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Association between alcohol consumption and dietary supplement intake of students from the University of Sarajevo

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ABSTRACT

Introduction: Dietary supplements are an important source of vitamins and minerals that may help prevent several disease-causing biological pathways involved in one-carbon metabolism, including the suppression of cell proliferation, oxidative stress, nitric oxide synthesis, and angiogenesis. The present study aimed to assess the association between the intake of folate, Vitamin B6, Vitamin B12, and minerals and the consumption of alcohol among university students.

Methods: This study was participated by students aged 19-22 years from the University of Sarajevo between 2017 and 2018. Using a questionnaire, we interviewed in a week them to collect information regarding age, socio-economic status, alcohol consumption, and dietary supplement intake. Then, we investigated the association between the baseline intake of folate, B vitamins, and minerals and that of alcohol consumption.

Results: Most students consumed Vitamin B supplements (32%) and folic acid (10%). Dietary multivitamins and minerals were less prevalent in more than a year, accounting for 186 (23.9%) and 174 (24.3%) students, respectively, than those in less than a year. In a year, <20% of students consumed multivitamins 129 (16.6%) and minerals 116 (15.3%). Meanwhile, 256 (27.1%) students consumed alcohol. The Chi-square test of independence showed that drinking habits and the intake of such dietary supplements had no association ($p > 0.05$).

Conclusion: An extremely low percentage of the participating students in Canton Sarajevo used dietary supplements of Vitamin B, folate, multivitamins, and minerals. Moreover, alcohol consumption and dietary supplement intake were not associated. Further research is needed to establish the best cost-effective public health system to achieve a sufficient intake of dietary supplements.

Key words: Folate; Vitamin B; multivitamins; minerals; students

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INTRODUCTION

Millions of people worldwide use dietary supplements. Dietary supplements represent an important source of essential nutrients (1,2). In Germany, around 21% of young people, as well as 66% of American students, 68% of Serbian students, and 43% of Malaysians students, used dietary supplements (3-6). Alcohol intake is one of the common habits that may impair the biological actions of folate. Ethanol and its metabolites appear to reduce the circulating folate levels and interfere with some of its biochemical actions (7). Alcohol may alter the status of folate and/or Vitamin B12 due to their critical roles in one-carbon metabolism (8,9). Low folate intake and high alcohol intake increase the risk of colorectal cancer (10-12). In this cycle, the folate- and Vitamin B12-dependent enzyme methionine synthase stands at the junction of two key processes responsible for maintaining DNA integrity, and these processes are the synthesis of purines and thymine, and methylation reactions through *S*-adenosylmethionine. When folate and/or Vitamin B12 is depleted, one-carbon metabolism may be altered, and possibly, procarcinogenic effects, including uracil incorporation and increased susceptibility of DNA to strand breaks, aberrations in the methylation of DNA, and disruption of DNA repair, may occur. Total homocysteine (tHcy) is a cardiovascular disease (CVD) risk factor. It is elevated in patients who have chronic alcoholism and experienced falls following alcohol withdrawal; therefore, alcohol may have a deleterious effect on health by increasing the tHcy levels. Homocysteine is regulated through a series of pathways that are dependent on B vitamins, particularly folate (8,9). Associations between moderate alcohol consumption and tHcy concentrations and between alcohol, folate, and chronic disease risk have been extensively reported (13-21). This study aimed to determine the prevalence of usage of dietary supplements containing Vitamin B12, folic acid, multivitamins, and minerals in students from the University of Sarajevo, and to assess their alcohol consumption and its relationship with supplement intake.

METHODS

Subjects

We investigated students aged 19-22 years from the Faculty of Health Studies, Faculty of Electrical Engineering, School of Economics and Business, and Faculty of Pedagogy at the University of Sarajevo between 2017 and 2018. The participants were interviewed in a week to collect information on age, socio-economic status, and alcohol and dietary supplement intake. Subjects who were currently diagnosed with diseases such as diabetes, cancer, CVD, and kidney disease; were taking medications that can affect the folate metabolism; and did not finish their survey were excluded from the study. A total of 960 students participated.

Methods

In accordance with our questionnaire, we interviewed 1st and 4th-year students coming from the above-mentioned health and non-medical faculties. We examined their general characteristics, alcohol intake, dietary supplement use, and lifestyle. The questionnaire contains questions such as "Do you take supplements of Vitamin B or folic acid?" and "How long do you use multivitamins or minerals?" The answers were "yes or no" for the first question and "1 year," "more than 1 year," and "<1 year" for the second one (Figures 1 and 2).

Statistical analysis

After returning all completed questionnaires, the data were analyzed by the Statistical Package for Social Sciences (SPSS) version 13.0 software (SPSS Inc., Chicago, USA) and Microsoft Excel. The absolute (n) and relative frequencies (%) were determined and then cross-tabulated with the sex of participants, faculty attended, year of the study, status of studies, vitamin and mineral intake, place of residence (town; village; and suburb), parents' educational attainment, alcohol drinking, and the relationship between alcohol consumption and vitamin or mineral intake. The differences between the study groups were tested for significance by Pearson's Chi-square test. The differences between the study groups were considered significant if the probability of zero hypothesis ($p \leq 0.05$).

RESULTS

In our study, we interviewed 960 students from the University of Sarajevo, with an average age of 20.4 ± 2.1 years. The investigation was based on a

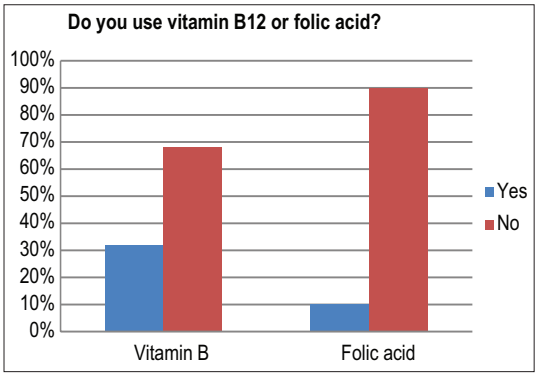

FIGURE 1. Frequency of consuming Vitamin B and folic acid supplements.

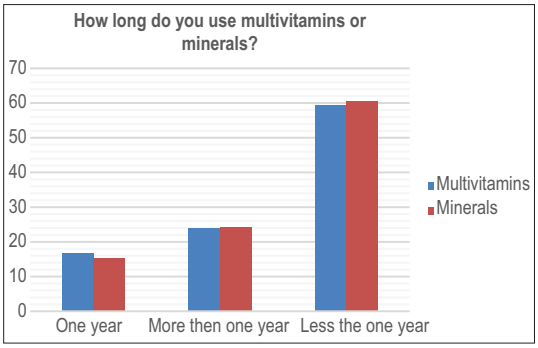

FIGURE 2. Prevalence of consuming vitamin and mineral supplements.

questionnaire about dietary supplement usage, time of supplement use, consumption of alcohol, and relationship between alcohol consumption and supplement intake. Most of the study participants were female, accounting for 656 (68.3%), whereas male students accounted for 304 (31.7%). Meanwhile, 38.1%, 24.7%, 30.4%, and 6.8% of students belonged to the Faculty of Health Studies, Faculty of Electrical Engineering, School of Economics and Business, and Faculty of Pedagogy, respectively. Furthermore, 593 (61.8%) students were still in the 1st-year level, and 367 (38.2%) were in the 4th-year level. Out of the 960 students, only 256 (27.1%) consumed alcohol. With regard to the frequency of intake of vitamin and mineral supplements, most of the students did not take Vitamin B (642, 68%) and folic acid (843, 90%) supplements. Conversely, in terms of prevalence, more than half of the student population took multivitamin 462 (59.5%) and mineral 458 (60.4%) supplements in <1 year, but dropped to 186 (23.9%) and 174 (24.3%), respectively, in more than a year. In addition, <20% of students took multivitamins 129 (16.6%) and minerals 116 (15.3%) in 1 year. The most used dietary supplements were Vitamin B (32%) and multivitamins (16.6-59.5%). The results are shown in The questionnaire consists of five questions relating to socio-economic status. We found that during classes, 662 (69%) students lived in an apartment, 187 (19.5%) in a rented apartment, and 111 (11.6%) in dormitories. More than half of the student population lived with their families 648 (67.5%), some lived with their friends 230 (24%), and a few lived alone 82 (8.5%). Many lived in towns 639 (66.6%), some lived in the suburbs 259 (27%), while a few lived in a village 62 (6.5%). Parents of students were mostly employed 759 (80.6%), some were unemployed 95 (10.1%), and the rest were retired 88 (9.3%). The faculty education has 443 (47.5%) parents, and high school education has 517 (52.5%) parents (Table 1).

Of the 960 students, 256 consumed alcohol, while 689 did not. Chi-square test of independence revealed that drinking habits and B vitamin supplement use were not associated (p = 0.369). Multivitamin and mineral intakes were also not associated with alcohol consumption (p > 0.05). Moreover, drinking habits and folic acid supplement use are not associated (p = 0.924) (Table 2).

DISCUSSION

Dietary supplements are an important source of essential nutrients; hence, millions of people worldwide use dietary supplements. The European Union (EU) Directive 2002/46/EC was the first dietary supplement regulatory act in the EU countries. As mentioned earlier, in Germany, around 21% of young people used dietary supplements, as well as 66% of American students, 68% of Serbian students, and 43% of Malaysian students (3-6). In the current study, approximately 32% and 10% of students took Vitamin B and folic acid supplements, respectively. In general, folate deficiency is most often the result of decreased food intake and is more common in developing and socioeconomically

TABLE 1. Socio-economic status of students

Question	n	%
Where do you live during classes?		
Apartment	662	69.0
Rented apartment	187	19.5
Dorms	111	11.6
Who do you live with?		
Family	648	67.5
Alone	82	8.5
With friends	230	24.0
What kind of place do you live?		
Town	639	6.6
Suburb	259	27.0
Village	62	6.5
What is the working status of your parents?		
Employed	759	80.6
Unemployed	95	10.1
Retired	88	9.3
What is your parents' educational attainment?		
College education	443	47.5
High school education	517	52.5

TABLE 2. Relationship between alcohol drinking (yes/no) and consumption of dietary supplements in students

Dietary supplements		Alcohol		χ2 test
		Yes	No	*p*
Vitamin B				
Yes	n	87	211	0.369
	%	34.3	31.2	
No	n	167	466	
	%	65.7	68.8	
Folic acid				
Yes	n	26	68	0.924
	%	10.3	10.1	
No	n	226	605	
	%	89.7	89.9	
Multivitamins				
More than	n	57	125	0.413
1 year	%	26.6	22.6	
1 year	n	31	95	
	%	14.5	17.2	
<1 year	n	126	332	
	%	58.9	60.1	
Minerals				
More than	n	59	120	0.123
1 year	%	27.8	22.4	
1 year	n	25	89	
	%	11.8	16.6	
<1 year	n	128	327	
	%	60.4	61.0	

distressed countries. In contrast, more than half of the student population took multivitamins and minerals in <1 year, but at 1 year, only <20% of students consumed these supplements. The most used dietary supplement was Vitamin B, followed by multivitamins and then multiminerals.

Recently, a high percentage (49.6%) use of nutritional and herbal supplements was found among college students in Qatar. In Bahrain and Saudi Arabia, the general population and patients with diabetes used complementary and alternative medicines, respectively (22,23). Young people are particularly vulnerable to the effects of poor nutrition, including nutrient deficiencies (24). The prevalence of dietary supplement use among the studied university students was 30.5%, which is similar to the results in Korea (31.3%), Middle East (39%), and Tehran (33%). In addition, many similar studies reported that multivitamins and multivitamin-mineral combinations are the most frequently used dietary supplements among students (25-27). Socio-economic status is related to the use of dietary supplements. The US NHANES 2001-2002 and NHANES III 1988-1994 surveys showed that supplement users were more affluent than those who were not. In another study, French women who were supplement users were more likely to live alone, to have few or no children, to live in the Mediterranean region, and to live in larger cities. Meanwhile, dietary supplement use is related to higher educational attainment (28,29).

In our study, most of the students lived with parents and in towns, while the least lived alone and in dorms. More than half of the parent population were employed and had attained a high school education.

Many studies found that people who consume less alcohol were more likely to take supplements; however, a study from Canada did not find an association between alcohol consumption and dietary supplement use, consistent with the current study. These discrepancies may be due to the type of alcohol consumed; previous studies found positive

associations for wine consumption but not for beer consumption (30,31).

In our study, less than half of the student population consumed alcohol. As revealed by the Chi-square test of independence, drinking habits and Vitamin B supplement use were not associated. Around two-thirds of the students did not take this supplement with or without alcohol intake. Similarly, drinking habits and folic acid supplement use were not associated. Cigarette smoking and alcohol intake are two common habits that may impair the biologic actions of folate. With the presence of ethanol and its metabolites, the circulating folate levels could be reduced, and some of its biochemical actions could be interfered (32). Considering that we lack information about low or moderate alcohol consumption, the results cannot be considered an adequate means of describing the relationship between alcohol consumption and folate and Vitamin B status.

CONCLUSION

Only few students consumed Vitamin B, which was the most used dietary supplement, and folic acid supplement. In <1 year, more than half of the student population consumed multivitamins and minerals. Alcohol consumption and multivitamin or mineral supplement intake were not associated. Likewise, drinking habits and folic acid supplement use were not associated. Moreover, the study emphasizes the need for increased awareness and basic knowledge on the side effects and source of reliable information for the use of dietary supplements. Expert health-care practitioners are also needed in the related field for proper and timely guidance in the general population.

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CONFLICTS OF INTEREST

The author(s) confirm that this article content has no conflicts of interest.

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