

## Use of Internet Health Information Among Students in Jeddah, Saudi Arabia: A Cross-Sectional Study

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### Abstract

**Background:** Internet is a resource used to deliver health information, and has the potential to provide nutrition education in particular for individuals with a good level of education. The purpose of this study was to investigate the use of internet as a source for health information and analyzing the related factors for internet as a source for health information among students in Jeddah, Saudi Arabia.

**Methods:** We recruited 164 high schools, undergraduate and postgraduate students living in Jeddah, Saudi Arabia. A self-administered structured questionnaire to collect data on searching the internet for health information was used. It included frequency and timing of search, type of information, use of information in decision making, general health condition and socio-demographic characteristics. Differences between students who perceived and those who did not perceive improvement in health care after using internet health information were assessed using the chi-squared test.

**Results:** 92.7% of the students usually searched the internet for health information and 84.8% perceived internet health information as a help towards improving their health status. Students at higher educational levels talked significantly more often with their doctors regarding the health information they got from the internet ( $p = 0.014$ ). We found significantly higher rates of perceived improvement in health among females ( $p < 0.001$ ), participants who trusted the health information they got from the internet ( $p < 0.001$ ), those who searched the internet for health information for themselves and other persons ( $p = 0.034$ ), who searched for information on health care, physical fitness and nutrition and specific diseases ( $p = 0.005$ ) and those who did it to increase their knowledge ( $p = 0.024$ ).

**Conclusion and Recommendations:** The majority of participants perceived the health information they got from the internet as a help towards improving their health status. Interventions should be developed to enhance the use of internet health information among males and high school students.

**Keywords:** internet, health information, health care, nutrition education

**Key Message:** Internet is widely used as a source for health information among Saudi students

### 1. Introduction

Today's culture enhances patients and healthy individuals to play an active role in taking care of their health. Most young adults are able to search electronic sources for health information and to use these for decision making (Stellefson et al., 2011; Stellefson et al., 2012; Britt et al., 2017; Bakarman, 2017), and internet is becoming a major source of health information for the new generation (Tao, 2017). Several studies examined students' online habits and their use of internet as a source for health information (Osei Asibey, Agyemang, & Boakye Dankwah, 2017; Albarrak et al., 2016; O'Carroll, 2015; Aldebasi & Ahmed, 2013; Schwartz, 2016; Horgan & Sweeney, 2012; Percheski, 2011; Bensley et al., 2014). A cross-sectional study conducted in 3 universities in Ghana and included 650 students (Osei Asibey, Agyemang, & Boakye Dankwah, 2017), reported that 67.7% of the students used the

internet for health purposes. Most of the students (72.4%) used internet health information to assist in modifying their lifestyle and only 39.5% used it for discussions with their health professionals. 73.6% of the students reported a 'lot to somehow' improvement in health after using internet health information (Osei Asibey, 2017). A cross-sectional study which was conducted among 448 college students in Riyadh, Saudi Arabia, found that half of the students used internet to search for health information on obesity and more than a half used this information to modify their lifestyle (Albarak, 2016). Female students used internet health information to modify their lifestyle significantly more than male students (Albarak, 2016). A web-based survey of 213 medical students in Halifax, Canada, showed that most of the participants used Google on a daily basis and that Wikipedia and UpToDate were also commonly used (O'Carroll, 2015). A study conducted in four medical colleges in Qassim University, Saudi Arabia, enrolled 500 students (Aldebasi & Ahmed, 2013). While internet was the most preferred source of medical information in males (84%), it was used for this purpose in only 14% of the females. Whereas most of the male students (54%) accessed internet at cyber cafés, the majority of female students used it at home (84%) (Aldebasi & Ahmed, 2013). Horgan and colleagues investigated internet habits of 922 university students aged 18–24 years in Ireland (Horgan & Sweeney, 2012). 72.4% used the internet several times per day and 66.1% used it to search for health information. They used the internet to search for health information on specific diseases (7.1%, n = 37), signs and symptoms (11.6%, n = 60), treatment options (4.4%, n = 23), causes of the diseases (1.5%, n = 8), prescription medication (6.2%, n = 32) and alternative treatments (3.5%, n = 18) (Horgan & Sweeney, 2012). A further study of 1,060 first-year university students at the Midwest of USA showed that 78% of the students used the internet to search for health information (Percheski & Hargittai, 2011). They found that female students used internet health information significantly more often than male students. Non-native English speakers, students with greater Web skills and students living away from their parents showed significantly higher likelihood to use internet health information (Percheski & Hargittai, 2011).

The aim of our study was to investigate the use of internet as a source for health information and analyzing the related factors for internet as a source for health information among students in Jeddah, Saudi Arabia.

## 2. Methods

We followed the 'Strengthening the Reporting of Observational Studies in Epidemiology' (STROBE) guidelines for reporting our study methods and results (von Elm, 2007).

**Study design:** A cross-sectional study was conducted between September 2017 and February 2018.

**Study participants:** We recruited 164 high school students, undergraduate and postgraduate students living in Jeddah, Saudi Arabia. Students  $\geq 16$  years old were eligible to participate. University students were recruited from King Abdulaziz University in Jeddah. We used flyers and social media to invite students to participate in the study. Excluded from the study were students who suffered from health problems that affect their ability to use internet.

**Study setting and location:** The study was conducted in Jeddah city, a coastal city on the Red Sea on the western region of Saudi Arabia.

**Data collection method and study variables:** We used a self-administered structured questionnaire that was developed and used by Power and colleagues (Power, 2017). After taking permission from the authors, we modified the questionnaire and customized it to the Saudi culture. The questionnaire contained questions on age, sex, educational level, searching the internet for health information, number of searched websites, trustworthiness and usefulness of internet health information, type of internet health information, use of information in decision making, general health conditions.

**Sample size:** Our primary expected outcome was the role of internet health information in improving health. We anticipated that 88% of our study participants will find internet health information as a help for improving health. Assuming this rate of perceived improvement in health in our study, we needed to recruit a minimum of 162 students to estimate improvement in health care with a precision of 5%. We succeeded to recruit a slightly higher number of eligible students in our study sample (n = 164).

**Statistical analysis:** We used frequencies and absolute numbers to describe categorical variables and mean and standard deviation to describe continuous variables. Differences between students who perceived and who did not perceive improvement in health care after using internet health information were assessed using the chi-squared test. A p value less than 0.05 was considered significant. SPSS version 21.0 was used to conduct all statistical analyses.

**Ethical considerations:** The study protocol was reviewed and approved by the Biomedical Research Ethics Unit at King Abdulaziz University. Participation was voluntary, data confidentiality was assured and informed consent was obtained from all participants.

### 3. Results

Our study included 164 participants, 53% of them were females and 86% were less than 25 years old. High school students consisted of 30.5%, undergraduate university students 61%, whereas postgraduate university students consisted of 8.5% of the participants. All the participants were using the internet to search for health information and 46.3% (n = 76) did that daily, 63.4% (n = 104) visited 1-5 websites and 17.7% (n = 29) visited 6-10 websites when they searched the internet for health information. More than three quarter (84.4%) perceived internet health information as a help for improving their health status. Searching the internet health information for themselves was done by 22.6% (n = 37) and 73.2% (n = 120) searched for other persons including parents. Ninety four students (57.3%) searched the internet for information on health and health care, physical fitness, nutrition and specific diseases. When the participants searched the internet for health information on a specific disease, 45.7% (n = 75) of them looked for information on symptoms and 22.6% (n = 37) sought information on medications. Half of the participants (54.3%) found moderate benefit from the health information they got from the internet and 26.2% (n = 43) reported a large benefit from it. Another half (54.9%) stated that the health information they got from the internet generated new questions and 30.5% (n = 50) reported that it stimulated a visit to their doctors. The detailed descriptive statistics of our study sample are shown in Table 1.

Table 1. General characteristics of study participants (n= 164)

Variables	Statistics	
	N	%
Sex	Male	77 47
	Female	87 53
Age	17-19	48 29
	20-22	88 54
	23-25	5 3
	Above 25	23 14
Educational Level	Secondary school students	50 30.5
	Undergraduate university students	100 61.0
	Postgraduate university students	14 8.5
What is the number of different electronic sites you entered searching for health information?	1-5	104 63.4
	6-10	29 17.7
	11-15	8 4.9
	16 and more	23 14.0
For whom did you search for health information on the internet?	For myself	37 22.6
	For one of my parents	4 2.4
	For another person	3 1.8
	All the above mentioned	120 73.2
What is the type of health information you searched for lately on the internet?	Health and health care	12 7.3
	Physical fitness and nutrition	28 17.1
	Specific diseases	22 13.4
	All the above mentioned	94 57.3
	Others	8 4.9
When you search for health information on a specific disease on the internet, what type of	Symptoms	75 45.7
	Medications	37 22.6

information do you search for?	Prognosis	20	12.2
	Others	32	19.5
What was usually the effect of the health information you got from the internet?	No effect	4	2.4
	Generated new questions	90	54.9
	Stimulated a visit to my doctor	50	30.5
	Stimulated a visit to another doctor than my doctor (second opinion)	20	12.2
How do you evaluate your general health condition?	Fair	15	9.1
	Good	111	67.7
	Excellent	38	23.2

We found 87.2% (n = 143) of the participants trusted some of the internet's health information they retrieved, compared to nearly 10% who stated they trusted all internet health information. However, this had no statistical significance (P>0.05). Those who searched the internet health information to increase their knowledge equaled 65.9% (n = 108) and 18.3% (n = 30) searched it to check information before or after a visit to their doctors. Others (15.9%), searched the internet as an alternative to visit their doctors, but this was without statistical significance (P>0.05). One hundred and thirty students (79.3%) admitted that the health information they got from the internet affected their decision on health care or medical treatment and 76.2% (n = 125) reported that it affected their decisions on food choices or physical exercise. Again this was of no statistical significance (P > 0.05).

Table 2. Characteristics of Study Participants by Educational Level(n= 164)

Variables		Educational Level						P value *
		Secondary		University		Post-graduates		
		n	%	n	%	n	%	
Trusting health information from the internet?	None	3	60.0	1	20.0	1	20.0	0.244
	Some	41	28.7	89	62.2	13	9.1	
	All	6	37.5	10	62.5	0	0.0	
Reasons for searching health information on the internet?	As alternative to visiting my doctor	7	26.9	18	69.2	1	3.8	0.961
	Check information before visiting the doctor	6	31.6	11	57.9	2	10.5	
	Check information after visiting the doctor	4	36.4	6	54.5	1	9.1	
	To increase my knowledge	33	30.6	65	60.2	10	9.3	
Types of health information searched lately on the internet?	Health and health care	2	16.7	9	75.5	1	8.3	0.656
	Physical fitness and nutrition	6	21.4	20	71.4	2	7.1	
	Specific disease	10	45.5	10	45.5	2	9.1	
	All the above mentioned	29	30.9	56	59.6	9	9.6	
Have you ever talked with your doctor about the health information you got from the internet?	No	28	40.0	40	57.1	2	2.9	0.014
	Yes	22	23.4	60	63.8	12	12.8	

Internet health information affects your decisions concerning health care or medical treatment?	No	10	29.4	20	58.8	4	11.8	0.751
	Yes	40	30.8	80	61.5	10	7.7	
Health information you got from the internet affects your decisions concerning food choices or physical exercises?	No	15	38.5	20	51.3	4	10.3	0.364
	Yes	35	28.0	80	64.0	10	8.0	
Health information got from the internet usually helps you in improving your health?	No	7	28.0	15	60.0	3	12.0	0.787
	Yes	43	30.9	85	61.2	11	7.9	
The effect of the health information you got from the internet?	No effect	1	25.0	2	50.0	1	25.0	0.212
	Generated new questions	28	31.1	52	57.8	10	11.1	
	Stimulated a visit to my doctor	18	36.0	29	58.0	3	6.0	
	Stimulated a visit to another doctor than my doctor (second opinion)	3	15.0	17	85.0	0	0.0	

\*Based on the result of chi-squared test.

As shown in Table 2, students at higher educational levels talked significantly more often with their doctors regarding the health information they got from the internet ( $P = 0.014$ ).

In comparison, between students who perceived and who did not perceive improvement in health after using internet health information, we found that the participants who trusted the health information they got from the internet ( $p < 0.001$ ), who searched for internet information on health and health care, physical fitness and nutrition as well as on specific diseases ( $p = 0.005$ ) and those who were stimulated by the internet health information to generate new questions or visit their doctors ( $p = 0.002$ ) reported significantly higher rates of perception of internet information as a help for improving health. For more details on differences between students who perceived and who did not perceive improvement in health after using internet health information can be seen in Table 3.

Table 3. The differences between students who perceived and who did not perceive improvement in health after using internet health information ( $n = 164$ )

Variables		Improvement in Health				p value*
		No		Yes		
		N	%	n	%	
Educational Level	Secondary school students	7	14.0	43	86.0	0.787
	Undergraduate university students	15	15.0	85	85.5	
	Postgraduate university students	3	21.4	11	78.6	
What is the type of health information you searched for lately on the internet?	Health and health care	2	16.7	10	83.3	0.005
	Physical fitness and nutrition	4	14.3	24	85.7	
	Specific disease	3	13.6	19	86.4	
	All the above mentioned	11	11.7	83	88.3	
	Others	5	62.5	3	37.5	

When you search for health information on a specific disease on the internet, what type of information do you search for?	Symptoms	6	8.0	69	92.0	0.109
	Medications	9	24.3	28	75.7	
	Prognosis	4	20.0	16	80.0	
	Others	6	18.8	26	81.2	
What is the number of different websites you usually visit searching for internet health information?	1-5	19	18.3	85	81.7	0.394
	6-10	4	13.8	25	86.2	
	11-15	0	0.0	8	100.0	
	16 and more	2	8.7	21	91.3	
What was usually the effect of the health information you got from the internet?	No effect	3	75.5	1	25.0	0.002
	Generated new questions	16	17.8	74	82.2	
	Stimulated a visit to my doctor	3	6.0	47	94.0	
	Stimulated a visit to another doctor than my doctor (second opinion)	3	15.0	17	85.0	
How you evaluate your general health condition?	Fair	4	26.7	11	73.3	0.338
	Good	17	15.3	94	84.7	
	Excellent	4	10.5	34	89.5	

\*Based on the result of chi-squared test.

#### 4. Discussion

More than 90% of our students searched the internet for health information. This represents a higher rate of internet use for health purposes than that found in studies on university students from USA (78%) (Percheski & Hargittai, 2011), Ghana (67.7%) (OseiAsibey, 2017), Ireland (66.1%) (Horgan & Sweeney, 2012) and Saudi Arabia (50%) (Albarak, 2016). Our study included students from different educational levels ranging from high school to post-graduate students. The vast majority of previous studies on use of internet as a health information source among students included under-graduate university students (Osei Asibey, Agyemang, & Boakye Dankwah, 2017; Albarrak, 2016; O'Carroll, 2015; Aldebasi & Ahmed, 2013; Horgan & Sweeney, 2012; Mahmood et al., 2016; Percheski & Hargittai, 2011). Educational level of students might play a central role on health information seeking behavior. Our study found no significant difference between students at different educational levels in use of internet as a source of health information, in its impact on the decisions concerning health care, medical treatment, food choices or physical exercises. However, we did find that students at higher educational levels talked significantly more often with their doctors about the health information they got from the internet ( $P = 0.014$ ). This might be explained by the fact that most school students are usually accompanied by their parents or caregivers during consultations with health professionals. In our study, 76.2% of the students used internet health information to assist them in improving their lifestyle through better food choices and higher rates of physical exercises. The study of Osei Asibey and colleagues from Ghana found a comparable rate (72.4%) of use of internet health information to modify the lifestyle of university students (Osei Asibey et al., 2017). However, a study among Saudi students found a lower rate of utilization of online health information on obesity to modify lifestyle (52.2%) (Albarak, 2016). We found that 57.3% of our study sample discussed the health information they obtained from internet with their doctors. A study from Ghana observed a lower rate (39.5%) of use of internet health information for discussions with health professionals (Osei Asibey et al., 2017). This may well be an indicator for the availability of less time for patient-physician interaction during clinic visits. More important is our finding that 84.4% of the students reported an improvement in their health after using health information from the internet. A lower rate of self-reported improvement in health after the use of internet health information was found by OseiAsibey and colleagues among Ghanaian students (73.6%) (Osei Asibey et al., 2017).

#### 5. Conclusions and Recommendations

The majority of our study participants used the internet as a source for health information and perceived the health information they received as a help for improving their health status. Interventions should be developed to enhance the use of internet health information among males and high school students.

## Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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