO, 2018), as many scientific and health sources recommend, a player at this age needs all different kind of food elements and in sufficient quantities in order to cover the needs of growth, especially during the puberty period, taking into account the activity and the physiological state.

Many studies have also tried to explain the causes and factors of large spread of this poor nutrition quality pattern among children and adolescents in our country, and perhaps the most explanation that the researcher tends to adopt is the explanation indicated by Mehkanch-dehel, which is consist of the impact of the socio-economic situation in which a majority of young player's families live that a weak purchasing power plays a prominent role in the selection of foods and diversification of their sources for an average Algerian family (Mekhancha-dahel, 2005).

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Conclusion :

The fast majority of scientists agree on the paramount importance of proper nutrition that must accompany the process of preparing adolescent football players for high levels of competition, and any deficiency in their nutrition can lead to performance problems, and may even affect their overall health. In the end of this humble work, we hope that we bring some attention to the nutritional status of the young soccer players, and therefore contribute at find ways to promote proper nutrition in sports clubs, the present study has also certain policy implications. Overall, it is evident that there is a considerable prevalence of undernutrition among young football players in Saida state , which is also consistent with the some recent local studies. From that, we recommend that nutrition policies enhancement among young athletes should be applied in our country to prevent growth retardation. It may be also suggested that efforts to improve agricultural activity or food availability, dietary quality, hygiene, supply of safe-drinking water, and prevention and treatment of infectious diseases are likely to improve the health and nutritional status of the young players over time.

Finely, good nutrition of the child or adolescent athlete is one of the most important guarantees of his good health and therefore one of the most important guarantees to achieve the desired goal of the entire training process, which is to achieve the highest possible athletic achievement (Rico-Sanz, 1998).

References :

1. AI-Saderi, A. M. (1991). NUTRITIONAL STATUS ASSESSMENT OF THE TECHNICAL AND VOCATIONAL STUDENTS' COMMUNITY IN RIYADH, SAUDI ARABIA. Liverpool -UK: Liverpool Polytechnic School of Education and Community studies.
2. Aissa, E., Ben mouhamed, A., & Samir, M. (2020). Concepts of healthy nutrition for athletes in sports clubs. Sport system journal, V/07 N/17 Year/2020 Pages 135-155.
3. Alghannam, A. (2013). Physiology of soccer: The role of nutrition in performance. Novel Physiotherapists, 1-5.
4. Balboul, M., Chehat , M., & Noureddine, B. (2021). The reality of some nutritional practices among players of the second Algerian professional football championship. Sport system journal, V/08 N/03 Year/2021 Pages 612-625.
5. Bangsbo, J. M. (2006). Physical and metabolic demands of training and match-play in the elite football player. Journal of Sports Sciences, 24, 665-674.
6. Basiotis PP, C. A. (2002). The Healthy Eating Index: 1999–2000. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. CNPP-12.
7. BENJAMIN CABALLERO, L. A. (2005). Encyclopedia of Human Nutrition- Second edition. Oxford United Kingdom: Elsevier Academic Press.
8. Brouns, F. (2002). Essentials of Sports Nutrition ,Second Edition. West Sussex England: John Wiley & Sons Ltd.
9. Castel, G. S., Serra-Majem, L., & Ribas-Barba, L. (2015). What and how much do we eat? 24-hour dietary recall method. Nutricion Hospitalaria, 3:46-48.
10. FAO. (2018). Base de données FAOSTAT de l'Organisation de l'Alimentation et de l'Agriculture. FAO- DIVISION STATISTIQUES. Retrieved from <http://www.fao.org/home/search/en/?q=ALGERIA>
11. Garcia-Roves, P. G.-Z.-G. (2014). Nutrient intake and food habits of soccer players: Analysing the correlates of eating practice. Nutrients, 6, 2697-2717.
12. Guenther, P. M.-S. (2014). The Healthy Eating Index-2010 is a valid and reliable measure of diet quality according to the 2010 Dietary Guidelines for Americans. The Journal of nutrition, 144(3), 399–407. Retrieved from <https://doi.org/10.3945/jn.113.183079>
13. Hima Bindu Malla, M. D. (2017). Nutritional status of athletes: A review.

International Journal of Physiology, Nutrition and Physical Education, 2(2): 895-904.

14. KJOHNSON, R., DRISCOLL, P., & IGORAN, M. (1996). Comparison of Multiple-Pass 24-Hour Recall Estimates of Energy Intake With Total Energy Expenditure Determined By the Doubly Labeled Water Method in Young Children. *Journal of the Academy of Nutrition and Dietetics association*, 96:1140-1144.
15. Laurence, R. (2005). « Situation mondiale de l'alimentation et de la malnutrition» In LA FRACTURE AGRICOLE ET ALIMENTAIRE MONDIALE – NOURRIR L'HUMANITE AUJOURD'HUI ET DEMAIN. Paris: UNIVERSALIS.
16. Mekhancha-dahel, C. C. (2005). Cadre pour la surveillance nutritionnelle des enfants et adolescents Cas du Khroub (Constantine, Algérie) - 1996/97 - 1999/00 - 2001/02. Constantine: institut de la nutrition, de l'alimentation et des institut de la nutrition, de l'alimentation et des technologies agro-alimentaires universite mentouri de constantine.
17. Reilly, T. a. (1979). Estimated daily energy expenditure of professional association footballers. *Ergonomics*, 22, 541-548.
18. Rico-Sanz, J. F.-B. (1998, 8 8). Dietary and performance assessment of elite soccer players during a period of intense training. *International Journal of Sports Nutrition*, pp. 230-241.
19. Roy, B. L. (2002). The influence of postexercise macronutrient intake on energy balance and protein metabolism in active females participating in endurance training. *International Journal of Nutrition and Exercise Metabolism*, pp. 12 ,172.
20. Slimani, & all, a. (2000). Standardization of the 24-hour diet recall calibration method used in the European Prospective Investigation into Cancer and Nutrition (EPIC): general concepts and preliminary results. *European Journal of Clinical Nutrition*, 54: 900-917.
21. WHO. (2002). The world health report Reducing risks, promoting healthy life. Geneva: The world health organization. Retrieved from <http://www.who.int/whr/2002/en>.