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Assessment of Nutritional Knowledge of Lebanese Coaches: A Unique Study in the Middle East and North Africa (MENA) Region

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Abstract

Background: Trainers provide nutritional information to their athletes, yet, their skills in this field remain weak. No related research has been conducted so far in the Middle East and North Africa (MENA) region.
Methods: In this cross-sectional study, 151 trainers working with adolescent athletes completed a validated psychometric questionnaire that identifies their practices of disseminating nutritional advice to athletes, their degree of nutritional knowledge, and the factors identifying their level of knowledge.
Results: A considerable number of trainers gave advice to their athletes (82.8%). The trainers answered 51.1% of knowledge questions correctly. According to t-test results, the trainers, who provided nutrition advice scored 54.5%, significantly higher than trainers, who did not provide advice (47.7%; P = 0.002). A one-way Analysis of Variance (ANOVA) revealed a significant relationship between the score of the total knowledge of all trainers and qualifications (P = 0.001), own knowledge rating (P = 0.001), and nutrition training (P = 0.002).
Conclusions: These trainers were not ready to give advice to athletes and they should undergo additional nutrition training.

Keywords: Sports, Nutritional Status, Knowledge, Coaching

1. Background

With the progress of research and emergence of new technologies, our knowledge of the diets suitable for sport performance has improved. Due to this enhancement of information, the nutritional advice given nowadays to the athletes differs from the one given a decade ago. While talent and training are considered as primary factors for athletic performance, following sound principles of sport nutrition could optimize the abilities of athletes (1).

Registered dietitians and sport nutritionists play an important role in integrating exercise with nutrition principles, in order for athletes to maintain optimal health and attain ideal sport performance. However, because of limited resources, such as funding and geographic separation, not all sport teams are guided by dieticians and nutritionists, whose advice are exclusively offered for first class players. In this way, athletes are usually exposed to nutritional knowledge that comes from those, who work with them on a regular basis, such as the trainer or coach at the club or entertainment level. The trainer, a key member in the team, is often responsible for controlling the nutritional habits of the team (2). Although several trainers may not be qualified to give scientifically healthy information about nutrition or to recognize the nutritional malformation, they usually prescribe meals, diets, supplements, and often expect loss/gain weight from their athletes (3).

The published data concerning the nutritional knowledge of trainers and type/adequacy of nutrition information they provide is limited. Cockburn et al. (4) found that UK trainers did not have suitable nutritional knowledge to advise their athletes correctly. In fact, more than half of UK trainers gave advice to their players (n = 93, 57.1%), although they were not qualified to do so. Trainers answered 60.3 $\pm$ 10.5% of all the questions of knowledge correctly with no differences between those who gave advice and those who did not. Moreover, Torres-McGehee et al. (5) reported that athletes had insufficient information in all domains, which included micronutrients and macronutrients, supplements and performance, weight management and eating disorders, and hydration. Mean score of athletes, who participated, (n = 185) was 55%, proving that they were deficient in suitable knowledge. The findings of Torres-McGehee et al. (5) are identical to the findings of another study conducted 10 years earlier. Rosenbloom, Jonnalagadda, and Skinner (6) reported that athletes had a faulty perception of the roles of carbohydrates, proteins, vitamins, and minerals. Many other studies have also noted these results (7, 8). A study of 168 rugby trainers,

showed that approximately 84% of trainers advised their athletes (9). Torres-McGehee et al. (5) unveiled that 43% of athletes sought nutrition advice from their trainer. Furthermore, research has precariously indicated that trainers do not acquire whole nutritional knowledge (5, 9, 10). Other studies claimed that the nutritional knowledge of trainers ranged from 55% to 70% (2, 9, 11). This is a critical fact, which implies the necessity to investigate trainers' nutritional knowledge and determine whether or not it is adequate.

In Lebanon, no research about trainers' nutritional knowledge has been conducted previously. Therefore, the objectives of this study were to determine whether trainers in Lebanon gave nutritional advice to their athletes, their degree of nutritional knowledge, and factors identifying their knowledge degree.

2. Methods

2.1. Participants

The questionnaire on nutritional knowledge and practices was completed by trainers working with adolescent athletes. Originally written in English, the questionnaire was translated to Arabic and French to suit the trainers' language preferences. E-mails, which included a personalized hyperlink to the questionnaire, were sent to 100 trainers, who had email-addresses. On the other hand, 51 trainers, who had not received emails, were sent hard copies of the questionnaire. Every trainer was informed about the target and the procedure of the study, and the return of their questionnaire showed their approval for participating. The study was conducted in accordance with the Helsinki Declaration principles and was approved by the institutional review board of the Lebanese University (Ethical approval reference number 28/1893, date: 07/12/2016).

2.2. Questionnaire

The Sports Nutrition Questionnaire developed and validated by Zinn was the used instrument (12). The questionnaire included 6 sections (nutrition, fluid, recovery, weight gain, weight loss, and supplements) and 23 multiple choice questions, with a total of 88 items. Each question in the questionnaire had 3 answer options: "yes", "no", or "unsure". The unsure option was included so that trainers avoided guessing the answers. This allowed distinguishing between trainers, who had the correct knowledge (chose the right answer), trainers, who had incorrect knowledge (chose the wrong answer), and trainers, who did not have the knowledge (chose the "unsure" option). Moreover, the questionnaire was preceded by a demographics section that comprised items such as age, gender, race, length of time training, and obtained college degree.

2.3. Data Analysis

Statistical analyses were conducted using the SPSS software (version 20.0). The level of significance was set at $P < 0.05$ for all statistical analyses. The demographic characteristics for trainers and their total and sub-category mean scores were tabulated. Descriptive analyses were based on frequencies and percentages. Student tests were used to decide if there were significant differences between the knowledge scores of trainers, who provide advice and those, who do not provide advice. A one-way ANOVA was used to decide whether knowledge scores were affected by the length of time coaching, age, qualifications, trainers rating of nutritional knowledge, how often trainers read about nutrition, whether trainers had received formal nutrition training, previous training level, and whether trainers had received advice as a player.

3. Results

One hundred and fifty-one trainers were interviewed. These trainers were from ten major cities and coached athletes enrolled in national/international gymnastics, tennis, swimming, basketball, football, and judo events. These trainers were divided to 2, almost equally aged groups, 30 to 39 and 40 to 49, and most of them had between 3 and 6 years of coaching experience. Most of the samples (72.8%) had an undergraduate degree or above.

3.1. Nutrition Advice

Most trainers (n = 125; 82.8%) gave nutrition advice to their athletes, while 26 trainers (17.2%) did not give any advice. The reasons why trainers did not give advice were the lack of confidence in their knowledge (58.9%), the fact that someone else gave advice (26.5%), the belief that the advice was not considered as important (13.2%), or the lack of time (9.9%). Moreover, trainers gave advice on fluid issues (84.8%), types of nutrients (79.5%), recovery (25.2%), supplements (31.8%), and weight control (19.9%).

3.2. Knowledge Rating

Most trainers, who have given advice, estimated their knowledge as average or good, with only a few extreme estimations as excellent or poor. However, trainers, who had not given advice, rated their knowledge as poor or average. Nevertheless, 50% of trainers (n = 10), who rated their knowledge as poor, were those, who always gave advice to their athletes. Figure 1 shows the level of trainers' knowledge in sports nutrition.

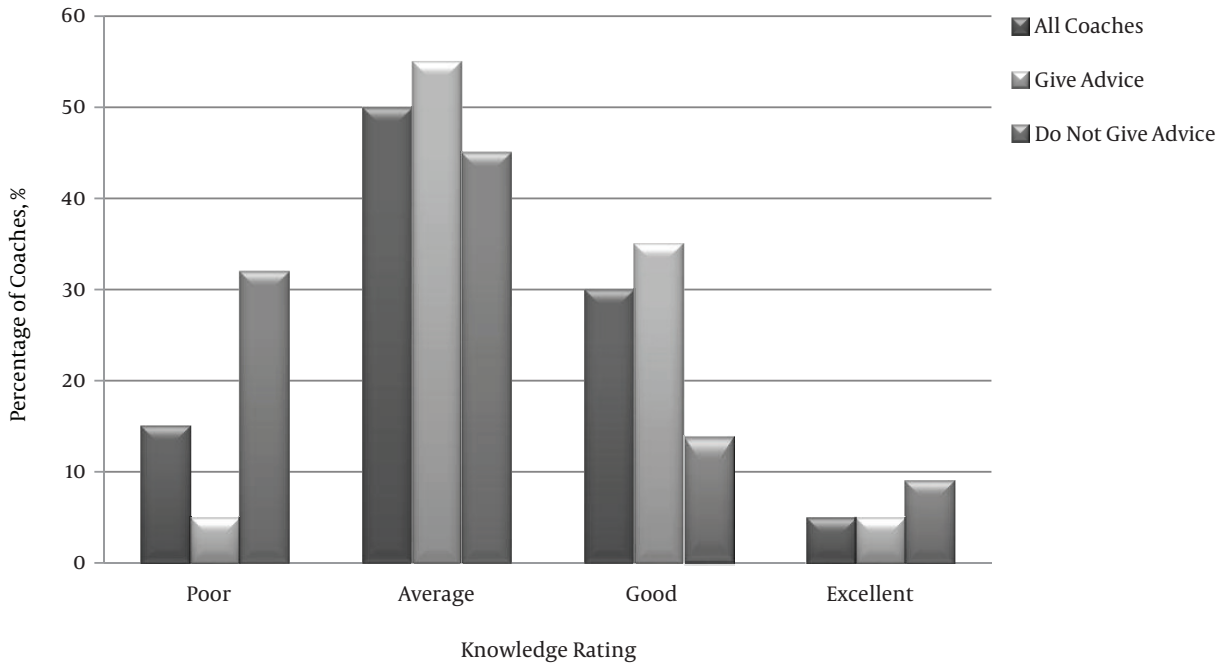

Figure 1. Ratings of Coaches Own Sports Nutrition Knowledge

3.3. Sports Nutrition Knowledge

The total percentage of results (correct, incorrect, and uncertain) obtained by the trainers in the questionnaire of nutrition knowledge is illustrated in Figure 2. A t-test showed that trainers, who gave nutritional advice had a significantly higher score (54.5%) than those, who did not give advice (47.7%; P = 0.002).

Table 1 exhibits the mean total, correct, incorrect, and unsure scores attained by trainers concerning each nutrition knowledge sub-category. Repeated measures one-way ANOVA proved a significant difference in mean total score between categories for all trainers ($P < 0.05$). Post hoc tests determined that trainers hit significantly higher scores in the nutrients category compared to all other sub-categories, and in the recovery category compared to fluids, weight control, and supplements. According to the analysis of the mean percentage of correct scores, it was found that trainers answered significantly fewer questions correct in the supplements category in comparison with all other sub-categories.

3.4. Sub-Category Knowledge

Fluid/Hydration: Trainers answered half of the fluid questions correctly. Most of the coaches knew about specific dehydration matters. However, only 33% of trainers recognized the optimal amount of fluid that was needed for a 2-hour training session, and only 13% recognized the right amount of carbohydrate in a sports drink.

Weight Control: The responses to the four questions related to weight control had a mean correct percentage range of 6.6% to 39.7%; 26.5% of the coaches believed that protein powder played an essential role in increasing lean muscle mass.

Supplements: This sub-category had the poorest answers among all other sub-categories. The number of unsure responses in this sub-category were remarkably greater than the number of incorrect responses (P = 0.000). Moreover, the number of unsure responses reported in this sub-category exceeded the number of unsure responses reported in any other sub-category (P = 0.000).

3.5. Nutrition Training and Information Sources

Only 26.5% of trainers had undergone formal nutrition training. Moreover, only 24% of the trainers issuing advice had undergone formal nutrition training. Trainers were requested to affirm how much they read about issues of sport nutrition. Twenty percent (19.9%) of trainers did not conduct any reading. Other trainers read about sports nutrition on a (8.6%) weekly, (35.8%) monthly, or (26.5%) six monthly basis. The trainers obtained knowledge on sports nutrition by reading via the Internet (60.9%), magazines (44.4%), lectures/seminars/courses (25.8%), journal articles

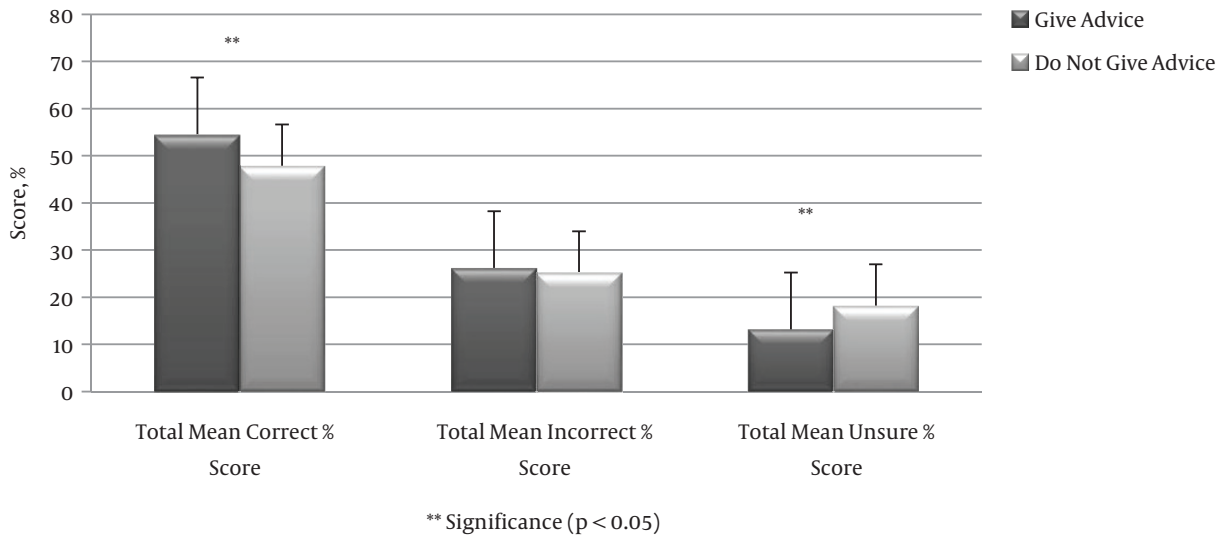

Figure 2. Total Mean Correct, Incorrect, and Unsure Percentage Scores

Table 1. Sub-Category Nutritional Knowledge Scores (N = 151)[a]

Sub-Category	Coach Group	Correct Knowledge Score	Incorrect Knowledge Score	Unsure Knowledge Score
Nutrients	All coaches	71.1 ± 8.1	23.9 ± 5.2	11.3 ± 9.9
	Give advice	64.1 ± 10.8	23.6 ± 5.3	10.6 ± 9.1
	Do not give advice	59 ± 11.0	24.1 ± 6.1	15.2 ± 12.8
Fluids	All coaches	56.5 ± 14.5	30.1 ± 11.8	20.9 ± 17.8
	Give advice	58.8 ± 12.5[b]	30.2 ± 12.9	18.5± 15.1[b]
	Do not give advice	44.6 ± 19.4	30.2 ± 10.7	32.9 ± 24.7
Recovery	All coaches	59.1 ± 22.0	31.4 ± 13.8	27.3 ± 9.2
	Give advice	60.6 ± 21.6	30.8 ± 14.5	11.7 ± 11.2[b]
	Do not give advice	51.5± 23.6	31.7 ±12.7	22.4 ± 12.8
Weight Control	All coaches	52.2 ± 13.4	34.3 ± 5.0	14.6 ± 16.7
	Give advice	52.7 ± 13.9	33.5 ± 4.8	13.2 ± 12.6[b]
	Do not give advice	49.5 ± 12.4	35.0 ± 4.8	21.5 ± 14.5
Supplements	All coaches	34.7 ± 18.8	21.4 ± 17.4	44.7 ± 24.2
	Give advice	36.9 ± 19.1[b]	21.0 ± 18.7	42.2 ± 23.1
	Do not give advice	23.7 ± 13.1	21.2 ± 16.3	57.7 ± 26.2

[a] Values are expressed as %mean ± SD
[b] Significant (P < 0.05).

(8.6%), and sponsors (1.3%). Amongst trainers, who gave advice to their athletes, 94.6% read about the issues of sport nutrition.

Most trainers (83.4%) did not employ a professional from the outside in order to give a sports nutrition advice to their athletes. On the other hand, the low percentage of trainers that employed a professional (14.6%), employed a sport nutritionist (66.2%), physiotherapist (50.3%), team trainer (37.1%), personal trainer (25.2%), registered dietician/nutritionist (16.6%), and academic (16.6%) and/or a doctor (8.6%). Moreover, among the trainers, who gave nutritional advice, 20.5% employed a professional.

3.6. The Relationship Between Knowledge Scores and Demographics

Statistical significant differences were not observed for the score of total knowledge for all variables, time coaching, qualifications, nutrition reading, level of playing experience, and advice received as a player. A significant difference was found between the score of total knowledge, qualifications of variables (P = 0.001), nutrition training (P = 0.002), advice provision (P = 0.004), and knowledge rating (P = 0.001). Trainers, who acquired more advanced qualifications and nutritional training, and gave advice to their athletes, had accomplished total scores that were greater than those, who were less qualified. The latter trainers did not give an advice, and had never undergone formal nutrition training. Furthermore, those who hit high levels of knowledge acquired scores that were greater than that of the trainers, who hit lower levels of their own knowledge. A step-wise multiple regression analysis showed the combination of 3 variables, qualifications, own knowledge rating, and whether the trainers had given nutrition advice, had accomplished a greater score of total knowledge (P = 0.001).

4. Discussion

4.1. Sports Nutrition Knowledge

For the first time in history, the MENA region witnessed a study that determined the nutritional knowledge of Lebanese trainers in "leanness" and "non-leanness" sports. The total average knowledge score of all trainers in this study was 51.1%, lower than the results reported by previous studies (2, 4, 5, 11, 13-15), through which the authors concluded that trainers needed supplementary nutrition training. Subsequently, the study's results proved that Lebanese trainers had incompetent knowledge of sports nutrition. It is worth mentioning that trainers of this study, who gave nutrition advice to their athletes obtained a significantly higher percentage of correct answers (54.5%), and a percentage of uncertain answers (10.22%) that was significantly lower than those, who did not give advice (47.7% and 15.9%, respectively). Recent research proves that athletes do not have enough nutritional knowledge (5, 6, 11, 16, 17), and their nutritional intake is inadequate to support health and performance (16, 18-20). Consequently, trainers in Lebanon must rely on adequate knowledge while disseminating factual nutritional information.

Although this study did not take into consideration what information the coaches gave to their athletes, multiple conclusions could be made. First, coaches only shared with their athletes the nutritional information that they adequately knew. Second, if a coach chose "unsure" as a response to a question, they presumably did not know the right answer and in this case they would not provide any relating advice to their athletes. However, what is critical is that coaches believed that the information they communicated to their athletes was correct, when in fact this information was not correct.

4.2. Sub-Category Knowledge

Most of the trainers' answers were correct concerning nutrients and recovery categories compared to fluids, weight control, and supplements. These results are identical to those of another research group (4, 14, 19), which found that trainers hit the highest score in the nutrients category compared to the remaining categories.

4.2.1. Fluid

Almost all coaches provided advice to their athletes regarding hydration. The percentage of correct answers of trainers, who gave advice (58.8%) was significantly greater than those, who did not give advice (44.6%). However, the scores are still considered undesirable. These results imply that if coaches believe that their knowledge is correct and they share this information with athletes, more than one-quarter of the information they communicate is incorrect. Moreover, 79.5% of the coaches knew that thirst did not best indicate the need for hydration, similar to what was reported by Smith-Rockwell et al. (10).

4.2.2. Weight Control

All trainers answered the questions of the questionnaire inaccurately concerning weight control issues. These conclusions are comparable with those of another research group (4, 9), and show that coaches are misled about weight control issues due to the spread of numerous nutritional myths and misinformation in our societies.

4.2.3. Supplements

It is worth noting that only 20% of trainers gave advice on supplements, thus they achieved significantly lower scores in this category compared to others. A similar low score was reported by Bedgood and Tuck (32.6%) (14) and Cockburn et al. (15.1%) (4), whereas, the trainers of Rockwell et al. recorded a high score (89%) (10). Based on the speculation described above, this finding is encouraging because it implies that trainers in this study may choose not to give an inaccurate advice on supplements. In this case, athletes could have the chance to obtain the correct information from a different source.

4.3. Nutrition Training

The trainers demographic that was distinguished were the trainers who underwent formal nutrition training. These trainers achieved a significantly greater percentage of correct answers than those who did not. This conclusion may determine that continued professional development is a must in order to develop knowledge of the trainer. In Lebanon, the coaching system is not licensed so that as soon as trainers acquire their qualification, they are no more required to undergo a continued professional development to maintain it. Cockburn et al. (4) observed that only 25.2% of UK trainers received a formal nutrition training. Similarly, this current study showed that only 26.5% of trainers underwent a formal nutrition training, even though the majority noticed the importance of nutrition for performance and injury. Juzwiak et al. (2) concluded that Brazilian trainers were not well-prepared to provide nutrition advice, and noticed that only 41% of their cases went to nutrition classes. Nevertheless, they did not provide any analysis of total score comparisons between the 2 groups. It is worth mentioning that the lack of continued professional development for trainers may have had a negative influence on the quality of coaching.

4.4. Nutrition Information Sources

Concerning informal learning, a great percentage (83.4%) of trainers read about the issues of sports nutrition. Nevertheless, this matter has nothing to do with nutrition knowledge. Most of the trainers referred to the Internet to enrich their information, since it has a wide variety of resources. Subsequently, it is regrettable to know that almost 9% of trainers consulted journal articles where they could find information of high quality, and this percentage was too far from what was mentioned by Cockburn et al. (4) (49%). However, a former research determined the existence of a gap between the research of sports science and coaching practice. For this reason, it is required to ensure that the research of sports science is distributed in both coaching forums and sport specific magazines, and that appropriate "lay" language is used (21). This may help trainers in using academic information and including it in their coaching with confidence.

4.4. Limitations

The present study had some limitations, which should be documented. The questionnaire did not recognize the level of athletes with whom the trainers worked. In addition, no gender differences could be determined because the gender of the sample was not examined. Accordingly, the fact that this study did not include this kind of information, it did not have serious disadvantages.

4.5. Conclusion

Although the perception of sports nutrition could be beneficial for every athlete, it would be difficult to appoint qualified professionals, like dieticians and nutritionists, to work with athletes in each sport unit in Lebanon. Consequently, the role of trainers is important because they are able to positively influence food consumption behavior of their athletes. The current results imply that the study's trainers were not sufficiently ready to deliver considerable quality of information concerning sports nutrition. Therefore, trainers should obtain necessary funding to be in permanent contact with a dietitian or a qualified nutritionist in order to provide nutritional information to the team. Additionally, it is recommended for trainers to receive further training to increase their nutritional knowledge.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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Footnote

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