

# Evaluation of the Nutritional Knowledge of Professional Track and Field and Triathlon Athletes



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## ABSTRACT

Proper nutrition is the key to better sports performance. Therefore, satisfactory nutrition knowledge becomes important to the practice of healthy nutrition habits and, consequently, more efficient to performance. This study aimed to evaluate the nutrition knowledge of professional track and field athletes and triathletes with application of a scale previously validated in Brazil. The sample was composed of 50 athletes with mean age of  $32.4 \pm 11.1$  years, being 37 of them (74%) male athletes. The athletes filled up a questionnaire containing questions on training, nutritionist appointments and the scale. Chi-square was used to associate the nutrition knowledge with the variables of educational background and nutritionist appointment and the Pearson Correlation Coefficients were used to correlate the ordinal variables, with significance rates of  $p < 0.05$ . The athletes had trained for  $9.4 \pm 8$  years; 82% had high incomplete or complete educational level and 70% had already had a nutritionist appointment. The average of points in the scale was of  $9.6 \pm 2.2$  points, which corresponds to the classification of “moderate nutrition knowledge”, and the males showed higher score in the scale of nutrition knowledge than the females ( $p = 0.047$ ). The educational level ( $p = 0.352$ ) and nutritionist appointment ( $p = 0.285$ ) variables had no correlation with nutrition knowledge results in the present study. However, the higher the educational level, the higher the number of athletes who had nutrition counseling. These results indicate the need of continuous education on nutrition for athletes, as well as further investigation which evaluates the nutrition knowledge in this sample.

**Keywords:** athletes, athletic performance, nutrition education, nutrition, scale, sports.

## INTRODUCTION

Suitable food and drink consumption should guide the principles of a healthy eating plan, and the choice of these food should also be suitable in order to fulfill the energy and nutrient needs<sup>(1)</sup>. However, physical exercise practice demands a differentiated focus on the nutritional follow-up, especially due to the intensity and duration of each exercise, as well as the conditioning level of the athlete<sup>(2,3)</sup>. Therefore, nutritional education becomes relevant, since it helps in understanding the predicting factors of the eating behavior and helps to create conditions which facilitate the choice for healthy food, both for sedentary and physically active individuals<sup>(4)</sup>.

Nutritional knowledge may be defined as a scientific construct created by nutritional educators to represent the individual cognitive process related to information on food and nutrition<sup>(5)</sup>. It facilitates the food choice, both with the purpose to prevent non-transmissible chronic diseases<sup>(6)</sup> and to improve athletic performance<sup>(7,8)</sup>. There are instruments to measure the nutritional knowledge of different populations. The scale on nutritional knowledge for use on the National Health Interview Survey Cancer Epidemiology used to test whether the nutritional knowledge on cancer prevention correlated with eating practices which would really prevent the disease, was developed by Harnack et al.<sup>(6)</sup>. This scale was later translated to Portuguese from Brazil by Scagliusi et al.<sup>(9)</sup>. Besides the translation, this scale was adapted to Brazil, since some of the questioned food

was not widely ingested in the Brazilian territory. Nicastro et al.<sup>(10)</sup> recently published results of the pioneer application of this scale of nutritional knowledge in a Brazilian population which practiced physical exercises, and hence a new study perspective came about in the field of evaluation of nutritional knowledge in athletes and sportspeople, with the use of a validated questionnaire.

Acknowledging the importance of the nutritional information when choosing right eating choices, it is important that athletes understand this topic. It is known that triathlon and track and field practitioners, more precisely competitors of events such as the Ironman and marathons, present high energetic demand, these choices hence need to be suitable in order to supply their energetic needs. Moreover, since these are individual sports, it is believed that suitable nutritional knowledge is necessary since information exchange amongst team members is not always present. Therefore, the aim of this study is to evaluate the nutritional knowledge of track and field and triathlon athletes, through the results of the application of the translated and adapted nutritional knowledge scale<sup>(9)</sup>.

## METHODS

### Study outlining

The present study presents a transversal character to evaluate the nutritional knowledge of professional track and field and triathlon athletes.

## Population and sample characterization

The studied population was composed of track and field and triathlon athletes, accordingly affiliated, aged between 18 and 65 years from both sexes, who trained on the athletics track of the State Center of Sports Training (CETE), Usina do Gasômetro and athletics track of the Gymnastics Society of Porto Alegre (SOGIPA), all located in the city of Porto Alegre, RS, Brazil. The sample was composed of athletes who voluntarily accepted to participate in the research, after having signed the Free and Clarified Consent Form in two copies previously approved by the Ethics and research Committee of the Methodist University Center IPA (protocol 444/2008). The individuals who had attended the college course in Nutrition or were graduated professional nutritionists have been excluded since they would already have advanced nutritional knowledge. Data collection was carried out at the previously mentioned training sites, at the pre and post-training or competition periods where the athletes were informed to answer to the questionnaire as honestly as possible.

Calculation of the sample size was based on prevalence that approximately 13% of the evaluated individuals presented high nutritional knowledge<sup>(9,10)</sup>. Since our sample includes individuals with high interest in nutrition, we suggest that 17% of the individuals will present high knowledge on nutrition. Admitting a one-tailed test with power of 80% and significance level of 5%, the sample size obtained was of 50 athletes.

## Description of the data collection instrument

The information on nutritional knowledge was obtained with the use of the questionnaire developed by Harnack et al.<sup>(6)</sup> and, later translated, adapted and validated to Brazil by Scagliusi et al.<sup>(9)</sup>. This questionnaire contains 12 questions with specific punctuation, and the data were subsequently recorded in data bank from Excel<sup>®</sup> 2007. Nutritional knowledge was classified with the use of the criteria according to the Brazilian validation<sup>(6)</sup>: Total punctuation between zero and six indicates low nutritional knowledge; between seven and 10 indicates moderate nutritional knowledge and above 10 indicates high nutritional knowledge. Nutritional knowledge was classified as satisfactory when the punctuation was higher than seven.

Additionally, data for sample characterization such as age, sex, schooling, training time, whether had seen a nutritionist or not and if makes use of food supplementation were collected. The "schooling" and "nutritional follow-up" variables were assessed to correlate the level of nutritional knowledge according to gender and age.

## Statistical analysis

In order to express the continuous and category data of sample characterization, absolute (means and standard deviations) and relative (%) frequencies were used. The association between the category variables was evaluated with the Fisher's exact test. The Pearson correlation test was used to correlate the numerical variables of the questionnaire of nutritional knowledge as well as the training time in years. The significance level accepted was of  $p < 0.05$ .

## RESULTS

Data of the sample characterization are available in table 1. The athletes were in their majority from the male sex and triathlon practitioners. There was not significant difference in the general

punctuation of the nutritional knowledge scale among the track and field and triathlon modalities ( $9.3 \pm 2$  and  $9.8 \pm 2.3$  respectively,  $p = 0.158$ ) and, therefore, it was decided to present the results of both categories in a single way. The mean training time corresponds to approximately 10 years, and the majority of the athletes (80%) made use of food supplements. The nutritional knowledge of the athletes, assessed through the application of the nutritional knowledge scale, was considered satisfactory, since 90% of the sample presented nutritional knowledge classified as "moderate" and "high".

Table 2 shows the association between the nutritional knowledge and some selected variables. There was no difference in the nutritional knowledge between the male and female athletes. In the group which reported having seen a nutritionist, the majority (94.3%) presented moderate or high nutritional knowledge, while among those who reported not to have seen a nutritionist, this ratio was lower (80%), although the difference has not been significant. Moreover, the fact of taking supplements or having attended college did not alter the knowledge of the individuals.

**Table 1.** Sample description data (n = 50).

	Mean $\pm$ SD	Number of subjects (%)
Age (years)	32.4 $\pm$ 11.1	-
Training time (years)	9.4 $\pm$ 8	-
Points on the scale (points)	9.6 $\pm$ 2.2	-
Sex	Male	37 (74)
	Female	13 (26)
Training modality	Track and Field	23 (46)
	Triathlon	27 (54)
Uses nutritional supplements	Yes	40 (80)
	No	10 (20)
Nutritional knowledge	High	17 (34)
	Moderate	28 (56)
	Low	5 (10)

**Table 2.** Association between the nutritional knowledge and the other assessed variables.

Variables	Nutritional knowledge				p*
		High n (%)	Moderate (%)	Low n (%)	
Sex	Male (n = 37)	15 (40.5)	17 (46)	5 (13.5)	0.067
	Female (n = 13)	2 (15.4)	11 (84.6)	0 (0)	
Visit to the nutritionist's	Yes (n = 35)	13 (37.2)	20 (57.1)	2 (5.7)	0.362
	No (n = 15)	4 (26.7)	8 (53.3)	3 (20)	
Use of supplements	Yes (n = 40)	15 (37.5)	21 (52.5)	4 (10)	0.674
	No (n = 10)	2 (20)	7 (70)	1 (10)	
Attended college	Yes (n = 41)	15 (36.6)	23 (56.1)	3 (7.3)	0.352
superior	No (n = 9)	2 (22.2)	5 (55.6)	2 (22.2)	

\*P value obtained with Fisher's exact test.

Table 3 presents the results of the association between the nutritional follow-up and the “schooling” and “use of supplements” variables. The frequency of visits to a Professional nutritionist was higher among those athletes who were college students ( $p = 0.002$ ). Additionally, the 12 athletes with post-graduation degree had already had a nutritional visit, while among the seven athletes with complete or incomplete high school, only one reported to have had a nutritional visit. Furthermore, these athletes who have or had nutritional follow-up reported consumption of nutritional supplements more remarkably than those who had no follow-up ( $p < 0.01$ ).

No statistically significant correlation was found between training time and punctuation obtained on the nutritional knowledge scale ( $r = 0.024$ ,  $p = 0.651$ ). Therefore, longer training period did not alter the nutritional knowledge of the studied sample.

**Table 3.** Association of the visit to the nutritionist’s and the “schooling” and “use of food supplements” variables.

Variables		Has seen the nutritionist?		P*
		Yes n (%)	No n (%)	
Attended college	Yes (n = 41)	33 (80.5)	8 (19.5)	0.002
	No (n = 9)	2 (22.2)	7 (77.8)	
Uses food supplements	Yes (n = 35)	33 (94.3)	2 (5.7)	< 0.001
	No (n = 15)	7 (46.7)	8 (53.3)	

\*P value obtained with Fisher’s exact test.

## DISCUSSION

The main finding of the present study was that, in their majority, the athletes present satisfactory nutritional knowledge. It is worth mentioning that until the present moment only four original studies have used the scale of the present study<sup>(9-12)</sup>. Such fact becomes a limiting factor for the discussion of our results. Nevertheless, this is a topic of great interest to the sports population, since good nutritional knowledge from the part of the athletes could improve sports performance. Thus, further investigation is needed in order to evaluate the nutritional knowledge of athletes, using a validated and adapted scale as the one used in this study. Although the scale had been initially designed to verify the existence of correlation between nutritional knowledge and practices for cancer prevention, it has been used in other populations since no other validated questionnaire is available in Brazil to evaluate nutritional knowledge.

In the validation of this questionnaire, Scagliusi et al.<sup>(9)</sup> applied it in women with eating disorders and nutrition students, who obtained punctuation of  $7.4 \pm 2.6$  and  $10.5 \pm 1.7$ , respectively. Vegetarian and omnivorous women presented punctuation of  $10.6 \pm 1.7$  and  $8.7 \pm 2.3$ , respectively, with the application of this instrument<sup>(11)</sup>. Despite not being athletes, the punctuation of the questionnaire in the previous studies was fairly similar to the one found in the present study ( $9.6 \pm 2.2$ ), except for the women with eating disorders, who presented lower punctuation. Other studies which assessed the punctuation of track and field and judo athletes found punctuation

of  $8.9 \pm 1.7^{(10)}$  and  $6.9 \pm 2.2$ , respectively<sup>(12)</sup>. The discrepancy in the found values with the application of the questionnaire in athletes of different sports demonstrates the need for nutritional education for this public, especially focusing on prevention of non-transmissible chronic diseases.

It is speculated that the level of schooling may interfere with the nutritional knowledge. Nicastro et al.<sup>(10)</sup> evaluated the nutritional knowledge of professional and amateur track and field athletes with this same scale and verified that the amateur athletes obtained significantly higher punctuation than the professional group. A justification for this finding would be the fact that professional athletes would be more dedicated to the sport and hence lower availability to study. Although these authors have not found significant correlation between years of study and punctuation in the questionnaire, schooling was higher in the amateur athletes group. In the present study, significant association was not verified between higher level education and nutritional knowledge of the athletes, likewise in another study which assessed the nutritional knowledge of judo athletes<sup>(12)</sup>. This finding may be partially explained by the high schooling level of the sample, where 82% reported to have attended a college course.

Besides schooling, the specialization field also interferes in the nutritional knowledge. In the study by Zawila et al.<sup>(13)</sup>, it was verified that 22% of the female athletes who had graduated in nutrition (13 out of 60 athletes) obtained higher punctuation in the questionnaire on nutritional knowledge when compared with the remaining athletes. In the questions especially concerning sports nutrition, this public presented punctuation significantly higher than the female athletes not connected with a nutrition course. Furthermore, Scagliusi et al.<sup>(9)</sup> verified that nutrition students present higher nutritional knowledge than individuals with eating disorders. Thus, in this study a confusing factor which could have affected the data analysis was excluded.

In this present study, significant differences have not been verified between nutritional knowledge and sex of the athletes. Nicastro et al.<sup>(10)</sup> found higher punctuation in the knowledge scale in female athletes. Although women present higher interest in nutrition, especially due to their concern about esthetics and body composition<sup>(11)</sup>, other factors may also have influenced on the result of the present study. The nutritional knowledge has not been associated with schooling; however, from the 29 athletes who had complete college degree or post-graduation, 22 of them (75.9%) were male. This information may partially justify a higher punctuation on the knowledge scale from the male athletes side, despite the lack of significant differences.

In the scientific literature, other instruments have been used for evaluation of nutritional knowledge of athletes. Raymond-Parker et al.<sup>(14)</sup> evaluated the nutritional knowledge of 59 female athletes vulnerable to the female athlete triad using the General Nutrition Knowledge Questionnaire (GNKQ)<sup>(15)</sup>. The authors verified higher punctuation in the scale when compared with 32 non-trained control women, suggesting hence that the female athletes present higher nutritional knowledge than the no-athletes. Other authors did not find higher punctuation in the nutritional knowledge questionnaire of athletes when compared with a non-trained control group<sup>(11,16-18)</sup>. However, it is important to stress that these studies

are older and currently the spread of information in the electronic media facilitated the access to information sources about health and eating healthy.

In this study, it was verified that the nutritional knowledge of these athletes is not associated with the follow-up of a professional nutritionist. However, further studies in the literature mention the nutritional knowledge for development of good eating habits. Smith-Rockwell et al.<sup>(19)</sup> carried out a study to evaluate nutritional knowledge, opinions and practices of coaches of athletes from the first university division (n = 53). Generally speaking, the coaches correctly replied to 67% of the questions. The data demonstrated that all coaches gave general dietetical recommendations during training, and that 30% of them reported to recommend that the athletes should search for a nutrition specialist, the same percentage of the ones who mentioned to regularly work with a nutritionist. Another study with this same aim demonstrated that 70% of the coaches correctly replied to the questions concerning nutrition, but only one third presented high level of certainty in their answers<sup>(8)</sup>. Thus, we highlight the importance of a professional nutritionist in the suitable guidance to individuals engaged in sports practice.

The number of athletes who make use of nutritional supplements with the goal to improve performance in sports has increased. This issue concerning food supplementation would need to be the topic

in a broader discussion in the sports scenario, involving aspects of nutritional education as well as sports motivation. Although statistical significance has not been verified in the association between the use of supplements and nutritional knowledge, this fact may be attributed to the small sample size. Despite having respected the minimum number of evaluated individuals mentioned in the calculation of the sample size, a bigger sample could reveal associations not observed in the present study. Thus, further studies assessing nutritional knowledge and including greater participation of volunteers should be carried out.

In conclusion, satisfactory nutritional knowledge was verified in the studied sample. Nevertheless, further studies about this theme should occur so that a panorama of the nutritional knowledge of professional athletes is provided. Moreover, it is important to evaluate the knowledge of athletes of other modalities, as well as to compare the knowledge difference between professionals of the individual and team sports. Therefore, we can broaden the knowledge on the role of nutrition for sports performance as well as elucidate the importance of this topic for athletes and coaches.

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