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Research Article

Determining the prevalence of dietary supplement consumption among Ardabil University students and related factors, 2014

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ABSTRACT

Background: Dietary supplements (DS) are commercially available products that are consumed as an addition to the usual diet. But little data are available on their use by sub-populations such as college students. Since college students share a variety of characteristics and similar lifestyles, their DS use may differ from the general population. In this study, we aimed to investigate the prevalence of food supplements usage, factors associated with DS usage and reasons for DS usage among a group of university students in Ardebil-Iran.
Methods: 250 College students from Ardabil universities were selected by random sampling in year 2014. The Survey questionnaire used in this study included Part I: demographic characteristic, Part II: types and frequency of dietary supplements used. Supplements were classified using standard criteria. Logistic regression and X2 test analyses examined relationships between demographic, lifestyle factors and dietary supplements use.
Results: The frequency of food supplements usage between students was 66.8% and there was a significant relationship between age, gender, marital status, BMI, income and DS usage, while there was no significant relationship between educational level and DS usage. The frequency of food supplements usage in students with 19 to 35 years and married females was high. After controlling the confounding factors, marital status variable was the factor that influenced the usage of dietary supplements so that, despite the high level of food supplements usage in males, married people's tendency to supplements usage in married people was 1.5 times more than the singles.
Conclusions: Results showed that the use of dietary supplements is considerably high among students. Doing further study on the general population can be necessary.

Keywords: Dietary supplements, College students, Life style, Ardabil

INTRODUCTION

Dietary supplements (DS) are commercially available products that are consumed as an addition to the usual diet.[1,2] Dietary fortification with micronutrients is a recent and important issue, intended particularly to provide nutritional elements useful for preventing diseases, maintaining a good status of health or for supply ready-to-use resources for sporting activities.[3] According to United States regulations, the term "dietary supplement" refers to a product that contains one or more of the following ingredients: vitamins, minerals, herbs or other botanicals, amino acids, dietary substances that supplement the human diet by increasing the total dietary

intake, concentrates, metabolites, constituents and extracts.[4] In the European legislation, Directive 2002/46/EC of the European Community, dietary supplements are defined as concentrated sources of nutrients or other substances with a nutritional or physiological effect whose purpose is to supplement the normal diet.[3] The tendency to use supplements such as multivitamins and minerals in different societies has been increased.[5,6] Using these dietary supplements are related with demographic characteristics such as age, sex, and health behaviors and chronic diseases of the individuals.[7] It has been observed that the use of food supplements in people who desire to lose weight is more common and overweight and obese are two factors that increase the frequency of supplements use.[8] Patterns of dietary supplement use are different among distinctive subpopulations.[1] In the United States, supplement use has demonstrated an increasing trend.[6] A growing proportion of older persons are using vitamin and mineral supplements, which can substantially increase nutrient intake and counter some of these shortfalls.[6] Also the use of dietary supplements depends on various factors such as marital status, fear of osteoporosis and use a multivitamin supplement.[9] For example, various studies have shown that the use of dietary supplements such as calcium and iron, among married people is more than single individuals.[10] Iron and folic acid supplementation programs in developing countries show that even cultural attitudes and beliefs can also affect food consumption patterns.[11] Given the prevalence of iron deficiency among females, tendency to use vitamin and mineral supplements can be seen more in this group of society.[12] The use of these supplements or foods containing iron enhances mental health and reduces fatigue, especially in pregnant women.[13] But in some cases it has been observed that long-term treatment of iron deficiency in this group of people can lead to increased levels of triglycerides and cholesterol, and ultimately lead to overweight and obesity.[14] It has been reported that the use of dietary supplements among married is more than single people.[15] Marital status has been known as one of the factors influencing the use of dietary supplements, and adults have used dietary supplements more than children and teenagers.[9,16] Nutritional supplements can be used as a supplement along with an unbalanced diet in order to meet the may be needed to help meet the nutritional needs of the consumer. Access to a daily balanced diet may not be possible on all days of the week or month and so in the long-term the effects of some nutrient deficiency can be detected. It has been shown in many studies carried out in different demographic groups and the lack of nutrients, especially vitamins and minerals, has caused the prevalence of iron deficiency anemia, osteoporosis and vitamin deficiency in mild and sever forms.[17] The Studies of the past two decades indicate that the beneficial effect of vitamin E supplementation in reducing the risk of oxidative stress in older adults, particularly in people having overweight and obesity. It has been reported that zinc supplementation usage reduces markers of oxidative stress in old people and vitamin c supplementation usage as an antioxidant is effective in reducing the risk of carcinogens.[18]

Due to the lack of study and not being able to access to the prevalence information and effective factors on food supplements usage among college students of Ardabil city, this study has aimed to identify the prevalence of food supplements usage and effective factors on their usage among college students of Ardabil.

METHODS

The present study is a descriptive Cross-sectional study. In this study 250 students participated. They were studying in the second term of 2013-2014 educational years at Medical Sciences, Mohaghegh, Payam-e-Noor and Azad universities of Ardebil (North West of Iran). 208 of the participants were male and 42 of the participants were female. In this study, data were collected through a questionnaire including 57 questions. The questionnaire had been prepared using previous similar studies and under the supervision of a general physician, a professor of nutrition and a professor of statistics. The questionnaire consisted of two parts: the first part was about the demographic information including age, sex, marital status, level of education, as well as height and weight to calculate BMI body mass index (BMI) and the second part of the questionnaire was about the using or not using of dietary supplements, including multivitamins, iron, calcium, zinc, weight loss tablets, multivitamins and multi-mineral and body building tablets. Accordingly, considering the purpose of the study, various dietary supplements were integrated and defined as binary variables of using and not using dietary supplements. The criteria for categorizing the age of the participants was, standard classification under 12 years (children), 12 to 18 years (Teens), 19 to 35 (Younger adults), 36 to 60 years (Adults) and older than 60 years (older adults), respectively.[19] To categorize the Body Mass Index (BMI), the standard classification of the World Health Organization (WHO) was used in which BMI <18.5 kilograms per square meter as thin, 18.5- 24.9 as normal, 25.0 - 29.9 as overweight and 30 or higher were considered as obesity.[20] To investigate the relationship between using, not using of dietary supplements and qualitative demographic variables chi-square test was used. The cases such as age categorization in which the conditions of chi-square test were not established, were defined and variable scores were combined to create the possibility of calculating the above mentioned test. Finally the age of the participants were considered as follow: below 19 years (children and teenagers), 19 to 35 years (young) and more than 35 years (middle-aged and elderly). Also to estimate odds ratios for each of the demographic variables on taking supplements and to determine the contributing factors to the use of dietary supplements, multiple logistic regression was used. In the regression model, these variables were selected as the reference variables: the age group variable as the age group below 19 years, male in

gender, single in marital status, BMI below 18.5, diploma degree in education and a low income in income variable, respectively. Finally, the data were entered into SPSS software for analysis. The P-Value of less than 0.05 was considered significant.

RESULTS

Table 1 shows that 167 students out of 250 participants of the study (66.8%) used various dietary supplement in the past six months of which 95.8% (OR= 1.67, 95%CI= 0.8-2.6) were in the age group of 35-19 years, 82.1% male, 79.6% single and 70.6% (OR= 1.1, 95% CI= 0.6-1.9) were with a normal Body Mass Index (BMI).

Table 1: Demographic and lifestyle characteristics of study participants with dietary supplement use.

Variable	Take supplements		P-value	OR (95% CI)
	No	Yes		
Gender			P= 0/006	
Male	71 (85.5)	137 (82.1)*		1
Female	12 (14.5)	30 (17.9)		1.65(0.98-2.73)
Age(years)			< 0/001	
<19	3 (3.6)	1 (0.6)		1
19 to 35	78 (94)	160 (95.8)		1.67(0.79-2.55)
≥ 35	2 (2.4)	6 (3.6)		1.32(0.83-2.96)
Marital status			< 0/02	
Single	78 (90.7)	133 (76.7)		1
Married	8 (9.3)	31 (23.3)		1.89(0.86-2.71)
Body mass index			< 0/001	
Underweight (<18.5)	2 (2.4)	5 (3)		1
Normal (18.5- 24.9)	67 (80.7)	118 (70.6)		1.12(0.64-1.89)
Overweight (25.0- 29.9)	13 (15.7)	41 (24.6)		0.98(0.49-1.81)
Obese(≥ 30.0)	1 (1.2)	3 (1.8)		1.03(0.68-1.50)
Level of education			P= 0/1	
High school diploma	1 (1.2)	4 (2.4)		1
Associate's degree	14 (16.9)	26 (15.6)		1.16(0.59-2.87)
Bachelor's degree	62 (74.7)	113 (67.7)		1.28(0.92-1.78)
Master's & Doctorate	6 (7.2)	24 (14.3)		1.12(0.89-2.68)
Economic class			<003	
Low income	29 (34.9)	37 (22.1)		1
Moderate income	43 (51.8)	84 (50.3)		0.94(0.71-1.52)
High income	11 (13.3)	46 (27.5)		0.87(0.39-2.41)

In relation to the education level of the supplement consumers, 2.4% with diploma and 67.7% (OR = 1.3, 95% CI =0.9-1.8) with undergraduate education level, were the lowest and the highest percentage of consumers, respectively. Most of the supplement consumers had a moderate income that in all cases, except for level of education, significant differences were observed between each of the variables.

The odds ratio obtained from multiple logistic regression analysis showed that 19-35 year participants used more dietary supplements than the reference group. After the removal of confounding variables in the regression analysis, marital status was the most important factor influencing the use of dietary supplements, so that tendency to the use of dietary supplements in married people was more than 1.5 in single people. In respect to BMI, according to Figure 1, the median and mean of the population of supplement consumers were significantly higher than the population of non-consumers' median and mean, so that the median and mean of population of consumers were 23.3, 23.6, respectively, for men and 22.7, 23.1, respectively, for women. Among the non-consumers population the median and mean were 22.2, 22.6, respectively, for men and 20.5, 21.7 for women, respectively. The mean BMI of the total population was 2.9 ± 23.2, which was normal. BMI assessment showed that from the population of consumers of supplements 41 students were overweight and only 3 students were obese.

Table 2 shows that most commonly used supplements by participants include: iron (30.8), multivitamin/mineral

(27.2), vitamin supplements (25.6), fitness & gym tablets(18.8)، calcium (18.4), zinc (16.4), lose weight tablets (10.8).The greatest differences between men and women in supplements usage was that men had higher usage rates of the above mentioned supplements except iron compared to women.

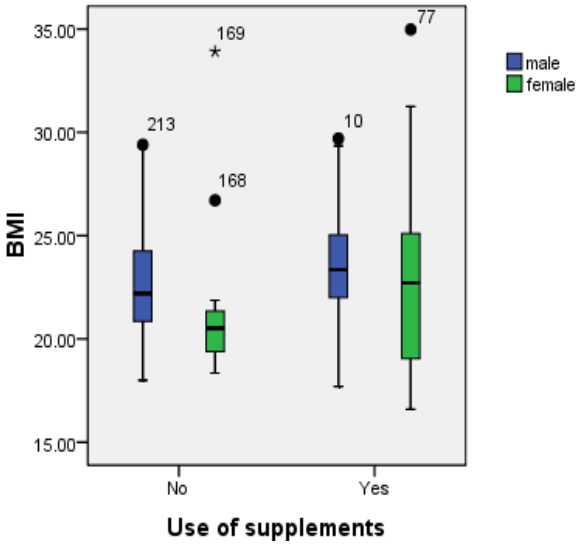

Figure 1: Differences in BMI between male and female supplements consumers and non-consumers.

Table 2: Top seven dietary supplements used by the population of university students.

Female (%)	Male (%)	Overall (%)	Rank
22.8	8.0	Iron (30.8)	1
3.6	23.6	Multivitamin/mineral (27.2)	2
7.2	18.4	Vitamin supplements (25.6)	3
0.8	18.0	Fitness & Gym tablets(18.8)	4
3.2	15.2	Calcium (18.4)	5
0.4	16.0	Zinc (16.4)	6
1.6	9.2	Lose weight tablets (10.8)	7

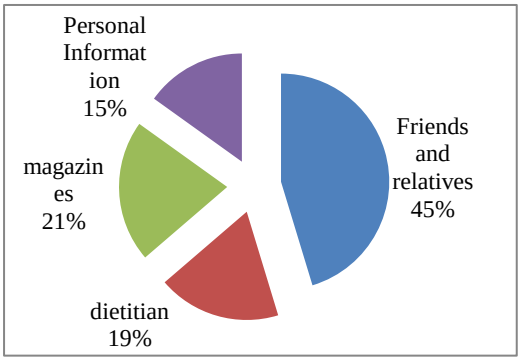

Figure 2: Sources of dietary supplement information among dietary supplements users.

Through statistical examinations, it was determined that the greatest amount of information was provided by friends and relatives (45.3%), and the lowest amount by personal information (15.1%) (Figure 2).

DISCUSSION

Despite of the small sample number, some considerations can be done. The results showed that approximately two-thirds of college students, being surveyed, (66.8 %), regularly used dietary supplement. In a similar study in south of Tehran-Iran, 36.3% of the people referring to the nutritional counseling centers during 2006-7 were using of nutritional supplements.[20] In another study in the West of Tehran-Iran, 41.9% of the people referring to Health Care Centers were using at least one type of supplement that slight differences observed in the study was likely due to the socioeconomic status of the studied units.[15] In a similar study in Ireland, 23% of participants in the study took advantage of dietary supplements.[21] In another study in the UK, over 40% of participants were using at least one type of dietary supplement. In this study it seemed that due to factors such as consumption of oil and energizing substances had been questioned it caused the increasing of the frequency of its usage in both sex.[22] It should be mentioned that the results of this study were somewhat similar to the results of surveys conducted among university students in Brazil and Poland and the United States.[23-26] Usage of dietary supplements is influenced by various factors such as gender, age, marital status and other similar factors.[7,15] For example, significant differences between men and women, who were consuming nutritional supplements were observed in the study, so that women tended to use dietary supplements 1.5 times more than men. The same results were observed in other areas of the world such as consumer population of dietary supplement in America and England and Poland, so that NHANESIII study showed that the willingness to consume dietary supplements among women is more than men.[24,27-29] O'Brien et al in their study reported that the willingness to regular consumption of dietary supplements in women is twice more than men.[21] Also Chen et al. in Taiwan have introduced women as a group which are more intended to use of dietary supplements than men.[6] The most popular products that college students took as their supplement diet were: iron (30.8%), multivitamin/multiminerals (27.2%), vitamin supplements (25.6%), Fitness & Gym tablets (18.8%), calcium (18.4%), zinc (16.4%) and lose weight tablets (10.8%). The findings of our study also indicate that iron and multivitamin/multiminerals are the most commonly used supplements among the surveyed college students. Read et al. study in seven Western states of America to assess the prevalence of nutritional supplements showed that 13% of consumers used nutritional supplements of calcium, 11% used iron supplement and 12% used zinc supplement in the past year.[30] In another study by Block et al in 2007, about the pattern of nutritional supplements consumption in the adult population in the US, it was found that 50% of

people were taking multivitamins.[31] By Chen et al study conducted in Taiwan it was revealed that the highest consumption of dietary supplements were multivitamins and minerals.[6] It was due to the fact that because iron deficiency and bone fractures, especially at older ages, are the problems that in many cases are seen in women than men, therefore, tendency to use iron supplements, calcium and vitamin D in this segment of society was somewhat predictable.[6,12,15] Marriage is the variable that, in many cases, is one of the factors influencing the use of dietary supplements. In this study, a significant association between marital status and the use of food supplements were found.[15,32] In a Similar study conducted by Najmabadi et al. in west of Tehran it was also revealed that those who were married used more of nutritional supplements than single people.[15] In Tehran Lipid and Glucose study the tendency to use dietary supplements in married men and women was more than single men and women.[32] But unlike the present study, a study carried out on the people of Taiwan and America didn't show a significant relationship between marital status and use of dietary supplements which could be the result of cultural, economic and social factors. It should be mentioned that these differences can be due to the different life styles of Taiwanese, American and Iranian people.[6,33] The major limitation of this study can be referred as the closed list of supplements. In other words the name of supplement(s) was not designed as an open question, in fact, if the student had the experience of using supplement, s/he would mention the name of the supplement in the next question. This way of questioning would lead to identify the commonly used supplements. It was similar to Hozoori et al study in which the experience of using 12 supplements had been mentioned in the questionnaire.[34]

In this study, participants who did not use any type of nutritional supplements in the past six months (33.2%), reported the reasons of not using of nutritional supplements as follow: 11.2% of participants due to the lack of sufficient financial capability, 73% due to not requiring nutritional supplements, 15.8% because of other factors. The findings of this study showed that the use of Multivitamin / mineral and Vitamin supplements and iron were the most common form of nutritional supplements among the surveyed students.

CONCLUSION

It is recommended that, where possible, physicians and nutrition consultants should recommend available food sources rich in vitamins and minerals and if it does not meet the needs, try to administer the nutritional supplements. It seems logical that in addition to education, ease of access to dietary supplements in married people should be increased so that the need feeling of dietary supplements use after marrying should be present in people's lives. As the last suggestion, considering that in this study the use of dietary supplements among students was significantly, it seems that there is a need for further study on the general population as well as a comprehensive study to assess the knowledge and attitudes of people in the use of dietary supplements.

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