

## The epidemiology of dietary supplements consumption in the athletes of Karaj Iran

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### ABSTRACT

**Background and aims:** Nutrition has a determinant role in success of professional athletes and dietary supplements can play an important role for supplying the nutritional needs for them in some situations. Consumption of Dietary Supplements (DS) was significantly increased in recent years. Based on this fact, assessing the amount, purposes and type of the supplements are all as prior as the affective factors on the choice and preparation of that. Therefore, we are going to evaluate the consumption of dietary supplement among athletes of Karaj, a big city near Tehran, capital of Iran.

**Methods:** In this cross-sectional study, we enrolled 195 athletes that were randomly selected from 8 sport clubs of Karaj city between December 2014 and February 2015. A self-administered questionnaire containing 17 questions was used to evaluate the field of sport, history and reasons of consuming the supplements, source of information and providing centers. Validity and reliability of questionnaire determined through panel of experts and Cronbach's alpha (N=25,  $\alpha=0.85$ ) respectively.

**Results:** The mean age of the athletes was  $24\pm 7$  years old. Thirty six percent of participants consumed the supplement during the study and 49% reported the previous use of it. The most important reasons of supplement's consumption were empowering sport's ability by 48%. Also supplying needs of body by 39% and increasing muscle's mass by 31% named the second and third reason of supplement use. For 64% of participants coach is the most important source of information and question about DS, and then nutritionists (24%) and Internet (23%) were after that in order. Sixty one percent of participants considered the coach as the most important source for buying supplements and then 51% of participants mentioned pharmacies as second main source for buying DS. Protein supplements, vitamins, creatine and glutamine were named as the most commonly used DS.

**Discussions:** The results of this study indicate that dietary supplements usage is common among athletes. According to these results, coaches have a significant role in athlete information and supplying the required supplements of athletes. It is necessary to consider the appropriate policy to remove coaches from the supply chain of dietary supplements.

**Keywords:** Dietary supplements, Nutritional information, Prevalence, Coach, Athlete.

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## INTRODUCTION

The beginning of scientific research in the field of nutrition went back to 200 years ago, but sports nutrition research is a new aspect in the area of human nutrition and physical activities during the last twenty years.<sup>1,2</sup> In fact, sport nutrition presents some solution in order to improve the health and performance of the athletes.<sup>1</sup>

Nowadays, athletes apply several strategies to achieve athletic success. The use of medicinal or nutritional products which are called supplements can be mentioned as an example of that enhancing athletic performance and capacity, accelerate recovery and reducing muscle injury are all some reasons to use these products by athletes.<sup>3</sup>

Athletes use several compounds with the aim of using the effect of ergogenic aids. Despite our limited knowledge about the beneficial effects of supplements among athletes. Studies indicate that sales of such products were about 13.9 billion dollars in the United States in 1998, more investigations indicate 300% growth of this industry in 2005.<sup>4</sup>

Intake of dietary supplements has been common among athletes and the prevalence of consumption has been reported 32-90% in several studies.<sup>5</sup> The result of a study done by Hozoori et al. in 2012 showed that 45% of athletes use at least one kind of dietary supplement.<sup>6</sup> The study performed by Dr. Golshanraz on female athletes in 2012 also clarified that while 35% of participants used dietary supplements on their daily schedule, the awareness of only 30% of them was good, 60% moderate, and 10% poor.<sup>7</sup> According to another study, 97% of bodybuilding athletes didn't consider minerals and 88% of them ignored water as essential nutrients.<sup>8</sup> Various factors affect the amount and tendency to the supplements

using such as the 'age', 'type of exercise' and in some cases 'gender'.<sup>5</sup> Nowadays, due to a wide range of production and distribution dietary supplements, assessing and monitoring the prevalence of them and its effective factors are the most important points in sports nutrition.<sup>9</sup>

However, due to the common increasing use of supplements among athletes, determining the effective factors on the supplement's choice, the centers for buying required supplements, source of information about them and also other effective factors on the use of this product can all be identified as health priorities in the field of sports nutrition.<sup>10</sup>

Accordingly, this study has been designed and implemented to evaluate the prevalence and factors of choice and consumption of dietary sports supplements among male athletes in Karaj. Karaj is the nearest city to Tehran-capital of Iran, and has a lot of sport club and professional athletes.

## METHODS

In a descriptive-analytic study, we are going to determine the use of dietary supplements and some affecting factors on DS selection in male athletes in the city of Karaj which was done between December 2014 and February, 2015. In this study, a questionnaire consisting of 17 questions was designed by researchers. This questionnaire was designed based on published research in this field. It included some questions about the history of sports, participation experience in competition, supplement use experience, reasons of taking supplements, centers of buying these products and their required information, in addition to personal data. The questions consisted of a series of

closed questions, Yes – No, and open questions. A panel of experts (N=6) on the nutrition, physical education and public health fields analyzed the content validity. Reliability was measured by test-retest and resulted in  $\alpha$  cronbach of 0.85.

Mentioning the name of participants was optional; their willingness to take part in the investigation was asked by a consent form. The participants were also assured that the personal information about each of them would be checked confidentially and secretly.

Among all the sport clubs in the Karaj province, 8 of them which have had different fields were chosen randomly from a table of random numbers. In order to perform this study, questionnaires were given to athletes after satisfying the officials of Board of Sports Medicine and clubs for the cooperation of the province. Among the 220 distributed questionnaires to the athletes of various fields of sports, 195 of them were completed (Response rate of 89%).

In the present study, SPSS software was used for data analysis and 2007 version of Excel software used for the graph. The

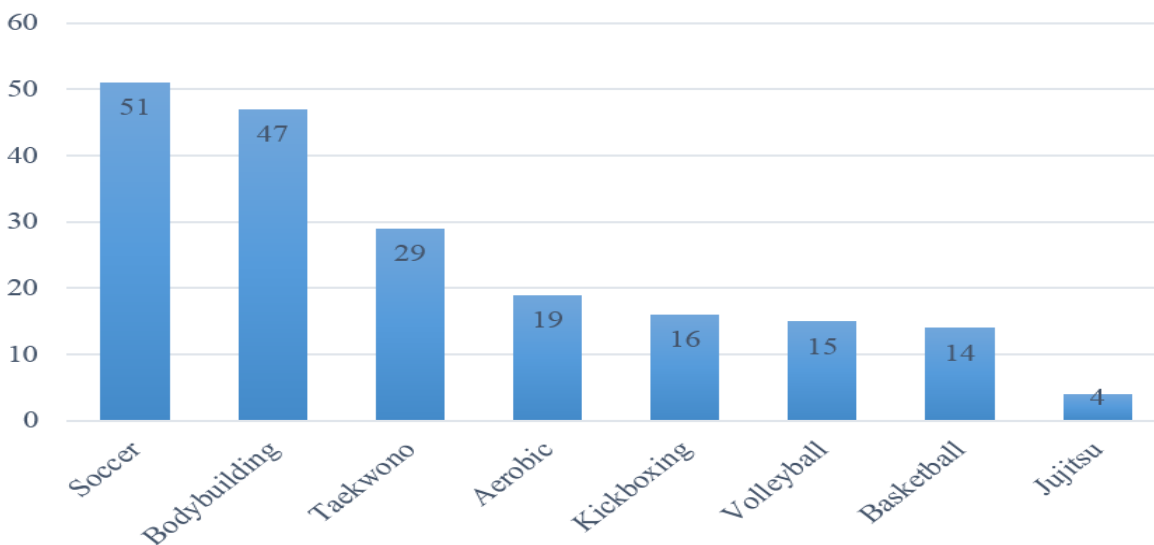
statistical methods used in this study were the frequency distribution, mean and standard deviation and coefficient correlation. In tests,  $P < 0.05$  was considered significant.

## RESULTS

One hundred and ninety five male athletes participated in this study. Their characteristics are listed in Table 1. Figure 1 indicates the athletic field of each participant, and figure 2 indicates the attendance history of athletes in official competition.

**Table 1:** Characteristics of participants (n= 195)

Variable name	Mean $\pm$ SD
Age (years)	25 $\pm$ 7
Weight (kg)	75 $\pm$ 14
Height (cm)	179 $\pm$ 8
History of sports (months)	79 $\pm$ 66
Exercise hours per week	13 $\pm$ 8



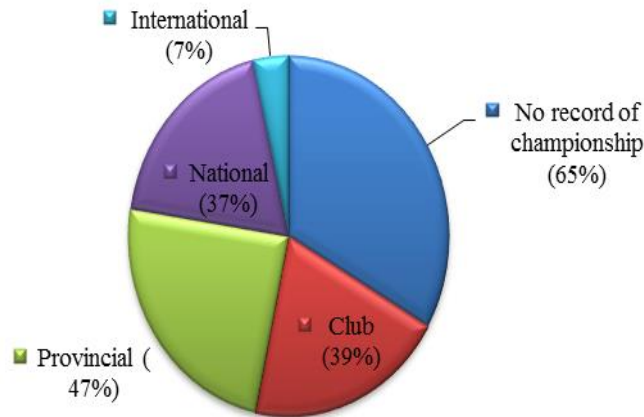
**Figure 1:** Number of athletes from different sports participating in the investigation

49% of participants had experienced dietary supplements using and 37% of them were taking supplements during the study.

The main reasons of dietary supplements using among these athletes are presented in Table 2.

The supplements consumed by athletes are presented as number and percentage in Table 3.

The best sources of information about supplements that reported by athletes, is presented in Table 4.



**Figure 2:** The history of championship athletes participating in the test

**Table 2:** Reasons of dietary supplements use among athletes

Reasons of supplement use	The number	Percentage
Enhancing athletic and capacity of performance	76	48
Supplying and promoting health	24	15
Supplying the body needs	63	40
Weight loss or gain	33	21
Increasing the muscle and lean body mass	50	31
Success in competitions	21	13
Others advice	9	6

**Table 3:** Supplements that have been reported their use by athletes

No.	Name of supplement	Number	Percentage	No.	Name of supplement	Number	Percentage
1	Creatine	47	17	2	Protein supplements	45	16
3	Multivitamin	36	13	4	Glutamine	38	14
5	Vitamin C	11	4	6	Vitamin E.	5	2
7	Amino capsules	25	9	8	Branched-chain amino acids	8	3
9	L-arginine	6	2	10	Carbohydrate supplements	13	5
11	Super Pump	7	3	12	Hormones	7	3

**Table 4:** The best sources to achieve information about supplements

Source of information about supplements	Number	Percentage
Friends and Teammates	33	18
Coaches	115	64
Doctors	27	15
Nutritionists	43	24
Brochure manufacturers	8	4
Newspapers and other media	5	3
The Internet	41	23
Parent	7	4
Sellers supplements	10	6

One of the questions asked in this study was about the location, or the center of

supplying, the necessary DS for athletes. The results are listed in Table 5.

**Table 5:** Shopping center to buy dietary supplements

Center of providing supplements	Number	Percentage
Representation of manufacturers	23	12
Supplement Stores	30	16
Pharmacies	60	32
Club coaches	72	38

The results of the relationship between the experience of dietary supplement use, sport field, sport’s experience, the hours of sport, and the experience of participating in sports competitions, are mentioned in Tables 6 and 7. As it is obvious, the experience of playing sports, weekly

training hours and the experience of participation in competitions has been related to the supplements use experience. This is despite the fact that in the case of supplements use at present, the main field of sport has been related to the use of supplements.

**Table 6:** Correlation between histories of dietary supplement usage and dietary supplement consumption at the study time with some dependent variables

Correlation*		The main sport	History of sports (months)	Exercise hours per week	The experience of participating in sports competition
History of, dietary supplements	N	195	195	195	195
	P	0.389	<b>0.029</b>	<b>0.013</b>	<b>0.007</b>
Dietary supplement usage at the study time	N	195	195	195	195
	P	<b>0.014</b>	0.642	0.944	0.228

\*Pearson Correlation Sig. (2-tailed).

## DISCUSSION

Based on the results of this study, nearly half of the athletes who participated

in the study had experienced supplementation and more than a third of

them were taking supplements at the time of the study. About half of the athletes used supplement for enhancing athletic performance and coaches by 64% is the mail source to achieve information about supplements. Also, there is significant correlation between dietary supplements usage and history of exercise training, training hours per week, and participating of subjects in sports competitions.

The results of this study and similar studies conducted in other countries and other parts of Iran, were all similar and indicating a high prevalence of dietary supplements use among different sport fields. However, there are some differences in the pattern of athlete's supplements consumption in comparison with other countries. A study of professional cyclists has determined that the amount of supplements consumption had been more than 80% among them.<sup>11</sup> A recent study proved the supplements consumption among more than 66% of university student athletes.<sup>12</sup> In Salgado's study in 2014, 28.3% of the participants were reported to use dietary supplements.<sup>13</sup>

Compared with the results of the study performed by Dr. Kargarfard in 2008, in Lorestan province that reflects the prevalence of dietary supplements among 32% of the athletes, the prevalence of consumption among athletes of this study has been observed much more abundant.<sup>14</sup> The reason of it can be attributed to the distribution of different sports in two studies. That is because according to the results of this study and many previous ones, there is a meaningful relationship between various fields of sports and dietary supplements consumption and the tendency is much greater in some sports. Moreover, based on the above study, there is a significant correlation between household income and supplements consumption among athletes.<sup>14</sup> Accordingly, the observed

differences, in consumption of dietary supplements in this study might be due to the different household income in Karaj and Lorestan. It should also be noted that the lack of consumer report can be because of some negative attitudes towards these product consumption. However, compared to the study of Hozoori et al. In 2012 in Tabriz which evidenced 45% supplementation during the study and 21% of them has the history of supplement use, the percentage of supplement use, especially in the history of the supplement using has been significantly increased.<sup>6</sup> Findings of this study about the reasons of supplementation show interesting results and athletes are mentioned in the order of preference as enhancing athletic performance, Supplying body needs and increasing muscle's mass. This finding was similar to many previous studies which identified the changes in body composition and success in competition as the main reason for supplementation and because of the focus on the body needs, 40% of respondents with previous findings in Tabriz is also close (35%) and can also be a positive sign of change in the awareness of the athletes in this case.<sup>6</sup> The reasons of sports supplements use among the Canadian athletes was respectively maintaining health, increasing energy, improving immunity system and faster recovery.<sup>15</sup> In a study in Brazil, increasing energy (30%), performance improvement (17%) and nutrients replacement (11%) were mentioned as the reasons of supplementation.<sup>13</sup> In a study of American college students, (73%) of subjects mentioned the supplementation as a case of improving health, 29% for increasing energy, enhancing muscle's strength (20%) and 19% for increasing the performance.<sup>12</sup>

The findings of this study in Table 3 demonstrate dietary supplements which have been used by athletes. Based on these findings, creatine (17%), protein supplements (16%) are named as the most important

supplements consumed by the athletes. These findings are similar to the results of Petroczi's study.<sup>10</sup> But, there are still concerns about the lack of necessary knowledge about the method and amount of supplementation.<sup>10</sup> It should be noted that although the beneficial effects of some compounds such as creatine consumption has been observed in athletes, but the beneficial effects of this supplement can be observed in controlled conditions and in accordance with appropriate and recommended doses.<sup>16</sup> Nowadays, it is well known that some dietary supplements contain substances that are prohibited in sport such as stimulants or anabolic steroids, that unfortunately, which were not declared on the labels.<sup>17,18</sup> For example, in some faked dietary supplements that advertised for weight loss, ephedrine was found that have been associated with significant morbidity and mortality.<sup>18</sup> According to the World Anti-Doping Action (WADA) regulation, the responsibility of responsibility for a positive doping test was directly to the athlete. So, athletes need to be aware of the problems that can follow supplement use, and sport authorities have to consider the nutritional education program for athletes. Also, it is emphasized for the appropriate regulation and monitoring of dietary supplements production, distribution, and consumption.<sup>17</sup>

Also multivitamin supplement and glutamine supplements are the most common type in the following category in Table 3. The results which are related to the high consumption of these products in the present study are similar to the findings of most of previous studies.<sup>10,16,19</sup> In the study of Golshanraz et al., on female athletes, the most consumed supplements are mentioned as vitamins (48%), minerals (43%) and energizing supplements (21%).<sup>7</sup> It should be noted that vitamin and mineral supplementation could be useful when their food source is not consume enough.<sup>16</sup> In a

study on Brazilian athlete's carbohydrate supplement (52%), vitamins (29%) and protein (14%) were the most common used supplements.<sup>13</sup> It was true while in a study of American athletes, 42% took multivitamin with minerals, 18% vitamin C, 17% protein and amino acid supplement and 13% used calcium at least one day a week.<sup>12</sup> The pattern of supplementation in Canada was consisting of protein powders, energy drinks, recovery drinks, branched-chain amino acids, beta-alanine and glutamine.<sup>15</sup> According to a sample study in other countries, sport drinks, sport bars and carbohydrate supplements are those which can be useful in special condition and could be affecting positively on the athlete's performance.<sup>16</sup> Low intake of carbohydrate supplements (5%) is the most determined paradox in this study in compared to other countries.<sup>10,19,20,21</sup> The reason of this finding might be the result of unawareness of our athletes about the effect of supplements and also limited access to carbohydrate supplements. Of course, some attitudes about fat gain after consuming carbohydrate compounds could be affecting on these findings. Therefore, more studies to better understanding of attitude to dietary supplement and effective factors on the use and selection of these products are required.

In addition to that, based on Table 4, however, some athletes introduce doctors (15%) and nutritionists (24%) as the most important source of gathering information about dietary supplement, it shouldn't be ignored that coaches (64%) and their teammates (18%) are still of special ranking in choosing dietary supplement for athletes. However, the source of information about the dietary supplement in the study of Weins, in 2014, on Canadian athletes were friends and relatives. Coaches, and teammates were the main source of information about DS, and 48% of athletes choose their required dietary supplements

after consultation with a nutritionist.<sup>15</sup> The study of Salgado on Brazilian athletes in 2014 is a good indicator of importance of coaches in selecting dietary supplements. The result of this study has evidenced that athlete's supplement intake increased 4.67 times due to the advice of coaches.<sup>13</sup> It represents the needs of education program for coaches to ensure correct choices and provide appropriate guidance to athletes. However, knowledge of these athletes and coaches about dietary supplements should be evaluated through short term studies before the codification of educational programs, and some educational programs should be formulated on the basis of training needs in the next step for this group of people.

Another striking point, which is listed in Table 4, is the 23% tendency of athletes to check the Internet for further information about the dietary supplements. This index shows an increase of about 6% compared to the study of Hozoori et al. in two years ago, and shows the increasing tendency and access of athletes to this source of information.<sup>6</sup> This finding may indicate the role of relevant institutions such as the Ministry of Health and the Food and Drug Administration to set up a trustworthy website for offering scientific information and documentation in cyberspace.

The results of Table 5 indicate the tendency of approximately a third of athletes to get their required supplement from the pharmacy, but it should be noted that coaches are still effective in supplying about 38% of athlete's needs to supplement. This rate which was estimated about one-fifth shows significant increase compared to the study of Hozoori et al. In Tabriz.<sup>6</sup> This evidence represents the need to provide permanent control of coaches in case of sport supplements, and coaches of sports clubs should be removed from the cycle of

preparing and delivering sports supplements with the help of sports institutions.

The results mentioned in Table 6 and 7 are the relationship between the history of sports supplements and supplementation during the study period. Based on the findings, history of sports supplements were associated with the history of the sport, exercise hours per week and the experience of participating in competitions. According to Table 7, supplementation during the study period was associated with sport and the highest prevalence were observed among bodybuilding athletes. These findings were similar to the results of Salgado's study, which indicated increasing the amount of supplementation by an increasing number of training hours and years of the sport experience.<sup>13</sup>

One of the main problems in gathering information about the prevalence of dietary supplement consumption in Iran is the athlete's concern to express their supplements consumption. This study was performed by some questionnaire which were voluntary in mentioning the name in order to make participants to answer accurately.

The findings of this study have got some limitations due to the sample size and based on the geographical location of the study. In this study, there is non-limiting list of supplements which have been reported as a limitation in some studies.<sup>21</sup> The names of supplement are designed as an open question in this study. Due to the prevalence of supplements consumed, it is recommended to assess knowledge of the athletes about the supplements, consumption methods and possible side effects. Recently, a study shows that awareness about dietary supplements of university student athletes was 28% in male and 32% female.<sup>22</sup> Since, in this study medical students get the significantly higher knowledge score, it seems that some further studies on athlete is



needed to assess the impact of this knowledge on the athlete's attitude and behavior.<sup>22</sup> Loraschi, in the study of cyclist's knowledge and attitudes to supplements and doping and Tavani, in the study of athletes in sports clubs in Italy could find that the athlete's knowledge about types and methods of consumption are low and educational interventions is needed to improve their knowledge.<sup>11,23</sup> To be concern what is mainly noted here is choosing the best method for this target group. Individual counseling, speeches and Internet are all the athlete's preferred educational methods which were mentioned by them during a study.<sup>15</sup> It may be needless to say that the lack of appropriate knowledge about the supplements can seriously endanger today's professional sports. For instance, it is recently clarified in the study of Barkoukis that the background of sport supplements consumption is possibly associated with the doping tendency among athletes.<sup>24</sup>

## CONCLUSION

Dietary supplements consumption is common among the athletes. Unfortunately, coaches have a significant role in supplying and recommending dietary supplements. So, it is necessary to consider an appropriate policy to remove coaches from the sales and offer of dietary supplements in sport.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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