

## Dietary supplement use and knowledge among students from a health science faculty in a Turkish University

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### Article history:

Received: 22 December 2020

Received in revised form: 29 January 2021

Accepted: 21 April 2021

Available Online: 19 September 2021

### Keywords:

Dietary supplements,  
Diet,  
University students,  
Nutrition

### DOI:

[https://doi.org/10.26656/fr.2017.5\(5\).760](https://doi.org/10.26656/fr.2017.5(5).760)

### Abstract

Dietary supplements are concentrated sources of nutrients used as an addition to a normal diet with a nutritional or physiological effect. In this cross-sectional study, it was aimed to determine the factors of dietary supplement use, the related knowledge, and their relationship with supplement use in a faculty of health sciences among university students. This cross-sectional study was carried out with 333 voluntary university students from Ankara Yıldırım Beyazıt University, the Faculty of Health Sciences. A questionnaire form consisting of 5 sections was applied to the students by face-to-face interview method. The most remarked purposes of supplement use were to improve health (44.2%) and boost immunity (22.1%). There was no difference between age, gender, department, coexistent disease, tobacco smoking and alcohol consumption in terms of dietary supplement use ( $p = 0.611$ ,  $p = 0.720$ ,  $p = 0.682$ ,  $p = 0.062$ ,  $p = 0.491$ , and  $p = 0.658$ , respectively). No significant difference was observed between physical activity status, the duration of physical activity, dieting status, the source of diet program, daily frequency of main meals and snacks, body mass index (BMI) groups, and the reason for meal skipping among students according to dietary supplement use ( $p = 0.180$ ,  $p = 0.205$ ,  $p = 0.686$ ,  $p = 0.226$ ,  $p = 0.533$ ,  $p = 0.449$ ,  $p = 0.976$ , and  $p = 0.758$ , respectively). There was not any significant difference between physical activity status, the duration of physical activity, dietary supplement use, dieting status, the frequency of main meals and snacks and BMI in terms of total knowledge score of dietary supplements ( $p = 0.245$ ,  $p = 0.713$ ,  $p = 0.278$ ,  $p = 0.067$ ,  $p = 0.466$ ,  $p = 0.647$ , and  $p = 0.851$ , respectively). Scientific attention should be paid to the use of dietary supplements. Arbitrary approaches can lead to unwanted interactions. Therefore, in order for health and government policies to be established related to dietary supplements, it is essential to determine the factors related to their use.

## 1. Introduction

Dietary supplements are concentrated sources of nutrients used as an addition to a normal diet with a nutritional or physiological effect (EFSA, 2020; EC, 2020). In other words, it is defined as the available forms of nutrients corresponding to high doses in the form of pills, capsules, or syrups. These products generally have a wide range, including vitamins, minerals, amino acids, essential fatty acids, pulp, various herbs, and their extracts (Tek and Pekcan, 2008). These single or multi-component products can be quite different in their characteristics (Karaarslan *et al.*, 2019).

These supplements are products that should be used with expert advice in cases where nutrition is not sufficient. However, they may be widely used in an

uncontrolled way all over the world (Karaarslan *et al.*, 2019). While the food supplement market in Turkey is growing each day, supplement use habits are also affected directly proportional (Bozkurt Bekoğlu and Ergen, 2016). In Turkey, the prevalence of using dietary supplements in individuals who exercise was 43–47.6% (Babal, 2015; Helvacı, 2017). Furthermore, 10.7% of university students used nutritional supplements (Kara, 2019). The prevalence of dietary supplement use in college or university students in other countries was also reported and was found to be in the 16.8–69% range (Axon *et al.*, 2017; Barnes *et al.*, 2016; Gajda *et al.*, 2017; Naqvi *et al.*, 2019; Radwan *et al.*, 2019; Serdarevic *et al.*, 2019).

The university period is a transition phase in which the late stages of adolescence and the first period of

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adulthood begin. When young people leave the family environment, their stress levels increase and their nutritional status changes accordingly. They are more affected by external factors and begin to make their own free choices prominently (Akdevelioğlu and Yörüsün, 2019). In this period, as well as the adaptation of students to a new discipline, the faster pace of life they lead also increases unhealthy and irregular nutrition behaviours (Kartal *et al.*, 2017). Zemzemoğlu *et al.* (2019) found high levels of main meal skipping and snack consumption among students from a faculty of health science. Also, these students were not physically active enough in Arslan's study. In addition, habits such as not drinking enough water and milk and preferring fast food were determined to increase in this period (Arslan *et al.*, 2016).

The types of supplements used vary depending on studies (Barnes *et al.*, 2016; Kobayashi *et al.*, 2017). Barnes *et al.* (2016) found mostly vitamin and mineral use in the Australian university population. While health anxiety in university students has been increasing over the recent years, in many studies students can use dietary supplements to support their immunity and to maintain and improve their health in this environment (Sharma and Adiga, 2014; Ünsal *et al.*, 2010; Radwan *et al.*, 2019; Kotic *et al.*, 2020). These products are used by people who are of the opinion that nutrition will cure their diseases (Erden and Tanyeri, 2004). The prevention of weakness, increasing physical and mental performance, muscle development, and fat burning were among the reasons for supplement use stated in other studies (Babal, 2015; Bekoğlu and Ergen, 2016). However, it should be considered that random approaches about supplements may lead to inadequate treatment of certain diseases, delayed diagnosis by concealing some symptoms, and latent drug interactions (Erden and Tanyeri, 2004).

Understanding the characteristics of dietary supplement consumers, their awareness levels, and usage rates of the products is important in determining the strategy for healthcare professionals, producers, and the government (Bekoğlu and Ergen, 2016). In this cross-sectional study, it was aimed to determine the factors of dietary supplement use, the related knowledge, and their relationship with supplement use in a faculty of health sciences among university students.

## 2. Materials and methods

This cross-sectional study was carried out with 333 voluntary university students from Ankara Yıldırım Beyazıt University, the Faculty of Health Sciences from May to September 2019, in Ankara, Turkey. A questionnaire form consisting of 5 sections was applied

to the students by face-to-face interview method. Data in the questionnaire forms were kept confidential. The study was approved by the Institutional Review Board and Ethics Committee of Ankara Yıldırım Beyazıt University (Project No: 2019-197) and all the subjects gave written informed consent in accordance with the Declaration of Helsinki.

### 2.1 Demographic information of students

The section consists of demographic characteristics such as department, age, gender, tobacco smoking, alcohol consumption, coexistent diseases, physical activity status and duration, dieting status and the source of diet program, which were used to assess the general information about students.

### 2.2 Nutritional habits

The frequency of daily main meals and snacks and the reason for meal skipping were questioned to determine the nutritional habits.

### 2.3 Anthropometric measurements

Students' body weight and height were measured by a trained researcher. Body weight was measured via Tanita Body Composition Analyzer UM-073. The participants were asked to wear light clothes and be barefoot during the procedure. Seca 206 stadiometer was used to measure height. The students were aligned in a standing position with head at Frankfort plane. After obtaining body weight and height, BMI was calculated. The formula 'weight (kg)/height × height (m<sup>2</sup>)' was used to assess BMI and the obtained results were categorized according to the WHO criteria (WHO, 2020).

### 2.4 Habits of dietary supplement use

The use of the dietary supplement, the supplement type, the place of purchase of the product, the duration of use, and the purpose of use was questioned in this section.

### 2.5 Level of knowledge on dietary supplements

Students' level of knowledge was evaluated via 10 multiple choice questions based on their declaration (true, false, I do not know). The questions included in this section were: 'Additional vitamin-mineral use is absolutely necessary.' 'Vitamins energize the body.', 'Antioxidants have no effect on the immune system.', 'Every herbal product is harmless.' 'Anyone can use multivitamins.', 'It is not necessary to consult a doctor to use dietary supplements.', 'The dosage is not important to us when using dietary supplements.', 'Vitamins-minerals taken more than necessary will not be harmful.', 'Protein supplements above the requirement

should be used to increase muscle mass.’, and ‘Dietary supplements do not interact with medicines, foods and beverages.’. Only the correct answers were scored as ‘1’ and the wrong answers and the answers of ‘I don’t know’ were scored as ‘0’. The total knowledge score was calculated between ‘0’ and ‘10’.

### 2.6 Statistics

Continuous numerical variables were transformed into sequential qualitative (categorical) data and included in the analysis. The relationship (independence) between categorical variables was analyzed by chi-square tests and reported with the exact p-value. The relationship between continuous qualitative variables was analyzed with Goodman-Kruskal’s gamma test. The significance level was accepted as 0.05 (5%) and the data obtained were analyzed with SPSS (Statistical Package for Social Sciences, version 25).

### 3. Results

The study included 333 university students, of whom 28.5% declared that they used dietary supplements. The dietary supplement that was mainly used was multivitamins (25.3%) and omega-3 (24.2%). The students generally preferred to purchase the supplements from the pharmacy (95.8%). Of the students, 51.1% stated one month of duration on supplement use. The most remarked purposes of supplement use were to improve health (44.2%) and boost immunity (22.1%) (Table 1).

Table 2 demonstrates that there is no difference between age, gender, department, coexistent disease, tobacco smoking and alcohol consumption in terms of dietary supplement use ( $p = 0.611$ ,  $p = 0.720$ ,  $p = 0.682$ ,  $p = 0.062$ ,  $p = 0.491$ , and  $p = 0.658$ , respectively).

No significant difference was observed between physical activity status, the duration of physical activity, dieting status, the source of diet program, daily frequency of main meals and snacks, BMI groups, and the reason for meal skipping among students according to dietary supplement use ( $p = 0.180$ ,  $p = 0.205$ ,  $p = 0.686$ ,  $p = 0.226$ ,  $p = 0.533$ ,  $p = 0.449$ ,  $p = 0.976$ , and  $p = 0.758$ , respectively) (Table 3).

There was not any significant difference between physical activity status, the duration of physical activity, dietary supplement use, dieting status, the frequency of main meals and snacks and BMI in terms of total knowledge score of dietary supplements ( $p = 0.245$ ,  $p = 0.713$ ,  $p = 0.278$ ,  $p = 0.067$ ,  $p = 0.466$ ,  $p = 0.647$ , and  $p = 0.851$ , respectively) (Table 4).

Table 1. Descriptive information about dietary supplement use of participants

	n	%
<b>Dietary supplement use</b>		
Yes	95	28.5
No	238	71.5
<b>Supplement type</b>		
Multi-vitamin	24	25.3
Omega-3	23	24.2
Vitamin C	15	15.7
Vitamin D	14	14.7
Probiotic	8	8.4
Vitamin B	5	5.3
Protein powder	3	3.2
Zinc	2	2.1
Other	1	1.1
<b>Place of purchase</b>		
Store	4	4.2
Pharmacy	91	95.8
<b>Duration of use</b>		
Less than 1 month	13	13.7
1 month	47	49.5
2 months	24	25.2
3 months and above	11	11.6
<b>Purpose of usage</b>		
Improve health	42	44.2
Boost immunity	21	22.1
Vitality	14	14.7
Adequate nutrition	11	11.6
Improve performance	4	4.2
Increase muscle mass	3	3.2

### 4. Discussion

The status of nutritional supplement use varies according to the characteristics of the population, countries, and selected samples (Teng *et al.*, 2008; Yahia *et al.*, 2016; Barnes *et al.*, 2016; Gajda *et al.*, 2016; Axon *et al.*, 2017; Kobayashi *et al.*, 2017; Kara, 2019; Naqvi *et al.*, 2019; Radwan *et al.*, 2019; Serdarevic *et al.*, 2019). The frequency of nutritional supplement use in this study population was 28.5% and it was higher than a study conducted with university students in Turkey (10.7%) (Kara, 2019). Dietary supplement use is very common among health sciences students and could be higher than the general population (Teng *et al.*, 2008).

While the mainly used dietary supplements were multivitamins (25.3%) and omega-3 (24.2%) in our research, in another study 32.5% of university students used nutritional supplements and vitamins/minerals and 44.2% used other supplements (Kara, 2019). Similarly, most of the students used vitamin/mineral supplements in Japan and multivitamins in Pakistan and the United Arab Emirates (Naqvi *et al.*, 2019; Radwan *et al.*, 2019).

Table 2. Comparison of sociodemographic characteristics according to dietary supplement use

	Dietary supplement use				Chi-square	p
	Yes		No			
	n	%	n	%		
Age (year)					1.819	0.611
18 and below	17	33.3	34	66.7		
19	31	25.6	90	74.4		
20	23	26.4	64	73.6		
21 and above	24	32.4	50	67.6		
Gender					0.269	0.720
Male	14	31.8	30	68.2		
Female	81	28.0	208	72.0		
Department					2.319	0.682
Nutrition and Dietetics	24	25.3	71	74.7		
Nursing	17	25.8	49	74.2		
Child Development	12	27.9	31	72.1		
Audiology	37	31.6	80	68.4		
Sports Sciences	5	41.7	7	58.3		
Coexistent disease					3.797	0.062
Yes	20	40.0	30	60.0		
No	75	26.5	208	73.5		
Tobacco smoking					1.528	0.491
Current smoker	27	32.9	55	67.1		
Non-smoker	62	27.8	161	72.2		
Former smoker	6	21.4	22	78.6		
Alcohol consumption					0.842	0.658
Drinker	25	31.2	55	68.8		
Non-drinker	67	28.2	171	71.8		
Former drinker	3	20.0	12	80.0		

Students generally purchased supplements from pharmacies similar to the other studies (Kobayashi *et al.*, 2017).

In this study, 49.5% of the students stated supplement use over a one-month period. In another study, the duration of dietary supplement use was found to be 1–3 months among 34.9% of Turkish university students (Kara, 2019). When the duration of dietary supplement use of students is taken into consideration, it was found that there were mostly short-term uses in our research. The main reasons for consuming dietary supplements were to improve health (44.2%) and boost immunity for our participants. In Turkey, the first two reasons to use nutritional support products for the general population were robustness and immunity in another study (Ünsal *et al.*, 2010).

According to our data, there was no difference between age, gender, department, coexistent disease, tobacco smoking, and alcohol consumption in terms of dietary supplement use. Alfawaz *et al.* (2017) did not find any significant relationship between age, coexistent disease, and the use of dietary supplements, either. Fattahzadeh-Ardalani *et al.* (2016) found a significant relationship between age and gender and no significant relationship between educational level and supplement use. These differences in the literature may be due to the sample diversity and sample size.

We found no relationships between dietary supplement use and lifestyle habits. In contrast to our results, in other studies, there were significant associations between supplement use and exercise (Sharma and Adiga, 2014; Lieberman *et al.*, 2015; Al-Johani *et al.*, 2018; Radwan *et al.*, 2019). In the literature, supplement users consumed more meals per day as compared to non-users (Radwan *et al.*, 2019). In our participants, those who did not use supplements consumed more meals, but this relationship was not statistically significant.

We also did not find any significant relationship between supplement use and BMI. Similarly, Radwan *et al.* recorded no significant association of BMI with supplement use (Radwan *et al.*, 2019). In contrast, dietary supplement use had a significant relationship with BMI in Iran (Fattahzadeh-Ardalani *et al.*, 2016).

When the participants' total knowledge score of dietary supplements was examined, their knowledge about supplements was not determinative in our data. No significant correlation was found between the knowledge score and the use of supplements in private sports centers (Helvacı, 2017). On the contrary, the knowledge of dietary supplements was found to be significantly different between supplement users and non-users ( $p$ -value = 0.000) in college students (Radwan *et al.*, 2019). There might not be sufficient information in the literature about the level of knowledge regarding supplement use

Table 3. Association between lifestyle habits and dietary supplements use

	Dietary supplement use				Chi-square	p
	Yes		No			
	n	%	n	%		
Physical activity					1.991	0.180
Yes	48	32.4	100	67.6		
No	47	25.4	138	74.6		
Duration of physical activity (min./week)					3.031	0.205
90 and below	22	40.7	32	59.3		
90–180	16	26.7	44	73.3		
180 and above	10	29.4	24	70.6		
Dieting					0.330	0.686
Yes	8	24.2	25	75.8		
No	87	29.0	213	71.0		
Source of diet program					5.632	0.226
Doctor	1	50.0	1	50.0		
Dietitian	3	33.3	6	66.7		
Physical trainer	1	100.0	-	-		
Social media	3	15.8	16	84.2		
Friend	-	-	2	100.0		
Main meal (time/d)					0.479	0.533
2	39	30.7	88	69.3		
3	56	27.2	150	72.8		
Snacking (time/d)					2.838	0.449
1	29	27.1	78	72.9		
2	58	28.7	144	71.3		
3	7	30.4	16	69.6		
4	1	100.0	-	-		
Body Mass Index (kg/m <sup>2</sup> )					0.156	0.976
Underweight	30	29.4	72	70.6		
Normal	49	27.8	127	72.2		
Overweight	14	29.2	34	70.8		
Obese	2	28.6	5	71.4		
Reason of meal skipping					2.750	0.758
Lack of habit	13	30.2	30	69.8		
Financial difficulties	1	50.0	1	50.0		
Waking up late	2	50.0	2	50.0		
Inappetence	7	21.9	25	78.1		
Lack of time	12	33.3	24	66.7		
Desire to lose weight	4	40.0	6	60.0		

Table 4. Relationship between lifestyle habits, nutritional status, and total knowledge score of dietary supplements

	Total score												Gamma	p	
	0		1		2		3		4		6				
	n	%	n	%	n	%	n	%	n	%	n	%			
Physical activity														-0.110	0.245
Yes	74	50.0	45	30.4	20	13.5	6	4.1	2	1.4	1	0.70			
No	100	54.1	62	33.5	15	8.1	5	2.7	3	1.6	-	-			
Duration of physical activity (min./week)														0.042	0.713
90 and below	23	42.6	22	40.7	9	16.7	-	-	-	-	-	-			
90–180	36	60.0	15	25.0	5	8.3	3	5.0	1	1.7	-	-			
180 and above	15	44.1	8	23.5	7	20.6	2	5.9	1	2.9	1	2.90			
Dietary supplement use														-0.112	0.278
Yes	46	48.4	30	31.6	15	15.8	2	2.1	1	1.1	1	1.10			
No	128	53.8	77	32.4	20	8.4	9	3.8	4	1.7	-	-			
Dieting														0.293	0.067
Yes	22	66.7	8	24.2	2	6.1	-	-	1	3.0	-	-			
No	152	50.7	99	33.0	33	11.0	11	3.7	4	1.3	1	0.30			
Main meal (times/d)														-0.070	0.466
2	63	49.6	43	33.9	14	11.0	5	3.9	2	1.6	-	-			
3	111	53.9	64	31.1	21	10.2	6	2.9	3	1.5	1	0.50			
Snacking (times/d)														-0.041	0.647
1	57	53.3	32	29.9	13	12.1	2	1.9	2	1.9	1	0.90			
2	103	51.0	66	32.7	21	10.4	9	4.5	3	1.5	-	-			
3	13	56.5	9	39.1	1	4.4	-	-	-	-	-	-			
4	1	100.0	-	-	-	-	-	-	-	-	-	-			
Body Mass Index (kg/m <sup>2</sup> )														0.015	0.851
Underweight	54	52.9	36	35.3	8	7.8	3	2.9	1	1.0	-	-			
Normal	88	50.0	57	32.4	22	12.5	6	3.4	2	1.1	1	0.60			
Overweight	29	60.5	10	20.8	4	8.3	4	8.3	1	2.1	-	-			
Obese	2	28.6	3	42.9	1	14.3	-	-	1	14.3	-	-			

and the related factors.

Conducting the study on a faculty of health sciences had both strengths and limitations. Its strength is that there is an inadequate number of studies that have investigated dietary supplements designed with participants from the field of health sciences in our country. Its weakness is that the students of health sciences do not represent the general university population. On the other hand, studying the effective factors of dietary supplements extensively increases the value of our study.

## 5. Conclusion

Scientific attention should be paid to the use of dietary supplements. Arbitrary approaches can lead to unwanted interactions. Therefore, in order for health and government policies to be established related to dietary supplements, it is essential to determine the factors related to their use. By emphasizing the adequacy of a balanced diet, increasing nutrition education at university

programs can positively affect public health by regulating the use of supplements.

## Conflict of interest

The authors declare no conflict of interest.

## Acknowledgments

The authors thank all participants.

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