

# PREVALENCE, ATTITUDES AND MOTIVATIONS CONCERNING DIETARY SUPPLEMENTS IN SPORT INTAKE AMONG MEDICAL STUDENTS

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**Abstract** Nowadays, because of irregular lifestyle, high level of stress dietary supplements (DS) are becoming more popular as a source of needful nutrients among millions of people all over the world. The main purpose of present study was to estimate prevalence of dietary supplement consumption in sport, motivation in DS usage and sources of information.

Anonymous self-administered questionnaire was spread among students of medical faculty in the end of their fourth year of study. There were 218 students of the fourth year of the Medical Faculty, of which 60.1% were females and 39.9% were males. Males more often used or had been using dietary supplements than females. The most popular dietary supplement was whey protein. The most common aim among men was to build up muscle mass.

It is possible to state conclusions that prevalence of using dietary supplement among students is similar to values reported previously in the literature. Males were definitely more often undertaking physical activity in the gym and that could be the reason why they were definitely more often using specific dietary supplements.

**Key words** dietary supplements, students, nutrition, sport

## Introduction

In 1994 for the first time dietary supplements (DS) were legally defined by Dietary Supplement Health and Education Act, which constituted DS as products containing one or more nutritional ingredients such as vitamins, minerals, herbs, amino acids, or other botanicals (DSHEA, 1994). Then, in 2002, a similar directive, which contained juridical regulations of supplements in European Union countries, was extradited European Union Parliament (European Communities, 2002).

It is known that proper and balanced diet is responsible for providing different kinds of nutrients which are essential for our body to work efficiently, to maintain good health and to protect from diseases (Block et al., 2007). Nowadays – because of irregular, sedentary lifestyle, high level of stress and insufficient length of time to prepare appropriate meals – DS are becoming more and more popular as a source of needful nutrients among millions of people all over the world (Archer et al., 2005; Stojiljković, Radulović, Jović, 2012). College students are known as a distinctive group more predisposed to consume DS because of specific lifestyle including studying, sports activity, alcohol and tobacco usage (Paffenbarger, Kampert, Lee, 1997; Borsari, Carey, 2001). Moreover, medical students are a specific group, due to acquired knowledge about health and adequate nutrition (Borsari, Carey, 2001). Taking part in different mandatory medical courses during studies such as biochemistry, internal medicine and pharmacology, should have an effect on the level of knowledge about supplements among students; validity of their usage, potential benefits and side effects. Therefore, it is essential to find out if studying medicine has an impact on using DS in sport. According to data from German National Nutritional Survey II, the usage of DS is especially common among group aged 18–24 and is increasing with age (Federal Research Center for Nutrition and Food, 2008). Available research show that the most popular causes of using DS among students are to maintain/improve general health, strengthen immune system and provide adequate nutrition (Alhomoud, Basil, Bondarev, 2016; Stanojevic-Ristic et al., 2017; Sotoudeh et al., 2015; Žeželj et al., 2018). Even though the usage of DS can lead to improvement of general condition, endurance and appearance, help maintain good health and lower the level of stress, the specific influence of supplements to our organism is still not clarified (Froiland, Koszewski, Hingst, Kopecky, 2004; Erdman, Fung, Reimer, 2006; Lukaski, 2004).

## Materials and methods

Anonymous self-administered questionnaire (Appendix A) was spread among students of Medical Faculty at the end of their fourth year on the Medical University of Lublin. The survey was composed of one choice questions (f.e. “Do you train in the gym?”) as well as multiple choice questions (f.e. “Which from the most popular dietary supplements in sport mentioned below do you use /used?”), which were 19 in total. At the beginning we collected demographic data such as age, sex, place of residence, marital status. In the following questions, the respondents answered if they had been going to the gym and how often. Furthermore, we asked students if they had been using dietary supplements in sport, which type and what was the aim of using. The last part contained questions about the sources of information about supplements.

The results of the survey were statistically analyzed. The values of analyzed parameters were presented by numbers and percentage. Chi<sup>2</sup> test was used to detect dependence between analyzed variables. Moreover, Spearman's rank correlation was performed in order to examine dependency among some of the variables. The level of significance was  $p < 0.05$ , which signalized the existence of statistically significant differences and dependences. Database and statistical analysis were carried out using Statistica 9.1 (StatSoft, Poland).

## Results

General characteristic of the study group is specified in Table 1.

**Table 1.** Characteristic of surveyed students of the fourth year of Medical Faculty

All	N = 218	%
Sex		
Females	131	60.10
Males	87	39.90
Place of residence		
Countryside	33	15.00
City (<150,000 inhabitants)	70	32.20
City (>150,000 inhabitants)	115	52.75
Age		
21–22 years old	40	17.88
23–24 years old	145	66.50
≥25 years old	34	15.60

The survey shows that there exists a difference between males and females in training in a gym (Table 2), while men definitely more often attend to the gym ( $p = 0.02314$ ).

**Table 2.** Dependence between training in a gym among genders

		Do you train in a gym?		Chi <sup>2</sup> p
		Yes	No	
Females	N	39	92	5.157959 $p = 0.02314$
	%	29.77	70.23	
Males	N	39	48	
	%	44.83	55.17	
In total	N	78	140	–
	%	35.78	64.22	

The present survey had in view to estimate dependency between dwelling place and attending to the gym. The number of students of both sexes, who confirmed training in the gym, is slightly larger among the respondents living in more populated cities (>150,000 inhabitants), although the differences are not statistically significant. Among the students, males used or had been using dietary supplements definitely more often than females (Table 3).

The most popular dietary supplement among both genders was whey protein. Moreover, definitely more males than females used creatinine ( $p = 0.00022$ ). Distinctly more men than women used whey protein ( $p = 0.02499$ ) (Table 4).

**Table 3.** Consumption of dietary supplements in sport among all the respondents

		Have you ever used dietary supplements in sport?			Chi <sup>2</sup> p
		never used	had used before	currently using	
Females	N	109	9	13	23.98776 p = 0.00001
	%	83.21	6.87	9.92	
Males	N	46	21	20	
	%	52.87	24.14	22.99	
In total	N	155	30	33	
	%	71.1	13.76	15.14	

**Table 4.** Consumption of specific dietary supplements among the respondents who confirmed consumption of dietary supplements currently or in the past

		Dietary supplement							
		BCAA	creatine	arginine	fatty acids	β-alanine	whey protein	gainer	carbohydrates
Females	N	7	2	1	4	1	9	1	2
	%	31.82	9.09	4.55	18.18	4.55	40.91	4.55	9.09
Males	N	21	25	4	7	5	30	11	7
	%	48.78	60.98	9.76	17.07	12.20	73.17	26.83	17.07
X <sup>2</sup>		1.467614	13.69103	0.0578628	0.0564436	0.28771907	5.024963	3.278853	0.2357262
		p = 0.22573	p = 0.00022	p = 0.80991	p = 0.81221	p = 0.59203	p = 0.02499	p = 0.07018	p = 0.62731
In all	N	28	27	5	11	6	39	12	9
	%	12.84	12.38	2.3	5.04	2.75	17.89	5.5	4.13

The most popular aim among men was to build up muscle mass and the difference between genders in case of that purpose was significant ( $p = 0.00015$ ). Among females the most common aim of dietary supplement consumption was to reduce adipose tissue (Table 5).

**Table 5.** Purposes of dietary supplements consumption among the respondents who confirmed using dietary supplements

		Purpose				
		build up muscle mass	improvement of condition and endurance	reduction of adipose tissue	maintain health and strengthen immune system	improvement of appearance
Females	N	4	2	11	4	5
	%	18.18	9.09	50	18.18	22.73
Males	N	28	12	12	7	5
	%	68.29	29.27	29.27	17.07	12.20
X <sup>2</sup>		14.38465	2.306125	1.835722	0.0564436	0.5313805
		p = 0.00015	p = 0.12887	p = 0.17546	p = 0.81221	p = 0.46603
In all	N	32	14	23	11	10
	%	50.79	22.22	36.51	17.46	15.87

The most common way among both genders to obtain information was through the Internet. Significantly more men used newspapers as a source of knowledge than women, where  $p = 0.01553$  (Table 6).

**Table 6.** Sources of knowledge about dietary supplements among the respondents

		Sources of knowledge				
		friends	the Internet	newspapers	physicians	others
Females	N	33	89	12	15	11
	%	25.19	67.94	9.16	11.45	8.40
Males	N	19	59	18	6	12
	%	21.84	67.82	20.69	6.90	13.79
X <sup>2</sup>		0.3233562	0.0003619	5.855683	0.7772275	1.091954
		$p = 0.56960$	$p = 0.98482$	$p = 0.01553$	$p = 0.37799$	$p = 0.29604$
In all	N	52	148	30	21	23
	%	23.85	67.89	13.76	9.58	10.55

## Discussion

The present survey had in view to estimate consumption of DS in sport among medical students and the results of the research showed that 28.89% of students were currently using or had used supplements. Obtained results were similar to those in other research. According to available data the prevalence of DS consumption (mainly vitamins, herbs, microelements) was present among about 33% of Medical Faculty students (Alhomoud et al., 2016; Sotoudeh et al., 2015; Žeželj et al., 2018). In addition, the surveys detected that Medical Sciences students had used DS slightly more often than non-medical sciences students (Stojiljković et al., 2012; Alhomoud et al., 2016; Žeželj et al., 2018) and general population (Axon, Vanova, Edel, Slack, 2017). Higher educational status predisposes to more frequent DS consumption due to enrichment of nutrition (Alfawaz et al. 2017; Pouchieu et al., 2013). Moreover, the surveys showed that the knowledge of DS definition and its safety was statistically higher among Medical Science students, because of acquired knowledge during pharmacology and other medical courses (Žeželj et al., 2018; Al-Naggar, Chen, 2011; Azizi, Aghaee, Ebrahimi, Ranjabar, 2011).

In the present study, males used DS definitely more often than females, which was statistically significant. Therefore, the results in present scientific paper are not coherent with findings in other surveys. On the contrary, in some of the studies gender was not associated with DS intake (Žeželj et al., 2018), while in the others – females were using supplements more often (Sotoudeh et al., 2015). The variation in present study could be connected with the fact that the survey mainly concerns using DS in sport and males definitely more often attend to the gym. Some of the studies detected that the usage of DS is higher among more physically active respondents (Suleiman, Alboqai, Yasein, Al-Essa, El Masri, 2008). However, individual sport training may predispose to using supplements more than team sports (Sirico et al., 2018; Foote et al., 2003; Radimer et al., 2004; Ranelli, Dickerson, 1993; Gunther, Patterson, Kristal, Stratton, White, 2004; Dickinson et al., 2014).

The present research shows that the most common purpose of DS consumption in sport among males was to build up muscle mass (68.29%), while among females – to reduce adipose tissue (50%). Findings mentioned above are not consistent with the ones in other research. The most frequent reasons of taking DS (especially vitamins)

mentioned in available data was: maintain good health, strengthen immune system, provide adequate nutrition, enhance daily energy (Alhomoud et al., 2016; Stanojevic-Ristic et al., 2017; Sotoudeh et al., 2015; Žeželj et al., 2018). The difference between this scientific paper and others could be connected with the fact that the present survey was mainly concerned about using specific DS in sport and among physically active medical students. DS in sport have different effect; one of them is used to reduce adipose tissue, while the others – to build up muscle mass. Moreover, each DS should be used in specific dose or exact time of day (Kerksick et al., 2018). Therefore, the users of DS in sport have to have adequate knowledge about these substances. Other studies were centered upon using DS like minerals, herbs, vitamins. Scientific papers show that provision of nutritional status was the most common purpose among females, while enhancing stamina was the most frequent among males (Sotoudeh et al., 2015; Tsang, Pycz, Herbold, 2007; Saeedi, Mohd Nasir, Hazizi, Vafa, Rahimi Foroushani, 2013). Respondents who cared mainly about maintaining good health and exercise regularly, reported the lowest DS consumption (Vinnikov, Romanova, Dushpanova, Absatarova, Utepbergenova, 2018).

In the present survey the Internet was the most common source of knowledge of DS among the respondents (67.89%). The results were coherent with other studies. One of the researches presented that the Internet was the most popular source of knowledge among 66.1% of respondents (Žeželj et al., 2018), while in another study among 40% of students (Kobayashi, Sato, Umegaki, Chiba, 2017). On the contrary, another data reported that friends/family and a doctor were the most mainstream sources of information about DS (Al-Naggar et al., 2011; Dundas, Keller, 2003; Sharma et al., 2014). The comparison between medical and non-medical sciences students reported significant variations in sources of knowledge of DS among each group. Undergraduates of Medical Faculties read leaflets of products definitely more often, while non-medical undergraduates more frequent used friends or family advice (Žeželj et al., 2018).

## Conclusions

This research mainly concerned specific dietary supplements used in sport. Based on obtained results, it is possible to state conclusions that: prevalence of using dietary supplement among students is similar to values reported previously in the literature. Males were definitely more often undertaking physical activity in the gym and that could be a reason why males were definitely more often using specific dietary supplements. The main purpose of using DS among men was to build up muscle mass, while among women – reduce adipose tissue. In both genders, the Internet was the most popular source of information about dietary supplements.

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