



# Validity and Reliability of the Persian Version of the Sports Nutritional Knowledge, Attitudes, Behaviors questionnaire in Adolescent Athletes

Faezeh Ahmadi<sup>1</sup>, Mohsen Ebrahimi<sup>2\*</sup>, Vali Ollah Kashani<sup>3</sup>

1. MSc of Exercise Physiology, Semnan University, Semnan, Iran.

2. Assistant Professor of Exercise Physiology, Semnan University, Semnan, Iran.

3. Assistant Professor of Motor Behavior, Semnan University, Semnan, Iran.

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## ABSTRACT

**Introduction:** The present study aimed to evaluate the validity and reliability of the Persian version of the Sports Nutritional Knowledge, Attitudes, Behaviors questionnaire (SNKABQ) in adolescent athletes.

**Methods:** SNKABQ was designed by Walsh et al. The questionnaire was translated and re-translated using the WHO standard method and in line with the Iranian culture and nutrition habits. The qualitative content validity of the questionnaire was assessed by five experts, time reliability was assessed using the test-retest method, and the correlation coefficient and differential validity were determined by comparing novice and skilled athletes using the Mann-Whitney U test. In addition, the internal consistency of the questionnaire was assessed based on Cronbach's alpha, and the questionnaire was completed by 191 male and female students aged 15-18 years.

**Results:** The total time reliability of the questionnaire was estimated at 0.86, while it was 0.92 for eating and drinking habits, 0.75 for nutrition attitudes, 0.88 for nutrition knowledge, and 0.89 for nutrition information sources. Moreover, the Mann-Whitney U test indicated that the questionnaire has significant differential validity ( $P=0.00$ ). The total internal reliability of the questionnaire was determined to be 0.74. The internal reliability of the subscales was also measured and estimated at 0.71 for eating and drinking habits, 0.80 for nutrition attitudes, and 0.70 for nutrition knowledge and nutrition information sources.

**Conclusion:** SNKABQ had acceptable validity and reliability in the adolescent athletes and could be used as a tool for the assessment of Iranian adolescent athletes.

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## Introduction

Poor eating behaviors play a key role in the development of chronic diseases, and changes in eating habits could largely influence the human health throughout life. Recognition of the nutritional status of various communities is paramount, especially in school-age children (1, 2) to resolve the lack of knowledge in this regard through the implementation of training courses.

Extensive research has confirmed the effects of proper nutrition and physical activity on the growth and overall health of children. Furthermore, In Adolescents who are involved in championship sports, nutrition plays a key role in exercise performance and training adaptations. In addition to the ratio of nutrients, meal and snack timing is just as important

because it plays a pivotal role in athletes' performance and recovery (3).

Terms such as nutrients, dietary supplements, ergogenic supplements, and performance-enhancing supplements are used frequently in various products claiming to improve athletic performance and health to attract the attention of athletes. Proper sports nutrition strategies and selecting the optimal supplements (if needed) require an adequate knowledge of nutrition (4). Therefore, the knowledge and awareness of athletes should increase in this regard, especially in the case of adolescent (5). Notably, the level of knowledge, attitude, and practice should be initially enhanced by valid tools for the evaluation of these parameters. According to the literature, the general knowledge of nutrition and sports may vary with changes in social conditions and

\* Corresponding author: Mohsen Ebrahimi, Assistant Professor of Exercise Physiology, Semnan University, Semnan, Iran. Tel: +982333382184; Email: mebrahimi@semnan.ac.ir.

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geographical climate, and even the gender of athletes is considered to be an influential factor in this regard (6). The healthy diet of athletes requires a high level of nutrition knowledge (7). A study indicated that after the nutrition education of adolescent soccer players, they obtained higher scores of nutrition knowledge, which encouraged them to take healthier meals (8). In another research conducted in 2014, it was reported that adolescent rugby players had an adequate, general knowledge of nutrition and sports, while they were not sufficiently aware of carbohydrates and their dietary role (9).

Given the diversities in dietary habits and cultures and type and name of foods consumed across the world, a valid questionnaire is required for each population based on their specific cultural habits and native language (10). According to research in Iran, no complete and comprehensive studies have investigated the attitudes and nutrition knowledge of adolescent athletes, and data are scarce on the nutrition knowledge of adolescents; therefore, extensive research is required in this regard. Moreover, the validity and reliability of the sports nutrition knowledge questionnaire has not been assessed for young Iranian students.

The present study aimed to evaluate the validity and reliability of the sports nutrition knowledge questionnaire in adolescent athletes.

## Materials and Methods

SNKABQ was first used by Walsh et al. (2011) to assess the sports nutrition knowledge, attitudes, and behavior of Irish athletic male students. The original version of the questionnaire was completed by 203 rugby players who were selected from six boys' schools in Ireland to determine their knowledge, attitudes, and behavior toward sports nutrition. In the present study, the questionnaire was translated based on the cultural and nutrition habits of Iranians and re-translated using the World Health Organization (WHO) standard method for the conversion of the original language into the language of the target community (11). After performing the translation-Retranslation process, the researcher examined the validity and reliability of the Persian version of the Sports Nutrition Knowledge Questionnaire in Iranian athletes aged 15 to 18 years (12). The final questionnaire used in this study was translated into Persian and modified by Iranian

culture and eating habits and, includes the following five sections: 1. Athlete training program inside and outside the school, 2. Eating habits and Drinking (10 questions), 3. Nutrition attitude (5 questions), 4. Nutrition knowledge (13 questions), 5. Sources of the nutritional information of athletes.

In two-choice questions, each correct answer has 1 point, and the fault answer has 0, also in more than two-choice questions, the correct answer has 2 points, the fault answer has 0, and the "don't know" response has 1 point. The minimum score that the subjects can receive in the translated version is zero and, the maximum score is ninety-eight points.

A panel of five experts also determined the face validity of the questionnaire, including three professors of sports sciences (Semnan University), one nutritionist, and one psychologist (Qazvin International University) who was familiar with Iranian cultural and dietary habits. The viewpoints of the experts were applied to the questionnaire. All the experts confirmed that the items of the Persian version of the sports nutrition knowledge questionnaire could accurately assess the knowledge and attitude of sports nutrition in athletes. In the Persian version of the questionnaire, the original version was modified to some extent. For instance, we added the choice of 4-6 days to item four (due to the possibility of selecting the choice by those consuming breakfasts four, five, or six days a week) and the milk choice to item eight regarding snack consumption (milk is a usual snack among Iranians). In addition, we changed the term "non-alcoholic beverage" to "drink" in item nine due to the prohibition of using the words describing alcohol and its derivatives in research questionnaires of students, and item 10 was also eliminated since it was also focused on the consumption of alcoholic beverages (non-compliance with the nutritional culture of Iranians).

To determine the time reliability using the test-retest method, the questionnaire was completed by 19 adolescent football players twice at two-week intervals. Following that, the correlation-coefficient between the obtained scores of the two tests was calculated, and the reliability coefficient was determined. The final version of the questionnaire was distributed among 191

athlete students (more than 5 sample per each item of questionnaire).

With regard to the sample population, we selected 174 adolescent athletes from the schools in districts one, four, seven, and 11 of Tehran (Iran) and 10 participants from the Wushu athletes who were involved in the Gold Belt Competitions held in Tehran in December 2019. In addition, seven other subjects from different cities in Iran completed the questionnaire online via a link.

The differential (diagnostic) validity of the questionnaire was determined by comparing two groups of novice and skilled athletes, which were classified based on the longest presence or

gaining a sports position in national/provincial competitions or in Tehran. In addition, validity was assessed using Mann-Whitney test in SPSS version 24, and descriptive statistics were also used to categorize the raw data and adjust the tables.

The obtained data were not normally distributed as indicated by the K-S test (Table 1).

## Result

The following tables (table 2-4) show the demographic information of the subjects. Table 5 shows the comparison of the novice and skilled athlete groups.

**Table 1.** Tests of Normality (Kolmogorov-Smirnov)

	Statistics	df	Sig
Habits	0.095	191	0.00
Attitude	0.117	191	0.00
Knowledge	0.098	191	0.00
Total	0.092	191	0.00

**Table 2.** Demographic Information (School Type)

	Female	Male	Total
All regions	99	92	191
District one of Tehran	1	10	11
District four of Tehran	0	19	19
District seven of Tehran	57	42	99
District ten of Tehran	1	0	1
District eleven of Tehran	28	19	47
District fourteen of Tehran	1	0	1
Cities around Tehran	6	0	6
Ilam	0	1	1
Markazi	2	0	2
Golestan	2	0	2
North khorasan	1	1	2

**Table 3.** Demographic Information (School Type)

School Type	Governmental	70	55	125
	Non-Governmental	29	37	66

**Table 4.** Demographic Information (Sports)

	Sports	Female	Male	Total
Aerobics		1	0	1
badminton		6	3	9
Bodybuilding		2	7	9
basketball		5	6	11
Shooting		2	0	2
table tennis		5	2	7
Cycling		0	1	1
Track and Fields		1	1	2
Rock climbing		1	0	1
Equestrian		1	0	1
Swimming		7	0	7
Soccer		2	46	48
Futsal		6	2	8
Wrestling		0	3	3
Volleyball		23	7	30
Handball		1	1	2
Martial Arts		21	9	30
No answer to the relevant question		16	4	20

**Table 5.** Results of Mann-Whitney U Test for Differential Validity

	N	Mean Rank	Sum of Ranks
Elite	97	111.28	10794
Amateur	94	80.23	7542
<b>Total</b>	191		

**Table 6.** Test Statistics

Mann-Whitney U	3077
Wilcoxon W	7542
Z	-3.88
Asymptotes Sig. (two-tailed)	0.00

A significant difference was observed between the beginners and skilled athletes. With regard to reliability, the Cronbach's alpha coefficient indicated the total internal reliability of the questionnaire was 0.74. The coefficient was also

determined for the subscales of eating and drinking habits (0.71), nutrition attitude (0.80), nutrition knowledge (0.70), and nutrition information sources (0.72) (Table 7).

**Table 7.** Results of Cronbach's Alpha Coefficient

Subscale	Number of Items	Cronbach's Alpha Coefficient
Eating and Drinking Habits	10	0.71
Nutrition Attitude	5	0.80
Nutrition Knowledge	13	0.70
Sources of Nutrition Information	7	0.72
<b>Total</b>	39	0.74

According to the information in Table 8, the intraclass correlation-coefficients were determined for the subscales of eating and drinking habits (0.92), nutrition attitude (0.75),

nutrition knowledge (0.88), and nutrition information sources (0.89), as well as the entire questionnaire (0.86).

**Table 8.** Results of Intragroup Correlation-coefficients

Subscale	Number of Items	ICC
Eating and Drinking Habits	10	0.92
Nutrition Attitude	5	0.75
Nutrition Knowledge	13	0.88
Sources of Nutrition Information	7	0.89
<b>Total</b>	39	0.86

## Discussion

Adequate knowledge of nutrition is essential to achieving sports goals and maintaining health and athletic success in childhood and adolescence. In Iran, the lack of a valid measurement tool for this purpose is an obstacle to the research regarding the sports nutrition of adolescents. Therefore, we aimed to prepare a questionnaire in Persian.

Due to the nature of the questionnaire (multiple-choice questions), we measured the internal reliability of the questionnaire based on Cronbach's alpha coefficient, and the internal reliability of the entire questionnaire was estimated at 0.74. In addition, we calculated the internal reliability of the subscales of eating and drinking habits (0.71), nutrition attitude (0.80), nutrition knowledge (0.70), and nutrition information sources (0.72). The obtained values in the present study were considered to be

within the optimal range ( $\alpha > 0.7$ ), which is consistent with the previous studies in this regard. Therefore, it was concluded that the questionnaire has acceptable internal reliability. In a study Aylin Alsaffar et al. (2011) compared the nutrition scores obtained by engineering students and nutrition students to determine the validity of a questionnaire (13). To measure the construct validity of the questionnaire in the present study, the researcher divided the students into two groups of elites (skilled) and novice athletes based on standard definitions. Comparisons were made using different tests, and the results showed that the questionnaire could make fitting distinctions between the amateur and professional athletes. Therefore, the questionnaire was considered an accurate tool to assess the knowledge of sports nutrition in adolescent athletes.

Mai Matsumoto et al. (2017) evaluated the validity and reliability of the nutrition knowledge questionnaire in Japan, reporting the Cronbach's alpha coefficient of the entire questionnaire to be 0.95 (10). Furthermore, the findings of Wardell (1999), Hendrich (2008), and Al-Safar (2011) indicated this value to be 0.97, 0.92, and 0.89 in the United Kingdom, Australia, and Turkey, respectively. The values reported in the aforementioned studies confirm the optimal internal reliability of the general nutrition knowledge questionnaire in the selected samples (13-15), as well as the temporal reliability of the questionnaire. In another study performed in 2017, the reliability of the sports nutrition knowledge questionnaire in Italian adolescents was confirmed at the Cronbach's alpha coefficient of 0.86, indicating the optimal internal reliability of the questionnaire in the Italian adolescent population (16).

According to the previous studies regarding the nutrition knowledge questionnaire, the intergroup correlation-coefficient for temporal reliability in Japan has been reported to be 0.75, while the estimated coefficient in the Turkey, Australia, and United Kingdom is 0.86, 0.87, and 0.98, respectively (13-15). In a study conducted in Italy in 2017, the intragroup correlation-coefficient of the questionnaire was estimated at 0.83 using the test-retest method, which indicated proper time reliability as well (16). Similar to the mentioned study, we also applied the test-retest method to evaluate time reliability, and the intragroup correlation-coefficient of the eating and drinking habits subscale was considered excellent (0.929). In addition, the time reliability coefficient of the subscale of nutrition attitude was considered acceptable (0.75). Acceptable values were also obtained in the subscales of nutrition knowledge (0.88) and nutrition information resources (0.89).

## Conclusion

According to the results, the Persian version of SNKABQ is a reliable and valid tool to be used by sports organizations, managers, coaches, and sports teachers to assess nutrition knowledge, attitude and behavior of adolescent athletes in Iran. Getting the right information and making decisions can ultimately lead to optimal sports

performance and guaranteed health in children and adolescents.

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