

Dietary Supplements: A Survey Use, Attitudes and Knowledge Among IIUM Kuantan Students

Siti Nur Atirah Mohd Radzi^{1,2}, Redzuan Nul Hakim Abdul Razak^{1*} & Nik Fakhruddin Nik Hassan³

¹Department of Basic Medical Sciences for Nursing, Kulliyah of Nursing, International Islamic University Malaysia, Pahang, Malaysia.

²Avisena Specialist Hospital, Selangor, Malaysia.

³Forensic Science Programme, School of Health Sciences, Universiti Sains Malaysia, Kelantan, Malaysia.

ABSTRACT

Objectives: Dietary supplements have been recognized as products that are globally used, especially among university students due to its effectiveness and benefits towards health. In order to determine the efficiency of the supplements, the users must equip themselves with knowledge on the usage of dietary supplements. Hence, this study mainly aims to assess the usage, attitude and knowledge on dietary supplements among IIUM Kuantan students. **Method:** This study used a descriptive cross-sectional with stratified random sampling study among 349 undergraduate students at the International Islamic University Malaysia (IIUM), Kuantan campus. Data was collected using online questionnaires and shared with students from IIUM Kuantan campus. The data was analyzed by using IBM Statistical Package Social Science (SPSS) version 25.0. **Results:** The overall prevalence of dietary supplements used by the students in the university was 31.8%. On the other hand, students show to have positive attitude and good knowledge, 70.8% and 84.0%, respectively. There was an association between course study and presence of illness with the level of attitudes based on Fisher exact test with p-values of <0.05 representing statistical significance. The same test was used resulting in age and BMI were associated with the level of knowledge. **Conclusion:** Prevalence of dietary supplements used was lower than other local findings and most of the students depict a good level of knowledge and positive attitudes towards dietary supplements. nevertheless, educational information regarding dietary supplements still needs to be provided to university students as the number of consumers keeps rising.

Keywords: Dietary Supplements, Prevalence, Use, University Students, Attitudes, Knowledge.

INTRODUCTION

Dietary Supplement Health Education Act (DHSEA) (1994) defines dietary supplement (DS) as products designed to complement the diet which contains one or more nutritional ingredients (vitamins, minerals, herbs or other botanical substances, an amino acid). It also will increase the total dietary intake and is intended for oral administration only which available in the form of tablets, capsules, powders, energy bars or liquids ⁽¹⁾. It is widely used as most of the products are available in stores and on the internet without a prescription, which is also referred to as over-the-

counter drugs ⁽²⁾.

However, the supplementation must be taken into consideration in a recommended amount as it is proven by many studies to have possible adverse reactions such as hepatotoxicity, birth defects, drug interaction, kidney and gastrointestinal problems ⁽³⁾. The prevalence of DS usage has been increasing over the past decade especially in the United States. It has been reported that the usage was half of the population in the country ⁽⁴⁾. Meanwhile in Malaysia, data was taken from the Malaysian Adults Nutrition Survey (MANS) in 2014 documented that only one-third of Malaysian adults consumed DS which also reported that the number has increased from the past few years ⁽⁵⁾. College students also displayed a greater number in the DS consumption. For instance, about 66% of American college students regularly use DS which more than the number of the general population usage ⁽⁶⁾. A similar study with Axon et al. (2017), Sharma et al. (2014) and Wiltgren et al., (2015) recorded 52% of American students, 49.6% of Arabian students and 56% of Australian students who consumed DS, respectively ^(5,7,8). Malaysia also recorded the same findings in two of the

* Corresponding author:

Dr. Redzuan Nul Hakim Abdul Razak

Department of Basic Medical Sciences for Nursing,
Kulliyah of Nursing,
International Islamic University Malaysia,
Jalan Sultan Ahmad Shah, Bandar Indera Mahkota,
25200 Kuantan, Pahang, Malaysia.

Email: redzuan@iium.edu.my

Telephone number: 09-5707330

universities in Kuala Lumpur with 43% and 50.8%^(3,10) however, findings in one university in Ipoh reported that the usage was lower with 21.2%⁽¹¹⁾.

The problem arises when some studies displayed students' misconception on DS as they may believe that supplements are a substitution for food and any natural ingredients such as fruits and vegetables which is opposed from the actual definition of DS which is supposed to supplement the diet⁽¹²⁾. Similar findings from Lieberman et al. (2015) documented that students have a poor attitude towards the use of DS as they replace them with a healthy lifestyle, for instance, they consume more vitamins or pills more than healthy foods⁽⁶⁾. Hence, this indicates a lack of precise knowledge and attitudes of university students regarding DS.

Lot of studies have been conducted in developed countries to assess the level of knowledge and attitudes on DS and still on progress. However, there are limited studies have been performed in Malaysia especially among university students. Therefore, concerning the risks and benefits of DS on students' health, it is vital to observe their knowledge and attitudes on DS. Consequently, this research was conducted in hopes that the knowledge and attitudes of the consumers toward the DS also increase indirectly. Thus, the main objective of this study was to assess the usage, attitude and knowledge on dietary supplements among IIUM Kuantan students.

MATERIALS AND METHODS

A descriptive cross-sectional study was carried out among 3690 undergraduate students from six different of Kulliyah (faculties) which consist of Kulliyah of Medicine (KOM), Kulliyah of Nursing (KON), Kulliyah of Pharmacy (KOP), Kulliyah of Dentistry (KOD), Kulliyah of Science (KOS) and Kulliyah of Allied Health Science (KAHS) in International Islamic University Malaysia (IIUM), Kuantan Campus, Pahang, Malaysia. The study was conducted from October until December 2020 by using online questionnaires.

Stratified random sampling was implemented in this study. The sample size was measured by using Raosoft Sample Size Calculator. To achieve a confidence level of 95% and a margin error of 5%, a minimum sample size of 349 was required. The inclusion criteria were IIUM undergraduate students from the six Kulliyah meanwhile the exclusion criteria were postgraduate students and participants from the pilot study.

To stratify this sample, the researcher had randomly selected respondents from each Kulliyah with the sample size of respondents of each Kulliyah is proportionate to its population size. This resulting in the same sampling fraction for each of strata or Kulliyah. Thus, these are the number of respondents that will be taken from the six Kulliyah; KOM (67), KON (37), KOP (45), KOD (28), KOS (102) and KAHS (70).

The set of questionnaires was shared via google form to the representative of six Kulliyah through WhatsApp messages and email. Then the link was distributed randomly to all of the undergraduate students from each Kulliyah. The data was gathered after the total sample size is reached by all Kulliyah and the questionnaire is filled. All the information given by the respondents was kept confidential throughout the research process.

The questionnaires were divided into four sections which consist of section A: socio-demographic status, section B: Usage on dietary supplements, section C: Attitudes on dietary supplements and section D: Knowledge on dietary supplements. All of the items were adapted and modified from the previous study which is Naqvi et al. (2018) and Alhomoud et al. (2016)^(15,14). The socio-demographic status was based on gender, age, course study, total household income per month as well as lifestyle status which are the presence of any illness, body mass index (BMI) and exercise frequency per week.

Each item with total of 8 items in the section for level of attitude on DS (section C) was summed up from scores of 0- not sure, 1- no and 2 -yes. The greater score will be displayed as positive attitudes and the lower score portrayed as negative attitudes. Whereas, the section for level of knowledge on DS (section D) which contains 7 items were measured use Likert-scale, 1- strongly disagree, 2- disagree, 3- neutral, 4- agree and 5- strongly disagree and also was summed up together. A higher score indicates good knowledge of the students followed by fair and poor.

Ethical approval was obtained from the Kulliyah of Nursing Post Graduate Research Committee (KNPGRC) and International Islamic University Malaysia Research Ethics Committee (IREC). Prior the data collection, the content validity of the items was reviewed and checked by three faculty members who expert in diet, herbal and natural products. Next, the questionnaires have been subjected to pilot study in 37 students of IIUM Kuantan who met the inclusion criteria to test the reliability and internal consistency of the instruments. The reliability coefficient was

conducted and the Cronbach's Alpha value obtained was 0.728 (attitude on dietary supplements) and 0.712 (knowledge on dietary supplements). The values were acceptable for the researcher to continue in data collection.

STATISTICS

The acquired data of this research was measured and analyzed by using IBM Statistical Package Social Science (SPSS) version 25.0. The descriptive statistics such as gender, age, course study, total household income per month as well as lifestyle status which are the presence of any illness, body mass index (BMI) and exercise frequency per week were described in terms of frequency (n) and percentage (%) for demographic characteristics. Besides, the prevalence and usage of DS was also measured using frequency (n) and percentage (%). Meanwhile, relationship between studied categorical variables were conducted using Fisher Exact test. P-values of less than 0.05 ($p < 0.05$) is representing as statistical significance.

RESULTS

Table I presents the sociodemographic characteristics of the respondents. With a total of 349 respondents, the vast majority of the participants were female 269 (76.9%) with only 81 male respondents (23.1%). Respondents in this study range in age from 18 to 26 years old with the largest group of the respondents indicating their age was between 21 to 23 years old ($n=256$, 73.1%). Out of 349 respondents, 67 (19.2%) were from Kulliyah of Medicine, 37 (10.6%) from Kulliyah of Nursing, 28 (8.0%) from Kulliyah of Dentistry, 45 (12.9%), 70 (20.1%) and 90 (29.2%) were from Kulliyah of Pharmacy, Kulliyah of Allied Health Sciences and Kulliyah of Science, respectively. About half of the students reported had more than RM 5000 per month as total household income (51.9%), exercise 1-2 times per week (55.3%) with duration in less than 30 minutes per session (50.4%). They showed a high percentage in absence of any illness (77.9%) and had a normal BMI (60.5%).

The general prevalence of dietary supplement usage among IIUM Kuantan students was 31.8%. Most of the respondents were reported to consume the supplements daily (16.3%). Vitamins were used the most (26.2%) followed by protein (4.4%), multivitamins/minerals (3.6%), fats (3.3%) and minerals (2.6%). Only a few were consumed fibers and herbs (1.8%). Multiple reasons were given by the consumers and the majority of them consumed dietary supplements to maintain general health

Table I: Socio-demographic characteristics of IIUM Kuantan students. (N=349)

Variables	Frequency (n)	Percentage (%)
Age (years)		
18-20	83	23.7
21-23	256	73.1
24-26	9	2.6
> 26	2	0.6
Gender		
Male	81	23.1
Female	269	76.9
Course study		
Kulliyah of Medicine	67	19.2
Kulliyah of Nursing	37	10.6
Kulliyah of Dentistry	28	8.0
Kulliyah of Pharmacy	45	12.9
Kulliyah of Allied Health Sciences	70	20.1
Kulliyah of Science	102	29.2
Total household income (RM) per month		
< RM 1000	42	12.0
RM 1000 - RM 3000	78	22.3
RM 3001 - RM 5000	48	13.8
> RM 5000	181	51.9
Presence of illness		
Yes	34	9.7
No	272	77.9
Not sure	43	12.3
Body Mass Index (BMI)		
Underweight	59	16.9
Normal	211	60.5
Overweight	59	16.9
Obese	20	5.7
Exercise frequency in a week		
1-2 times	193	55.3
3-5 times	71	20.3
6-7 times	13	3.7
Not exercise at all	72	20.6

and wellbeing (21.1%) and followed by boosting immunity (12.2%). Mostly they did not suffer from the side effects of the DS (30.1%). The details of the prevalence and usage of DS are tabulated in Table II.

Table II: The prevalence and usage of dietary supplements among IIUM Kuantan students. (N=349)

Variables	Frequency (n)	Percentage (%)
Dietary supplements usage		
Yes	111	31.8
No	238	68.2
Frequency of Dietary Supplements Used		
Daily	57	16.3
Weekly	22	6.3
Once a month	18	5.2
Not sure	14	4.0
Never	238	68.2
Type of dietary supplements used		
Vitamins	102	26.2
Minerals	10	2.6
Proteins	17	4.4
Fats	13	3.3
Fiber	7	1.8
Herbs	7	1.8
Multivitamins/minerals	14	3.6
Others	6	1.5
Not applicable	238	57.5
Reasons of dietary supplements used		
General health and wellbeing	102	21.1
Boost immunity	59	12.2
Weight gain	8	1.7
Weight loss	10	2.1
Bodybuilding	9	1.9
Sports performance	4	0.8
Doctor's recommendation	7	1.4

Poor diet	17	3.5
Energy source	29	6.0
Enhance appearance	23	4.8
No reason	11	2.3
Not applicable	238	42.2
Sources of information on dietary supplements used		
Family/Relatives	90	15
Friends	59	9.8
Doctors	47	7.8
Pharmacists	41	6.8
Internet/Social Media	113	18.8
Newspaper/Magazines	12	2.0
Not Applicable	238	39.6
Side effects of dietary supplements		
Suffered from the side effects of dietary supplements	2	0.6
Suffered from the side effects but unsure the cause of the side effects	4	1.1
Did not suffer from the side effects	105	30.1
Not applicable	238	68.2

Table III shows the results of the level of attitudes and knowledge on dietary supplements among IIUM Kuantan students. Level of attitudes has been portrayed as positive and negative attitudes where the largest participants depict positive attitudes with 70.8% and 29.2% of the participants depict negative attitudes on DS. Besides, the level of knowledge has been categorized as good, fair and poor. The results show that majority of the students perceived good knowledge towards dietary supplements (84.0%) followed by fair knowledge (14.6%) and only 1.4% had poor knowledge.

Table III: The level of attitudes and knowledge on dietary supplements among IIUM Kuantan students. (N=349)

Variables	Frequency (n)	Percentage (%)
Level of attitudes		
Positive	247	70.8
Negative	102	29.2
Level of knowledge		
Good	293	84.0
Fair	51	14.6
Poor	5	1.4

Table IV outlines the results of the Fisher Exact test for the relationship between socio-demographic status with the level of attitudes of IIUM Kuantan students. The result of this test show that only course study and presence of illness has a significant association with the level of attitudes on dietary supplements as p is less than 0.05 ($p < 0.05$).

Table IV: Relationship between socio-demographic status and level of attitudes on dietary supplements among IIUM Kuantan students. (N=349)

Variables	Level of attitudes		p-value
	Positive (%)	Negative (%)	
Course study			
Kulliyyah of Medicine	54 (80.6)	13 (19.4)	0.001*
Kulliyyah of	25 (67.6)	12 (32.4)	
Kulliyyah of	21 (75.0)	7 (8.9)	
Kulliyyah of	41 (91.1)	4 (8.9)	
Kulliyyah of Allied Health Sciences	46 (65.7)	24 (34.3)	
Kulliyyah of Science	60 (58.8)	42 (41.2)	
Presence of illness			
Yes	29 (85.3)	5 (14.7)	0.034*
No	193 (71)	79 (29.0)	
Not sure	25 (58.1)	18 (41.9)	

Table V outlines the results of the Fisher Exact test for the relationship between socio-demographic data of IIUM Kuantan students with the level of knowledge on the dietary supplement. Age group and BMI are the only variables that display a significant difference with the level of knowledge on dietary supplements as p is less than 0.05 ($p < 0.05$).

Table V: Relationship between sociodemographic status and level of knowledge on dietary supplements among IIUM Kuantan students. (N=349)

Variables	Level of knowledge			p-value
	Good (%)	Fair (%)	Poor (%)	
Age (years)				
18-20	67 (81.7)	15 (18.3)	0 (0.0)	0.002*
21-23	221 (86.3)	31 (12.1)	4 (1.6)	
24-26	4 (44.4)	5 (55.6)	0 (0)	
> 26	1 (50.0)	0 (0.0)	1 (50)	
Body Mass Index (BMI)				
Under-weight	51 (86.4)	8 (13.6)	0 (0.0)	0.039*
Normal	174 (82.5)	35 (16.6)	2 (0.9)	
Overweight	54 (91.5)	3 (5.1)	2 (3.4)	
Obese	14 (70.0)	5 (25.0)	1 (5.0)	

Table VI reveals the results of the Fisher Exact test for the relationship between the level of knowledge on dietary supplements with the level of attitudes on dietary supplements among IIUM Kuantan students. The result of this test showed that there is no relationship between the two variables as p is more than 0.05 ($p > 0.05$).

Table VI: Relationship between the level of knowledge and level of attitudes on dietary supplements among IIUM Kuantan students. (N=349)

Variables	Level of attitudes		p-values
	Positive (%)	Negative (%)	
Level of knowledge			
Good	212 (85.8)	81 (79.4)	0.209
Fair	31 (12.6)	20 (19.6)	
Poor	4 (1.6)	1 (1.0)	

DISCUSSION

The importance of a balanced diet and adequate nutrition are widely acknowledged for maintaining good health. Consequently, the consumption of dietary supplements was increased significantly with varieties of reasons on the consumption. In this study, it is found that the prevalence of dietary supplement usage among IIUM Kuantan students is 31.8%. The result was consistent with some studies in college from Tehran, Dammam, Pakistan, United Arab Emirates and South Europe (13,14,15,16). However, this result depicts a lower prevalence from previous studies where half of the respondents were DS users where the findings were reported from universities in India, Australia, China and also two universities from Malaysia (17,7,8,3,10).

According to Alhomoud et al. (2016), the prevalence was expected to increase in developing countries due to the widespread use of the DS and increase the trust in the needs of dietary supplementation (14). Malaysia is one of the developing countries that reported was showing an increasing number of DS consumers, especially among adults as reported from the Malaysian Adult Nutrition Survey (MANS) 2014 (9). Consequently, the number also may increase among college students as evidenced by Al-Naggar and Chen (2011) and Haque et al. (2016) (3,10). As the respondents are medical and health science students, they may prefer to consume a healthy diet from daily dietary intake instead of consuming DS. This reason may lead to the outcome of lower prevalence on the usage of DS among the respondents in this study.

Most of the users are reported to consume the DS daily and vitamins/minerals were the most commonly used supplements in this study. The vitamins/minerals that include vitamin C, vitamin B, calcium, iron and other various vitamins/minerals were also popular by the study in Japan, Australia and China ^(18,17,8). It is believed that single vitamins/minerals supplementation able to maintain general health and increase energy levels. Dissimilar from research of Lieberman et al. (2015) presented that many of American students consume multivitamins/minerals to promote general health ⁽⁶⁾. Corresponding to the assumption, most of the users in this study consume DS to promote general health and wellbeing as well as to boost immunity.

Besides, this study revealed that the most common sources of information on DS were internet or social media followed by family and relatives in accordance with the study in Croatia ⁽¹⁶⁾. This is probably due to the easy accessibility of DS information from the internet and website. In contrast with study Alhomoud et al. (2016), Al-Naggar and Chen, (2011) and Sharma et al. (2014) reported that respondents choose healthcare providers as their main source of information on DS ^(14,3,7). The healthcare providers become the most trusted and reliable advisors in gaining information regarding DS because they are believed to have wise knowledge in the medical field. In the contrary to the results demonstrated in the study conducted by Naqvi et al. (2018), the respondents in this study did not reported of having any side effects from DS as the health science-based students may know how to evaluate the use of DS and also aware when or where to report any adverse effects.

Comparison between socio-demographic and level of attitudes towards DS revealed that only registered courses taken and presence of illness show a significant difference ($p < 0.05$). The results were similar to the findings of the study conducted in Croatia among college students ⁽¹⁶⁾. In regard to the presence of illness, there are none of the previous studies analysed the variables with the level of attitudes. However, it is believed that the students consume DS to prevent any disease and having optimum general health. In results, students portray good attitudes towards DS ⁽¹⁹⁾. Meanwhile, there is no association between age group with attitudes level and the outcome was contradict with Naqvi et al. (2019) ($p < 0.05$). Nevertheless, gender was in line with this study outcome ($p > 0.05$) ⁽²⁰⁾.

In terms of the association between socio-demographic status and knowledge on dietary supplements, only ages group and BMI showed a significant association ($p = 0.02$). The results indicated that respondents with the age of 21-23 years old had higher knowledge regarding DS compared to other age groups. The results were consistent with study conducted by of Emiru et al., (2019) ⁽²¹⁾. The difference occurs maybe because a majority of young Malaysians are reported to have use DS and having high knowledge in DS due to the widespread availability of the DS and the information that can easily get from social media. Furthermore, this age group are usually spending more time with gadget and smartphone where the information on DS were shared.

In addition, Body Mass Index (BMI) of the respondents has an association with the level of DS knowledge with $p < 0.05$. Majority of the students are having normal BMI which concludes that they have a healthy lifestyle in the mean of ability to control their own weight. Based on a results from the study of Chandika et al. (2017) the individuals with normal BMI are reported to have good knowledge on DS which different from obese or overweight individuals who portray the opposite result ⁽²²⁾. The reasons might be due their will to maintain good lifestyle habits by equipping themselves with appropriate knowledge of DS and other health information in their daily livings.

This study revealed that most of respondents have positive attitudes and good knowledge towards DS. All respondents are medical and health sciences students and they may learn and practice basic principles about DS in their courses. Same findings from Žeželj et al. (2018) where the medical science students know better the definition of DS and its safety compared to non-medical science students ($p < 0.001$) ⁽¹⁶⁾. Liu et al. (2018) also discuss the same matters which portray the same findings ⁽¹⁷⁾. This is expected due to the nature of the course taken where the students have already exposed with healthcare settings.

Interpretation of the data analysis shows that majority of the students who had good knowledge had positive attitudes, however, students who portray poor knowledge did not portray negative attitudes toward DS. This is maybe due to the outcome where there is no significant association between the level of knowledge and level of attitudes on DS ($p = 0.209$). This concludes that respondents with good

knowledge will not inevitably show good attitudes on DS and vice versa. Similarly, college students in Kuala Lumpur also presented the same outcomes ($p=0.422$). The researcher claimed that participants with good knowledge and positive attitudes are having a high tendency to purchase DS compared to participants who had low knowledge and poor attitudes towards DS ⁽¹⁰⁾.

CONCLUSION

In conclusion, the prevalence of the DS used is still low among university students, however, it is predicted that the number will increase year by year. In this study, students possess positive attitudes and good knowledge towards DS. However, educational information about DS still needs to be provided to university students as the number of consumers keeps rising. Therefore, the university must play a vital role in educating the importance of dietary supplements knowledge and raise awareness regarding the indications, side effects and the right way to consume DS. As IIUM Kuantan campus is one of the health-care based campus, knowledge regarding DS should be considered in the course syllabus.

LIMITATIONS

The limitation of this study is the data for male was underrepresented because the number of male students is low compared to female students. In addition, the results of good knowledge and positive attitudes on DS among the participants may be due to the distribution of the study population is not equal as the majority of the respondents were from medical-based course. Consequently, the students may have a better understanding towards DS because of their nature of the course taken. Lastly, the number of students age 21-23 were bigger than other age groups where more attention is needed to make a conclusion on a precise outcome.

ETHICAL MATTERS

This study was conducted with ethical approval from Kulliyyah of Nursing Postgraduate Research Committee (KNPGRC) and International Islamic University Malaysia (IIUM) Research Ethics Committee (IREC 2020-KON2/15). Written informed consent was obtained from the study participants prior answering the questionnaires.

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CONFLICTS OF INTEREST

There is no conflict of interest declared by the authors.

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