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PROFILING PATIENTS WHO USE THE INTERNET FOR HEALTH INFORMATION: IM- PLICATIONS FOR HEALTH- CARE PROVIDERS

Key Words

***Patients; Internet;
Health Information;
Saudi Arabia.***

Abstract

This cross-sectional survey was conducted in Riyadh, Saudi Arabia to determine the prevalence of patients who use the Internet seeking health information and whether such information has an impact on their health seeking behavior. Bivariate and logistic regression analyses revealed that patients with poor health conditions were more likely to search the Internet for health information. Respondents indicated that the Internet has acquired them with more information than they received from other sources and that such information has influenced their health seeking decisions. Measures should be taken to ensure that the public have access to more reliable health information.

Introduction

Access to the Internet has increased dramatically all over the world and many people are more and more turning to the Internet to obtain healthcare information (Bundorf *et al.*, 2006). Surveys of patients in the United States (Schwartz *et al.*, 2006), Canada (Lemire *et al.*, 2008), United Kingdom (Dolan *et al.*, 2004), Australia (Trotter and Morgan, 2008) and Switzerland (Jeannot, 2004) esti-

mated the percentage of patients who use the Internet for health information to be ranged from 10 to 80%.

While much of the information on the Internet is primarily designed for health professionals, more and more websites are directed to the general population which may provide them with information about health problems, self-care and prevention (Benigeri and Bluye, 2003). At present,

there are many websites where patients have the opportunity to chat and discuss health matters with others all over the world (see examples in **Appendix 2**). There are on-line doctor consultations, on-line ordering of drugs and Internet therapy which aim to provide advice about many health problems, or direct patients on how to cope with their health conditions (de Boer, 2007).

The improved living conditions in Saudi Arabia, together with the ease of access to the Internet, may encourage the public to use the Internet for health information and become involved in managing their health problems which, in turn have an impact on the population's health. This may inspire researchers to strive for a better understanding of the Internet's appeal as a privileged source of health information among the general population. It is expected that this study will provide a greater understanding of how patients are making use of health-related information from the Internet. These findings can be used to help both decision makers and health-care providers in Saudi Arabia for dealing appropriately with Internet-informed patients.

Literature Review

Recently, the Internet has made a major change in the dissemination of

health and medical information, with the promise of transferring knowledge from health professionals to the general public (Benigeri and Bluye, 2003). This transfer may help individuals to maintain their health and may reduce the gap between health professionals and the general population in terms of knowledge about symptoms, disease patterns, treatments and diagnosis of health problems. This part sheds some light on aspects relevant to the study, such as the impact of the Internet on patient-doctor relationship, characteristics of patients using the Internet, nature of information retrieved, patients' sources of health information, and the quality of health information in the Internet.

Patient-doctor Relationship and the Use of the Internet

A number of studies have reported that the availability of Internet-based health information to non-health professionals has influenced patients knowledge and expectations regarding healthcare, as well as the patient-doctor relationship (Kim and Kim, 2009). For example, the study carried out by Jadad *et al.* (2001) found that over 90% of a sample of cancer-care providers reported that patients had brought information from the Internet to them for discussion. Similarly, the study carried out by Murray *et al.* (2003) reported that 31% of the sur-

veyed people had looked for health information on the Internet in the past year; of which 16% had found health information relevant to themselves; and 8% had taken information to their physicians. The authors of this study indicated that the majority of people who took information to their physicians wanted an opinion rather than a specific intervention. But, other authors (Henwood *et al.*, 2003) found that physicians are often not receptive to discussing Internet information brought to a visit by their patients, sometimes leading to poorer doctor-patient communication.

Diaz *et al.* (2002) indicated that the majority of respondents in their study felt that the information on the Internet was the "same as" or "better than" information from their doctors. Authors of this study also indicated that the majority of respondents who used the Internet for health information did not discuss this information with their doctors. Both qualitative (Henwood *et al.*, 2003) and quantitative (Murray *et al.*, 2003) studies have reported that physicians can feel challenged by the patients who bring Internet information, leading to degradation of the patient-physician relationship. These studies indicate that patient-medical provider relationship will probably change, and medical providers will face new chal-

lenges as patients obtain health information from the Internet, share only some of this with their doctors, or potentially turn to the Internet instead of consulting a healthcare provider (Diaz *et al.*, 2002).

It could be argued that, as the use of the Internet increases, it will be important for healthcare providers to identify patients who use the Internet and to understand how they use it as a source of medical information. The Internet has the potential to dramatically change the patient-doctor relationship in that it offers an opportunity for patients to increase their knowledge, become more informed, and increase their involvement in their own health decision-making process.

Characteristics Associated with the Internet Use

Previous studies identified that Internet access was significantly associated with both socio-demographic characteristics and health needs of patients. For example, the study carried out by Schwartz *et al.* (2006) identified that individual's level of education and income were positively associated Internet use and that men were less likely than women to use the Internet for health information. Other authors indicated that people with chronic conditions or those in poorer

health are more likely to employ the Internet for medical information seeking (Bundorf *et al.*, 2006). In general, previous research in different parts of the world identified that personal and health characteristics of respondents are considered important predictors in the use of the Internet for health information (Escoffery *et al.*, 2008).

Types and Sources of Health Information Sought

The literature indicates that patients search the Internet for different types of health information. A study of primary care services in the United States suggested that 41% of individuals looking for health information on the Internet were interested in complementary or alternative medicines, and 68% were interested in nutrition and diets (Diaz *et al.*, 2002). A study in the United Kingdom identified that 48% and 52% of the respondents accessed health information for similar reasons (alternative medicine, and nutrition and exercise, respectively) (Lemire *et al.*, 2008).

There is also a growing body of literature exploring patient use of the Internet for healthcare information. However, most of the previous studies focused on disease-specific issues or special populations such as HIV-infected patients (Horvath *et al.*, 2009), patients with epilepsy (Escoffery *et al.*,

2008), cancer patients (Eysenbach *et al.*, 2003), dental clinic patients (Harris and Chestnutt, 2005), surgery patients (Ikemba *et al.*, 2002), diabetic patients (Nordfeldt *et al.*, 2005), gastroenterology clinic patients (Roshandel *et al.*, 2005), ambulatory care patients (Larner, 2006), rheumatology clinic patients (Richter, *et al.*, 2009). Few studies have looked at this issues with respect to primary care population (Dickerson *et al.*, 2004; Dolan *et al.*, 2004).

The literature tended to demonstrate that there are several sources of health information that patients may rely on to acquire knowledge about their health conditions. These sources included the printed media, the Internet, friends, family and healthcare professionals. The explanation as to why people choose one source of information over another remains unclear. However, studies have shown that preferences may differ according to users characteristics, or particular contexts. Despite the fact that many people are becoming interested in alternative and complementary sources of health information, several studies suggested that most of them still respect physicians as the most reliable source of health information (Lemire *et al.*, 2008; Ayan-tunde *et al.*, 2007; Cotten and Gupta, 2004).

Perceived Quality of Health Information in the Internet

While the Internet has dramatically increased access to patient health information, concerns about the quality of information available on the Internet and the ability of patients to identify reliable information, raises questions about the implications of expansions in its use (Schwartz *et al.*, 2006). Health professionals are concerned that those who consult websites for medical information may not be as likely to consult a real doctor when serious health problems arise (Anderson *et al.*, 2003) and they fear that a lot of information on the Internet can be inaccurate, incomplete or out of date. Skinner *et al.* (2003) indicated that a lot of information on the Internet is commercial, but cannot easily be identified as such. It could be argued that without proper guidance, information on the Internet can be harmful, confusing, conflicting and overwhelming.

Some authors argue that acquiring information from the Internet can improve a patient's understanding of their medical condition and self-care, thereby reducing unnecessary visits to the doctor and may relieve some of the burden on healthcare facilities (McMullan, 2006). An American survey of cancer patients showed that 92% of patients believe that Internet

information empowers them to make health decisions and helps them to talk to their physicians (Eysenbach, 2003); resulting in a more patient-centered interaction between health professionals and their patients (McMullan, 2006).

Although several studies have provided valuable insights on the specific points such as reasons (Sillencea *et al.*, 2007) or the type of information sought by patients (Gauld and Williams, 2009), less attention has been paid to analyzing the personal and health-related factors that likely act together, affecting the perceptions and behaviors of Internet users as they search for health information. In Saudi Arabia, a better understanding of these factors could be helpful for identifying users' needs, and for finding ways to increase individual participation in disease prevention and health promotion.

Objectives

The emergence of the Internet as a source of health information provides new impetus to study the determinants of its use, types of information sought, and patients' reasons for searching the Internet and how patients perceive the quality of health information on the Internet. Therefore, this study seeks to explore personal and health-related factors that are

likely to explain the use of the Internet as a preferred source of health information. Specifically, the main objectives of this study were:

1. To identify factors that may influence Internet use for health information among patients in Saudi Arabia.
2. To characterize the patterns of behavior for using Internet-based healthcare information in Saudi Arabia.

Understanding the use of the Internet for healthcare information and the factors associated with such use is necessary for healthcare providers and policy makers. This could help in establishing appropriate interventions which ensure providing the general population with reliable health information.

Theoretical Framework of the Study

Research Hypotheses

The general hypothesis of this study is that the use of the Internet for health information is influenced by a number of socio-demographic and health-related factors of respondents. Accordingly, a model that incorporates such factors was used in order to provide structure and organization for the factors that are believed to affect the Internet use for healthcare information

and the actual use of such information (see Figure 1 in **Appendix 1**).

In order to achieve the first objective of the study, two hypotheses will be tested. First, we hypothesized that socio-demographic characteristics of respondents (age, gender, marital status, educational level, employment status, nationality, marital status and income) will influence the use of the Internet for health information (H1). That is; respondents who were younger, males, married, having better education, employed, and those who had higher income have a greater use of the Internet for health information. In this respect, most of the literature suggests that such individuals were more likely to have Internet access and ability to use the Internet for health information compared to disadvantaged people or those in poor socio-economic status. Second, we hypothesized that health-related factors of respondents (health status, presence of chronic illness and having a longer duration of illness) have an influence on the use of the Internet for health information (H2). That is; those who perceived their health status as poor, those who currently suffer from chronic illnesses and those who had their illness for a longer period of time (three months or more) have a greater use of the Internet for health information. The literature suggests that such individuals have greater

health needs and accordingly they turn to the Internet for health information in order to help themselves cope with their health conditions.

The second objective of the study represents a further analysis of the Internet use for healthcare information. For example, respondents were requested to provide information about their reasons for searching the Internet, the types of health information sought, patients' perception about the usefulness of health information found on the Internet and whether such information influenced their health seeking behavior.

Methods

This is a cross-sectional survey conducted to explore the patients' use of the Internet for health information. To serve the purpose of this study, Riyadh city was divided into five geographical locations: East, West, North, South and Central. From each location two primary health care (PHC) centers were selected by simple random sampling. In each PHC center, a random sample of 100 adult patients (50 males and 50 females) was selected using systematic random sampling. Accordingly, 1000 self-administered questionnaires were distributed, of which 963 (96.3%) questionnaires were successfully completed. The remaining 37 question-

naires (3.7%) were not completed because of respondents' lack of time. The study took place in Riyadh City, Saudi Arabia, during October 2008.

The questionnaire was divided into two major parts. Part I was filled out by all respondents and consisted of three sections; the first section included questions about the respondents' socio-demographic characteristics, including their gender, age, nationality, educational level, employment status, marital status and income. The second section consisted of questions on respondents' health-related aspects which may have an influence on the use of the Internet such as their perceived health status, duration of illness and whether a patient is having a chronic condition. In section three, respondents were asked about their perception about the usefulness of various sources of health information. Part II of the questionnaire was designed to collect information from those who sought the Internet for health information *only* and consisted of four sections; in the first, patients were asked to identify the types of health information they retrieved. In the second section, respondents were asked about the extent to which various sources of information contributed to their health knowledge. In the third section, respondents were asked whether any subsequent action was undertaken

after retrieving the health information from the Internet. In section four, respondents were requested to report on the reasons for searching the Internet for health information. The questionnaire was written in both Arabic and English (see **Appendix 3** for the English version).

Study Variables and Measurements

The main outcome (dependent) variable in this study is a dichotomous measure of whether or not a respondent searched the Internet for health information in the past three months. Measurement of the use of the Internet is based on the question: "Have you used the Internet for health information in the past three months?" Respondents who stated "Yes" were considered "users" and those who stated "No" were deemed "non-users".

For explaining the Internet use, two groups of measures were included as a proxy for the use of the Internet for health information. These variables represent the primary independent measures of this study. The first group of independent variables included the respondents' socio-demographic characteristics, including their gender (males vs. females), age (18-45 vs. >45), marital status (married vs. unmarried), nationality (Saudi vs. non-Saudi), educational

level (less than high school vs. high school or above) and income (<SR 5,000 vs. ≥SR 5,000). The second group of independent variables included three self-reported health aspects which may have an effect on the use of the Internet for health information. These factors included perceived health status (good vs. poor), presence of chronic condition (yes vs. no) and the duration of illness (less than three months vs. three months or more). Such classification and measurements of variables has been used in a number of studies (Ayantunde *et al.*, 2007; Bundorf *et al.*, 2006; Schwartz *et al.*, 2006).

In order to explore this topic, patients who reported using the Internet for health information were asked to identify their reasons for searching the Internet, the types of health information sought and the extent to which the obtained information has contributed to their knowledge about health. Furthermore, respondents who reported using the Internet for health information were requested to report on whether they have made any subsequent actions as a result of the retrieved information or not. Such information is important in order to gain better understanding about the use of the Internet for health information among the population and its impact on the people's health seeking behavior.

Validity and Reliability

A number of steps were taken into account in order to increase the content validity of the questionnaire. First, a review of the relevant literature was carried out in order to select aspects related to the study. Second, two academic staff reviewed the draft questionnaire and made comments and suggestions. Finally, the questionnaire was pre-tested in a pilot survey of 30 respondents in a primary health care center to ensure that the wording, format and length of questions were appropriate. In the light of their feedback and the outcome of the pilot study, a few questions were rephrased and others were added (or excluded). The pilot survey questionnaires were not included in the main study. The respondents were assured of confidentiality and provided with an explanation regarding the purpose of the study and the importance of their contribution. The subjects gave verbal consent to participate in the study. All questionnaires were distributed by well-trained postgraduate students and were completed during the respondents' waiting time in the designated primary health care centers. The questionnaire was also tested for the reliability. Dimensions of the questionnaire were tested and the Cronbach alpha ranged from 0.76 to 0.84.

Data Analysis

In addition to the descriptive statistics (frequency distribution, percentages and means), Pearson chi-square test (for discrete variables) and *t*-test (for continuous variables) were employed where appropriate to find out differences (if exist) between those who "used" and those who "did not use" the Internet for health information. A logistic regression analysis was performed to identify factors that significantly influenced respondents' use of the Internet for health information. The multivariate-adjusted odds ratio (OR) and the corresponding 95% confidence intervals (CI) were calculated. All tests were two-tailed with a statistical significance level of 0.05. The data for this study were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 11.

Results

Patient Profile

Respondents were predominantly young of age averaging 35.43 ± 12.9 years (range, 18-68 year). Males comprised 52.0% of the sample. The vast majorities of respondents were Saudis (67.9%), married (62.6%), currently employed (63.8%) and had a monthly income of more than SR 5,000 (56.4%). Participants who had an educational level of "high school" or

above comprised of 57.6% of the study sample.

Prevalence of Internet Use for Health Information

Among the 963 patients who responded to the questionnaire, 258 (26.8%) indicated that they have "used" the Internet for health infor-

mation in the past three months while the reminder 705 (73.2%) indicated that they "did not use" the Internet for health information.

Differences in the Use of the Internet for Health Information

Table 1 presents the difference between those who "used" and those

Table 1
Socio-demographic Characteristics and the Use of the Internet for Health Information (N = 963)

Characteristics	Used the Internet for health information?		χ^2	P-value
	Yes ¹ n (%)	No ² n (%)		
Gender				
Male	149 (29.7)	352 (70.3)	4.323	0.038*
Female	109 (23.6)	353 (76.4)		
Age (M = 35.43, SD $\pm$ 12.9)				
18 - 45	234 (30.0)	545 (70.0)	21.061	0.000**
> 45	24 (13.0)	160 (87.0)		
Nationality				
Saudi	175 (26.8)	479 (73.2)	0.000	1.000
Non-Saudi	83 (26.9)	226 (73.1)		
Educational level ³				
Low	79 (19.4)	329 (80.6)	19.266	0.000**
High	179 (32.3)	376 (67.7)		
Employment status				
Employed	182 (29.6)	432 (70.4)	6.623	0.010*
Unemployed	76 (21.8)	273 (78.2)		
Marital status				
Married	149 (24.7)	454 (75.3)	3.285	0.070
Unmarried	109 (30.3)	251 (69.7)		
Income				
< SR 5,000	92 (21.9)	328 (78.1)	8.633	0.003*
$\geq$ SR 5,000	166 (30.6)	377 (69.4)		

¹ n = 258, ² n = 705, ³ (Low = Less than high school, High = High school or above)

* p < 0.05, ** p < 0.001

who "did not use" the Internet for health information according to their socio-demographic characteristics. Those who "used" the Internet for health information were more likely to be males ($\chi^2 = 4.323, p < 0.05$), younger ($\chi^2 = 21.061, p < 0.001$), more educated ($\chi^2 = 19.266, p < 0.001$), currently in employment ($\chi^2 = 6.623, p < 0.05$) and had a higher monthly income ($\chi^2 = 8.633, p < 0.05$) than their counterparts who "did not use" the Internet for health information.

Table 2 presents the difference between those who "used" and those who "did not use" the Internet for health information according to their self-reported health status. Patients

who perceived their health status as "poor" made a significantly higher percentage of use of the Internet for health information than those who perceived their health status as "good" ($\chi^2 = 27.921, p < 0.001$). Similarly, patients who reported having "chronic conditions" made a significantly higher percentage of use of the Internet for health information than those who did not report such illnesses ($\chi^2 = 12.944, p < 0.001$). Finally, patients who reported having a health illness for a longer period of time (> 3 months) made a significantly higher percentage of use of the Internet for health information than those who reported a shorter period of time " < 3 months" ($\chi^2 = 58.234, p < 0.001$).

Table 2
Self-reported Health Status and the Use of the Internet
for health information (N = 963)

Health status aspects	Used the Internet for health information?		χ^2	P-value
	Yes ¹ n (%)	No ² n (%)		
Perceived health status				
Poor	79 (42.5)	107 (57.5)	27.921	0.000**
Good	179 (23.0)	598 (77.0)		
Having chronic condition				
Yes	68 (37.8)	112 (62.2)	12.944	0.000**
No	190 (24.3)	593 (75.7)		
Duration of health illness				
Less than 3 months	91 (17.0)	445 (83.0)	58.234	0.000**
3 months or more	167 (39.1)	260 (60.9)		

¹ n = 258, ² n = 705.

** p < 0.001

Table 3 shows the results of the logistic regression analysis. Among the socio-demographic characteristics, respondent's level of education and

Table 3
Characteristics Associated with the Use of the Internet for Health Information in the Logistic Regression Analysis

Characteristic	Odds Ratio (95% CI)	P value
Age (years)		
> 45 years	1.00 (reference)	
18-44	1.64 (0.97-2.76)	0.063
Gender		
Female	1.00 (reference)	
Male	1.36 (0.98-1.90)	0.068
Nationality		
Non-Saudi	1.00 (reference)	
Saudi	1.4 (0.98-2.04)	0.061
Educational level ^a		
Low	1.00 (reference)	
High	1.5 (1.02-2.06)	0.037*
Marital status		
Unmarried	1.00 (reference)	
Married	1.3 (0.80-1.81)	0.175
Employment status		
Unemployed	1.00 (reference)	
Employed	3.4 (2.24-5.13)	0.000**
Income		
Less than SR 5000	1.00 (reference)	
SR 5000 or more	1.05 (0.69-3.60)	0.827
Perceived health status		
Good	1.00 (reference)	
Poor	6.15 (2.62-14.41)	0.000**
Having chronic condition		
No	1.00 (reference)	
Yes	2.6 (1.09-6.15)	0.031*
Duration of illness		
Less than three months	1.00 (reference)	
Three months or more	5.5 (3.60-8.32)	0.000**

^a (Low = Less than high school, High = High school or above)

* $p < 0.05$, ** $p < 0.001$

employment status were found to be statistically significant predictors in using the Internet for health information. That is; patients who had a higher level of education and patients who were in employment were more likely to use the Internet for health information than those who did not attain such characteristics. All health-related aspects employed in the study were found to be statistically significant predictors in searching the Internet for health information. That is; patients who reported having "poor" health statuses were about 6 times more likely to use the Internet for health information than those who reported having "good" health status ($p < 0.001$). Similarly, respondents who indicated having chronic health conditions were about 2.5 times more likely to use the Internet for health information than those who did not indicate such a health condition ($p < 0.05$). Finally, respondents who

reported having the illness for a duration of three months or more were 5.5 times more likely to use the Internet for health information than those who reported the illness for a shorter period of time ($p < 0.001$).

Based on the results emerged from tables 1, 2 and 3 we can conclude that the first hypothesis (H1) which states that personal socio-demographic characteristics have an influence on the use of the Internet for health information was partially supported in this study. Similarly, the second hypothesis (H2) which states that health-related factors of respondents have an influence on the use of the Internet for health information was completely supported in this study.

Types of Health Information Sought by Patients

Table 4 shows the types of health information sought by the 258 respon-

Table 4
Types of Health Information Sought by Respondents Who Used the Internet for Health Information (N = 258)

Types of health-related information	Frequency*	
	n	(%)
Specific disease or condition	204	79.1
General health information	147	57.0
Medication	74	28.7
Nutrition and/or exercise	45	17.4
Complementary or alternative treatments	39	15.1
Illness prevention	34	13.2
Healthcare providers	25	9.7
Other types	43	16.7

*Respondents were instructed to select as many types as applicable.

dents who used the Internet for health information. The vast majority (79.1%) of respondents indicated that they sought specific disease or condition. More than half (57%) of respondents noted using the Internet for general health information. More than a quarter (28.7%) searched for information about medications and 17.4% sought information on nutrition and/or exercise. Respondents indicated that they sought the Internet for other types of health information such as information about complementary/ alternative treatments, illness prevention, and healthcare providers.

Subsequent Actions Undertaken by Health Information Seekers

Table 5 indicates the subsequent actions/ behaviors that were undertaken after obtaining the health in-

formation from the Internet. More than a quarter (26.7%) of respondents indicated that they discussed/ verified the information with their healthcare providers. This is followed by discussions with friends and/ or family members (22.9%). About 15% contacted other healthcare specialists for further treatments and a similar percentage (14.3%) bought over-the-counter (OTC) medications from community pharmacies. Respondents reported other subsequent actions such as buying health products, treating themselves, and changing some of their life-style behaviors.

Reasons for Searching Health Information on the Internet

Respondents who had reported using the Internet to find health-related information (N = 258) were queried

Table 5
Actions Undertaken After Obtaining Health Information from the Internet (N = 258)

Actions undertaken	Frequency*	
	n	(%)
Discussed/verified information with healthcare providers	69	26.7
Discussed with friends/family members	59	22.9
Contacted health specialists	39	15.1
Bought OTC medication**	37	14.3
Bought health products	35	13.6
Treated myself	26	10.1
Changed diet & exercise habits	48	5.0
Other actions	44	17.1

*Respondents were instructed to select as many actions as applicable.

** OTC = Over-the-counter

about the reasons behind searching the Internet for such information. Table 6 presents their responses which indicate that more than half (52.3%) did so to acquire more information about their health problems. A similar percentage (49.6%) reported that they did so because they were given insufficient information about their health conditions by their treating health staff. More than a quarter (25.6%) of those who searched the Internet for health information indicated that they did so because they wanted to verify information given to them and about 20% indicated that they did so because they "did not agree" with the information given to them by their treating doctors.

Respondents' Sources of Health Information

When patients who used the Internet for health information (n = 258)

were asked about the extent to which various sources of information contributed to their knowledge about health, different responses emerged. Table 7 shows the respondents' answers according to the mean scores in a descending order. Respondents rated TV/radio as the highest source of health information (mean = 4.18). The Internet was rated as the second important source of health information (mean = 3.98). Respondents reported that schools and health staff were among the least contributing sources of health information.

Usefulness of Various Sources of Health Information

When participants (n = 963) were asked about the usefulness of the various sources of health information, both respondents who "used" and those who "did not use" the Internet

Table 6
Reasons for Searching the Internet for Health Information (N = 258)

Reasons	Frequency*	
	n	(%)
Wanted to know more about my health problem	135	52.3
Given insufficient information by the treating health staff	128	49.6
To verify information given to me about my health condition	66	25.6
Did not agree with the information given to me by my doctor	51	19.8
Other reasons	38	14.7

*Respondents were instructed to select as many reasons as applicable.

Table 7
The Extent to which Various Sources of Information have Contributed
to Respondents' knowledge about Health (N = 258) (only for those
who Searched the Internet for Health Information)

Source of information	None		Little (or very little)		Much (or very much)		Mean* (S.D.)	
	n	(%)	n	(%)	n	(%)		
Television/Radio	32	(12.4)	11	(4.3)	215	(83.3)	4.18	(1.33)
Internet	49	(19.0)	11	(4.3)	198	(76.7)	3.98	(1.54)
Newspapers / printed media	54	(21.0)	151	(58.5)	53	(20.5)	2.48	(1.34)
Schools	34	(14.3)	217	(84.1)	4	(1.6)	2.37	(0.74)
Health staff	151	(58.6)	69	(26.7)	38	(14.7)	1.88	(1.24)
Other	165	(64.0)	75	(29.0)	18	(7.0)	1.69	(1.4)

*The mean score was calculated on a 5-point Likert scale (1 = none, 2 = very little, 3 = little, 4 = much and 5 = very much)

for health information rated health-care providers as the most useful source of health information (Table 8). However, those who did not use the Internet for health information (N = 705) reported significantly higher mean scores of usefulness of information obtained from both healthcare providers and TV/ radio (4.48 and 3.77 respectively) than those who used the Internet (4.31 and 3.52 respectively). On the contrary, respondents who used the Internet for health information (N = 258) reported a significantly higher mean score of usefulness (3.89) of the information obtained from the Internet than those

who did not use the Internet for health information (2.95).

Discussion

In this study, about 25% of respondents searched the Internet for health information. This percentage is notably lower than that found in other Western studies. For example, it has been reported that 80% of adults in the United States and 66% of adults in Europe seek online health information (Sillencea *et al.*, 2007). However, the percentage of patients who use the Internet for health information reported in previous studies is inconsistent and studies have produced a wide variation in their estimates. It could be

Table 8
Patients' Perception about the Usefulness of Various Sources
of Health Information (N = 963)

Source of health information	Mean score of usefulness ^a		T-test	P-value
	Used the Internet for health information ¹	Did not use the Internet for health information ²		
Healthcare providers	4.31	4.48	-2.643	0.008*
Internet	3.89	2.95	9.172	0.000**
TV / Radio	3.52	3.77	-2.417	0.016*
Journals/newspapers	3.26	3.10	1.549	0.122
Family/Friends	3.10	2.93	1.355	0.176
Other sources	2.19	2.02	1.501	0.134

¹ n = 258, ² n = 705.

^a The mean score was calculated on a 5-point Likert scale (1 = not useful at all, 2 = not useful, 3 = not sure, 4 = useful and 5 = very useful)

* p < 0.05, ** p < 0.001

argued that the volume of patients who use the Internet to access health information in different healthcare systems can only be compared with caution. For example, the UK and the US have distinctly different healthcare systems; one is based on a strong foundation of Gatekeeping primary care and the other on a long tradition of easy access to specialists so long as the patient can pay (Fry *et al.*, 1995).

It is difficult to generalize these findings to the Saudi context since these studies are conducted within different cultures and different healthcare systems. Further, many of these studies may have limited generalization because many of them are based

on convenience samples and examine limited sets of potential explanatory factors. Studies are needed in the Kingdom, taking into account the particularities of the Saudi population, in order to determine the possible factors that could partially explain the use of the Internet for health information.

The findings of this study show that the Internet use for health information is associated with some of the socio-demographic characteristics of respondents. For example, the results of the bivariate analysis show that young male respondent, patients with higher level of education, patients in employment and those earning a high-

er level of income were more likely to use the Internet for health information than their counterparts. Similarly, the results of the multivariate analysis indicate that the educational level and employment status were significantly associated with the use of the Internet for health information. Therefore, our first group of hypotheses (H1), which indicates that socio-demographic characteristics of respondents are associated with Internet use of health information, was partially supported. These results are in line with prior research (Schwartz *et al.*, 2006; Baker *et al.*, 2003) which found that respondents' personal profile is associated with searching the Internet for health information.

As for the health-related aspects of the respondents, the findings reported here show that the Internet use for health information is strongly connected to the health needs of the patients. For example, in the bivariate analysis, the perceived health status, the presence of chronic illness and the duration of health problem were significantly associated with the use of the Internet for health information. These results remain significant in the logistic regression analysis. That is; patients who perceived their health status as "poor", those who had chronic illnesses and those who had the illness for a longer period of time

were more likely to use the Internet for health information than their counterparts. Therefore, our second group of hypotheses (H2), which indicates that health-related factors of respondents are associated with Internet use of health information, was strongly supported. These findings are consistent with studies reported in the literature (Bundorf *et al.*, 2006; Dickerson *et al.*, 2004) which suggest that health-related aspects of patients are strongly associated with the Internet use for health information.

In this study, most patients who used the Internet for health information did so because they wanted to know more about their health problems or because they were given insufficient information, or wanted to verify information given to them by the treating doctors. This agrees with previous research which reported that patients refer to the Internet for information because they were dissatisfied with the information provided by their treating health professionals (Ayan-tunde *et al.*, 2007) or to reassure themselves that they have much information about their illnesses (Derdiarian, 1986). It has been reported that the perception of the patients about health professional as a source of health information has changed over time as they become aware of the amount of

information available on the Internet (Eysenbach *et al.*, 2003).

In this study, the vast majority of respondents indicated that TV has contributed much to their health knowledge. This is probably not surprising since it has been reported that visual media has a strong impact on the knowledge of the general public about many health issues (Montazeri, 1995). What is probably surprising is the fact that more than three-quarters of respondents who used the Internet for health information indicated that the Internet has acquired them with more health information than schools or health staff. This indicates the importance of the Internet as a source of health information for many patients and, at the same time, may question the health education programs provided in schools and healthcare facilities.

In this study, respondents rated the information obtained from healthcare providers as the most useful source of health information compared to other sources. This agrees with the research carried out by McMullan (2006) which found that people, in general, do not consider the Internet as a substitute for consulting health professionals. It has been reported that the Internet is more likely to be considered as a

complement to other ways of obtaining assistance or opinions (Pandey *et al.*, 2003). However, other studies indicated that patients turn to the Internet for health information when they become dissatisfied with the information provided to them by their treating doctors (Ayantunde *et al.*, 2007).

While some authors indicated that the availability of health information on the Internet is a positive development (Kim and Kim, 2009), others are concerned about patients who rely on the information in the Internet for their healthcare decisions and noted that deficiencies with health information on the Internet may negatively influence patients' health (Schwartz *et al.*, 2006). In general, health professionals are worried about the accuracy, quality, validity, reliability and confidentiality of health information and patients abilities to interpret the information with the possibility of leading to inappropriate self-diagnosis or treatments.

It could be argued that health information on the Internet can be written by individuals without appropriate qualifications and the information may not be evidence based. A further problem is that of bias, with many websites promoting a commercial product or company (Ayantunde

et al., 2007). Eysenbach *et al.* (2003) reviewed 79 distinct studies that evaluated the quality of Internet health information and concluded that 70% of these studies found that quality is a problem. The authors reported that studies that draw neutral or positive conclusions use less rigorous criteria to evaluate Web information. Thus, patients may not be receiving accurate, legible and complete information from the websites they are visiting and may be unaware of their limitations.

The results of the present study indicate that a considerable percentage of respondents who used the Internet for health information undertook some sort of actions such as changing their practice or health seeking behavior. For example, more than a quarter of respondents who used the Internet for health information discussed the obtained information with their healthcare providers. Others bought some medications or health products or treated themselves. Others changed their eating and exercise habits. It is possible that information retrieved from the Internet influenced their understanding and they behaved accordingly.

It could be argued that as the use of the Internet increases, it will become more important for healthcare providers to identify patients who use the

Internet as a source of health information. In their research, Iverson *et al.* (2008) indicated that the Internet has the potential to dramatically change the doctor-patient relationship in that it offers an opportunity for patients to increase their knowledge, become more informed and increases their involvement in their healthcare decisions.

Implications

The fact that more than a quarter of patients in this study searched the Internet for health information, suggests that the Internet serves as an important source of information, particularly for patients with chronic health conditions. Since most patients who used the Internet for health information did so because they wanted to know more about their health conditions or because they were given insufficient information about their health, more efforts by healthcare providers should be made to offer patients with necessary information about their health problems.

As the people increasingly use Internet as a major source of health information, healthcare providers may offer suggestions for reliable medical websites that can be found on the Internet. To adequately prepare healthcare providers to be able to do this, it is recommended that courses about the Internet use and

access to reliable medical websites or databases are integrated as a part of medical education in universities or as a part of the continuing medical education of healthcare providers.

As the Internet is becoming a major source of health information dissemination, there is a pressing need to develop validated health information portals or sites where patients can easily understand and recognize as reliable. Health decision makers and providers are required to work together in order to embrace the Internet as an excellent route for delivering health information that meets patients needs and expectations and should ensure the quality of such health information to protect users from misinformation.

Conclusion

Healthcare providers should realize that many patients are using the Internet to find both general and specific health information which may influence their practice and health seeking behavior. Healthcare providers and decision makers need to acknowledge that the Internet is one of the most important sources for delivering health information and, at the same time, need to concern about the quality of such information to protect patients from inaccurate or unreliable information. Doctors, as

well as other health professionals, should inquire about their patients' use of the Internet and assist them in their search for appropriate and understandable sources of information about their health problems.

This study has several limitations which are worth noting. First, the findings reported here may be influenced by the study design and the available data. Second, the results were based on self-reported information provided by patients and are subject to the usual problems of bias associated with the accuracy of recalling and reporting on healthcare events. Third, because of the limited resources, the study took place in Riyadh City only. However, Riyadh is the largest and the most populated city in the Kingdom with many inhabitants coming from different parts of it. Despite these limitations, it is believed that the results from the study provide a valuable insight into matters which appear to influence people's health. Further research, taking into account the above mentioned limitations, is needed.

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Appendix 1

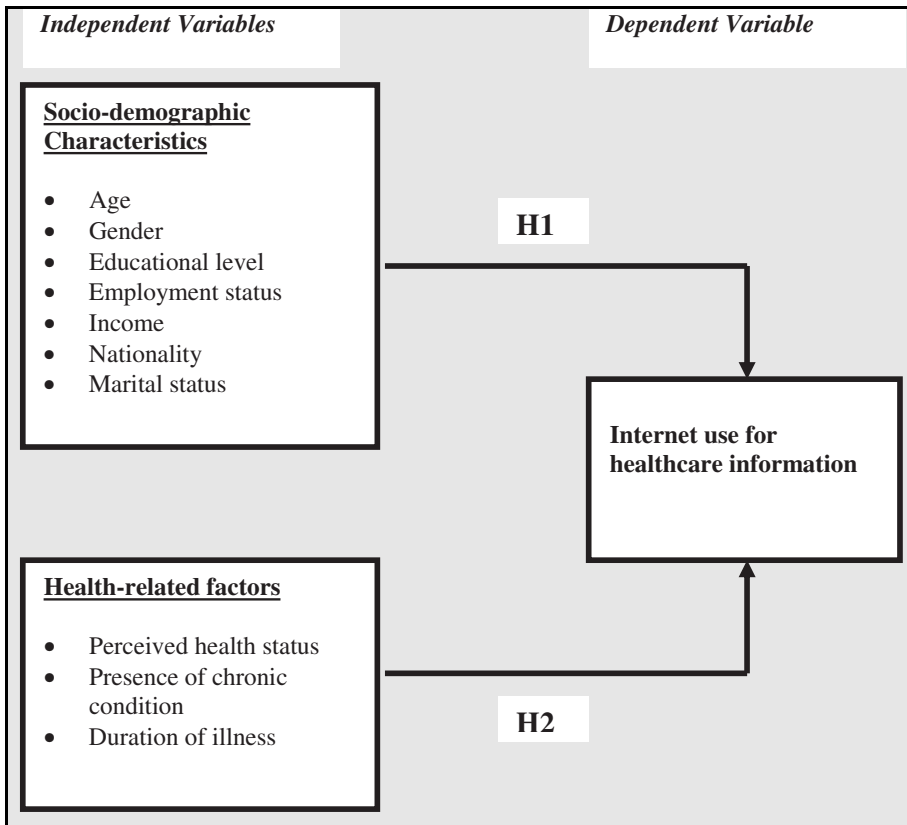


Figure 1: Research model for this study

Appendix 2

Examples of national and international web sites on health information*

Name of the organization	Website
1. Ministry of Health, Saudi Arabia	http://www.moh.gov.sa/ar/index.php
2. World Health Organization	http://www.who.int/
3. Electronic Clinic, Saudi Arabia	http://www.moh.gov.sa/des/index.php
4. Health Questions, Saudi Arabia	http://www.moh.gov.sa/ar/modules/xoopspoll/
5. First Aids, Saudi Arabia	http://www.moh.gov.sa/des/sections.php?CatParent = 29 & CatID = 31
6. Health Polls, Saudi Arabia	http://www.moh.gov.sa/ar/modules/mysections/article.php?lid = 110
7. Age Concern, UK	http://www.ageconcern.org.uk/
8. Diabetes	http://www.diabetes.com/
9. Asthma, UK	http://www.asthma.org
10. Arthritis, UK	http://www.arthiritis.org
11. Cancer, USA	http://www.cancer.org

*Accessed on the 23rd February, 2010.

Appendix 3
The Study Questionnaire

PART I: Personal socio-demographic characteristics.

Please place a tick (✓) where appropriate.

1. Your gender

() Male () Female

2. Your age: Years

3. Your nationality

() Saudi () Non-Saudi

4. Your marital status

() Married () Unmarried

5. Your level of formal education

() Less than high school () High school or higher

6. Your employment status

() Employed () Unemployed

7. Your monthly income (in Saudi Riyals)

() Less than 5,000 () 5,000 or higher

8. In general, how do you describe your health status?

() Good () Poor

9. Do you suffer from any chronic illness?

() Yes () No

10. For how long do you suffer from your illness?

() Less than three months () Three months or more

PART II:

11. Have you used the Internet for health information in the past three months?

() Yes () No

If "No", *please skip to question no. 15.*

**12. Please indicate the types of health information you have sought in Internet
(Please tick all that applies).**

- ☐ Specific disease or condition
- ☐ General health information
- ☐ Medication
- ☐ Nutrition and/or exercise
- ☐ Complementary or alternative treatments
- ☐ Illness prevention
- ☐ Healthcare providers
- ☐ Other types

**13. Have you undertaken any action as a result of the retrieved health information
from the Internet?**

- ☐ Yes ☐ No

If "Yes", *please indicate which actions undertaken (please tick all that applies).*

- ☐ Discussed/verified information with healthcare providers
- ☐ Discussed with friends/family members
- ☐ Contacted health specialists
- ☐ Bought OTC medication
- ☐ Bought health products
- ☐ Treated myself
- ☐ Changed diet & exercise habits
- ☐ Other actions

**14. Please indicate the reason(s) for searching the Internet for health information
(Please tick all that applies).**

- ☐ Wanted to know more about my health problem
- ☐ Given insufficient information by the treating health staff
- ☐ To verify information given to me about my health condition
- ☐ Did not agree with the information given to me by my doctor
- ☐ Other reasons

15. In your opinion, how useful each of the following sources of health information.

Source of information	Not useful at all	Not useful	Not sure	Useful	Very useful
Healthcare providers					
Internet					
TV / Radio					
Journals/newspapers					
Family/Friends					
Other sources					

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الملخص

التعرف على المرضى الذين يستخدمون الإنترنت مصدراً للمعلومات الصحية: مقترحات لمقدمي الرعاية الصحية

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تم القيام بهذه الدراسة المسحية في مدينة الرياض بالمملكة العربية السعودية، وذلك للتعرف إلى مدى استخدام المرضى للإنترنت مصدراً للمعلومات الصحية، وفيما إذا كان للإنترنت تأثير على سلوكهم في البحث عن الرعاية الصحية. أظهرت نتائج التحليل الثنائي والانحدار المتعدد أن المرضى ذوي الحالات الصحية المتردية هم الأكثر استخداماً للإنترنت في البحث عن المعلومات الصحية. كما أفاد هؤلاء المرضى أن الإنترنت زودهم بالمعلومات الصحية أكثر من المصادر الأخرى، وأن هذه المعلومات قد أثرت في سلوكهم وقراراتهم الصحية. ولذلك فإنه يجب اتخاذ التدابير اللازمة لضمان وصول أفراد المجتمع لمصادر معلومات صحية أوفر حظاً من الثقة.

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