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Food situation and conditions of training by Congolese endurance athletes in the precompetitive phase

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Abstract

The achievement of the results of athletes is linked to the combination of several factors we can cite: dietetics, hard training, technique, commitment and the will of the athlete. This study is also part of the orientation of athletes on the mode of sports practice and food consumption, it provides information on nutrition knowledge and eating habits of Congolese athletes practicing endurance races. Knowing that a varied and balanced diet is necessary to meet the energy needs of the athlete, it must be varied and taken on a daily basis to ensure a balanced diet. This study also proposes ways to valorize an effective training allowing to develop his skills necessary for the realization of the performance. This study aims to verify if the training conditions and the eating habits of Congolese athletes meet the required standards.

Keywords: Food situation, living conditions, trainability, endurance athletes

Introduction

The study of the nutritional profile of Congolese athletes remains a constant concern, in particular, in its aspects such as: living conditions and practice, frequency of training, training time, eating habits, accessibility to food, situation food, and frequency of consumption of different foods. It is revealed that a varied and balanced diet is necessary enough to meet the energy needs of the sportsman (Huot I, 2004, Favre-Juvin A, Genas MH, 2002.)^[1, 2], it must be based largely on the choice of foods rich in nutrients such as vegetables, fruits, seeds, cereals, lean meats and fish (Nicolas Aubineau, 2018)^[3]. The adoption of such a scheme contributes to the achievement of a good sporting performance. However, our country is characterized by a constant deterioration of living conditions, with a Human Development Index (HDI) equal to 0.234 in 2011 (UNDP, 2011), which places Congo at the 136th rank in the world compared to the development objectives sustainable. This results in under-nutrition of the general population (FAO, 2009)^[6]. Moreover, during the 2012-2016 Olympiads and the current Olympiad, Congolese endurance racing athletes have been characterized in the various local and continental competitions by poor performances (Force du direct, 2010)^[7]. Food and living conditions go hand in hand and remain important factors in promoting learning and performance (Bachelard O., (2017))^[43]. It is in this sense that we wanted to know the factors that limit the performance of the Congolese athletes. To do this, we can ask ourselves the question of whether sports training conditions and dietary habits of Congolese athletes are favorable to impact Performance?

The aim of our study was to determine whether the nutritional profile and training conditions of Congolese middle and deep-seated athletes were likely to adjust the level of performance.

Methodology

our cross-sectional study took place from May 10 to June 30, 2017 in Brazzaville, capital of the Republic of Congo. It has interested female and male athletes in preparation for this season's national and international competitions. Our sample was 32 athletes, ie 10 girls and 22 Boys with average age, weight, height, and BMI respectively 24.65 years; 50.60kg; 1m70 and

15.67kg / m² for girls and 25.16 years old; 60.48kg; 1m74 and 17.35kg / m² for boys.

Conduct of the investigation

our investigation was conducted according to the following principle:

1-Anthropometric measurements

Middle and middle-aged athletes were interviewed for the explanation of the study to be conducted. And, we had proceeded to take their size and weight.

2-Food assessment measures

after taking the anthropometric data, we submitted a questionnaire to these athletes. This questionnaire adapted by Cupisti (2002) and of the "24-hour recall" type (Arab *et al.*, 2011, SOUCI *et al.*, 1994, Tran KM *et al.*, 2000, Thompson, FE *et al.*, 2013, Cubeau J. *et al.*, 1976)^[9, 11, 12] allowed to present not only their mode of training and competition, but also their daily eating habits (Cade J., *et al.*, 2002)^[10]. It was filled on site in the training areas and should be removed immediately.

Results and discussion

the intense practice of sport and the preparation of competitions are the subject of nutritional strategies whose application must be personalized. They aim to correct the main mistakes made by athletes (destructuring, nibbling, imbalance, insufficient diversification and poor hydration), to match the energy intake with the measured expenses, to maintain a weight of form and to obtain the day of the competition an optimal muscle glycogen reserve (Go forth HW *et al.*, 2002)^[15] and Brooks GA *et al.*, (2004)^[16].

However, different scientific protocols are established to help clarify the specific adaptations to the purpose of the research.

Our study aimed to know the quality of the training, the living conditions and housing of the athletes, the marital status, the size of the household, the frequency of taking the meals and the different habits related to the feeding of the athletes Congolese background and middle distance in precompetitive period.

To our knowledge, few studies (Mbemba *et al.*, 2006; Mbemba *et al.*, 2007; Bouhika *et al.*, 2016; Z. Mboungou *et al.*, 2016)^[17, 18, 16] and Mbanzoulou *et al.*, 2017^[21] have addressed the nutritional and sporting aspects of Congolese athletes.

The results obtained are not of less interest.

Table 1: Anthropometric Data of Athletes

Variables	Girls (n = 10)					Men (n = 22)				
	Mini	Maxi	\bar{X}	\pm	σ	Mini	Maxi	\bar{X}	\pm	σ
Ages (years)	17	36	24.65	0.22	5.65	26	37	25.16	1.83	5.16
Weight (Kg)	39	60	50.60	0.11	5.82	50	76	60.48	0.09	5.58
Size (m)	1.50	1.70	1.61	0.03	0.04	1.60	1.86	1.74	0.04	0.08
BMI(Kg / m ²)	13.00	18.86	1.67	0.09	1.55	15.15	20.43	17.35	0.06	1.14

This table indicates that the average age, weight, height, and BMI of our subjects are respectively 24.65, 50.60kg, 1m70 and 15.67kg / m² for girls and 25.16 years, 60.48kg, 1m74, 17.35kg / m² for boys.

Table 2: Athletes' Professions

Variables	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Pupils	2	20	2	9.09
Student	5	50	14	63.63
Worker	0	00.00	1	4.54
Unemployed	3	30	5	22.74

Legend: n = number of subjects; % = percentage The results of our study showed that all athletes were students, students and unemployed with percentages of 20%, 50% and 30% respectively for girls and 9, 09%, 63.63%, and 22.74% among boys.

Table 3: Housing Condition

Conditions	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Under housed	0	00.00	1	4.54
At the parents	6	60	13	59.09
Tenant only	4	40	08	36.36

This table indicates that with regard to housing conditions, it should be emphasized that our athletes lived with parents (60% at the girls' level This table indicates that with regard to housing conditions, it should be emphasized that our athletes lived with parents (60% at the girls' level and 59.09% at the boys' level) and tenants alone (40% at the girls and 36.36% for boys),

The results of our study show that athletes lived alone or

under housing by parents. The latter not being salaried could not control their ration, nor know a food discipline related to their sport. Because they ate according to their parent's program. Indeed, the expense was related to the monthly income of the parents or head of household as indicated by Folaranni (2012)^[24].

Table 4: Number of people in the household

Variables	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
One people	2	20	4	18.18
Two people	1	10	0	00.00
Three people	0	00	1	4.55
four people	0	00.00	2	9.09
Five people	1	10	4	18.18
Six people	2	20	2	9.09
Seven people	2	20	4	18.18
More than Eight people	2	20	5	22.73

With regard to the number of people in the household, this survey showed that our athletes lived in the household from 5 to more than 8 people (10%, 20%, 20% and 20% among girls while 18, 18%, 9.09%, 18.18% and 22.73% among boys). However, the study by Folaranni (2012)^[24] reveals that the larger the household size, the greater the risk of food insecurity. In the same vein, WFP and the European Union (2010)^[25] concluded that households living in food insecurity account for 19% to 22% in Brazzaville. These results are similar to those found by the National Center for Statistics and Economic Studies (CNSEE) (2011-2012)^[26], which revealed a household size of more than 4 people for 3000 FRS of meals, because of 375 FRS 750 FRS per dish, which is insufficient given the current cost of food on the Brazzaville market.

Table 5: Athlete meal frequency per day

Variables	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Once	1	10	6	27,27
Two times	6	60	14	63,64
Three times	1	10	2	9,09
Four times	0	00	0	0

Regarding the frequency of meals per day, our results show that athletes ate 1 to 2 times a day (10% and 60% for girls versus 27.27% and 63.64% for boys). However, the study of Super Christophe, (2003) shows that the 3 to 4 meals of the day are very important for the athletes in order to fill not only the energy needs, but also to ensure a good muscular preparation for the competition.

Our results are therefore contrary to those found by Super Christophe (op cit), indicating that taking 3 to 4 meals a day is very beneficial for athletes. This author shows the rationale for eating 3 to 4 times a day, while our athletes only eat once or twice a day.

Table 6: Food Variation (Foods Diversity)

Answers	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Yes	3	30	2	9.09
No	7	70	20	90.91

For food variation, our results show that athletes did not consume a variety of foods (70% for girls and 90.91% for boys).

These results tend to show that these subjects did not have an optimal diet for a consequent energy supply (AE). Indeed, the monotony of the diet, the lack of food and the fact of not being able to take balanced meals because of financial problems of parents and stakeholders lead to food insecurity (Dubois *et al.*, 2000) ^[18].

However, some studies have shown the importance of varying the diet to reach the reasonable level of macronutrients set by some authors such as Petrie *et al.* (2004); Bar-Or *et al.* (1994); Boisseau *et al.* (2007) ^[31] and Tripton *et al.* (2004).

Our results are far from being in agreement with those of the authors cited above, given the cost of food on the market and the level of social conditions of the athletes and parents of the athletes surveyed.

Table 7: Respect of meal times versus hours of training

Answer	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Yes	1	10	6	27.27
No	7	70	16	72.73

Regarding the respect of meal times, it is clear that our athletes fed the parents and the rhythm of life of parents, did not have the concept of respect meal time during their different practices sports. For, 70% of the girls and 72.73% of the boys did not respect the meal interval compared to the hour physical sports activities. However, according to some studies, the time between meals and physical activity must be 3 hours (Superchristophe, op cit, Makrelouf H., 2010) ^[33].

This allows a good digestion and promotes a good recovery before approaching a physical work.

Our results indicate that the meal times separating the sport were either short or long.

Speaking of the quantity and quality of food consumed by the athletes, various indicators were constructed from the responses provided by these. The results presented show that, the quality of the food was bad (60% of the girls and 63, 64% of boys).

Table 8: Quality of food consumed by athletes

Appreciation	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Good or sufficient	1	10	4	18.18
Bad or insufficient	6	60	14	63.64
Do not know	3	30	4	18.18

Similarly, the quantity proved insufficient (60% of the girls and 54.55% of the boys) However, from the point of view of quality of food, one could have noticed the presence of the meat, the fish, the fruits, the cereals, natural juices, vegetables, cheeses, and energy drinks that can fill nutritional and energy deficits (Favre - Juvin A. *et al.*, 2004).

However, from a quantitative point of view, to obtain enough energy and ensure muscle glycogen, a balanced intake of carbohydrate, lipid and protein was necessary. Indeed, the fact of feeding is a necessity for the man because it must produce energy permanently, that it is for the movements, the vital functions (breathing, circulation, digestion) but also for the functioning of the brain.

The sources of energy must come from outside inputs and then be synthesized in the body. However, in terms of food, excesses are as harmful as deprivations and the quantity must be combined with quality. Meals should be varied and all categories of food represented (IMSAT, op cit).

Table 9: Accessibility of Athletes to Food

Variables	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Easy	2	20	5	22.73
Difficult	8	80	17	72.27

With regard to the availability of food and its accessibility in the Congolese market, it is important to note that our athletes found it difficult to access food (80% of girls and 72% of boys).

Similarly, the results indicate that food is very expensive in the market (80% of girls and 77.27% of boys). Indeed, it is clear that food availability remains insufficient in Congo. It is linked to low local agropastoral and fish production, inadequate income, lack of a culture of conservation, processing and storage of food and seasonality of product supply. This would lead to the use of inappropriate eating habits (PRSP, 2008-2010).

In these conditions, the accessibility to a healthy diet is almost reserved for affluent populations. Because the right to food and the realization of food security are not guaranteed, this affects athletes in their eating habits.

Table 10: Meals taken during the day (privileged)

Meal	Girls (n = 10)		Men (n=22)	
	n	(%)	N	(%)
Breakfast	3	30	5	22.73
Lunch	3	30	4	18.18
Collation	-		-	
Dinner	3	30	5	22.73
Breakfast and lunch				
Breakfast and snack			1	4.54
Lunch and dinner				
Breakfast lunch dinner			3	13.64
Breakfast - lunch - snack and dinner				
Breakfast and dinner	1	10	4	18.18

Regarding meals taken during the day, the results indicate that breakfast is taken singularly by girls and boys, respectively at 30% and 22.73%; lunch is also taken by girls and boys respectively at 30% and 18.18% and finally, dinner at 30% and 22.73% by girls and boys. By cons, the number of athletes who took the 3 or 4 meals of the day is very poor. Despite the importance of daily meals, our athletes are limited to a meal during the day. This certainly indicates a purchasing power of parents who do not meet their expectations.

Table 11: Activity duration of the activity (Training age)

Duration	Girls (n = 10)		Men (n=22)	
	n	%	n	%
6 month -1 year	3	30	1	4.54
2-3 years	1	10	2	9.09
4-5 years	1	10	5	22.73
More than 6 years	5	50	14	63.63

Regarding the age of training, our results indicate that all the subjects had an average age of training of more than 6 years and more (60% of the girls and 63, 63% of the boys). However, to have mastery of certain skills, it is important to have a good duration of practice (Dufour M, 2011). Thus, our athletes had a favorable training age capable of mobilizing all possible forces in order to perform. The age of training is a very important factor in the sport, some studies have shown that the higher the age of training is, the more appropriated the gesture and the ability to achieve performance becomes easy (Dufour M, op cit, IAAF, 2012-2013).

Table 12: Training time per day

Practice time	Girls (n = 10)		Men (n=22)	
	n	%	n	%
1h-2h	03	30	05	22.73
2 h30	04	40	12	54.54
3 h	03	30	05	22.73
More than 4 h	00	00.00	00	00.00

However, with regard to training time per day, there are some limitations. Our results indicate that the athletes train for 1h30 (40% for girls and 54.54 for boys) per day, which is equivalent to a weekly training of 9 hours.

However, the results of some studies (Dufour, op cit, IAAF, op cit) show that an effective training passes by a number of days of important practice like 5 to 6 days, a daily training time of 4h to 5h in from 2h to 2h30 per session, for a weekly time of 24 hours to 30 hours and a daily frequency of 2 sessions per day (morning and afternoon or morning and evening).

Indeed, very active people like athletes or those whose work requires a lot of physical activity require a high calorie diet. However, because of the immense diversity in food

composition and the wide range of nutritional requirements, there is no single food that provides all the essential nutrients other than breast milk (Guilland JC *et al.* 2001) [40].

That's why variety is one of the fundamentals of healthy eating: athletes and anyone else should consume all kinds of foods on a regular basis. What really matters is how we associate food over a period of time: meals, snacks, day or week (Schlienger JL.2014) [41].

Table 13: Number of days of training per week

Number of training days	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
2-3Days	03	30	05	22.73
4Days	05	50	13	59.09
5days	02	20	04	18.18
More than 6 Days	-	-	-	-

Limited number of training days (4 days for girls and 4 days for boys) and insufficient training frequency per day (60% of girls and 63.63% of boys training in the afternoon)

Table 14: Frequency of training per day

Training frequency	Girls (n = 10)		Men (n = 22)	
	n	%	n	%
Morning	1	10	5	22.74
Noon	1	10	1	4.54
After noon	6	60	14	63.63
Morning and noon	0	00.00	0	0.00
Morning and afternoon	2	20	2	9.09
Noon and afternoon	0	0.00	0	0.00

Of these results, the afternoon was the most favorable training period (60% for girls and 63.63% for boys) This number of days per week and the frequency of training per day correspond to the rhythm of a health sport, far from being a rhythm of high-level sport (Hauswirth, 2012, Dufour M, op cit and IAAF, op cit) [42].

Conclusion

Based on our results, the surveyed athletes had a monotonous, undifferentiated diet. The situation is actually more worrying, because of the lack of dietetic bases in training programs or competitions. However, we can also talk about the role of "dietary education" ignored by parents. Training conditions also prove its limits, athletes have almost a practice environment influenced by nutritional aspects that do not predispose the achievement of the best results. Further, these habits are a reflection of the "obesogenic" lifestyle of our consumer society, turned to routine and the pursuit of pleasure. Indeed, there is also the problem of the food supply. On the one hand, healthy eating costs

expensive. Cheap food is often of poor nutritional quality. This set of hypotheses on the explanation of bad eating habits is not exhaustive, *l'et al* one a discovery, just like the results of our study. These results symbolize the deformation of the triple dimension of the food act in athletes: biological (lack of knowledge of the rules of diet and energy needs), symbolic (diet "comfort"), and social (problem of food supply).

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