



Prevalence of Dietary Supplement Use and Associated Factors Among College Students in the United Arab Emirates

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Abstract

The use of dietary supplements (DS) is increasing worldwide, however, there are limited studies examining the characteristics of people who take supplements in the United Arab Emirates. To examine the use of DS and their association with sociodemographic/lifestyle factors among college students in the UAE. A cross-sectional study conducted on 452 (18 to 24 years) college students (247 females and 205 males). A self-administered questionnaire that included sociodemographic and lifestyle characteristics, DS use, attitudes, and behavior was used. The prevalence of DS users was 35.6%. Dietary supplement use was significantly more among males than females ($P=0.008$). The males preferred protein supplements (29.4%), while females consumed multivitamin and mineral supplements. Dietary supplement use was related to physical activity and the existence of a health problem. Males took DS for medical needs and to increase their muscle mass while females took them for medical needs ($P=0.001$). While there was a significant difference between DS users and non-users related to knowledge ($P=0.000$). The majority of DS users agreed that supplements are essential for health (68.3%) and only 39.8% agreed it was safe to use. Dietary supplement users source of information was health care providers (30.5%) followed by social media (22.2%). The prevalence of supplement use among college students was moderate among college students in the UAE. The results draw the attention for increasing public awareness about the DS appropriate use and safety from reliable sources so they could make more informed choices.

Keywords Dietary supplements · Physical activity · College students · Adults · UAE

Introduction

The prevalence of the use of DS which is intended to provide the diet with additional nutrients has globally increased. In the USA, dietary supplement use has increased according to the National Health and Nutrition Examination Survey (NHANES) III from 42% in 1988–1994 to 53% in 2003–2006 [1]. While another study conducted in Spain showed that DS was consumed by only 9.3% [2]. In the Middle East region, DS use was much higher. A survey in Lebanon showed that 53% of participants were consuming herbal products or DS [3]. Furthermore, in Kuwait, herbal remedies were used by 41.3% of respondents and 53.3% used DS such as vitamin/minerals, amino acids, and probiotics [4].

In the UAE, a study examined the practices of DS among university students where 39% were DS users [5]. It has been shown that the intake of supplements is increasing with advancing age, female gender, higher education, and socioeconomic status [6]. In addition, reports from National Institutes

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of Health (NIH) find that use of dietary supplements is highest among those who: are in the best state of health, have a body mass index less than 25 kg/m², are non-smokers, are physically active, report good health, adhere to a healthy diet, and use food labels in making food choices [7].

More researches are needed to find the prevalence of DS consumption among the general population in the UAE. It remains unclear whether there is a relationship between the consumption of DS and lifestyle factors such as PA or BMI.

The purpose of this study was to examine the use of DS and its association with PA and BMI among college students in the UAE.

Methodology

A quantitative, cross-sectional study conducted from February 2018 until May 2018 at the University City in Sharjah. The target group was university students in the UAE who can communicate in Arabic or English.

Data Collection

An online questionnaire was distributed through social media and emails to university students in Sharjah. The questionnaire was pretested and pilot tested. After agreeing to the consent form, the participants filled the questionnaire. It included demographic information, lifestyle characteristics, level of PA, dietary habits and the type and use of DS.

Data Analysis

Data analysis was done using Statistical Package for the Social Sciences (SPSS) version 21 software. Descriptive statistics were utilized; frequencies and percentages were calculated, and associations were determined using the Chi square test. The level of significance was set at $P < 0.05$.

Ethical Consideration

The study protocol was approved by the Research Ethics Committee at the University of Sharjah. Ref No.: REC-18-03-05-02-S. Informed consent was obtained from subjects who agreed to participate in the study and subjects were informed about the purpose of the study and assured confidentiality and anonymity.

Results

Sample Characteristics

The study included 452 participants, 205 (45.4%) were males and 247 (54.6%) were females. The majority were

university educated, aged between 18 and 24 years, and 85.4% were non-smokers. The prevalence of DS use was 35.6% of the participants. Out of them, 18.4% had health problems such as; diabetes mellitus, hypertension, asthma, etc. There was a highly significant association between existing health problems and DS use ($P = 0.032$). The majority of the participants were either overweight (29.6%) or obese (24.3%) with a significant difference between males and females ($P = 0.000$). While there was no significant association of BMI with the DS use.

According to PA, almost half of the participants reported that they were sedentary most of the time. While about 42% of males and 41% of females were exercising about 3 h daily and DS users were significantly more active than non-DS users (P value = 0.014). Moreover, males were significantly exercising more than female participants ($P < 0.005$) (Table 1).

Dietary Patterns

University students were asked about the type of diet followed and it showed that 71% of the males were trying to gain weight while 56.1% of females were trying to lose weight and the difference was significant between male and female participants ($P = 0.049$). Moreover, the number of meals consumed daily was significantly different between males and female participants (P value = 0.011) as well as between DS users and non-DS users ($P = 0.023$). The majority of DS users consumed more meals per day as compared to non-DS users (54.5%) (Table 2).

Patterns of DS Use

Out of 205 males, 42% were DS users (Table 3). The most common types of supplements used by males were protein (29.4%), and vitamins (21.2%) such as; vitamin D and vitamin C. The main reasons of DS use reported by male participants were medical needs (34.1%) followed by increasing muscle mass (21.2%). About 31% of the female participants were DS users. They used mostly multi-vitamins/minerals (42.1%), and single vitamins (27.6%). The main reasons for DS use among females were for medical needs (46.1%) and for promoting general health (17.1%). There were significant differences between male and female participants in the type of DS, the form, the duration, the reason for the DS use ($P < 0.001$) (Table 3).

Knowledge of DS

The knowledge and beliefs of DS differed significantly between DS users and non-users (P value = 0.000). The majority of the DS users agreed that DS are essential for health (68.3%), while only 32.3% of non-DS users agreed

Table 1 Demography and lifestyle characteristics for supplements users and non-users, males and females (N=452)

Characteristics	DS users % (n)	Non-DS users % (n)	P value	Males % (n)	Females % (n)	P value	Total % (N)
Total	35.6 (161)	64.4 (291)	–	45.4 (205)	54.6 (247)	–	100 (452)
Age group							
18 to 24 years	60.2 (97)	66.7 (194)	0.172	48.3 (99)	77.7 (192)	0.000	64.4 (291)
+24 years	39.8 (64)	33.3 (97)		51.7 (106)	22.3 (55)		35.6 (161)
Education level							
University	87.6 (141)	88.7 (258)	0.732	84.4 (173)	91.5 (226)	0.019	88.3 (399)
Non-university	12.4 (20)	11.3 (33)		15.6 (32)	8.5 (21)		11.7 (53)
BMI							
Underweight	10.6 (17)	13.7 (40)	0.597	2.4 (5)	21.1 (52)	0.000	12.6 (57)
Normal	35.4 (57)	32.3 (94)		41.0 (84)	27.1 (67)		33.4 (151)
Overweight	31.7 (51)	28.5 (83)		34.1 (70)	25.9 (64)		29.6 (134)
Obese	22.4 (36)	25.4 (74)		22.4 (46)	25.9 (64)		24.3 (110)
Type of diet followed							
To gain weight	7.5 (12)	3.1 (9)	0.103	7.3 (15)	2.4 (6)	0.049	4.6 (21)
To lose weight	23.6 (38)	26.1 (76)		24.4 (50)	25.9 (64)		25.2 (114)
Not following any diet	68.9 (111)	70.8 (206)		68.3 (140)	71.7 (177)		70.1 (317)
Health problems							
Yes	23.6 (38)	15.5 (45)	0.032	19.5 (40)	17.4 (43)	0.565	18.4 (83)
No	76.4 (123)	84.5 (246)		80.5 (165)	82.6 (204)		81.6 (369)
Smoking							
Yes	15.5 (25)	14.1 (41)	0.678	25.9 (53)	5.3 (13)	0.000	14.6 (66)
No	84.5 (136)	85.9 (250)		74.1 (152)	94.7 (234)		85.4 (386)
PA (hours/day)							
None	43.5 (70)	59.5 (173)	0.014	50.2 (103)	56.7 (140)	0.050	85.4 (243)
0 to 3	50.9 (82)	35.7 (104)		42.0 (86)	40.5 (100)		41.2 (186)
4 to 8	4.3 (7)	4.1 (12)		6.3 (13)	2.4 (6)		4.2 (19)
9 to 12	0.6 (1)	0.7 (2)		1.5 (3)	0.0 (0)		0.7 (3)
+12	0.6 (1)	0.0 (0)		0.0 (0)	0.4 (1)		0.2 (1)

Table 2 Dietary pattern of DS users and non-users (N=452)

Characteristics	DS users % (n)	Non-DS users % (n)	P value	Males % (n)	Females % (n)	P value	Total % (N)
Total	35.6 (161)	64.4 (291)	–	45.4 (205)	54.6 (247)	–	100 (452)
Type of diet followed							
To gain weight	57.1 (12)	42.9 (9)	0.103	71.4 (15)	28.6 (6)	0.049	4.6 (21)
To lose weight	33.3 (38)	66.7 (76)		43.9 (50)	56.1 (64)		25.2 (114)
Not following any diet	35.0 (111)	65.0 (206)		44.2 (140)	55.8 (177)		70.1 (317)
Number of meals per day							
Two meals with snacks	34.0 (73)	66.0 (142)	0.023	37.7 (81)	62.3 (13)	0.011	47.6 (215)
Three meals with snacks	32.8 (64)	67.2 (131)		50.8 (99)	49.2 (96)		43.1 (195)
Four meals with snacks	54.5 (12)	45.5 (10)		63.6 (14)	36.4 (8)		4.9 (22)
More than four meals	60.0 (12)	40.0 (8)		55.0 (11)	45.0 (9)		4.4 (20)

on that. Moreover, the majority of supplement users (75.8%) and non-users (55%) believed that the use of DS has an effect on their weight and exercise level. Interestingly, our results showed that 40.4% of DS users disagreed

that supplements are always safe while only 11% of non-DS users agreed that DS are safe (Table 4).

As for the source of information regarding DS use, 31% of the DS users depended on health care providers as the

Table 3 The patterns of DS use among males and females (N= 161)

Variables	Male % (n)	Female % (n)	P value
Prevalence of DS use	41.5 (85)	30.8 (76)	0.018
Type of DS			
Vitamins	21.2 (18)	27.6 (21)	
Minerals	10.6 (9)	0.0 (0)	
Multi-vitamins/minerals	16.5 (14)	42.1 (32)	<0.001
Proteins	29.4 (25)	3.9 (3)	
Herbs	3.5 (3)	2.6 (2)	
Others	18.5 (16)	23.8 (18)	
Form of DS			
Tablet/pills	55.3 (47)	88.2 (67)	
Powder	36.5 (31)	5.4 (4)	
Liquid	7.1 (6)	5.3 (4)	<0.001
Chews	1.2 (1)	1.3 (1)	
Duration of use			
Days	22.4 (19)	6.6 (5)	
Weeks	30.6 (26)	21.1 (16)	
Months	25.9 (22)	56.6 (43)	<0.001
Years	21.2 (18)	15.8 (12)	
Reason for use			
Medical need/deficiency	34.1 (29)	46.1 (35)	
Promote general health	11.8 (10)	17.1 (13)	
Enhance the diet	4.7 (4)	2.6 (5)	
Give more energy	2.0 (4)	0.8 (2)	
Increase muscle mass	21.2 (18)	0.0 (0)	0.001
Others	26.2 (20)	33.4 (21)	

source of DS information, followed by the social media (22%) and then family members or friends (20%). However, the non-supplement user got their information from social media (37%), family members or friends (20%), then health care providers (16%) (Fig. 1).

Discussion

The findings of the study reported that the prevalence rate of DS use was moderate (35.6%) in our study which is similar to a previous study conducted among university students in the UAE (39%) [5]. While it was higher than what is reported in Japan (16.8%) [8]. In Saudi Arabia, however, the DS use prevalence rate was higher than what was reported in this study (76.6%) [9].

Our present reported that there was a significant association of PA with DS users. Similarly, in Saudi Arabia, DS users were more likely to be engaged in moderate or vigorous physical activity [9]. In another study, which was conducted in Iceland, reported that who exercised four times or more weekly were less likely to use supplements than those who exercised fewer times [10].

Our findings also support the previous literature that the most common source of information for DS information were healthcare providers followed by the social media and family members or friends [5].

Furthermore, the results of this study revealed that the main types of DS consumed were multi-vitamins/minerals, and protein. These results were consistent with a previous study among USA college students, which reported that the

Table 4 Knowledge and beliefs for supplements users and non-users (N=452)

Variables	DS users % (n)	Non-DS users % (n)	Total % (N)	P value
Total	35.6 (161)	64.4 (291)	100 (452)	–
Supplements are essential for health				
Agree	68.3 (110)	32.3 (94)	45.1 (204)	<0.001
Disagree	20.5 (33)	40.5 (118)	33.4 (151)	
Don't know	11.2 (18)	27.1 (79)	21.5 (97)	
Supplements are always safe				
Agree	39.8 (64)	11.0 (32)	21.2 (96)	<0.001
Disagree	40.4 (65)	51.9 (151)	47.8 (216)	
Don't know	19.9 (32)	37.1 (108)	31.0 (140)	
Supplements use affect weight and exercise				
Agree	75.8 (122)	55.0 (160)	62.4 (282)	<0.001
Disagree	10.6 (17)	12.0 (35)	11.5 (52)	
Don't know	13.7 (22)	33.0 (96)	26.1 (118)	
Nutrients in food are enough				
Agree	34.2 (55)	39.9 (116)	37.8 (171)	0.304
Feel neutral about	36.6 (59)	35.1 (102)	35.6 (161)	
Disagree	17.4 (28)	11.7 (34)	13.7 (62)	
Don't know	11.8 (19)	13.4 (39)	12.8 (58)	

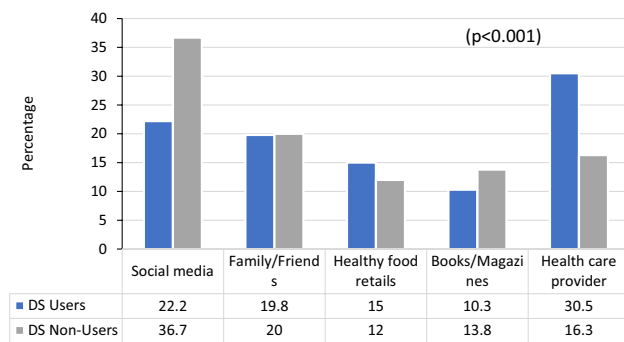


Fig. 1 Sources of information on the DS use

popular supplements were multivitamin/minerals (42%), and protein or amino acids (17%) [11]. Multi-vitamin/mineral (56.8%) were the most common supplements used among the Mediterranean population, followed by essential fatty acids (16.8%) and antioxidants (10.1%) [2].

There were gender differences in the purposes and types of supplements used in this study. Males used protein supplements for building muscle, whereas females used DS for general health, which is consistent with another study in the US [12]. Similarly, Lieberman et al. noted that USA college students used supplements to promote general health (73%), provide more energy (29%), increase muscle strength (20%) [11].

Moreover, in this study, the participants who did not have health problems significantly used more DS than the ones who had health problems. In a similar study in the UK, it was reported that people with a history of chronic diseases were less likely to take antioxidant, vitamin and/or mineral supplements than those who did not have chronic diseases [13]. Although, another study in Canada reported that respondents with chronic disease were more likely to take vitamin and mineral supplements than those without a chronic condition [14].

There were some limitations to this study. First, this survey used an Internet-based questionnaire. The height and weight were not measured but reported by the participants. Moreover, the present findings cannot be generalized due to the small sample size, which is not representative of the overall population in the UAE. Due to the cross-sectional design of this study, the reported associations, could not establish causality.

Conclusion

The results of the current study contribute to a deeper understanding of the gender-specific reasons for the use of DS in the UAE. This is important for developing appropriate prevention and public health intervention strategies to target

specific groups. Furthermore, the study emphasizes the need for increased awareness and education to prevent adverse effects resulting from supplement use in college.

Author Contributions HR, HAH, LG, GA, AS, AA, FA contributed to conception and design, acquisition of data. HAH was involved in analyzing and interpreting the data. LG, GA, AS, drafted the manuscript. HR and HAH have been involved in revising it critically for important intellectual content. HR gave final approval of the version to be published. Each author has participated sufficiently in the work to take public responsibility for appropriate portions of the content; and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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