

RESEARCH COMMUNICATION

Prevalence of Vitamin-mineral Supplements Use and Associated Factors Among Young Malaysians

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Abstract

The objective of this study is to determine the prevalence and associated factors of vitamin-mineral supplements use among Management and Science University students. The cross-sectional study protocol was approved by the Ethics and Research Committee and questionnaires were distributed randomly using simple random sampling to students from all faculties and consent was obtained. The data were analyzed using the SPSS version 13. Total number of the participants in this study is 105. More than half of them were female, older than 20 years of age and Malay (58.1%, 61.9 and 61.9% respectively). The prevalence of vitamin-mineral supplement use was 43%, the main reasons being 'to maintain good health' 80%, followed by 'to ensure adequate nutrition' (10.5%). There was a significant positive association with monthly household income and BMI ($P=0.039$; $P=0.048$), with significant dependence on race and knowledge about vitamin-mineral supplements ($P=0.002$). There was a significant difference between medical and health sciences as compared to non-medical and health science faculties ($p=0.05$). The conclusion is 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.

Keywords: Prevalence - vitamin - supplement - Malaysia

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Introduction

Dietary supplements are defined in the United States Dietary Supplement Health and Education as any product (other than tobacco) intended to supplement the diet that bears or contains one or more of the following ingredients: a mineral; a vitamin, a herb or other botanical, an amino acid, a supplement used by man to supplement the diet by increasing the total dietary intake, or a concentrate, metabolite, constituent, extract, or combination of any ingredient described (Dietary, 1994). It is well documented that micronutrient deficiencies affect at least a billion of people worldwide (Diaz et al., 2003; Muller and Krawinkel, 2005). The use of supplements can increase daily intake of vitamins and minerals beyond what is obtained from food alone (Archer et al., 2005) and thus, may confer health benefits, including chronic disease prevention⁵. An extensive review found strong and consistent evidence that diets 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; however, studies of dietary intake of specific nutrients have been less consistent (American Institute for Cancer Research, 1997).

Several studies suggested that specific vitamin(s) or multivitamin-multimineral can help to reduce the risk

of chronic diseases. For instance; studies suggested that vitamin and mineral supplementation may reduce the risks of chronic diseases and birth defects (Earnest et al., 2002; Olney and Mulinare, 2002; Schuurman et al., 2002; Knekt et al., 2004). Reduction of the risks of cardiovascular diseases and prostate cancer has been associated with the use of supplemental antioxidants and multivitamins (Earnest et al., 2002; Schuurman et al., 2002; Knekt et al., 2004). Multivitamins are also associated with a reduced risk of neural tube birth defects, colon cancer and death from acquired immune deficiency syndrome (White et al., 1997; Olney and Mulinare, 2002; Fawzi et al., 2004).

There is substantial and growing interest in reducing chronic disease risks through vitamin and mineral supplementation (Stephens et al., 1996; Weber et al., 1997; Carr and Frei, 1999). However, not all supplementation trials have shown this to be beneficial and optimal supplement intakes are still highly debated (Tribble and Frank, 1994; Levine et al., 1996; Young, 1996; Patterson et al., 1998; 16). A randomized controlled trial suggested that regular intake of multivitamin and multi-mineral supplements may reduce infection among patients with diabetes (Barringer et al., 2003). The protective effect of multivitamin supplements intake against the progression of HIV was also observed in a randomized controlled trial (Fawzi et al., 2004). Many nutrients have shown cancer

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preventive properties in in-vitro, animal, and human clinical studies^{22&23}. Epidemiologic studies suggested links between supplement use and reduced risk of chronic diseases, including cancer, cardiovascular disease, and osteoporosis (Sauberlich and Machlin, 1992; Block et al., 1994). Supplemental calcium has been associated with a reduced risk of colon cancer, osteoporosis and hip fractures (White et al., 1997; Baekgaard et al., 1998; Kampman et al., 2000; Peacock et al., 2000; Jorde et al., 2002). There is also evidence that supplemental vitamin E, supplemental calcium and long-term multivitamin use may reduce the risk of colorectal cancer (Bostick et al., 1993; White et al., 1997; Giovannucci et al., 1998; Baron et al., 1999; Albanes et al., 2000; Jacobs et al., 2001). Evidence exists that vitamins A, C, E and selenium may help prevent various cancers (Willett & MacMahon 1984 Part I; Willett & MacMahon 1984 Part II; Block 1991).

In contrast, the use of supplements can be a risk rather than a benefit to some individuals. In theory, the overuse of vitamins and minerals from supplements can lead to medical complications including neurologic disturbances, gastrointestinal symptoms, liver toxicity, birth defects, and select drug interferences (Hathcock, 1997). However, a meta-analysis of five randomized control trials found no significant beneficial effect of multivitamin and multiminerals supplements (Huang et al., 2006). In another study that investigated the pooled data from eight prospective studies, no association was evident between the lung cancer risk and the use of folate, vitamins A, C, E, and multivitamins (Cho et al., 2006). On the contrary, a meta-analysis of 19 trials concluded that high-dosage of vitamin E supplements could actually lead to an increased mortality (Miller et al., 2005). In spite of these and other contradictory evidence, use of dietary supplements remains popular in Western populations.

Consumers have little rigorous scientific information to guide them in selecting the types and dosages of supplements to use for disease prevention. According to the United States Commission on Dietary Supplement Labels, it is important for health and nutrition professionals to become more knowledgeable about all types of dietary supplements in order to help consumers make appropriate choices (National Institutes of Health, 2000). In Malaysia, there is no regulation of vitamin-mineral supplements in that they are widely available over the counter from such places as pharmacies and markets them without a prescription. There is no regulation or health policy on the use of vitamin-mineral supplements, and furthermore, data on the prevalence and use of vitamin-mineral supplements are limited or non-existent in Malaysia.

The practices towards vitamin-mineral supplement among university students in Malaysia remain undocumented and for our best knowledge there is no such study conducted in Malaysia; thus there is a need to understand the frequency with which people use supplements and what variables are associated with particular frequencies of use. Therefore this study is conducted to determine the prevalence and associated factors of vitamin-mineral supplement use among Malaysian university students and to determine reasons for vitamin-mineral supplement use and associated factors.

Materials and Methods

Cross-sectional study was conducted among Management and Science University students. There are five faculties in the university: International Medical School (IMS), Faculty of Health and Life Sciences (FHLS), Faculty of Business Management and Professional Studies (FBMP), Faculty of Information Sciences and Engineering (FISE), School of Pharmacy (SOP) and Centre of Foundation Study (CFS). Questionnaires were distributed randomly using simple random sampling to 105 students from all faculties. The sample was choosing randomly. Administration of questions: Place of distribution of the questionnaires were throughout the MSU campus area including MSU's lectures halls which located at 5th to 8th floors, library, classes, and hallways. Before distributing to the respondents, permission was asked from them directly and signed consent was obtained.

Once the respondents understood the purpose of study, the questionnaire form was handed to them. Once the respondents completed the questionnaire and gave it back to the investigators, the respondents were given a brochure on more information about the vitamin-mineral supplements. The questionnaire consisted of three sections:

Section 1: Socio-demographic: This section contains basic demographic questions. These include the respondents' sex, age, race, marital status, monthly family income, weight, height, faculty, and semester.

Section 2: Vitamins-minerals intake and lifestyle: In this section, the respondents were asked on their vitamin-mineral intake as a supplement and their lifestyle. The respondents were asked about their source of information regarding the vitamin-mineral supplements. They were asked about alcohol intake, cigarette smoking, whether they are vegetarian, the type of supplement they take, the duration of taking the supplement, the reasons of taking the supplement, dosage per day and week, and whether they exercise or not.

Section 3: Knowledge on the relationships between chronic disease and mineral-vitamin supplements consumption. This section asked about the association between chronic diseases and mineral-vitamin supplements consumptions. Their knowledge on malnutrition and whether it can cause cancer or not. Disease caused by malnutrition. It asked them whether smoking and drinking alcohol can increase the chances of getting chronic diseases. The formation of the questions for the questionnaire was based on a previous study conducted by Suleiman et al., (2008). The protocol of this study was approved by the Ethics and Research Committee of Management and Science University. Once the entire questionnaires are completed, the data were recorded and key in into the computer. The raw data were analyzed by using the SPSS version 13 using t-test and ANOVA test.

Results

A total number of 105 students participated in this study. More than half of the study participants were female, older than 20 years of age and Malay (58.1%; 61.9;

Table 1. Socio-demographic Characteristics of University Students (n=105)

Variables		N	%
Sex	Male	44	41.9
	Female	61	58.1
Age (years)	<20	40	38.1
	≥20	65	61.9
BMI	Underweight	28	26.7
	Normal Weight	66	62.9
	Overweight	11	10.5
Race	Malay	65	61.9
	Non-Malay	40	38.1
Family Monthly income (RM)	≤5000	80	76.2
	>5000	25	23.8
Faculty	FBMP	66	62.9
	FHLS	3	2.9
	IMS	18	17.1
	SOP	5	4.8
	FISE	11	10.5
	CFS	2	1.9

Table 2. Distribution of Lifestyle Practices among Study Participants (n=105)

Variables		N	%
Exercise	Ever Exercised	63	60
	Never Exercise	42	40
Smoking	Yes	18	17.1
	No	87	82.9
Vegetarian	Yes	13	12.4
	No	92	87.6
Alcohol	Yes	10	9.5
	No	95	90.5
Take Vitamin-Mineral Supplements	Yes	46	43.8
	No	59	56.2

61.9%; respectively). The majority of the participants were within normal weight 66 (62.9%). The majority of the participants had a monthly family income of less than or equal to RM 5000 (76.2%). They were from different faculties: FBMP, FHLS, IMS, SOP, FISE, and CFS (Table 1). This study showed that the prevalence of vitamin-mineral supplement use among university students was 43%.

Regarding lifestyle practices among university students, the majority of the participants had a good practice of healthy lifestyle. The majority of participants, who ever exercise, never smokes and never drinks alcohol (60%; 82.9%; 90.5%; respectively). Few participants in this study were vegetarian (12.4%). More than half of the participants never take vitamin-mineral supplements (56.2%) (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 80%, followed by to ensure adequate nutrition (10.5%), then to loss weight (4.8%) and finally to enhance physical appearance (3.8%) (Table 3). Regarding the sources of information about vitamin-mineral supplement intake among the participants were family members (34.3%), doctors (26.7%), then from the internet (18.1%) (Table 4).

As for types of vitamin-mineral supplements, the majority of the participants took vitamin only (30.5%),

Table 3. Reasons for Taking Vitamin-mineral Supplements among the Study Participants (n=105)

	N	%
Maintain Good Health	84	80.0
Ensure Adequate Nutrition	11	10.5
Weight Loss	5	4.8
Enhance Physical Appearance	4	3.8
Others	1	1

Table 4. Sources of Information about Vitamin-mineral Supplement among the Participants (n=105)

	N	%
Family	36	34.3
Friends	13	12.4
Internet	19	18.1
Magazines	7	6.7
Doctor	28	26.7
Others	2	1.9

Table 5. Types of Vitamin-mineral Supplement among the Participants (n=105)

	N	%
Multi-Vitamins Only	32	30.5
Multi-Vitamins and Multi-Minerals	21	20
Multi-Mineral	5	4.8
Never	47	44.8

Table 6. Socio-demographic Characteristics and Vitamin-mineral Supplements Intakes among Study Participants (n=105)

Variable		Mean±SD	p value
Sex	Male	1.61±0.49	0.37
	Female	1.52±0.50	
Race	Malay	1.55±0.50	0.86
	Chinese	1.43±0.54	
	Indian	1.60±0.50	
	Others	1.63±0.52	
BMI	Underweight	1.54±0.51	0.05
	Normal Weight	1.52±0.50	
	Overweight	1.91±0.30	
Age	<20	1.68±0.47	0.19
	20-23	1.50±0.50	
	>23	1.46±0.52	
Income	<1000	1.77±0.43	0.04
	1000-5000	1.52±0.50	
	>5000	1.44±0.51	
Faculty	Non-health	1.57±0.50	0.784
	Health	1.54±1.54	

vitamin-mineral (20%), then mineral only (4.8%) (Table 5).

There was a significant association between monthly household income and taking vitamin-mineral supplement among university students using ANOVA test ($P=0.039$). There was a significant association between BMI and taking vitamin-mineral supplement among university students using ANOVA test ($P=0.048$). Furthermore, using Post Hoc test there was a significant difference between those with a normal weight and those who were overweight ($p=0.044$). Sex, race, age and types of faculty did not significantly influence the practice of taking vitamin-mineral supplements among university students using t-test (Table 6).

Regarding the relationship between socio-demographic

Table 7. Socio-demographic Characteristics and Knowledge of Vitamin-mineral Supplements Intakes among the Participants (n =105)

Variable		Mean±SD	p value
Race	Malay	0.88±0.33	0.002
	Chinese	1.00±0.01	
	Indian	0.76±0.36	
Faculty	Medical and Health faculties	0.78±0.41	0.05
	Non-medical and health faculties	0.92±0.27	
Income	<1000	0.81±0.40	0.93
	1000-5000	0.83±0.38	
	>5000	0.80±0.41	

characteristics of the participants and their knowledge; in general there is a difference between the mean of different races in terms of knowledge and there was a significant association between race and the knowledge about vitamin-mineral supplement among university students using ANOVA test ($P=0.002$). Furthermore, Post Hoc test showed the difference was between Malay and others ($p=0.002$) on one hand, and Chinese and others ($p=0.008$) on other hand. As for types of faculty, there was a difference between the mean of those from medical and health sciences background and from other faculties in terms of knowledge and this difference is statistically significant ($p =0.05$). Regarding the monthly income, there is no significant relationship between income and knowledge of vitamin-mineral supplements ($p=0.926$) (Table 7).

Discussion

This study showed that the prevalence of vitamin-mineral supplement use among university students in Malaysia is 43%. Thus, the vitamin-mineral supplement use by university students in Malaysia is a common practice. This is higher than the prevalence among Korean students which is 31.3% (Kim et al., 2001). 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. The relatively high prevalence of vitamin-mineral intake may also due to the beliefs about the need for supplement use was widespread. Similar prevalence was reported in university students in the United States with the rate varying from 47-74% (Ranelli et al., 1993; Driskell et al., 1998; Driskell et al., 1998; Herbold et al., 2004; Herbold et al., 2004). Similar prevalence (42%) of vitamin-supplement use among university students was reported in South Africa (Steele and Senekal, 2005). Lower prevalence (27.4%)⁵⁰ of supplement use was reported by Suleiman et al. (2008) among Jordanian students. Kim et al., (2003) (Kim, 1997) reported higher prevalence of vitamin-mineral supplement intake among students was 58%. These results may indicate that vitamin-mineral supplement users are health conscious and they are aware of health and healthy lifestyle.

Regarding the reasons for taking vitamin-mineral supplements among university students, the majority of them consumed vitamin-mineral supplements to

maintain good health 80%, followed by to ensure adequate nutrition (10.5%), then to loss weight (4.8%) and finally to enhance physical appearance (3.8%). Similar findings were reported by several studies indicated that reasons behind taking vitamin-minerals supplements by people included maintain the general health, ensure adequate nutrition, enhance physical appearance and promote weight loss (Eldridge and Sheehan, 1994; Kaufman et al., 2002; Tamim et al., 2004; Dorsh and Bell, 2005). Other studies showed similar finding that health and illness prevention are the main reasons for taking supplements (McDowall, 2007). Reasons for taking supplements were quite similar in all studies with ensuring good nutrition, preventing illness and tiredness or fatigue (English and Carl, 1981; Pallay et al., 1984; Dannehower et al., 1985; Sobal et al., 1986). Driskell (1999) reported that present illness, inadequate diet and increased energy were the main reasons students gave for using supplements. Dundas and Keller (2003) also reported that students took supplements mainly to improve their health, to prevent colds and flu, and for increased energy. Schulz (1988) found that nutritional insurance, avoiding illness and increasing energy, and vitality or strength were the most common reasons reported by students for taking supplements. People have reported a variety of reasons for taking dietary supplements, including decreasing their susceptibility to health problems such as stress, colds, heart attacks, osteoporosis, neural tube defects, dental caries and cancer, as well as to increase energy (Worthington and Breskin, 1984; Read et al., 1989).

Family was the strongest influences (34.3%) in the decision to take supplements by participants in this study. Similar finding indicate that family and friends, doctors and advertising are the most important sources of information on the need for supplement use (Steele and Senekal, 2005). Our findings are similar to those of Neuhouser et al., (1999) for a general population sample in the United States of America and to those of Dundas and Keller (2003) and Eldridge and Sheehan (1994) for student populations in the USA.

The supplements typically can be classified into three categories: supplements that are believed to add nutrients to a system that owing to inadequate dietary practices might otherwise be lacking (Schulz, 1988); supplements that allege rapid weight loss and maintenance of the loss (Thompson et al., 1987), or conversely, supplements that are believed to result in weight gain or muscle development (Wolfe, 2000). In this study the majority of the participants used multivitamin (30.5%). Similar finding was reported by Moore and Saddam (Driskell et al., 1998) that the most frequently used supplements were multivitamins (60%), Vitamin C (37%), calcium (30%), vitamin E (19%), and iron (16%). Steele & Senekal (2005) 49 reported that the most frequent used supplements were multivitamins and vitamin-mineral combination. The types of supplements consumed in Malaysia also appear to be similar to other countries (English and Carl, 1981; Schutz et al., 1982; Pallay et al., 1984; Worsley and Crawford, 1984; Dannehower et al., 1985; Steward et al., 1985; Sobal et al., 1986; Block et al., 1988) with multivitamins predominant, iron supplements frequent,

and vitamin C or the B vitamins next most common.

In this study, there was a significant association between race and the knowledge about vitamin-mineral supplement among university students using ANOVA test ($P=0.002$). Similar findings have been found a relationship between vitamin-mineral intake and race (Greger, 2001; Messerer et al., 2001).

As for the types of faculty, there was a different between the mean of those from medical and health sciences background versus others in terms of knowledge ($p=0.05$). This may due to that those who are from medical and health faculties had better knowledge about vitamin-mineral supplement intake than those from non medical and health faculties. Similar findings reported a relationship between vitamin-mineral supplement use and education (Greger, 2001; Messerer et al., 2001).

There was a significant association between BMI and taking vitamin-mineral supplement among university students using ANOVA test ($P=0.048$). Similar studies showed that lower BMI was linked to increase multivitamin intake (Lyle et al., 1998; Hoggatt et al., 2004; Radimer et al., 2004).

There was a significant association between monthly household income and taking vitamin-mineral supplement among university students ($P=0.039$). Similar findings were reported from several studies (Lyle et al., 1998; Messerer et al., 2001; Knudsen et al., 2002; Ishihara et al., 2003; Tsang et al., 2007). These results are similar to investigations done in other countries that have shown that the consumption of dietary supplements is higher among higher income population (Read et al., 1989). Other studies that examined the association between income and supplement use among adults and children found a positive association (Pelletier and Kendall, 1997; Yu et al., 1997; Lino et al., 1999; Balluz et al., 2000; Fennell, 2004; Picciano et al., 2007). Other studies found a relationship between supplement use and income (Greger, 2001; Messerer et al., 2001). Another studies reported that individuals in high socioeconomic groups take vitamin-mineral supplements more frequently than their counterparts (Subar and Block, 1990; Kim et al., 2003).

In conclusion, Although the prevalence of supplement use among university students is high, many of them do not have accurate information about vitamin-mineral supplements. Therefore, there is an urgent need to provide university students with education and access to scientific and unbiased information. Race, income, BMI, and type of education are the associated factors that influence the participants to consume vitamin-mineral supplements. The main reasons for taking vitamin-mineral supplements among participants are: to maintain good health, ensure adequate nutrition, lose weight and to enhance physical appearance.

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