

Original Article

Knowledge, Attitude and Practice of Iranian Pharmacists, Body Builders, and Their Coaches Regarding Sports Supplements

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ABSTRACT

Objective: This study is conducted on Iranian pharmacists, coaches, and athletes regarding sports supplements to assess their knowledge, attitude, and practice (KAP) regarding sports supplements. **Methods:** This was a cross-sectional study conducted in 2015. The study population consisted of all community pharmacists, bodybuilders, and bodybuilding coaches. The questionnaire was applied consisting some demographic questions and 25 questions for assessing KAP (6, 9, and 10, respectively). The collected data were analyzed with independent *t*-test, ANOVA, and Pearson correlation. **Findings:** In all three studied groups, the mean of KAP was upper than intermediate level 3 ($P < 0.05$) except the pharmacists' knowledge. A statistically significant difference appears between knowledge and age of pharmacists ($P = 0.007$). In addition, there was a significant relationship between coaches' practice and age ($P = 0.04$). **Conclusion:** According to the results although the studied groups have the intermediate level of KAP, organized and regular education courses are highly recommended along with paying more attention to the curriculum taught in the pharmacy schools according to the community current needs.

KEYWORDS: *Body builders, body building coaches, knowledge, attitude, and practice study, pharmacists, sports supplement*

INTRODUCTION

Ever increasing pressure on athletes and bodybuilders to perform and do their best along with increasing competitiveness of sports make many athletes add pharmacological agents and supplements to their training, and nutritional eating plans to improve their performance levels.^[1] In this regard, evidence indicates an increasing popularity of supplement among bodybuilders due to the effect of these materials on compensating drastic reductions in their body fat and at the same time maintaining their muscle mass.^[2]

For this reason, bodybuilding coaches usually have the most significant role encouraging the bodybuilders to consume different kinds of supplements to achieve the best performance in a shorter time.^[3] Although evidence shows that the knowledge of these coaches about nutrition and sports supplements is not sufficient in many conditions.^[4] For instant, Little *et al.* confirmed that in general, adolescents from low-income countries receive

less educational contents about these kinds of supplement to make the best decision.^[5] It would be obvious that in such a condition, trainers and bodybuilding coaches can have a determinant role in recommending supplements to their trainees and have a powerful influence on their knowledge, attitude, and behavior.^[6]

Moreover than bodybuilding coaches, pharmacists can have a significant role in prescribing and determining the amount and kind of supplement use. At the same time, pharmacists as the reliable drug experts can be a good resource of information to the general public and athletes as well.^[7] In this regard, most consumers of dietary supplements emphasize on the role of pharmacists in recommending these supplement consumption.^[8] For instance, Braun *et al.* report that most consumers of

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dietary supplements believe that the pharmacist should be able to recommend the effective dietary supplements.^[9]

Moreover than what was said, it seems that sports pharmacists are responsible for dispensing, advising, prescribing and monitoring sports medications and supplements whether they are intended for therapeutic or performance enhancement reasons.^[7] Hence, it will be very important to have enough and update knowledge in this area. It is while the previous studies show that pharmacists' information about the supplements is not enough in many conditions. The results of Clauson *et al.* showed that the majority of pharmacists' knowledge about dietary supplements is inadequate and pharmacists do not have enough self-confidence to answer consumers' questions.^[10]

Regarding the importance of bodybuilders, coaches and pharmacists knowledge about rational prescribing and using of sports supplements and with regard to the influence of this knowledge on their attitude and behavior, a knowledge, attitude, and practice (KAP) study is considered to be conducted.

A KAP survey measures KAPs of a community to tell us what people know about certain things, how they feel and also how they behave,^[11] hence in this study, we aimed to compare the above groups' KAP about sports supplements in South of Iran.

METHODS

This cross-sectional survey was conducted from August to December 2015. The statistical population consisted of a sample of technical officials and deputies of community pharmacies, bodybuilders, and bodybuilding coaches in Shiraz, as the largest metropolitan in south of Iran. Simple randomized sampling was the use for selecting participants in the way that 200 bodybuilders, 55 coaches, and 70 pharmacists were selected to participate in the study.

The pharmacologist-made-structured questionnaire was applied consisting some questions for demographic characteristics, 6 questions of knowledge (questions from 1 to 7), 9 attitude questions (8–16), 10 questions of practice (17–26), and 7 knowledge tests to monitor the actual knowledge of the participants (27–33) [Appendix 1]. These questions categorized into KAP. According to Mehralian *et al.*^[12] and Bastani *et al.*^[13] and comments of a team of experts (2 pharmacologists, 2 pharmacists, and an epidemiologist).

The validity and reliability of the questionnaire were approved using the comments of experts and according to Mehralian *et al.*,^[12] respectively, with the calculation of Cronbach's alpha coefficient (for the aspects of

knowledge, attitude, and performance as 0.86, 0.61, and 0.81, respectively).

Grading the questions related to knowledge, attitude, and performance based on the Likert scale and from the score 1 "strongly disagree" to score 5 "strongly agree" is done. Furthermore, for grading the scientific questions, the scores "0" and "1" were considered for the wrong and correct questions, respectively, and to classify the scores related to the scientific questions, the participants who answered correctly to <30%, 30%–40%, 40%–60%, 60%–70%, and >70% of questions were classified as "very weak," "weak," "intermediate," "good," and "excellent," respectively.^[12]

The process of data collection was in a way that after coordination and receiving the necessary legal permits, one of the researchers visited the participants and after the explanation of the research goals and satisfying them, distributed the questionnaires, and then collected them at the end of the same day for decreasing attrition rate. In this way, data were collected through the participants' self-reporting or if they do not have enough time to answer the questions by themselves, through structured interview by one of the researches.

Analytic and descriptive statistics were used after entering the data to SPSS for Windows (Version 16.0. Chicago, SPSS Inc.), Normality of variables was analyzed and accepted with Kolmogorov–Smirnov test at first (knowledge: $P = 0.321$, attitude: $P = 0.433$ and performance: $P = 0.412$). Then, data were analyzed using one-sample t -test, independent t -test, one-way ANOVA, and Pearson correlation at the significance level of 0.05.

RESULTS

Among 325 distributed questionnaires, 289 were received by the research team (response rate = 89%). Table 1 shows the demographic findings of the study.

Results of one sample t -test indicated the significant difference between the mean of KAP of the body builders comparing with the theoretical mean that was calculated as 3. As the lowest and highest scores of the Likert scale were 1 and 5, respectively, their mean (=3) was supposed as the intermediate level and the means upper than 3 was considered as high intermediate level. In this regard, results showed that the present mean of KAP variables was upper than the average level (3) while there were only significant differences among the mean of attitude and practice of the pharmacists and the theoretical mean (3) that indicate the high intermediate level of their attitude and practice. In contrast, the pharmacists' knowledge was lower than 3 with no significant statistical difference. Finally, in coaches group, one

sample *t*-test showed a significant difference in all three aspects of KAP with the theoretical mean of three and all the coaches have the upper intermediate KAP [Table 2].

Results of independent *t*-test and ANOVA showed that there is no significant statistical difference between the body builders' average of knowledge scores and their sex, age, and work experience ($P > 0.05$) but their attitude scores had a significant difference according to their sex. Although this result should be interpreted conservatively because the proportion of male and female gender was different. In another word, male body builders had the upper level of attitude about sports supplements. The body builders' attitude scores had no significant relationship according to their work experience and age either. In body builders' practice aspect, there was only a significant difference between their mean of practice and work experience, and according to *post hoc*, these differences were occurred between those who had work

experience under 5 years and those with 11–20 work year experiences. While, the body builders' practice had no statistical difference with other demographic variables the same as age and sex significantly [Table 3].

Other finding of Table 3 demonstrates that there was no significant difference in any areas of coaches' KAP according to their age, sex, and work experience.

Finally, independent *t*-test showed that the mean scores of pharmacists' KAP had no significant relationship in accordance with their sex ($P > 0.05$) while ANOVA in this group showed a significant relationship between their knowledge according to their age and work experience in the way that younger pharmacists and those with lower work experience had lower level of knowledge about sports supplements [Table 3].

The results of Pearson correlation showed that there is a positive statistical correlation between knowledge and practice and attitude and practice in body builders group so that this correlation is stronger between knowledge and practice than attitude and practice. The same results present a significant positive correlation between knowledge and attitude and knowledge and practice among pharmacists. In contrast, there was no significant correlation in coaches group [Table 4].

Finally, Table 5 shows that there is a significant relationship between KAP scores in three studied groups according to ANOVA. *Post hoc* demonstrates that the mean scores of knowledge and practice in coaches were higher than pharmacists and body builders significantly while the body builders' attitude was higher than those other studied groups.

DISCUSSION

Results of the present study showed that the KAP of the studied body builders, coaches, and pharmacists were higher than intermediate level. The only exception here was about the pharmacists' knowledge that was lower than intermediate level (mean = 3).

In this regard, results of Karimian and Esfahani showed that about half of the Iranian body builders desire to use supplements for different results the same as improving their general health (45%), enhancing their immune system (40%), and improving athletic performance (25%). Furthermore, most athletes (72%) claimed that they had access to a nutritionist but their coaches (65%) had the greatest influence on their supplementation practices more than nutritionists and even general practitioners.^[14] These results can be justified the present results that body builders and their coaches' positive bailiffs toward supplements may cause them seek the related knowledge. Moreover, other studies the same as Nazni and Vimala^[4]

Table 1: The frequency of the participants' demographic characteristics

Variables	Study groups		
	Body builders	Coaches	Pharmacists
Sex			
Male	158 (83.6)	36 (83.7)	32 (58.2)
Female	31 (16.4)	7 (16.3)	23 (41.8)
Age			
<25	66 (34.9)	7 (16.3)	21 (38.2)
25-35	95 (50.3)	32 (74.4)	21 (38.2)
36-45	18 (9.5)	2 (4.7)	6 (10.9)
>45	10 (5.3)	2 (4.7)	7 (12.7)
Work experience (years)			
<5	66 (34.9)	7 (16.3)	35 (63.6)
5-10	64 (33.9)	22 (51.2)	7 (12.7)
11-20	31 (16.4)	11 (25.6)	6 (10.9)
>20	28 (14.8)	3 (7)	7 (12.7)
Education level			
Pharmacy student			25 (45.5)
PharmD			24 (43.6)
PhD pharmacist			6 (10.9)

Values are reported as *n* (%) of participants

Table 2: Comparing knowledge, attitude, and practice with the theoretical mean

Study groups	Variables	Values	Mean difference	<i>P</i>
Body builders	Knowledge	3.19±1.13	0.190	0.024
	Attitude	3.59±0.62	0.584	<0.001
	Practice	3.26±0.72	0.258	<0.001
Coaches	Knowledge	4.16±1.06	1.16	<0.001
	Attitude	3.17±0.44	0.17	0.014
	Practice	4.12±0.97	1.42	<0.001
Pharmacists	Knowledge	2.89±0.65	-0.1	0.237
	Attitude	3.22±0.37	0.22	<0.001
	Practice	3.22±0.60	0.22	0.01

Table 3: Participants' knowledge, attitude, and performance according to their demographic characters

Study groups	Variables	Knowledge	Attitude	Practice
Body builders	Sex			
	Male	3.18±1.12	3.63±0.63	3.29±0.73
	Female	3.23±1.15	3.32±0.49	3.07±0.63
	Test result (<i>t,P</i>)	-0.24, 0.81	2.44, 0.016	1.45, 0.15
	Age			
	<25	3.34±1.49	3.65±0.49	3.31±0.82
	25-35	3.12±0.89	3.60±0.68	3.22±0.63
	36-45	3.08±0.74	3.37±0.64	3.43±0.55
	>45	3.0±0.91	3.32±0.69	2.96±0.86
	Test result (<i>F,P</i>)	0.63, 0.59	1.41, 0.24	1.04, 0.37
	Work experience (years)			
	<5	3.08±1.52	3.62±0.76	3.05±0.75
	5-10	3.11±0.91	3.51±0.44	3.31±0.66
	11-20	3.47±0.69	3.66±0.59	3.59±0.64
	>20	3.27±0.85	3.56±0.61	3.23±0.72
Test result (<i>F,P</i>)	0.99, 0.39	0.52, 0.66	4.26, 0.006	
Coaches	Sex			
	Male	4.30±1.12	3.18±0.63	4.34±0.73
	Female	3.45±1.15	3.09±0.49	4.87±0.63
	Test result (<i>t,P</i>)	1.99, 0.051	0.50, 0.611	-1.33, 0.189
	Age			
	<25	4.07±0.64	3.20±0.63	4.40±0.51
	25-35	4.22±1.18	3.18±0.43	4.46±1.06
	36-45	4.33±0.47	3.05±0.08	4.90±0.14
	>45	3.33±0.47	3.05±0.08	3.40±0.56
	Test result (<i>F,P</i>)	0.45, 0.71	0.10, 0.95	0.92, 0.44
	Work experience (years)			
	<5	3.08±1.52	3.62±0.76	3.05±0.75
	5-10	3.11±0.91	3.51±0.44	3.31±0.66
	11-20	3.47±0.69	3.66±0.59	3.59±0.64
	>20	3.27±0.85	3.56±0.61	3.23±0.72
Test result (<i>F,P</i>)	0.68, 0.56	0.06, 0.98	1.20, 0.32	
Pharmacists	Sex			
	Male	3.01±0.54	3.21±0.32	3.15±0.62
	Female	2.73±0.77	3.24±0.44	3.31±0.58
	Test result (<i>t,P</i>)	1.57, 0.12	-0.29, 0.77	-0.91, 0.36
	Age			
	<25	2.54±0.77	3.25±0.42	3.18±0.61
	25-35	3.0±0.47	3.22±0.35	3.24±0.52
	36-45	3.25±0.36	3.03±0.26	3.53±0.68
	>45	3.28±0.49	3.28±0.36	3.01±0.75
	Test result (<i>F,P</i>)	4.20, 0.01	0.60, 0.61	0.82, 0.38
	Work experience (years)			
	<5	2.68±0.64	3.27±0.38	3.17±0.55
	5-10	3.35±0.73	3.01±0.32	3.52±0.63
	11-20	3.08±0.25	3.18±0.36	3.31±0.71
	>20	3.30±0.47	3.22±0.32	3.07±0.78
Test result (<i>F,P</i>)	3.99, 0.01	0.95, 0.42	0.86, 0.46	
Education				
Student	2.62±0.75	3.21±0.40	3.16±0.53	
PharmD	3.20±0.44	3.22±0.35	3.36±0.68	
PhD	2.80±0.42	3.26±0.32	2.85±0.46	
Test result (<i>F,P</i>)	5.68, 0.06	0.03, 0.97	1.97, 0.15	

Table 4: Pearson correlation of the participants' knowledge, attitude, and practice

Study groups	Variables	Knowledge	Attitude	Practice
Body builders	Knowledge	1		
	Attitude	-0.01	1	
	Practice	0.396**	0.186*	1
Coaches	Knowledge	1		
	Attitude	0.407	1	
	Practice	0.896	0.927	1
Pharmacists	Knowledge	1		
	Attitude	0.296*	1	
	Practice	0.342*	0.236	1

*Significant at the level of 0.05; **Significant at the level of 0.01

Table 5: Comparing the mean scores among three studied groups

Groups	Knowledge	Attitude	Practice
Body builders	3.19±1.13	3.59±0.62	3.26±0.72
Coaches	4.16±1.06	3.17±0.44	4.12±0.97
Pharmacists	2.89±0.65	3.22±0.37	3.22±0.60
Test result (P,F)	<0.001,11.22	<0.001,17.12	<0.001,21.37

and Battalwar and Sahijwani^[15] are in line with our results in acceptable KAP scores of athletes and their trainers. However, other studies like Mosavi Jazayeri and Amani^[3] claimed that there was a poor level of KAP among athletes. The results of Clauson *et al.*^[10] also emphasized on inadequate knowledge of the pharmacists about supplements that confirms the present findings.

In this regard, Naidu *et al.*^[16] and Brown *et al.*^[17] believe that incompetent training about supplements and lack of improving awareness of pharmacists in terms of the importance of counseling medication in courses of pharmacy schools or unavailability of approved resources may lead to insufficient knowledge of pharmacists about supplements.

Moreover than what was discussed, other present findings directly indicate that younger pharmacists and those with lower work experience had lower level of knowledge about sports supplements. This finding can be justified with the pre-stated discussions in the way that uncomplete curriculum of the pharmacy schools may lead to such results that are highly recommended to include practical and update materials in the students obligatory courses and pay attention to their present needs according to the current changes in the society. Moreover as the results of Bastani *et al.*^[13] show, the relationship between knowledge and performance of the pharmacists toward dietary supplements was stronger than the relationship between knowledge and attitude ($r = 0.47$). These results may lead us to the effect of improving the pharmacists' knowledge on their practice and behavior of prescribing the supplements. Besides that, as the results of these

pharmacies' accreditation show an intermediate grade elsewhere^[18] it is recommended to pay attention to enrich the personnel development plan of these pharmacists and add new topics the same as dietary supplements into their obligatory educational plan or apply further studies for the comprehensive need assessment in this area.

Other present results indicate that male body builders had the upper level of attitude about sports supplements. In this regard, El Khoury and Antoine-Jonville confirm that patterns of supplement use are differed by gender, age and total time of exercise,^[19] other studies report higher supplement use among male exercisers,^[20] these evidence again may justify the seeking behavior for knowledge and attitude changes in the male athletes.

Other results of this study declare that in body builders' practice aspect, there was a significant relationship between those who had work experience under 5 years and those with 11–20 work year experiences that may emphasize on the effect of information the athletes with the higher length of work gain from their coaches, nutritionists, medias, etc. In this regard, organized education programs for professional and nonprofessional athletes by the food and drug deputy of university of medical sciences can be helpful improving body builders and their coaches' knowledge and as a result of this information raise, improve their attitude and practice. This may be need more consideration if knowing the economic burden of not rational use of these supplements^[21] and the side effects of using fake supplements that are importing to the country easily and are accessible for everyone without need to physicians' prescription or pharmacists' consults. Meanwhile, considering the potential negative impact on the health of athletes and potential fraudulent use of supplementary and great financial burden spending for the import of medicines, it is recommended applying the Deputy special regulatory mechanisms to control the supply of the supplements by licensed pharmacies.

The present findings showed a moderate level of KAP in all three under study groups. Meanwhile, the average score of the bodybuilding coaches were higher than the other groups versus the score of athletes and pharmacists were in the middle range, these findings imply the need to strengthen the authoritative source of knowledge, especially in the group of pharmacists as prescribers through effective training courses and also linking this knowledge with laws such as the extension of licenses and permits and so on. In addition, attention to the role of pharmacists in future to improve the present problems related to supplement food for body builders may be a new concern for pharmacy schools and policy makers, in this area related changes in the pharmacists educational curriculum and designing compulsory tutorials and

also suitable workshops for correcting their attitudes according to the importance of the subject and the probable problems may occurred.

According to the results although the studied groups have the intermediate level of KAP, organized and regular education courses are highly recommended along with paying more attention to the curriculum taught in the pharmacy schools according to the community current needs. Improving the knowledge of all the athletes and body builders through public health programs and medias can also be helpful in this regards.

AUTHORS' CONTRIBUTION

Dr. Peivand Bastani designed the study and finalized the article draft, Ali Amjad Nia, Mohammadreza Shabanpoor and Safoora Mehravar collected and analyzed the data and Dr. Sara Kashefian did the technical editing of the manuscript.

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Conflicts of interest

There are no conflicts of interest.

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Appendix 1: The knowledge, attitude, and practice study questionnaire used for pharmacists

Variables	Questions
Knowledge	Generally, I have sufficient information toward sport supplement
	I have sufficient information about efficiency and effectiveness of sport supplement
	I have sufficient information about side effects of sport supplement
	I have sufficient information about dosage and administration of sports supplement at the cases of pregnancy, baby breast feeding, adolescents and elderly
	I have sufficient information about drug-supplement interactions
	I have sufficient information about dosage and administration of sports supplement, especially in diabetics, high blood pressure, renal failure, gastric, etc.
Attitude	Dietary supplements have a positive impact on improving body builders' physical activities and energy
	Therapeutic efficacy of sports supplement may be considerable the same as other pharmaceuticals
	Pharmacists should be knowledgeable about sports supplements and consulting in this field is part of pharmacist's duties
	There is an adequate educational content in pharmacy schools' curriculum about sport supplements
	Sports supplement should dispense according to the nutritionist or physicians prescription
	Sports supplement should be sold in pharmacies under pharmacist's supervision
	Sports supplement is considered as an important source of profit for pharmacies
	Price is an important factor for recommending supplements to customers body builders and other athletes
Body builders and other athletes usually are influenced by pharmacist's comments about sport supplements	
Practice	I always devote enough time for giving advice to sports supplements' consumers
	I've studied some scientific references regarding to sport supplements
	I could refer to valid web pages and scientific references relevant to sports supplement in case of needed
	I always recommend sports supplements to consumers with confidence about their effectiveness
	I always inform consumers about possible adverse effects of sport supplements
	I always advise consumers about dosage and administration of sport supplements
	I always ask consumer's physical condition when I recommend these products
	I always check whether particular supplement taken by consumer interact with her/his prescription medicines
I always inform consumers about drug-supplement interactions	
	I have self-confidence for recommending sport supplement