PJN
ISSN 1680-5194

PAKISTAN JOURNAL OF NUTRITION

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
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OPEN ACCESS Pakistan Journal of Nutrition

ISSN 1680-5194
DOI: 10.3923/pjn.2018.654.660

Research Article
Nutritional Epidemiology Study: Prevalence of Vitamin and Mineral Supplement Use and Correlated Factors among University Students in Jordan

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Abstract

Objective: This study was carried out to determine the prevalence and associated factors of vitamin-mineral supplements use among University students. **Methods:** A cross-sectional study applied a quantitative research approach using a self- administrated questionnaire given to University students in Jordan. **Results:** The prevalence of vitamin-mineral supplement use was 23%. The main reasons for using vitamin mineral supplements were 'to maintain good health' (73%), followed by 'to lose weight' (11%). Vitamin-mineral supplement use among participants was significantly ($p<0.05$) associated with gender, age, BMI, family monthly income, physical activity, smoking status and vegetarian status. The main source of information of supplement use was doctors (60.5%). "Maintaining good health" was the most frequently given reason for using supplements (73%). The major frequently used supplements were vitamin only supplements (51.5%), followed by vitamin-mineral combinations supplements (44%). **Conclusion:** This study highlighted that although the prevalence of vitamin-mineral supplement use among university students is relatively high, many of them do not have accurate information about supplements. Therefore, there is a need to provide them with education and access to scientific and unbiased information.

Key words: Jordanian population, micronutrients, vitamin and mineral, supplement users, multivitamins

Received: February 27, 2018 Accepted: August 27, 2018 Published: November 15, 2018

Citation: Mohammed O. Ibrahim, 2018. Nutritional Epidemiology Study: Prevalence of Vitamin and Mineral Supplement Use and Correlated Factors among University Students in Jordan. Pak. J. Nutr., 17: 654-660.

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Competing Interest: The author has declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Deficiencies of micronutrients including vitamins and minerals are affecting around a billion of people worldwide[1]. Supplements are used to increase the daily intake of vitamins and minerals beyond what is obtained from food alone[2]. Diets that are high in vegetables and fruits reduce the risk of cancers of the mouth and pharynx, esophagus, lung, stomach, colon and rectum and possibly of breast and bladder cancers[3]. A huge number of studies suggested that specific vitamin(s) or multivitamin-multiminerals can help to reduce the risks of chronic diseases and birth defects[4-7]. Meanwhile, the use of supplemental antioxidants and multivitamins was found to be associated with reduction in the risks of cardiovascular diseases and prostate cancer[4,6,7]. Also, Multivitamins are associated with reduction in neural tube birth defects, colon cancer and death from acquired immune deficiency syndrome[5,8,9].

In recent time, there is a growing interest in reducing chronic disease risks through the use of vitamin and mineral supplements[10]. It was found in a randomized controlled trial that regular intake of multivitamin and multi-mineral supplements may increase the reduction rate of infection among patients with diabetes[11]. In a randomized controlled trial, it was found that multivitamin supplements intake have a protective effect against the progression of HIV[9]. Links between supplement use and reduction the risk of chronic diseases, including cancer, cardiovascular disease and osteoporosis was suggested in different epidemiologic[12,13]. Calcium supplements have been associated with a reduced risk of colon cancer, osteoporosis and hip fractures[8,14-17]. Also, there is evidence that supplemental vitamin E, supplemental calcium and long-term multivitamin use may reduce the risk of colorectal cancer[8,18-22]. Many studies suggested that vitamins A, C, E and selenium may help prevent various cancers[23-25].

On the other hand, the overuse of some supplements can be a risk rather than a benefit. In theory, the overuse of some supplements can lead to medical complications including liver toxicity, gastrointestinal symptoms, neurologic disturbances, birth defects and drug interferences[26]. Meanwhile, a meta-analysis of five randomized control trials suggested that there is no significant beneficial effect of multivitamins and multiminerals supplements[27]. Also, the pooled data from eight prospective studies found that there was no association between the lung cancer risk and the use of folate, vitamins A, C, E and multivitamins[28]. In addition, a meta-analysis of 19 trials suggested that overuse of vitamin E supplements could actually lead to an increased mortality[29]. In spite of these and other contradictory evidence, use of dietary supplements still popular in Western populations. Consumers have little scientific information to guide them to select the types and dosages of supplements to be used in disease prevention. According to the United States Commission on Dietary Supplement Labels, it is highly important for the professionals in health and nutrition filed to become more knowledgeable about all types of supplements in order to help consumers make appropriate choices[30].

Dietary supplements participate in saving millions of lives each year and improving the quality of life of many more[31,32]. For this reason, policy makers and many public health officials worldwide considered the usage of vitamin-mineral supplements as an important strategy in the prevention and treatment of chronic and micronutrient deficiency diseases. On the other hand, the sales of dietary supplements are growing. For example, the sales in the United States increased by nearly 80% from 1994-2000[33].

In Jordan, a high prevalence of chronic diseases associated with micronutrient deficiency were found in a diseases such as coronary heart disease, cancer, obesity, diabetes, osteoporosis and anemia[34-36]. The main objective of this survey was to determine the prevalence, reasons and sources of information of vitamin-mineral supplement use among University students in Jordan. Also, to identify the relationship with selected demographic and lifestyle characteristics.

MATERIALS AND METHODS

A cross-sectional survey on vitamin-mineral supplement use was conducted on 860 students attending Mutah University, Karak, Jordan. Mu'tah University consists of 14 faculties. A multistage stratified sampling technique was used to recruit the participants of the study. At the first stage of selection, a systematic random sampling technique was used. At the second stage of selection one class from first, second, third and fourth years in each faculty were randomly selected. Students were visited by the research team to clarify the study and they showed their willingness to participate in the study. The second visit was scheduled to give the students to fill-in a self-administered questionnaire. Also, an informed consent was obtained from each participant. A hard follow-up was made to make sure that all participants had filled the questionnaire question by question.

Once the respondents completed the questionnaire and gave it back to the research team, the respondents were given a sheet on more information about the vitamin-mineral supplements. The questionnaire consisted of two parts:

- **Part 1:** "Socio-demographic part" that includes basic demographic questions regarding the participants' age, gender, family monthly income, as well as information on some selected lifestyle characteristics such as smoking status, physical activity, vegetarian status and body height and weight
- **Part 2:** "Vitamins-minerals intake part" that includes a series of questions on the students' use of vitamin and mineral supplement during the last year, the number, name, frequency of use, dosage, reasons for use and source of information of the supplement

Data entry and statistical analysis were performed using the Statistical Package for Social Science (SPSS) program, for windows (version 22, SPSS Inc., Chicago, Illinois). Frequency and range checks were performed initially to detect errors in the data entry. Detected errors were corrected by rechecking the original data forms. Descriptive statistics such as means and standard deviation were used to summarize the quantitative variables. Proportions and percentages were used to summarize category variables. Chi-square test ($\chi 2$) examined the relationship between demographic, lifestyle characteristics and vitamin-mineral supplement use and to compare males and females relative to vitamin-mineral supplement use. p-values ≤ 0.05 were considered for statistical significance.

RESULTS

The study sample included a total of 860 students. Overall, 23%, (n = 198), of students reported having used vitamin-mineral supplements during the past year. Approximately 34.5% (n = 68) were males and 65.5% (n = 130) were females. The female to male ratio was approximately 2:1. The mean age for all subjects was 21.6±2.3 years (range = 17-24 years). Most (77.5%) were of normal weight. Most of the students (65%) had a monthly family income less than 1000 JD. Approximately 22% of students were smokers. Approximately 28% of students were physically active compared with 72% of students who were physically inactive.

Table 1 shows the prevalence of vitamin-mineral supplement use among students by demographic and lifestyle characteristics. Gender was significantly (p = 0.002) associated with vitamin-mineral supplement use. Females were more likely to use vitamin-mineral supplements than males. Age was also significantly associated with vitamin-mineral supplement use. Students with an age group between 17-20 years were more likely to use vitamin-mineral supplements than students with an age group between 21-24 years. Data analysis showed that BMI was significantly associated with supplements use. Students with a normal BMI were more likely to use supplements than other weight groups. There is a significantly increasing pattern in supplement use with increasing family monthly income. Nearly one third (35.0%) of students with incomes of 1000 JD and more took supplements compared with 65.5% of students with incomes more than 1000 JD. Physically active students were more likely to use supplements than physically inactive students. Non-smokers were more likely to use supplements than current smokers or former smokers.

Table 1: Socio-demographic characteristics of university students (n = 198)

Characteristics/Categories	N	Percentage	p-value
Sex			
Male	68	34.5	0.005
Female	130	65.5	
Age			
17-20 years	133	67	0.001
21-24 years	65	33	
BMI			
Underweight	8	4.5	0.001
Normal	154	77.5	
Overweight	25	12.5	
Obese	11	5.5	
Family monthly income			
<1000 JD	129	65	0.18
>1000 JD	69	35	
Exercise			
Yes	55	28	0.029
No	143	72	
Smoking			
Yes	43	22	0.005
No	155	78	
Vegetarian			
Yes	48	24.5	0.003
No	150	75.5	

Table 2: Sources of Information about vitamin-mineral supplement among the participants (n = 198)

Source	N	Percentage
Doctors	120	60.5
Pharmacists	39	20
family members	21	10.5
Friends	11	5.5
Media	7	3.5

The major 5 sources of supplement information of supplement use were doctors (60.5%), pharmacist (20%), family members (10.5%), friends (5.5%) and media (3.5%) (Table 2). Regarding the reasons for taking vitamin-mineral supplements among university students, the majority of them consumed the vitamin-mineral supplements to maintain good health (73%), followed by to ensure adequate nutrition (11%), followed by to lose weight (9%), then to enhance physical appearance (5.5%) and finally to prevent disease (1.5%)

Table 3: Reasons for taking vitamin-mineral supplements among the study participants (n = 198)

Reason	N	Percentage
Maintain good health	145	73
Weight loss	21	11
Ensure adequate nutrition	18	9
Enhance physical appearance	11	5.5
Prevent disease	3	1.5

Table 4: Types of vitamin-mineral supplement among the participants (n = 198)

Type	N	Percentage
Multi-vitamins only	102	51.4
Multi-vitamins and multi-minerals combinations	87	44
Multi-minerals only	9	4.5

(Table 3). As for types of vitamin-mineral supplements, the majority of the participants took vitamin only (51.5%), followed by vitamin-mineral combinations (44%), then mineral only (4.5%) (Table 4).

DISCUSSION

Jordanian population considered as one of the population that consume foods from major food groups in a quantity that is lower than recommended by the dietary guidelines[37,38]. Moreover, availability, variety and affordability of foods are inadequate among Jordanians. Also, there is no stable fortification policy of stable foods in Jordan and consequently the dietary intake of vitamins and minerals in the Jordanian diet is inadequate. In addition to that, in Jordan there are high rates of smoking (45%)[39-41]. It is well known that cigarette smoking is a major risk factor in reduction of plasma antioxidant concentrations[42,43]. In addition, the levels of physical inactivity among Jordanian adult males and females were over 50%[34] and these results might indicate an unhealthier, less illness-preventive lifestyle for Jordanians.

Recently, an epidemiological transition in Jordan is coming to the surface. This transition is characterized by an increase of micronutrient deficiency diseases such as nutritional anemia (13-50%), iodine deficiency (33.5%), vitamin A deficiency (47%) and osteoporosis (23%)[35,36,44-47]. Unhealthy diet, smoking and physical inactivity are the leading risk factors for high prevalence of micronutrient deficiency diseases among Jordanian population[34,35,46,47].

The greater use of supplements by university students might be explained by the fact that these students often feel fatigued and had intense study levels. Moreover, the relatively high prevalence of vitamin-mineral intake may be due to the beliefs about the need for supplement use was widespread. These results may indicate that vitamin-mineral supplement users are aware about health concept and they are highly interested about healthy lifestyle. The results of the recent study showed that the prevalence of vitamin-mineral supplement use among Mu'tah University students in Jordan is 23%. Consequently, the vitamin-mineral supplement use by Mu'tah University students is a common practice. This overall prevalence rate of vitamin-mineral supplement use is lower than that found in several studies conducted worldwide, particularly among university students in USA where the rate varied from 47-74%[48-52], South Africa (42%)[53] and Korea (58%)[54].

The results of the present study show that vitamin-mineral supplement users were more likely to be females of younger age. Also, the users were from families with a higher monthly income. The majority of the users were having normal body weight, physically active, vegetarians and non-smokers. Our study findings are consistent with the findings of the other studies in the developed world[55-60]. In general; the results might indicate that supplement users as compared with non-users are more interest to be health conscious and more aware of health and healthy lifestyles.

Doctors had the strongest influences (60.3%) in the decision to take supplements by participants in this study. This is inconsistent with the findings of the study by Steele and Senekal[53] who indicated that family is the most important sources of information on the need for supplement use. Moreover, results of the current study contradict with those of Neuhouser *et al.*[61] for a general population sample in the United States of America and to those of Dundas and Keller[62] and Eldridge and Sheehan[63] for student populations in the USA.

In the side of the reasons for taking vitamin-mineral supplements among university students, the highest percentage of them consumed vitamin-mineral supplements to maintain good health (73%), followed by to lose weight (11%), followed by ensure adequate nutrition (9%), then to enhance physical appearance (5.5%) and finally to prevent disease (1.5%). Our results were Similar to those reported by several studies indicated the reasons behind taking vitamin-minerals supplements by people included maintain the general health, ensure adequate nutrition, enhance physical appearance and lose weight[63-66]. Moreover, McDowall[67] in his study reported that health and illness prevention are the main reasons for taking supplements. Generally speaking, the reasons for taking supplements were quite similar in all studies with ensuring good nutrition, preventing illness and tiredness or fatigue[68-71]. In addition to that, it was reported that students took supplements mainly to improve their health, to prevent colds and flu and for increased energy[62].

Regarding the types of vitamin-mineral supplements that were used among the participants, it was found that the

majority of the participants used multivitamin (51.4%). This result is consistent with the findings of Driskell *et al.*[50] who reported that the most frequently used supplements were multivitamins. Similarly, Steele and Senekal[53] reported that the most frequent used supplements were multivitamins and vitamin-mineral combination.

CONCLUSION

It is concluded that majority of the vitamin-mineral supplement users were females of younger age (university students) and the most frequent used supplements were multivitamins and vitamin-mineral combination. Vitamin-mineral supplements are consumed to maintain good health, to lose weight, to ensure adequate nutrition and to enhance physical appearance. Many of the students do not have accurate information about supplements. Therefore, there is a need to provide them with education and access to scientific and unbiased information.

SIGNIFICANCE STATEMENT

This study showed the importance of vitamin mineral supplement to reduce the prevalence of micronutrient deficiencies and suggested to implement new strategies by adopting healthy lifestyles, particularly following a healthy diet, a physical exercise and quit smoking. On the other hand, it is important to encourage valuable food fortification policies of stable foods. Finally, it is highly important to increase the great efforts to raise the awareness of the general public as well as health care providers to the importance of healthy lifestyles by health and nutrition education.

ACKNOWLEDGMENTS

The author appreciates the cooperation of the students from all faculties in filling the questionnaire. Also, the author thanks his colleagues for their efforts in facilitating the procedure of data collection. Moreover, the author thanks Eng. Bassam Omar to conduct the statistical analysis.

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