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Ranking of Shiraz Top Fitness Clubs Regarding Nutritional Knowledge, Attitude, and Performance of Sport Trainers Using Multi-Criteria Decision Making Approach

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ABSTRACT

Background: It is important to know the physiological needs of athletes in relation to the type of sport, exercise, and the competition, about the amount of energy intake, macronutrients, micronutrients and fluids. Therefore, the purpose of this study was to assess the nutritional knowledge, attitude, and the performance of Shiraz top fitness clubs' sport trainers and ranking the clubs in this regard.

Methods: In this descriptive cross-sectional study, the General Nutrition Knowledge Questionnaire of Parmenter and Wardle were used to record nutritional information including nutritional knowledge, attitude, and the performance of the sport coaches of 26 top clubs in Shiraz, southern Iran. To determine the weight of questionnaire's dimensions, the Shannon entropy method was used and the Topsis technique was used to rank the clubs.

Results: The mean scores of the top fitness clubs' coaches in Shiraz in different aspects of nutritional knowledge, attitude, and performance were 14.367, 9.17, and 3.381, respectively. The ranking of clubs showed that 73% and 27% of the top clubs in Shiraz, respectively, had a moderate and poor status in the knowledge, attitude and performance of the coaches, and none of the clubs been in a good condition. In addition, the highest scale in this ranking was related to nutritional knowledge of coaches.

Conclusion: The top sport clubs' coaches in Shiraz had a low level of nutritional knowledge, attitude and performance, and none of the clubs had a good score in this regard. Therefore, the need for interventional actions to promote these items seems necessary.

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Introduction

Nutrition has always been considered as a factor affecting the physical efficiency and body composition of athletes (1). It is important to know the physiological needs of athletes in relation to the type of sport and exercise, and the competition,

on the amount of energy intake, macronutrients, micronutrients and sufficient fluids in them (2). Healthy eating habits and the use of appropriate supplements in athletes can provide the athletes' supplying nutritional needs, as well as their appropriate physical efficiency goals and also reduce the probability of injury and illness (2).

In addition, in order to meet the energy and nutritional requirements of athletes, and to maintain the proper body mass and reduce the risk of injury, there is always a recovery period between the training sessions (2). However, today, most athletes use a variety of strategies to achieve sporting success, including the use of supplementary pharmaceutical or nutritional products, and the adherence to certain dietary regimens, and supplements proposed by their coaches and friends (3). These diets and supplements, classified under the heading of ergogenic aid and sports foods (4), as part of the training and competitive program, in 40% to 100% of professional athletes depending on the type of exercise group (4, 5), which, in addition to imposing a high economic burden, can also affect the athletes' health (6).

The lack of adequate nutritional knowledge in athletes and their coaches can be considered as the main cause of inadequate dietary and supplement intake in athletes (7, 8). The obligation to win, having misinterpretation, and bias toward nutrition science and non-scientific beliefs, especially in sports trainers have led to unnecessary dietary manipulations and lead to severe consequences such as eating disorder in athletes (9). The most common misconceptions about energy density, exercise supplements, and protein intake are raised (10, 11). However, full comprehensive studies on nutritional knowledge of sport coaches and athletes have been done; it is recommended that higher-quality studies be conducted (11). Therefore, in this study, we investigated the nutritional knowledge, attitude, and the performance of Shiraz top fitness clubs' sport trainers with the aim of finding the status of the top clubs of this city in terms of paying attention to nutrition in athletes.

Materials and Methods

The present survey from the perspective of the aim is an applied study, from the aspects of the nature of the subject and the method of the study is a descriptive one, and in terms of time is a cross-sectional research. The purpose of this study was to assess the nutritional knowledge, attitude, and the performance of Shiraz top fitness clubs' sport trainers and ranking the clubs in this regard. In order to collect the required data for the present study General Nutrition Knowledge Questionnaire to assess Nutritional Knowledge, Attitude, and Performance as described by Parmenter and Wardel (12) were used.

It consisted of four sections; including personal and demographic information, nutritional knowledge, attitude and performance of the coaches. The nutritional knowledge section includes assessing the awareness of coaches about the division of food groups and their ingredients, and includes 31 questions. The third part contains 21 questions about the attitudes of the coaches to nutritional issues and related diseases. The last part consists of 8 questions about the nutritional performance of the coaches. The maximum score for each question was calculated as one score. Finally, the obtained points from these questions were used to determine the nutritional status based on the information presented in Table 1.

The validity of the questionnaire has already been confirmed by another study in Iran (13). In order to assess the reliability of the questionnaire, Cronbach's alpha was calculated for each section. In all three parts of the questionnaire, the Cronbach's alpha value is higher than 0.7, indicating the reliability of the questionnaire is at a desired level. Considering that the research design was using multiple attribute decision making techniques, and the whole target community was examined, so sampling was not needed in the sense of selecting some members of the community.

After obtaining the necessary permissions, the Shiraz top clubs (The first quarter of the clubs in terms of the number of athletes, according to the Fars province Physical Fitness Board), were visited and the questionnaire was completed by the respective coaches. The data from completed questionnaires were analyzed by multi-criteria decision-making techniques. According to the aim of the study, the technique for ordering performance by similarity to ideal solution (Topsis technique presented by Hwang and Yoon in 1981) was used to rank the top physical fitness clubs in Shiraz based on the three criteria of knowledge, attitude and nutritional performance of the coaches. In decision-making, there are generally several indicators that differ in their relative scale.

Hence, in order to compare the scales to each weight/scale, a score is given, in a way that the sum of the scales is equal to one. One of the methods used to weigh the criteria is Shannon Entropy. This method allocated weight based on the scattering of the data. That is, the more the data was scattered, the higher the weight of that criterion would be (14). In Topsis technique, m options (in the present study related to the clubs), based on n index, (in the present study related to the three main dimensions of the

Table 1: The score for the qualitative level of the three main indices of the research.

Variable	Weak	Moderate	Good
Nutritional knowledge	0-10	11-20	21-31
Nutritional attitude	0-7	8-14	15-21
Nutritional performance	0-2	3-5	6-8

research), were evaluated and ranked (15).

To accomplish this, the distance between each option from the ideal-positive option and the negative ideal option was computed. These intervals were represented by the d_i^+ and d_i^- characters. The ideal-Positive option was the option that had the best value in all criteria, and similarly, the ideal negative option was the option that had the worst value in all criteria. The best option was an option that had the least distance from the ideal positive option and the greatest distance from the ideal negative option. In order to identify the order of the options, the index indicating the relative closeness/proximity to the ideal-positive option was calculated as follows (16),

$c_i = \frac{d_i^-}{d_i^- + d_i^+}$ while, the lower the c_i value, the A_i option will got a better ranking.

It should be noted that in order to determine the status of the top sport clubs in Shiraz regarding their nutritional knowledge, attitude and performance of the coaches of the two hypothetical clubs, they were included as cutting points. In the first hypothesis club, the boundary between a good and moderate qualitative level is based on Table 1 with scores of 6, 15 and 21 for nutritional knowledge, attitude and performance, and for the second hypothesis club, the boundary between poor and moderate quality levels

Table 2: The nutritional knowledge, attitude and performance scores of the coaches of the top sport clubs in Shiraz and their weights.

Club symbol	Nutritional performance	Nutritional attitude	Nutritional knowledge
A_1	3	6.83	11.9325
A_2	3	7.07	11.61
A_3	2.5	8.58	10.6425
A_4	3	10.74	12.9
A_5	2	7.49	12.255
A_6	3	9.49	11.61
A_7	4	6.82	11.61
A_8	4	11.99	15.48
A_9	3	7.83	10.965
A_{10}	4	9.83	12.255
A_{11}	3	12	14.835
A_{12}	3	11.16	17.415
A_{13}	5	12	16.125
A_{14}	3.5	10.74	15.8025
A_{15}	3	9.16	16.77
A_{16}	3	7.83	13.545
A_{17}	3	10.16	16.77
A_{18}	4	9.16	15.48
A_{19}	3	8.91	14.835
A_{20}	3	6.83	12.9
A_{21}	3.5	8.91	15.8025
A_{22}	4	7.16	16.125
A_{23}	3.5	8.74	14.99625
A_{24}	3.25	8.99	15.48
A_{25}	4	9.7	16.93125
A_{26}	4.66	10.32	18.4857
Hypothesis club no.1	6	15	21
Hypothesis club no. 2	3	8	11
Total	96.91	261.44	404.5582
Weight	0.243335483	0.33829509	0.418369427

with grades 3, 8 and 11 for nutritional knowledge, attitude and performance were considered.

Results

The survey of male coaches from 26 Shiraz sport clubs showed that 51.5% of the instructors had a high school diploma, 9.5% had an undergraduate degree, 28% had a bachelor's degree, and 11% had a master's degree with an average age of 31.6 years. Table 2 shows the nutritional knowledge, attitude and performance scores of the coaches of the top sport clubs in Shiraz. It should be noted that in order to calculate the score of each club in each dimension, the average scores of the coaches of that club are calculated.

The average scores of the top fitness club in Shiraz for nutritional knowledge, attitude, and performance were 14.367, 9.17, and 3.381 respectively. Similarly, Shannon's entropy calculations showed that the knowledge dimensional weight was 0.418, and the next rank belonged to the attitude dimension, which was 0.338 and the last was the performance whose weight was 0.243. Table 3 shows the distance between each club from the positive and negative ideal option, as well as the final ranking of the clubs based on the Topsis technique. As the results of Table 3 show, none of the clubs had a good performance based on nutritional knowledge, attitude, and performance, because no one was higher than the first hypothesis club with a good and moderate performance. The results also showed seven clubs had a poor performance in this area.

Discussion

In our study, none of the coaches of the top sport clubs in Shiraz had a good score on nutritional knowledge, attitude and performance. Also, the ranking of clubs showed that 73% and 27% of the top clubs in Shiraz, respectively, had a moderate and poor status in the nutritional knowledge, attitude and performance, the highest contribution in this ranking belongs to nutritional knowledge of coaches. In terms of average scores of the coaches of different clubs, in the score of nutritional knowledge, attitude and performance, it can be said that this score indicates that they are in a moderate situation.

Table 3: The ideal options and rankings.

Club	Rank	c_i	d_i^-	d_i^+
Hypothesis club no.1	1	0.437846388	0.007127368	0.009150871
A_{13}	2	0.412694427	0.005951595	0.008469716
A_{26}	3	0.403072533	0.005507489	0.008156277
A_{8}	4	0.382290408	0.004825413	0.007796963
A_{25}	5	0.380345552	0.00476839	0.007768604
A_{18}	6	0.379423357	0.004785007	0.007826254
A_{10}	7	0.379139998	0.004842974	0.007930604
A_{22}	8	0.37814675	0.004764875	0.007835723
A_{7}	9	0.376797189	0.004836485	0.007999293
A_{14}	10	0.36146278	0.0042453	0.007499478
A_{21}	11	0.359463284	0.004221566	0.007522515
A_{23}	12	0.359179219	0.004234166	0.007554283
A_{24}	13	0.348366032	0.003955821	0.007399537
A_{11}	14	0.340748842	0.003755848	0.007266487
A_{12}	15	0.339323665	0.003685892	0.007176574
A_{4}	16	0.33883881	0.003767289	0.007350944
A_{17}	17	0.337823013	0.003679265	0.007211838
A_{6}	18	0.33732688	0.003774388	0.007414724
A_{15}	19	0.33654455	0.003665135	0.007225354
A_{19}	20	0.336359632	0.003700803	0.007301715
Hypothesis club no. 2	21	0.335899734	0.003773544	0.007460594
A_{9}	22	0.33576351	0.003773396	0.007464859
A_{16}	23	0.335434572	0.003718927	0.007367965
A_{2}	24	0.335111244	0.003757245	0.007454689
A_{1}	25	0.334914663	0.003750229	0.007447336
A_{20}	26	0.334786834	0.00372984	0.007411099
A_{3}	27	0.311702705	0.003286137	0.007256398
A_{5}	28	0.282415013	0.002774681	0.007050153

A study on the nutritional knowledge of 55 sports instructors in Brazil showed that they were able to answer 70% of the questions correctly, with an average score of 25, 17.5, while in this study, the sport coaches from the top clubs in Shiraz from 31 points obtain an average of 14.36 (7). In another study in Texas, it was found that 67% of sports coaches had good background information about the nutrition in athletes (17), however, in another study in North Carolina on nutritional knowledge of sports coaches, it was observed that although the coaches answered to 70% of the questions correctly, only one-third of the them were sure about the correctness of their answers (18).

In addition, in another study that investigated the nutritional knowledge and performance of the university athletic coaches found that coaches answered to only 67% of nutritional knowledge questions correctly. The female coaches rated more than men, and coaches with work experience of over 15 years obtained higher scores than their colleagues with less work experience (19). The reason for the difference in the results of various studies can be that in many countries, sports coaches do not need to attend academic courses (7), and also in these countries, professional athletes who did not finish their high school even after completing their professional sports courses can act as coaches in the same field.

Therefore, less than half of the coaches have completed their sports nutrition classes during their school year, which can have a direct influence on their performance (7). On the other hand, studies have shown that even if the coaches have completed the nutrition classes, their nutritional information is not necessarily enough, so the presence of nutritionists alongside the sport teams can help to promote teams' performances (19). On the other hand, the sports coaches are the main sources of information, including nutritional information for athletes, considered by their students as an aim.

Therefore, increasing information and nutritional beliefs of coaches can have the greatest effect on athletes. Therefore, in addition to the cooperation of health care professionals and nutritionist experts in sports teams, coaches 'instructors' training in relation to food choices, suitable foods for various sports courses, such as pre-workout, post-workout and competition, supplements, sports foods, and their disadvantages and benefits by nutritionists can be effective in raising the awareness and attainment of the athletes. As Belski et al. (2018) were able to increase the nutritional knowledge of the coaches by educating Australian football coaches about the nutritional needs of athletes and the importance of the athletes' adherence to the healthy diets (20). Therefore, it is suggested that future studies consider the nutritional knowledge, attitude and performance of coaches and athletes after nutrition education courses.

Conclusion

This study shows that the top sport clubs' coaches in Shiraz had a low level of nutritional knowledge, attitude and performance, with the most difference in the nutritional knowledge score, and none of the clubs had a good score in this regard. Hence, it is recommended to periodically provide nutritional education to these people in order to enhance the power of sports coaches in nutrition science, which is an essential and integral part of the exercise.

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Conflict of Interest

None declared.

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