

# Consumption Patterns of Dietary Supplements and Information Seeking Behaviors in the Youth an Exploratory Study

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**Abstract** The aim of this paper is to explore dietary supplements (DS) consumption patterns, sources of information about DS, and the impact of social media on DS knowledge among college students at Kuwait University. A cross-sectional self-administrated voluntary paper-based survey was distributed randomly to college students across all university campuses in December 2015. The questions focused on students' DS use and their attitudes towards the Internet and social media platforms (SMP) as a source of information about DS. Overall, 432 students across all Kuwait University campuses completed the survey (response rate 84% – mean age 20.9 ±2.9). Results show that DS use among college students is high with only 24% females and 26% males stating to have never used DS. Differences between males and females exist when it comes to type of supplements they perceive to be beneficial, reasons for use, and sources of information. Similar percentage of males and females use the Internet as a source of information on dietary supplements. However, males appear to use non-health oriented sources, such as friends and gym coach, as primary source of DS information while females appear to prefer primary physicians and dietitians as a source. SMPs appear to serve as a significant source of information about dietary supplements. DS use among college age students is prevalent and the Internet and SMPs appear to serve as an important medium for information. Future studies should evaluate the usefulness of using SMPs by official health organizations to disseminate health and nutritional information.

**Keywords:** nutrition, supplements, social media, informatics, information technology, information systems, information

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## 1. Introduction

The use and availability of dietary supplements (DS) are on the rise due to their increased demand and product visibility which may have been boosted by social media and its targeted marketing capabilities [1]. The popularity of DS in many countries such as the United States and the United Kingdom [2] as well as the widespread of its use by adults and adolescents [3] suggests that similar patterns exist elsewhere. However, despite the increase in spending on DS [4], evidence of broad beneficial effects remains elusive [5]. Many of the supplements available today target the younger population, yet information about DS use and selection remains poor [6]. In addition, DS are not strictly regulated which make them easy to market and sell. It is also extremely difficult to ascertain the safety and dosage requirements of DS since they vary in many ways including their use,

application, components, and purity [7].

It is understandable how attractive it can be for individuals to hope for quick or even significant results related to health by consuming substances that are perceived to be safe and effective due to their purported benefits. Individuals typically state reasons to use DS such as “promote general health”, “enhance performance and energy”, or “treat of specific health conditions” [8]. Perceptions about the safety and effectiveness of DS are likely reaffirmed by the availability of information online, including social media [9].

Today, with the reign of the digital revolution, 86% of Kuwait's entire population owns a smartphone [10] and more than 80% have access to the Internet [11]. Smartphones facilitate easier access to the Internet and the information resources it contains through various websites, social media platforms (SMP) and applications or ‘apps’ [12]. Recently, SMPs have been an increasingly popular medium to disseminate educational information about health and nutrition [13].

Many college students in Kuwait access SMPs such as Twitter and Facebook to get and share information [14]. However, little is known about the online habits of Kuwaiti youth and the influence of SMPs on seeking information about DS. Prior to this research, no particular study has examined DS usage patterns among college youth in Kuwait. Additionally, no evidence was available about the information seeking behaviors, including the influence of online information resources on DS knowledge. In this paper, we examine DS consumption patterns, sources of information and their impact on DS knowledge among college students at Kuwait University.

## 2. Subjects and Methods

### 2.1. Survey Instrument

A cross-sectional survey using a self-administrated voluntary paper-based questionnaire was distributed randomly to both male and female students across all Kuwait University campuses. The survey was conducted in December 2015 and no compensation or incentives were provided to the participants.

The survey consisted of 31 questions that were adopted from similar studies investigating dietary supplement consumption [3] and focused on students' DS use and their attitudes towards the Internet, including SMPs, as a source of information about DS. The survey was divided into four sections and solicited information about demographics, DS consumption patterns, reasons for DS consumption, sources of information about DS, and the influence of the Internet, including SMPs, on DS knowledge. The study was conducted in full accordance with the World Medical Association Declaration of Helsinki. Data was collected after obtaining the necessary ethical approvals from the Scientific Research Committee at the College of Life Sciences – Kuwait University. Prior to distributing the survey, a pilot survey was disseminated to a sample of students and university staff and adjusted thereafter to ensure reliability and clarity.

**Table 1. Dietary Supplements Use and Frequencies**

DS Use Frequency	Females (n=336)	Males (n=96)
+5 times/week	17.9%	22.9%
2-4 times/week	14.6%	8.3%
<2 times/week	8.6%	7.3%
Not using any currently	26.8%	24.0%
Never used	23.8%	26.0%

### 2.2. Data Collection & Analysis

The data were analyzed using the IBM SPSS Statistics version 20. Descriptive statistics were used to summarize and analyze the demographic data. Frequencies and percentages were used to analyze and compare responses to questions about the types, use frequencies and reasons for use of DS as well as the sources of information about DS, including online resources. For comparisons between genders, we used Pearson chi-square tests to determine if there is a correlation between current use of DS, and the various statements on DS use, as well as the source of

information, and the Internet, including SMP. For this exploratory descriptive study, we did not stratify the data based on nationality, nor gender.  $\alpha$  was set at 0.01 to adjust for multiple test comparisons.

## 3. Results

Overall, 432 students across all Kuwait University campuses completed the survey with a response rate of 84% and a mean age of  $20.9 \pm 2.9$ . The respondents were 77.8% female (n=336) and 22.2% male (n=96) of which 37% reported using DS (current and previous) with no difference between genders. Overall, 73% of females, and 85% of males (p=0.04) consider themselves "active" when asked about their activity level. Only 56% of females, and 84% of males (p=0.0001) exercise, and 20% of males and females follow specific diet

### 3.1. Type and Frequency of DS Consumed

At the time of the survey, about 40% of females and one third males reported current DS use when asked "Are you currently using DS?" (Refer to Table 1 for detailed information about DS use frequency). Answers for "yes" ranged from regular to rarely. The results revealed that females were more likely to take vitamin D, iron supplements, and herbal supplements. (Refer to Table 2 for detailed information about the types of DS consumed.) On the other hand, males were more likely to consume whey protein, energy drinks, creatine, amino-acids, omega 3, weight-loss supplements, caffeine pills, and electrolyte drinks.

**Table 2. Types of Dietary Supplements Consumed**

Type of DS	Females (n=336)	Males (n=96)	sig
Whey Protein	4.2%	21.9%	0.000
Weight Gain Supplements	2.7%	3.1%	NS
Multivitamines	8.9%	10.4%	NS
Vitamine C	4.5%	6.2%	NS
Vitamine D	19.6%	8.3%	0.009
Vitamine B-12 or other	5.7%	4.2%	NS
Other Vitamins	1.8%	2.1%	NS
Iron Supplements	12.5%	6.2%	NS (0.08)
Folic Acid Supplements	2.4%	3.1%	NS
Calcium	4.5%	6.2%	NS
Energy Drinks	1.8%	12.5%	0.000
Sports Supplements (Creatinine)	0.3%	8.3%	0.000
Sports Supplements (Amino-Acids)	1.8%	14.6%	0.000
Omega	9.8%	14.6%	NS
Ginseng	1.5%	2.1%	NS
Sports Stimulants	0.6%	1.0%	NS
Herbs	4.8%	0%	0.02
Weight Loss Supplements	1.2%	6.2%	0.04
Caffeine Pills	4.2%	10.4%	0.01
Sports Drinks (i.e. Gatorade)	0.6%	8.3%	0.000
Others	3.3%	3.1%	NS

### 3.2. Reasons and Attitude for DS Use

Both males (34.4%) and females (39.3%) listed health improvements as the primary reason for using DS. (Refer to Table 3 for detailed information about DS use reasons.) About one third of females listed physical improvements (hair, nail, and skin) compared to only 18.8% of males ( $p=0.01$ ). Males were about 3 times more likely to list enhance physical performance (19.8%, 0.000) as a reason to use DS compared to females. Additionally, the results indicate that 73.2% of females and 65.7% of males agree that DS are safe to use.

Moreover, 78.9% of females and 61.4% of males agree that DS enhance health. Males and females had contrasted attitudes about how DS affected weight loss, support for the immune system, improvement in physical appearance, and pain tolerance. More females (36%) compared to males (17.8%) had negative attitudes toward DS' ability to help with weight loss. Males had a more neutral to negative attitude toward DS' ability to improve physical appearance (48%) compared to only 15.5% of females. Males reported neutral to negative attitudes (59.4%) toward DS' ability to improve the immune system compared to 41.7% of females. Over sixty percent of males and females reported neutral to negative attitudes toward "DS ability to tolerate pain".

Table 3. Reasons for Dietary Supplements Use

Reason for DS use	Females (n=336)	Males (n=96)	Sig.
Health Improvements	39.3%	35.4%	NS
Physical Improvements	31.2%	18.8%	0.01
Enhance Physical Performance	7.1%	19.8%	0.000
Speeding Recovery	4.5%	8.3%	NS
Injury Prevention	3.3%	7.3%	NS (0.08)
Others (not listed)	3.6%	8.3%	0.05

Table 4. Sources of Information about Dietary Supplements

Information Source	Females	Males	Sig.
Gym Coach	3.9%	26.0%	0.000
Family Physician	33.9%	10.4%	NS
Nutritionist	23.2%	20.8%	NS
Scientific Journals/Books	4.2%	9.4%	NS (0.51)
Internet	33.3%	29.2%	NS
Newspapers & Magazines	0.9%	3.1%	NS
Friends	6.5%	29.2%	0.000
Family	14.6%	11.5%	NS

### 3.3. Source of Information on Dietary Supplements

About one third of female respondents reported the source of information on DS to be Primary care physicians and the Internet while about one-fourth reported dietitians as a source of information (Refer to Table 4 for more detailed information about information sources about DS). Approximately one third of males reported "friends", and one forth reported "coach at the gym" as a source of information on DS which were significantly higher than females ( $p=0.0001$ ). The Internet was reported by about one third of male and female respondents and was the

most common source of information about DS for both genders. To further explore the relationship between Internet as a source of information about DS, a chi-square test revealed that a correlation exists between the "Internet" as a source, and DS use for males ( $n=96$ , 0.01) but not females ( $n=336$ , NS).

### 3.4. SMP Source of Information

For the statement about the use of SMP to obtain information about DS, a total of 11.1% of respondents chose always, 26.9% chose mostly, and 30.3% chose sometimes. A total of 27.8% consider SMP a trusted source of information about DS, but 43% objected to the statement. 34% of respondents consider SMP to provide the best information on DS, while 38.7% objected to the statement.

Table 5. SMP's Source of Information about DS

SMP	Females	Males	Total
Facebook	17.3%	15.6%	16.9%
Instagram	66.4%	60.4%	65.0%
Twitter	40.8%	47.9%	42.4%
Snapchat	31.8%	33.3%	32.2%
Blogs	31.5%	25.0%	30.1%
Other	16.4%	20.8%	17.4%

## 4. Discussion

### 4.1. Prevalence of Dietary Supplements Use

The results show some areas of common habits related to lifestyle and DS use and some stark differences between college-age females and males. When it comes to diet plans, only 20% of females and males follow specific dietary plans. Both females and males consider themselves active (73% and 85% respectively). However, 84% of males exercise regularly, while only 54% of females. About 40% of females and one third of the males listed a current use of DS with the most common frequency of use is "regularly 5+ more times a week". Only 24% of females and 26% of males listed "never used DS". These trends show a strong interest and conviction in DS ability to provide the user with desired benefit. Examining this closely, show that almost 80% of females believe that DS enhance health which may explain the higher percentage use of supplements that are highly associated with correcting nutritional deficiencies such as vitamin D and iron. Males however, appear to use DS to enhance physical performance compared to females respondents which may explain their tendency to use certain DS such as proteins, amino acids, electrolyte drinks and caffeine pills which are typically perceived to "grow muscle" and "enhance performance".

Surprisingly, we found that more males use weight loss supplements than females. The difference in weight-loss supplements use is reflected in the attitude of females and males as more females viewed DS for weight loss negatively (38% vs. 18% respectively). These surprising results can be explained by three factors: (i) in this subset

of the population 84% of the males were exercising regularly which can result in weight loss and make supplements appear effective. (ii) More males were interested in DS to enhance performance which is usually associated with reduced fat percentage and weight thus making weight loss DS appear useful. (iii) Females at this age may have had repeated exposure to DS that promise weight loss with no success [15,16] leading to a more negative attitude and thus are less likely to view them positively.

The use of DS can sometimes pose serious risks, yet laws and regulations are not strict when it comes to the sales and/or marketing of DS. Manufacturers and sales entities are permitted to make dietary claims without evaluation of safety and efficacy. Most individuals self-prescribe or don't obtain the appropriate input from a healthcare provider to use DS. Undoubtedly certain DS can be safe and effective when used within specific dosages and guidelines, however broad or over consumption of DS can be hazardous. In many incidents, the US Food and Drug Administration (FDA) has issued warnings regarding specific DS that posed risk to the public [17,18]. In fact according to the FDA, the number of adverse events reports related to DS increased consecutively over the past few years.

#### **4.2 Sources of Information about DS: Internet and SMPs as Enablers**

The results highlight that males and females show mostly differential preference to sources of information on DS. While nearly one third of both genders stated the Internet as a source of information, males appeared to rely more on non-health sources such as friends and coaches beside the Internet, while females preferred more reliable sources such as physicians and dietitians. The male behavior can be described as more "hazardous" when obtaining DS information, compared to females who follow a safer approach to obtain DS information.

With clear evidence from the results, one third of the respondents used the Internet to seek information about DS and SMPs were indicated by 65% of respondents as a source of information about DS. This high utilization of online resources to seek information about DS presents great opportunities [19,20,21]. The increasing availability and plethora of online information about DS and health, as well as the ubiquity and accessibility of the Internet and SMPs, allows more youth to seek and find information about DS [22].

Access to information about safe DS use can empower youth and enable them to live a healthier lifestyle by providing them with the necessary information [23,24]. The Internet and SMPs can serve as platforms to engage and involve youth in healthier lifestyles.

However, broad and easy access to DS and health-related content on the Internet and SMPs is not always reliable or accurate and may lead to more risky habits and behaviors, especially among the youth [25]. In this study, many participants felt that the DS information was unreliable and needed to be verified by physicians or dietitians despite their belief about the easy access to such information.

This evidence presents positive attitudes and an opportunity to engage the youth in seeking nutrition and supplement information online. The high use of DS among both genders in this study, and the overwhelming perception about the absolute safety of DS, can lead to DS overuse and subsequently increase the risk of adverse events. The role of healthcare professionals, including dietitians, has never been more important [26]. Therefore, dietitians and other healthcare professionals should actively engage their patients about the quality of online DS information and how to discern reliable, trustworthy, credible and effective sources [27,28].

In Kuwait, there are no regulations or legislations that clearly govern the dissemination of nutrition and health-related information online. Similar to other countries [5], there needs to be more involvement and oversight from concerned entities such as the Ministry of Health and the General Authority for Food and Nutrition in Kuwait. Not-for-profit and educational organizations, groups, and societies, also need to become more involved and active in spreading awareness about trusted health and nutrition information [29]. Standards for publishing trusted health information electronically, such as the Health On Net Foundation, could be applied to SMPs and websites that offer nutritional advice and DS information [30].

#### **5. Limitations**

Similar to other studies, this study has limitations. The sample included a large proportion of females relative to males, which prevented the data from being equally representative. In addition, the study was not designed to stratify the various Kuwait University colleges and the impact of the educational discipline may have had on being more or less informed about DS and its use.

#### **6. Significance of the Study**

Nutritional advice is impacted by the widespread use of SMP. This study shows that college age students rely on SMP to obtain nutritional information on DS. The findings of the study highlight the differences in DS use trends among males and females. It also shows the difference in attitudes between genders toward the professional and non-professional sources of advice.

#### **7. Conclusion**

The study illustrates that DS use among college students is high with only 24% females and 26% males stating to have never used a DS. Differences between males and females exist when it comes to type of supplements they perceive to be beneficial, reasons for use, and sources. The high percentage of females using vitamin D, and iron supplements was as expected, but the low use of weight loss supplements among females and higher use among males was not expected. Dietary Supplements are viewed overwhelmingly positive by both genders as safe and healthful. Similar percentage of males and females

use the Internet as a source of information on DS. However, males appear to use non-health oriented sources such as friends and gym coach as primary source of DS information while females appear to prefer primary physicians and dietitians as a source. Additionally, SMP appears to serve as a significant source of information on DS with significant utilization of particular platform over other. Future studies should assess the usefulness of using SMP by official health organizations and agencies to disseminate health and nutritional information.

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