

RESEARCH ARTICLE

Frequency and Causes of Consuming Sports Supplements and Understanding their Side Effects among Bodybuilders in Fitness Gyms of Kermanshah City

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Abstract: Background: Nowadays, paying attention to sports nutrition, particularly focus on using supplements among athletes is increasing rapidly.

Objectives: This study has been carried out in order to investigate the frequency and causes of consuming supplements and understanding the side effects related to their consumption among bodybuilders in Kermanshah City.

Methods: The samples of this cross-sectional study include teenagers and young adults who are the members of fitness gyms around Kermanshah City. 244 individuals were selected as samples using simple random sampling. In order to gather the required data, a four-sectioned questionnaire designed by the research team was used. The data analysis was done using chi-square, independent t-test, and Pearson's and Spearman's correlation coefficients by SPSS-20.

Results: The majority of bodybuilders participating in the study (95.3%) have used supplements. The sources suggesting the consumption of supplements included other athletes, the coach, the media, nutrition specialists, and medical doctors, respectively. Generally, 37 types of sports supplements are used by the bodybuilders. Based on their rank, the supplements include vitamin C, Creatine, vitamin E, multivitamin, and iron. The most frequent reasons for consuming sports supplements included muscle building, increasing energy, and improving athletic performance. There is a significant difference between male and female athletes with regards to knowing the psychological and sexual side effects of consuming sports supplements ($P < 0.05$). In general, the level of understanding and knowing the side effects of consuming sports supplements among athletes is not desirable.

Conclusion: Since a significant percentage of athletes, particularly male athletes, have a history of consuming sports supplements, it is necessary that the people related to this issue including athletes, coaches, doctors, and nutrition specialists, get sufficient information about the ingredients, side effects, benefits, and applications of various nutritional supplements. Dysfunctional beliefs about the supplements consumption or non-consumption should be discussed.

Keywords: Bodybuilder, nutrition, public health, sports supplement.

1. INTRODUCTION

Since human beings started physical activities and sports, the issues of nutrition have always been on the mind of athletes [1]. Nutrition plays an important role in the success of athletes and their recovery after sports activities. Since being more energetic than ordinary individuals is considered an important common marker among athletes and focus on

sports nutrition, particularly on consuming supplements, is increasing among athletes [2]. Supplements are considered as a tool for increasing the ability of the body, including muscles, which involve a wide range of substances such as various types of vitamins, minerals, herbs, amino acids, enzymes, metabolites, fat burners, energy drinks, human growth hormone, and various drugs [3].

Previous studies on the prevalence of consuming sports supplements among athletes show that on average 59% of professional athletes and 43% of ordinary athletes consume sports supplements [4]. Based on statistics from developed countries, the consumption of supplements in the athletic

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community is increasing [5] in a way that during Atlanta and Sydney Olympic Games, 69 to 74% of Canadian athletes had a history of consuming nutritional supplements for sports competitions, respectively [6]. In a study on the amount and type of supplement consumption among American college athletes, it was found that usage of amphetamines among wrestlers increased from 4% in 1997 to 20% in 2007, usage of endorphin decreased from 10 to 8% during the same period, and usage of anabolic steroids increased from 2 to 8% in 2007 [7]. In 2005, Kristiansen evaluated the consumption of sports supplements among athletes in college teams and showed that 98.6% of all the members of these teams used food supplements. When compared to female athletes, male athletes of college teams have often used supplements such as sports drinks, carbohydrate gels, protein powders, and Creatine [8].

Many athletes consume supplements due to various reasons, for instance, an issue that has gained attention during the recent years among teenagers and young adults is the importance of body shape and getting in shape through the increase in muscle mass since men usually like to have a fit muscular body. Some teenagers believe that larger muscle mass is more attractive. Dissatisfaction with the shape of the body and willingness to change it are among the other important factors in consuming supplements [9]. In 2012, El Khoury investigated the level of supplement consumption among athletes who were gym members in Beirut. The results of this study showed that 36.3% of these athletes use food supplements [10]. In a study on the frequency and reasons of using food supplements among athletes in fitness gyms of Kerman City in Iran, Nakhaei *et al.* showed that among 199 men and 86 women participated in the study, 48.7% of men (97 individuals) and 4.6% of women (4 individuals) have a history of consuming food supplements. The most important reason behind consuming supplements was to increase athletic ability (77.3%) and fear of side effects was the most common reason behind not consuming these supplements among athletes [1].

Based on a limited number of reports, in some cities, the high rate of supplement abuse and negligence among young athletes, as well as false methods of promoting physical performance, which have serious health consequences on the community and have created a number of problems in terms of medical and athletic concerns. These concerns are more frequent in large cities because of a higher population, lack of ample supervision from responsible organizations and institutions, easy access, and lack of on-time and accurate information distribution [3]. The surface-level attractiveness of these substances can highly affect the athletic community, especially the bodybuilding community, and create a serious health risk for them. The current study was carried out to considering the side effects of unchecked consumption of food supplements and the fact that we do not have enough information regarding the amount and reasons of using these supplements as well as their side effects among bodybuilding athletes in Kermanshah City. We hope that the results of this study can help devise and design comprehensive programs for preventing the abuse of these substances and promoting correct consumption of useful sports supplements.

2. MATERIAL AND METHODS

The population of this cross-sectional study included teenagers and young adults who were the members of bodybuilding and fitness gyms in Kermanshah City. Based on estimates of the Sports and Youth Organization, the size of this population is about 1000 people. Using Cochran's formula and considering a population size of 1000 people, $z = 1.96$, $d = 0.05$, according to Kargardfard *et al.* [11], p and q are 0.7 and 0.3, respectively. Therefore, the size of the sample will be 244 and by considering a 5 percent fall in samples, 256 participants were entered into the study. The criteria for entering the study included the age of 15 to 45 years, having at least one-year of athletic history in bodybuilding, and willingness to participate in the study.

In order to gather the required data, a four-section questionnaire was used which was developed by the research team based on reliable articles and resources [10, 12-15]. The validity of the four sections of the questionnaire was evaluated through content validity. In order to do that, the questionnaire was distributed into twelve faculty members of the university and their corrections were incorporated in the questionnaire. The first section of the questionnaire, which includes eleven questions, is related to demographics including age, gender, marital status, education level, occupation, income level, history of sports activities, weight, height, history of using supplements, and the source recommending the supplements. The second part of the questionnaire was related to the frequency of using 38 different types of sports supplements with yes/no answers; the "no" answer would get a score of zero and the "yes" answer would get a score of one. The third part of the questionnaire was related to the reasons behind consuming sports supplements with thirteen questions. The answers were based on a Likert spectrum with four options including never, rarely, average, and always, scored from zero to three, respectively. The fourth section of the questionnaire included ten items on the level of awareness about the side effects of using sports supplements. The answers to the questions of this section were in the form of true/false, with the "true" option scored as one and the "false" option scored as zero (Appendix 1). In order to evaluate the reliability of the questionnaire, the internal consistency method was used and Cronbach's alpha coefficient was calculated for section two to section four of the questionnaire and the coefficients were equal to 0.73, 0.87, and 0.86, respectively.

In order to gather the required data, first, the necessary permits were obtained from the ethical committee of the Medical University of Kermanshah. Then, the sampling process was carried out in bodybuilding and fitness gyms around Kermanshah City and the participants who fulfilled the entrance criteria were entered into the study. In order to do this, the objectives of the study were explained for the participants and they were assured of the confidentiality of their personal information as well as their answers to the questions; then their written informed consent was obtained. Then, the questionnaires were given to the participants and were collected after being completed. The obtained data were entered into an SPSS-20 software application and analyzed using descriptive and inferential statistical tests.

Table 1. Comparison of supplement consumption in athletes in terms of demographics.

Individual Variables	Participants N= 244 (100%)	Chi-square Test	P-Value
Sex		0.81	0.47
Male	190 (96%)		
Female	54 (93%)		
Marital status		5.48	0.02
Single	162 (97%)		
Married	82 (91%)		
Age groups		1.03	0.29
15-30	192 (96%)		
31-45	51 (92%)		
Education level		0.82	0.10
Diploma and Under Diploma	94(94%)		
BS and higher	150 (96%)		
Income (Iranian Rials)		0.09	0.95
<1000000	126 (95%)		
1000000-2000000	72 (94%)		
> 2000000	46 (95%)		
Occupation		0.81	0.66
Unemployed	113 (96%)		
Employee	45 (93%)		
Self-employed	86 (94%)		

P-value less than 0.5 is highlighted

With regards to descriptive statistics, frequency distribution tables, mean, and standard deviation were calculated. With regards to inferential statistics, in order to compare nominal variables including the type of supplements, the reasons behind consuming them, and the sources of these supplements between age and gender groups, the chi-square test was used. In order to compare the mean scores of understanding the side effects of supplements based on age and gender groups, the independent t-test was used. For all the statistical tests, the significance level was considered at 0.05. Moreover, Pearson's correlation was used for evaluating the relationship between understanding the side effects of sports supplements and the frequency of consuming the supplements. Furthermore, Spearman's correlation was used for investigating the relationship between the ordinal variable of understanding the side effects of sports supplements and the frequency of consuming the supplements. For the main analysis, the frequency of consuming supplements in the target population was reported in percentages.

3. RESULTS

The average age of the participants was 26.5 ± 37.6 and 77.9% participants were male. With regards to the education level, based on frequency, 1.6% of individuals had elementary school education, 4.7% had secondary school education, 32.8% had high school diploma, and 60.9% had university-

level education. Among the participants, 64.8% were single and 35.2% were married.

The results show that the majority of bodybuilding athletes (95.3%) participating in the study have used supplements. The chi-square test does not show a significant difference between women (93%) and men (96%) with regards to consuming supplements. Single participants (97%) used supplements significantly more than married participants (91%), which shows a significant relationship between consuming supplements and marital status ($p = 0.01$).

Despite the fact that the athletes in the age group of 15-30 years (96%) have used supplements significantly more than those in the age group of 31-45 years (92%), the chi-square test does not show a significant difference between these two age groups with regards to consuming supplements. Moreover, this test shows that while athletes with a university-level education (96%) use more supplements compared to athletes without a university level education (94%), this difference is not statistically significant.

The chi-square test does not show a significant difference with regards to consuming supplements between athletes with different income levels. Unemployed athletes (96%), athletes with office jobs (93%), and self-employed athletes (94%) used supplements more than other participants, while these differences were not significant based on the chi-square test (Table 1).

Table 2. The comparison of recommended resources for the use of sports supplements among athletes.

Recommended Source	Total (n=256)	Male	Female	Chi-square Test	P-Value
		(n=198)	(n=58)		
Coach (%)	116 (45.3%)	96 (48.5%)	20 (34.5%)	3.839	0.147
Doctor (%)	39 (11.3%)	12 (6.1%)	17 (29.3%)	24.14	0.0005
Nutritionist (%)	33 (12.9%)	22 (11.1%)	11 (19%)	2.465	0.116
Other athletes (%)	139 (54.3%)	118 (59.6%)	21 (36.2%)	9.889	0.002
Media (%)	63 (24.6%)	41 (20.7%)	22 (37.9%)	7.173	0.007

P-value less than 0.5 is highlighted

Based on the results, the sources suggesting the consumption of sports supplements included other athletes (54.3%), coaches (45.3%), the media (24.6%), nutrition specialists (12.9%), and doctors (11.3%). Compared to males, females were significantly influenced by the suggestions of doctors ($p = 0.0005$) and the media ($p = 0.007$), while the main source suggesting the consumption of supplements for men was athletes and male athletes have been influenced by this source significantly higher than female athletes ($p = 0.002$) (Table 2).

In total, 37 types of food supplements have been used by bodybuilders which are vitamin C (47.3%), Creatine (46.9%), vitamin E (42.6%), multivitamin (42.2%), and iron (41%). The frequency of using other supplements was lower than 40 percent for the entire sample. Moreover, the frequency of using 19 sports supplements was significantly different between male and female athletes; vitamin C ($p = 0.0005$), iron ($p = 0.0005$), calcium ($p = 0.026$), L-carnitine ($p = 0.029$), herbs ($p = 0.032$), and Q10 ($p = 0.027$) were used by female athletes more than their male counterparts. For thirteen other supplements, male athletes show a higher level of consumption ($p < 0.05$) (Table 3).

With regards to consuming sports supplements based on the categories, it is shown that proteins, vitamins, antioxidants, mineral salts, hormones, sports drinks, oils, and herbs had the highest consumption rate among sports supplements, respectively. There was no significant difference between genders with regards to consuming vitamins, oils, and herbs. Compared to female athletes, male athletes consumed sports drinks ($p = 0.012$), proteins ($p = 0.009$), and hormones ($p = 0.0005$) significantly more. In contrast, compared to male athletes, female athletes consume minerals ($p = 0.0005$) and antioxidants ($p = 0.029$) significantly more (Table 4).

With regards to the frequency of consuming sports supplements, there was no significant difference between male and female athletes. However, with regards to reasons for consuming these supplements, the results show that there is a significant difference between these two groups for twelve items; for all these items, male athletes scored higher than female athletes ($p < 0.05$). Meanwhile, the average age of female athletes is higher than male athletes ($p = 0.045$).

There is a significant relationship between the frequency of consuming supplements and nine of the reasons for consuming supplements ($p < 0.001$). Moreover, based on the results depicted in Table 5, the most frequent reasons for consuming sports supplements include muscle building, increasing energy, and improving athletic performance.

With regards to being aware of the side effects of sports supplements, the results show that there is a significant relationship between male and female athletes solely with regards to understanding the psychological side effects ($p = 0.013$) and sexual side effects ($p = 0.023$). With regards to other variables, there is no significant difference between the genders. In general, the level of understanding the side effects of supplements among athletes is not satisfactory (Table 6).

4. DISCUSSION

The main objective of the current study was to investigate the frequency and reasons behind consuming sports supplements as well as the level of awareness with regards to the side effects of usage of supplements among bodybuilders who are members of bodybuilding and fitness gyms in Kermanshah City. The results show that the majority of bodybuilders in gyms around Kermanshah City have used and consumed sports supplements. The results of previous studies on the amount and patterns of consuming sports supplements vary based on country. Accordingly, in a study on young professional athletes in Germany in 2009, the level of consuming sports supplements was very high and about 81% [12]. The level of consuming supplements in other studies has ranged from 36% to 98% [8, 10, 13, 14]. Compared to the results of other studies, the results obtained from the current study show that the consumption rate of sports supplements in Iran, and in turn in Kermanshah City, is higher than in other countries. While evaluating the rate of consumption for sports supplements, the results show that vitamins, minerals, and proteins are used more frequently and the most common sports supplements consumed in Kermanshah City are vitamin C, Creatine, vitamin E, multivitamin, and iron.

Other studies show that the most common sports supplements are vitamin C, multivitamin, vitamin E, iron, various proteins and Creatine [2, 15]. These findings are in line with

Table 3. Frequency of consuming supplements in the whole sample disaggregated by gender.

Type of Supplement ^a	Total (n=256)	Male (n=198)	Female (n=58)	Chi-square Test	P-Value
Sport drinks ^b	58 (22.7)	51 (25.8)	7 (12.1)	4.797	0.029
Carbohydrate drinks	46 (18)	42(21.2)	4 (6.9)	6.237	0.013
Corn syrup (fructose)	4 (1.6)	4 (2)	0 (0)	1.190	0.275
Vitamin C	121(47.3)	80 (40.4)	41 (70.7)	16.508	0.0005
Vitamin D	78 (35.5)	56 (28.3)	22 (37.9)	1.971	0.160
Vitamin E	109 (42.6)	80 (40.4)	29 (50)	1.690	0.194
Vitamin B ₆	79 (30.9)	60(30.3)	19 (32.8)	0.127	0.722
Vitamin B ₁₂	94 (36.7)	71 (35.9)	23 (39.7)	0.278	0.598
Vitamin B complex	85 (33.2)	66 (33.3)	19 (32.8)	0.007	0.935
Vitamin B ₃	21 (8.2)	15 (7.6)	6 (10.3)	0.457	0.499
Multi vitamin	108 (42.2)	89 (44.9)	19 (32.8)	2.733	0.098
Iron	105 (41)	65 (32.8)	40 (69)	24.215	0.0005
Calcium	92 (35.9)	64 (32.3)	28 (48.3)	4.959	0.026
Zinc	47 (18.4)	32 (16.2)	15 (25.9)	2.816	0.093
Glucosamine	19 (7.4)	15 (7.6)	4 (6.9)	0.030	0.862
Amino acid	73 (28.5)	67 (33.8)	6 (10.3)	12.147	0.0005
Creatine	120 (46.9)	113 (57.1)	7 (12.1)	36.481	0.0005
Glutamine	99 (38.7)	90 (45.5)	9 (15.5)	16.952	0.0005
L- Carnitine	25(9.8)	15 (7.6)	10 (17.2)	4.756	0.29
Whey Protein	62 (24.2)	48 (24.2)	14 (24.1)	0.001	0.987
Casein	15 (5.9)	15 (7.6)	0 (0)	4.667	0.031
Weight gaining proteins	58 (22.7)	52 (26.3)	6 (10.3)	6.486	0.011
Fish oil	39 (15.2)	31 (15.7)	8 (13.8)	0.121	0.728
Omega 3	52 (20.3)	43 (21.7)	9 (15.5)	1.065	0.302
Omega 6	29 (11.3)	25 (12.6)	4 (6.9)	1.466	0.226
Herbal Medicines	32 (12.5)	20 (10.1)	12 (20.7)	4.598	0.032
Ginseng	21(8.2)	16 (8.1)	5 (8.6)	0.017	0.895
Ephedra	0 (0)	0 (0)	0 (0)	-	
Q10	7 (2.7)	3 (1.5)	4 (6.9)	4.885	0.027
Caffeine	17 (6.6)	14 (7.1)	3 (5.2)	0.261	0.610
Insulin	9 (3.5)	9 (4.5)	0 (0)	2.732	0.098
Growth Hormone	23 (12.9)	33 (16.7)	0 (0)	11.097	0.001
Testosterone	63 (24.6)	63 (31.8)	0 (0)	24.479	0.0005
Winstrol Depot	21 (8.2)	21 (10.6)	0 (0)	6.701	0.010
Androel	25 (9.8)	25 (12.6)	0 (0)	8.116	0.004
Nobaen	7 (2.7)	7 (3.5)	0 (0)	2.108	0.147
Nandrolone	57 (22.3)	57 (26.8)	0 (0)	21.480	0.0005
Oxymetalone	35 (13.7)	35 (17.7)	0 (0)	11.876	0.001

a= Antioxidants includes vitamin C and E, fish oil, and omega 3.

b= Sports drinks were defined as a sport supplement containing protein and carbohydrate compounds that are used by athlete, and it has a high prevalence in our study [4, 10]. P-value less than 0.5 is highlighted.

Table 4. The category of used sports supplements and its prevalence by gender and age.

Supplemental Group	Total (n=256)	Male (n=198)	Female (n=58)	P-Value	15-30 Years	31-45 Years	P-Value
Sport drinks	86 (33.6)	75 (37.9)	11 (19)	0.012	71 (35.3)	15 (27.3)	0.310
Vitamins	167(65.2)	119 (60.1)	48 (82.7)	0.054	127 (63.2)	40 (72.7)	0.391
Minerals	128 (50)	81 (40.9)	47 (81)	0.0005	96 (47.8)	32 (58.2)	0.331
Proteins	178 (69.5)	151 (76.3)	27 (46.5)	0.009	146 (72.6)	32 (58.2)	0.190
Oils	84 (32.8)	65 (32.8)	19 (32.7)	0.999	69 (34.3)	15 (27.3)	0.370
Herbal Medicines	48 (18.7)	31 (15.6)	17 (29.3)	0.053	39 (19.4)	9 (16.4)	0.612
Hormones	105 (41)	105 (53)	0 (0)	0.0005	83 (41.3)	22 (40)	0.912
Antioxidants	150 (58.6)	105 (53)	45 (77.6)	0.029	114 (56.7)	36 (65.4)	0.469

P-value less than 0.5 is highlighted

Table 5. The relationship between the frequency of using sports supplements and causes of use.

Variables	Total Mean (SD)	Male (SD)	Female (SD)	T-test	P-Value	r-Pearson CSU and FS	P-Value
Causes of supplement use							
Maintaining Health	1.79 (1.06)	1.94 (0.98)	1.28 (1.18)	4.360	0.045	0.278	0.0005
Improve health	1.63 (1.12)	1.72(1.06)	1.33 (1.26)	2.351	0.0005	0.242	0.0005
Strengthen the immune system	1.74 (1.14)	1.85 (1.09)	1.36 (1.24)	2.899	0.019	0.418	0.0005
Enhance Sport Performance	2.07 (1.11)	2.30 (0.96)	1.31 (1.24)	6.394	0.004	0.437	0.0005
Fatigue removal	1.63 (1.16)	1.82 (1.09)	0.98 (1.15)	5.097	0.0005	0.342	0.0005
Disease Prevention	1.34 (1.15)	1.50 (1.12)	0.81 (1.08)	4.121	0.0005	0.118	0.060
Increase energy	2.09 (1.08)	2.27 (0.97)	1.48 (1.20)	5.106	0.0005	0.2145	0.001
Muscle Building	2.23 (1.05)	2.45 (0.85)	1.47 (1.27)	6.879	0.0005	0.295	0.0005
Increase physical strength	1.92 (1.12)	1.07 (1.05)	1.41 (1.21)	4.028	0.0005	0.402	0.0005
Raise your body's tolerance	1.73 (1.13)	1.88 (1.09)	1.21 (1.09)	4.145	0.0005	0.435	0.0005
Pain Prevention	1.11 (1.06)	1.20 (1.06)	0.77 (1.01)	2.728	0.007	0.087	0.163
Pain control	0.97 (1.04)	1.04 (1.06)	0.74 (0.95)	1.933	0.054	-0.013	0.831
Weight/ fat loss	1.53 (1.19)	1.65 (1.20)	1.14 (1.07)	2.931	0.004	0.024	0.697
Frequency of supplementation	7.67 (5.71)	8.04 (6.04)	6.43 (4.22)	1.898	0.059	-	-
Age		25.99 (5.50)	1.28 (1.18)	4.360	0.0005	-	-

CSU= Causes of supplement use; FS= Frequency of supplementation.

P-value less than 0.5 is highlighted

the results of the current study. We found out that vitamin C, iron, calcium, L-carnitine, herbs, and Q1 are more frequently consumed by female athletes as compared to male athletes. Compared to female athletes, male counterparts consume sports drinks, proteins, and hormones significantly more, which is in line with the results of a number of other studies

[8]. This is why in the majority of western countries, consuming supplements in female athletes has been reported higher than in male athletes [5, 6].

It seems that the consumption of supplements among athletes, in comparison to Western countries, is less frequent, particularly among female athletes, which can be due to a

Table 6. The comparison of awareness of the side effects of athlete women and men.

Factor	Total	Male	Female	Chi-square	P-Value
Without problem					
Good	58 (22.6)	42 (21.2)	16 (27.6)	1.604	0.448
Average	98 (38.3)	75 (37.9)	23 (39.7)		
Weak	100 (39.1)	81 (40.9)	19 (32.8)		
Heart problems					
Good	109(42.6)	81(40.9)	28(48.3)	2.568	0.277
Average	98(38.3)	81(40.9)	17(29.3)		
Weak	100(39.1)	36(18.2)	13(22.4)		
Kidney problems					
Good	83(32.4)	58(29.3)	25(43.1)	4.031	0.133
Average	89(34.80)	73(36.9)	16(27.6)		
Weak	84(32.8)	67(33.8)	17(29.3)		
Liver problems					
Good	81(31.6)	61(30.8)	20(34.5)	1.182	0.554
Average	71(27.8)	53(26.8)	18(31)		
Weak	104(40.60)	84(42.4)	20(34.5)		
Digestive problems					
Good	106(41.4)	82(41.4)	24(41.4)	.410	0.815
Average	32(82)	62(31.3)	20(34.5)		
Weak	68(26.6)	54(27.3)	14(24.10)		
mental health problems					
Good	104(40.6)	77(38.9)	27(46.6)	10.838	0.013
Average	83(32.4)	63(31.8)	20(34.5)		
Weak	69(27)	58(29.3)	11(18.9)		
Sexual problems					
Good	90(35.1)	62(31.3)	28(48.3)	7.541	0.023
Average	96(37.5)	75(37.9)	21(36.2)		
Weak	70(27.3)	61(30.8)	9(15.50)		
Skin problems					
Good	104(40.6)	75(37.9)	29(50)	3.152	0.207
Average	91(35.5)	72(36.4)	19(32.8)		
Weak	61(23.8)	51(25.8)	10(17.2)		
Fever and seizure					
Good	127(49.60)	98(49.5)	29(50)	0.073	0.964
Average	100(39.1)	77(38.9)	23(39.7)		
Weak	29(11.3)	23(11.6)	6(10.3)		

P-value less than 0.5 is highlighted

number of various factors such as the level of awareness about supplements, accessibility, the beliefs of athletes, and the lower level of female participation in amateur and professional sports in Iran. The current study shows that the most common source of suggesting sports supplements are the coaches and other athletes. In another study, the most

common source of suggesting sports supplement is coaches and teammates, which is in line with our results [16].

Considering the role of coaches and other athletes in recommending sports supplements to individuals, it seems necessary to train coaches and athletes in this regard. The findings of the study show that the most frequent reasons for

consuming supplements include muscle building, increasing energy, and improving athletic performance. Other studies have also cited reasons for the consumption of sports supplements such as increasing the muscle mass, increasing physical strength, maintaining and improving health and improving athletic performance [17, 18].

It seems that male bodybuilders of Kermanshah City are more concerned with improving performance, muscle building, and being in shape more than their health, which is due to the dominant culture of the city and these tendencies are less frequent among female athletes. In this study, the athletes' level of understanding the side effects of consuming sports supplements was not satisfactory. The results of a number of other studies on the issue also indicate the low level of athletes' knowledge [8, 11], which is in line with our results.

CONCLUSION

Consuming sports supplements is an undeniable fact among athletes. The results of the current study indicate a high level of supplement consumption among bodybuilders. The most common supplements consumed are vitamin C, Creatine, vitamin E, multivitamin, and iron. The most common reasons for consuming supplements are increasing muscle mass, physical strength, maintaining and improving health, and improving athletic performance. The level of knowledge of athletes about the side effects of using supplements was not satisfactory. In general, it can be concluded that because of relatively high consumption rates of supplements among bodybuilders, it is necessary that people involved in this issue, including athletes, coaches, doctors, and nutrition specialists, must learn more about the ingredients, side effects, benefits, and applications of various food supplements so that a number of false beliefs about consuming or not consuming these supplements can be corrected. Based on the results obtained from this study, it is necessary to carry out a longitudinal study on athletes from various age groups to obtain a more comprehensive picture of the issue to be provided to coaches and scholars of different sports. Since in this study, the number of male and female athletes was not comparable because the number of females was lower than males, it is recommended that another study should be performed by considering a sufficiently large sample with equal ratios of both genders.

AUTHORS' CONTRIBUTIONS

All authors participated in the design of the study and drafted the manuscript and read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No Animals/Humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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APPENDIX 1

Part 1: Demographic information

Part 2: Frequency of using 38 different types of sport supplements with yes/no answers; the "no" answer would get a score of zero and the "yes" answer would get a score of one.

Have you used sports supplements over the past year?
Yes No

If your answer to the previous question is positive, please mark your supplementary form on the next table.

Type of Supplement	Yes	No
Sport drinks		
Carbohydrate drinks		
Corn syrup (fructose)		
Vitamin C		
Vitamin D		
Vitamin E		
Vitamin B ₆		
Vitamin B ₁₂		
Vitamin B complex		
Vitamin B ₃		
Multi vitamin		
Iron		
Calcium		
Zinc		
Glucosamine		
Amino acid		
Creatine		
Glutamine		
L- Carnitine		
Whey Protein		
Casein		
Weight gaining proteins		

fish oil		
Omega 3		
Omega 6		
Herbal Medicines		
Ginseng		
Ephedra		
Q10		
Caffeine		
Insulin		
Growth Hormone		
Testosterone		
Winstrol Depot		
Androel		
Nobaen		
Nandrolone		
Oxymetalone		

Part 3: Reasons behind consuming sports supplements.

Causes of supplement use	Not at all	Low	Medium	High
Maintaining Health				
Improve health				
Strengthen the immune system				
Enhance Sport Performance				
Fatigue removal				
Disease Prevention				
Increase energy				
Muscle Building				
Increase physical strength				
Raise your body's tolerance				
Pain Prevention				
Pain control				
Weight/ fat loss				

Part 4: Level of awareness about the side effects of using sports supplements.

What do you think about the side effects of taking supplements? Check the box below for your option?

Factor	Yes	No
Without problem		

Heart problems		
Kidney problems		
Liver problems		
Digestive problems		
mental health problems		
Sexual problems		
Skin problems		
Fever and seizure		

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