



## The Reliability and Validity of Persian Version of Sports Coaches' Nutrition Questionnaire

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### ABSTRACT

**Background:** Sports nutrition knowledge is one of the essential needs of coaches. However, there is no standardized questionnaire in Persian to assess coaches' nutritional knowledge and information. Therefore, the purpose of this study is to evaluate the validity and reliability of Persian version of the Coach Sports Nutrition Questionnaire (CSNQ). **Methods:** CSNQ was translated-re-translated according to the WHO standard method, following Iranian culture and eating habits. The reliability of the questionnaire was assessed by test-retest method, correlation coefficient and internal reliability by Cronbach's alpha, and differential validity by independent t-test. 123 Iranian coaches completed the questionnaire. **Results:** The total internal reliability of the questionnaire assessed by Cronbach's alpha was 0.73. The intragroup correlation of the questionnaire, assessed by the test-retest method, was 0.71. Moreover, the comparison of the coaches with different levels of education was found to be significant ( $P < 0.001$ ). **Conclusion:** The Persian version of the questionnaire regarding the coaches' nutrition sports knowledge has acceptable reliability and validity. It can help other studies and evaluate sports nutrition knowledge in Persian coaches.

**Keywords:** Sports; Nutritional status; Questionnaires; Nutrition knowledge.

### Introduction

Today, champions' progress in various sports depends on continuous and challenging training. Adequate and balanced nutrition is essential in achieving optimal performance and proper body composition. Nutrient timing has been shown to help athletes in training and competitions; proper nutritional strategies before, during, and after training and competition are needed to improve physical and mental function and performance at the highest level (Trakman *et al.*, 2016). Nutritional knowledge is one of the determinants of dietary behaviors. High nutrition

knowledge can affect the choice of quality food by the athlete (Aka, 2020). Sports nutritionists often focus on nutrition education to increase awareness and adherence to specialized dietary guidelines.

Various studies demonstrate that athletes prefer their coaches to nutritionists as the primary source of nutrition knowledge (Jessri *et al.*, 2010, Waly *et al.*, 2013). Therefore, the level of nutrition knowledge of the coach and other technical staff is essential for the athlete to choose proper food (Aka, 2020). Nevertheless, a study in California found that 89% of coaches have never participated

in a nutrition training program. Only 16.7% believed that they must give proper training on health musts their athletes. It was also found that female wrestling coaches had more knowledge about eating disorders than male wrestling coaches (Fehn-Tuavao, 2020). In another study on the nutrition knowledge of football coaches, researchers found that sports nutrition information of coaches trained in lower leagues was scarce (Aka, 2020).

Nutrition knowledge can be assessed using validated questionnaires (Heikkilä *et al.*, 2018). A comprehensive questionnaire can assess all aspects of nutrition knowledge, such as macronutrients, micronutrients, supplements, and hydration. In Iran, there is not much research on the level of nutrition knowledge of coaches and trainers. Although the questionnaire of sports nutrition knowledge of coaches has been introduced in different languages (Elsahoryi *et al.*, 2021, Salami *et al.*, 2017, Zinn *et al.*, 2005), this questionnaire does not exist in Persian. There is a standardized questionnaire of nutrition knowledge for non-athletes (Azizi *et al.*, 2011, Barzegari *et al.*, 2011), athletes (Basami *et al.*, 2016), and even young athletes (Ahmadi *et al.*, 2021); however, a suitable questionnaire to measure sports nutrition knowledge among coaches has not been made in the Persian language. Therefore, in the present study, the reliability and validity of the CSNQ have been investigated.

### Materials and Methods

*Study design:* The sports nutrition knowledge questionnaire of the coach, first designed by Zinn *et al.*, was selected for this study (Zinn *et al.*, 2005). At first, this questionnaire was translated according to Iranians' culture and eating habits. Next, it was translated-re-translated according to the standard method of the World Health Organization. Then, 123 coaches in different fields and cities of Iran completed the questionnaire through the online link.

The questionnaire consists of two parts: the first part examines personal and general knowledge of the coaches and consists of 22 questions. The

second part includes 23 multiple-choice questions divided into six sections: nutrition, fluids, recovery, weight gain, weight loss, and supplements (88 items). Each question has three options; the third one is "I am not sure" to prevent coaches from guessing. The changes made to the original questionnaire are as follows: In question 3, in the first part, the fourth option, "university education", was graded when returning to Persian and was precisely divided into three options: bachelor's, master's, and Ph.D degrees.

*Data analysis:* Demographic characteristics of coaches and the mean scores were tabulated. Descriptive statistics were determined based on frequency and percentage. In order to determine time reliability by test-retest method, this questionnaire was completed by 14 coaches twice with an interval of 2 weeks. The correlation coefficient was calculated with the Pearson method. Internal reliability was also assessed from the calculation of Cronbach's alpha. For assessing differential validity, coaches with a bachelor's or higher degrees were compared with coaches with a low bachelor's degree via t-tests. Also, the authors used one-way ANOVA to determine differential validity. Statistical analysis was performed using SPSS software (version 24). The significance level was determined at 0.05 for all statistical analyzes.

### Results

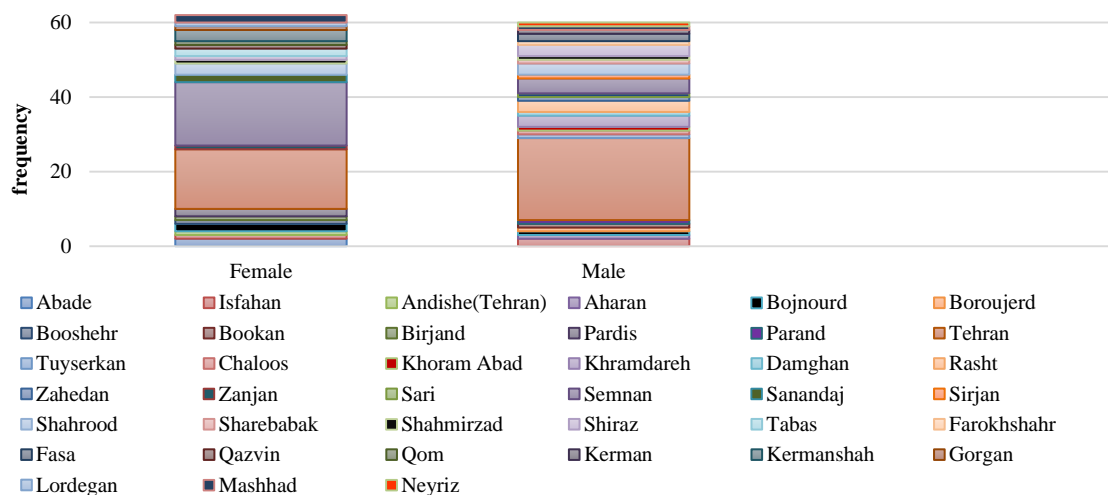
The demographic information of the research participants is shown in **Figures 1 to 3**.

**Validity:** Parametric statistics were used according to normality test (examined by the Shapirovik test). Coaches with a bachelor's or higher degrees received a mean score of 103.73, and coaches with a lower bachelor's degree received a score of 96.36. There was a significant difference between the two groups ( $P < 0.001$ ). Moreover, one-way ANOVA showed significant differences in total knowledge scores regarding the different levels of education and passing education courses (yes/no). Therefore, it can be said that the questionnaire had sufficient validity (**Table 1**).

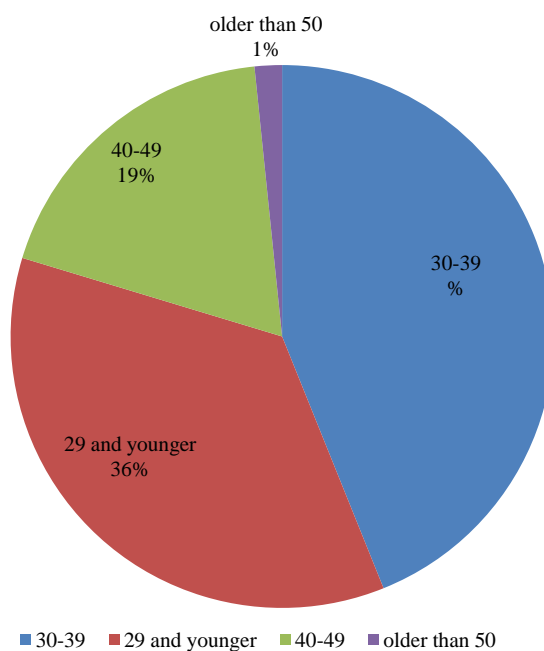
**Reliability:** Cronbach's alpha coefficient results

are presented in **Table 2**. The internal reliability of the whole questionnaire was 0.73. Also, the correlation between the score of test-retest was

acceptable (**Table 2**). Therefore, the questionnaire has acceptable internal and time reliability.



**Figure 1.** Demographic information (city of residence).



**Figure 2.** Age of participants.

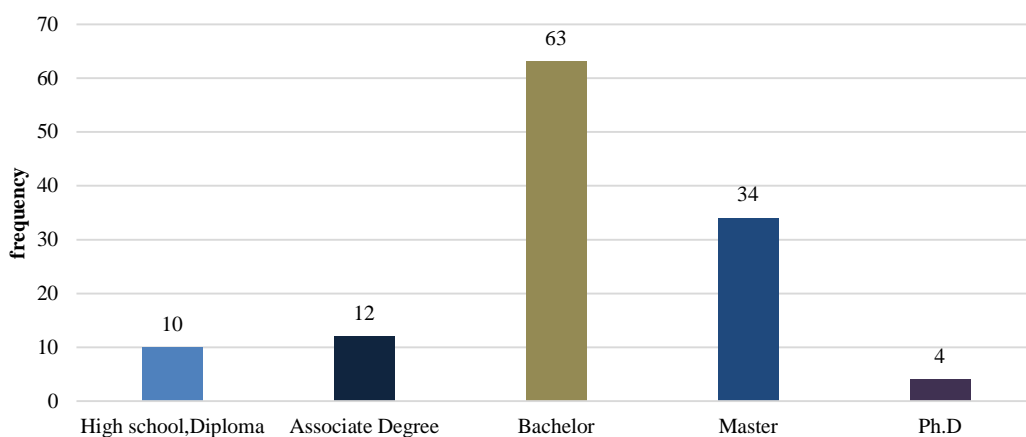


Figure 3. Level of Education.

Table 1. Results of one-way ANOVA tests to compare participants' nutrition knowledge.

Variables		Mean	df	F	P-value.
Educational levels	High school diploma	95.6	4	4.519	0.002
	Associate degree	97.0			
	Bachelor's degree	104.8			
	Master's degree	109.4			
	Ph.D.	113.7			
Passing educational courses	Yes	107.82	2	3.983	0.021
	No	102.60			
	I do not know / I have no answer	85.00			

Table 2. Cronbach's alpha and correlation coefficients of the whole questionnaire and subsections

Scale	Number of questions	Cronbach's alpha	Correlation coefficient
The whole questionnaire	80	0.73	0.71
Nutrient	34	0.61	0.79
Fluid	9	0.15	0.42
Recovery	11	0.45	0.58
Weight gain and loss	15	0.14	0.75
Supplements	11	0.38	0.17

**Discussion**

Athletes' nutrition is essential for maintaining their overall health and improving their athletic performance. Although the level of nutrition knowledge of coaches graduating in sports science is somewhat higher, the scores obtained from the coach nutrition knowledge questionnaire in previous research are not significant and appropriate (Aka, 2020). The relationship between knowledge, attitude, and behavior regarding nutrition is not fully understood. Nutritional

knowledge is essential for improving healthy eating habits, and recent studies suggest that proper exercise nutrition may play a small but pivotal role in this process (Vázquez-Espino *et al.*, 2020). Coaches are one of the primary knowledge sources for athletes. Therefore, it is necessary to determine the level of nutritional knowledge of coaches. In this study, the authors tried to introduce a suitable tool to measure coaches' level of sports nutrition knowledge in Persian language. The English version questionnaire of the coach's sports

nutrition knowledge, which was previously used in several studies, was selected (Cockburn *et al.*, 2014, Salami *et al.*, 2017, Zinn *et al.*, 2006).

Zinn *et al.* reported that construct validity of this questionnaire was high, as indicated by significant mean knowledge score differences between the groups and test-retest reliability, and Pearson's correlation was 0.74-0.93 (Zinn *et al.*, 2005). In another study, these researchers used this questionnaire to evaluate New Zealand's premier club rugby coaches (Zinn *et al.*, 2006). In addition, Salami *et al.* conducted a study to assess the nutritional knowledge of Lebanese coaches working with adolescent athletes via this questionnaire (Salami *et al.*, 2017). They translated the questionnaire into Arabic and French to suit the trainers' language preferences. In another study, Cockburn *et al.* evaluated the sports nutrition knowledge of UK coaching certificate (UKCC) Level 2 and 3 of hockey and netball qualified coaches with this questionnaire (Cockburn *et al.*, 2014).

In this study, acceptable internal and time reliability was found. Cronbach's alpha coefficients and intra-group correlation for the total questions of the questionnaire were 0.73 and 0.71, respectively, which indicates that the Persian version of the questionnaire on sports nutrition knowledge of coaches is a reliable and valid tool.

The total number of questions was 23, which considering the sub-categories, the total number of items to be answered was 81. Compared to the existing questionnaires, it seems that the questionnaire is not too long to complete and is appropriate according to its various sections. However, this questionnaire does not provide information about coaches' knowledge regarding doping. On the other hand, this questionnaire was completed online. Although it seems that the results would be the same as the paper form, this cannot be said with certainty.

Another important point is the athlete's assessment of the coaches' knowledge because if the athletes think that their coaches have good nutrition knowledge, they trust them more with

information. Therefore, the athletes' perception of their coaches' nutrition information should be considered, as well. If these perceptions are compared with the information obtained from this questionnaire, other helpful information will be also obtained.

The questionnaire was completed online, and through the web platform, fewer questionnaire samples were completed than the paper form. Furthermore, the accuracy of the information entered was based on the coaches' statements, who were asked to respond honestly. The strengths of the study were convenience and availability of the questionnaire even from cell phone browsers. Also, the coaches felt free to fill out the questionnaire without a third party to stress them out.

### Conclusions

According to the results, the Persian version of CSNQ is a reliable and valid tool for sports organizations, managers, federations, and sports boards to assess the nutrition knowledge, attitude, and behavior of coaches in Iran. According to previous studies, athletes usually consider their coaches as the most accessible and reliable source of nutrition information. It is essential to determine and increase the coach's amount of nutrition knowledge to be transferred to their athletes. This leads to right decisions, which ultimately leads to optimal sports performance and guaranteed health of the athletes.

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### Authors' contributions

Ebrahimi M designed the study and edited and translated the manuscript into English, Ahmadi F performed the statistical analysis and wrote the manuscript in Persian., Hashemi Fard ES designed the questionnaire in Google form, and Mehri N translated the main questionnaire into Persian; all the authors contributed by sharing the questionnaire with coaches and read and approved the final manuscript.

### Conflict of interests

The authors declared no conflict of interest.

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