# Accessing Web-Based Health Related Information by College Students: An Exploratory Study

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## Abstract

This study explored college students' online activities at health Web sites, their perceptions of the quality and accuracy of Internet medical information, and their concerns about Internet privacy and security. The research took place at a medium sized university in central California during the Fall 2002 semester with a sample of 136 students. The study found that 67% of the sampled students had sought health information on the Internet; 12% had used Internet medical consultations services; 7% had bought pharmaceutical products online; 2% had joined Internet health support groups; 7% had used e-mail to communicate with healthcare providers; 18% had sought second opinions online; 35% expressed serious concern about the accuracy of health information posted on the Web; and 53% were concerned about the privacy and security of personal information posted on the Web. Gender and age were identified as influential in some of the issues raised in the research.

*Keywords: internet use, students, reliability, privacy*

## Background

The advent of the Internet, specifically the World Wide Web (web), has changed the way individuals communicate, businesses promote their products and services, and society obtain information. In fact, the Internet has been credited with bringing people together and creating a sense of communities where none existed before (Surratt, 2001). Despite a very real Internet access divide, on-line services and information have had a profound impact on society and specifically on the way people obtain health information as well as doctor-patient relationships (Rajendra, 2001) and on how healthcare services are delivered around the world.

The increasing number of people searching the Internet for health- related information, products, and services is considered by some a citizen response to the self-help movement and disease prevention programs. Some seek for health-related information on-line as a result of distrust of health maintenance organizations (Sonnenberg, 1997) while others turn to the

Internet for health related information in order to take responsibility in preventing disease. Regardless of the reason for obtaining health information on-line, the free flow of health information (a.k.a. e-health) on the Internet continues to feed patients' growing demand for knowledge.

The National Research Council (2000) reported that the Internet has the potential to change the culture of healthcare in which patients will be partners in care and not merely recipients of care. From the privacy of one's home or office and without making an appointment, healthcare activities can be conducted between health professionals and patients who do not know each other. The availability, the anonymity, and the privacy of health web sites present an opportunity for many people to seek a second opinion.

Fox et al. (2000) analyzed data from a nationwide telephone survey of adults in 2000. Among the 12,751 adults surveyed, 6,413 claimed to be Internet users and 55% of those

users reported using the web to get health or medical information. About 50% said health information obtained online influenced the way they ate and exercised, 70% said health information retrieved from the Web influenced their decision about how to treat an illness or condition, 50% said the web information led them to ask a doctor new questions or get a second opinion from another doctor, and 28% said the information from the health Web site affected their decision about whether to visit a doctor.

Ahmann (2000) concluded that a well-informed patient is more likely to be an active participant in the course of treatment and to have better outcomes. These findings were supported by Berland et al., 2001, who found that 70% of people who use the Internet said that the health information they found influenced their decisions about treatment

Consumers' seemingly endless quest for e-health has fueled the growth of Internet sites offering information and services. Health web sites offered an unlimited number of services: patient insurance verification; transcription of medical records; processing of claims; online access to medical books, journals, and sites for continuing medical education; and information about diseases (Mitka, 1999). Some health web sites targeted consumers directly by offering online consultation including diagnosis, treatment, and prescriptions; information on clinical trials; support groups; health products; herbal supplements; and online booking of appointments with physicians (Baldwin, 2001).

Federal, state, and local governments have several health database sites on the World Wide Web that are accessible without cost to anyone looking for medical information on the Internet. Hospitals, medical schools, healthcare maintenance organizations, and not-for-profit organizations have all joined the World Wide Web to take advantage of this extraordinary medium of communication, the Internet, to reach a large number of customers anywhere on the globe.

It should be noted, however, that the Internet, with all of its flexibility, is not a panacea for obtaining health related information. Health information posted on the web has raised serious concerns since the medium remains largely unregulated.

Experts in the health field have questioned the quality and accuracy of health web sites' contents. There is a preponderance of evidence to suggest that most e-health web sites contain dubious health information (Friedewald, 2000; Impicciatore, Pandolfini, Casella, & Bonati, 1997). There is potential for harm that might be caused by inaccurate or inappropriate health information, poorly designed applications, inappropriate treatment advice, and delays in seeking necessary medical care (Robinson, Patrick, Eng, & Gustafson, 1998).

Additionally, questions about the privacy and security of personal information collected on the Internet by web site operators have raised consumers' concerns about the safety of doing business online (Wang, Lee, & Wang, 1998). In fact, in light of a lack of federal rules and regulations concerning privacy on-line, consumers employ a variety of means to protect their own privacy. A Pew Internet study (2000) found that 24% of people gave false names or personal information in accessing Web sites, 9% used encryption to scramble their e-mail, and 5% used software that hides their computer identity from visited web sites. The federal privacy law, HIPAA, passed in 1996, "has forced the health care industry to pay closer attention to privacy and security" (Fisher, 2001, p. 20). Under HIPAA, people have electronic access to their medical records, they can make corrections to those records, and they can authorize healthcare operators to use their medical data with their written consent (Wilder & Soat, 2001).

## Purpose
The purpose of this study was to investigate college students' patterns of Internet use for obtaining health-related information and services. The research focused on students' use of the Internet for finding medical information, purchasing healthcare services and products,

joining health support groups, and e-mailing healthcare professionals. It also explored students' perceptions of the quality and accuracy of medical information on the Internet and their thoughts concerning privacy and security of personal information disclosed on health Web sites.

## Methods

Data were collected from 136 students at a medium size university in California. Two series of simple random selections were conducted. First, 13 of the 141 upper division courses taught during the Fall 2002 semester at the university were randomly selected. Second, since most of the randomly selected courses have several sections or classes meeting on different days and at various times, 13 classes were randomly selected for participation in the study. The committee for the protection of Human Subjects at the university approved the study.

### Instrument

A comprehensive literature review did not reveal any previous studies on college students' use of the Internet specifically as it relates to accessing health-related information and services. Therefore questions for this study were drafted based on questions from a survey described by Borzekowski and Rickert (2001) in "Adolescent Cybersurfing for Health Information: A New Resource That Crosses Barriers." Other questions were drawn from an online survey conducted by the Health on the Net Foundation (2002).

The final instrument was divided into three sections: a) six demographic questions, b) 25 questions related to students' use of the Internet for health information and services, and c) six questions pertaining to perceptions of accuracy of health information, security, and privacy on the Internet.

### Face Validity

A panel of experts made up of an elementary school teacher, a psychologist, a registered nurse, and a public health professional reviewed the instrument for readability and understandability. All panel members agreed that the questions were clear and college students would have no difficulty reading, understanding, and responding to the questions. The panel recommended the use of all 37 questions for the study.

### Pilot Test

To test the instrument's reliability, a group of 10 students from the university were invited to participate in a pilot study. Participants took the same survey twice, on successive days. The participants were not told about test duplication until the end of the second test. The survey took less than 10 minutes to complete and participants provided feedback regarding the instrument's readability and understandability.

### Reliability

Data collected from the pre- and posttests were used to test the reliability of the instrument. STATA software version 7 was used to calculate Kappa value, a test statistic used to evaluate the reliability of a test. Kappa value of 1 is perfect and value equal or above 0.4 is acceptable.

The demographics section (survey questions #1 to #6) showed no sign of disagreement among the observers and as expected, resulted a value of 1. Survey questions #7 to #9, #11 to # 16, #18 to #20, #22, #24 to #28, #30 to #37 produced an acceptable Kappa value above 0.4. However, questions #10, #17, #21, #23, and #29 generated low Kappa values ranging from .25 to .38, indicating discrepancy in participants' response between the first and second tests. Those five questions were maintained as part of the instrument, but excluded during the analysis due to their low reliability factors.

### Data Collection

Three hundred ninety questionnaires were distributed to students of the selected classes during the months of November and December 2002. Survey questionnaires together with stamped return envelopes were handed to the first 30 students who walked in each class before the beginning of instruction. Participants were asked to complete the survey, place it in the envelope provided, seal the envelope, and drop the package with their outgoing mail as soon as it was completed. At the end, 136 (35%) of the

390 questionnaires were returned, which slightly exceeded the 30% expected rate of return.

**Findings**

Appendix A shows the demographic distribution of the study participants. Overall, 96% of participants reported using the Internet, 82% reported using the Internet two to seven days a week, 74% reported to be comfortable using the Internet, and 89% have accessed the Internet from home or school. Eighty two percent of participants also reported being in good to excellent health.

Findings from this research indicate that 67% (n=91) of participants accessed the Internet to obtain health-related information, more females than males (44% and 23% respectively) had searched the Internet for medical information, and 40% (n=55) of those who sought health information on the Internet were between 20 and 29 years old; 30% (n=41) were Whites, 15% (n=20) Asians, 24% (n=33) have no job, and 47% (n=64) reported an income less than $10,000. A significant difference was observed in the participants aged 29 or less (Table 1).

Table 1
Participants Aged 29 or Less Accessing the Internet for Health Information*

| Accessing | Age | | Total |
|---|---|---|---|
| | < 20 | 20-29 | |
| No | 26 | 16 | 42 |
| Yes | 32 | 55 | 87 |
| Total | 58 | 71 | 129 |

\* Chi-square = 7.2247, p = 0.007

Findings from this research indicate that the majority, 88% of the participants reported never having used online medical consultation and only 12% (n=17) of the participants reported having used medical consultation services offered by health Web sites with males being more likely than females to report such use.

Gender has an influential impact on the behavior. Of the 90 female participants who responded to the question, only seven reported having gone online for medical consultation versus 10 of the 46 male participants (Table 2).

Table 2
Participants' Use of Online Medical Consultation, by Gender*

| Use | Gender | | Total |
|---|---|---|---|
| | Male | Female | |
| No | 36 | 83 | 119 |
| Yes | 10 | 7 | 17 |
| Total | 46 | 90 | 136 |

*Chi-square = 5.4250, p = 0.02

Findings from this research indicate that 93% (n=126) of participants never bought pharmaceutical products on the Web. Only, 7% (10) reported having bought pharmaceutical

products online. Those who had purchased pharmaceutical products on the Internet, 3% (n=4) were Asians, 4% (n=6) were between 20

and 29 years of age, and 4% (n=6) reported annual incomes below $10,000.

Gender has an influential impact on the behavior. The results suggest that male participants are more likely to turn to the Web to buy pharmaceutical products than female participants (Table 3).

Table 3
Participants' Purchase of Pharmaceutical Products Online, by Gender*

| Purchase | Gender | | Total |
|---|---|---|---|
| | Male | Female | |
| No | 39 | 87 | 126 |
| Yes | 7 | 3 | 10 |
| Total | 46 | 90 | 136 |

* Chi-square = 6.3110, p = 0.012

Findings from this research indicate that 93% (n=127) of the participants reported never having used e-mail to communicate with a healthcare provider. Only 7% (n=9) of the participants had used e-mail to communicate with a healthcare provider. Of those who had used e-mail to communicate with their healthcare providers, findings from this research indicate that 4% (n=5) were between 20 to 29 years old, 3% (n=4) were Asians, 4% (n=5) were juniors, seniors, or graduate students, 4% (n=6) reported being employed, and 4% (n=6) declared an annual income less than $10,000.

Gender is an influential factor in the use of e-mail for communicating with healthcare providers. Findings from this research indicate that of the 66% (n=90) female participants, only 1% (n=2) used e-mail correspondence with healthcare providers whereas 5% (n=7) of the 46 male participants had used the Internet to communicate with healthcare providers (Table 4).

Table 4
Participants' Use of E-mail with Healthcare Provider, by Gender*

| Use of E-mail | Gender | | Total |
|---|---|---|---|
| | Male | Female | |
| No | 39 | 88 | 127 |
| Yes | 7 | 2 | 9 |
| Total | 46 | 90 | 136 |

* Chi-square= 8.3187, p = 0.004

Findings from this research indicate that 35% (n=46) of the participants expressed serious concern about the accuracy of health information found on the Internet. A small number of participants, 7% (n=10) expressed no concern whatsoever regarding the accuracy of health information posted on the Internet). No statistical differences found between demographics on the issue.

Findings from this research indicate that 53% (n=71) of the participants expressed serious concern about the privacy and security of personal information disclosed on the Internet. Thirty one percent of participants age 20 to 29 years old reported to be seriously concerned compare to 14% of those less than 20 years of age. These findings suggest that older students are more likely than younger ones to be concerned about the issue of privacy and security of personal information disclosed on the Internet (Table 5).

**Participants' Main Reason Accessing the Internet**
Findings from this research indicate that 42.1% (n=56) of participants reported to access the Internet mainly to do school assignment, 36.8% (n=49) to e-mail friends, relatives and others, 4.5% (n=6) to shop or get product information, 3.8% (n=5) to get information about music, 3.8% (n=5) to get information about sports.

Table 5
Participants' Concerns About Internet Privacy, by Age*

| Level of Concern | Age | | | | | |
|---|---|---|---|---|---|---|
| | <20 | 20-29 | 30-39 | 40-49 | 50-59 | >59 |
| Not at all | 3 | 3 | 0 | 0 | 0 | 1 |
| Not too | 5 | 4 | 2 | 0 | 0 | 0 |
| Somewhat | 19 | 22 | 2 | 0 | 1 | 0 |
| Very | 29 | 41 | 0 | 0 | 0 | 1 |
| Total | 56 | 70 | 4 | 0 | 1 | 2 |

* Chi-square = 22.7331, p = 0.030

**Most Health Topics Sought by Participants on the Internet**
Data from this research indicate that 32% (n=38) of the participants reported diet and nutrition, 20% (n=24) checked fitness exercise, 8% (n=10) reported sex, 5% (n=6) checked for cancer, and 3% (n=4) mentioned sexually transmitted diseases (Table 6).

Data from this research indicate that 66% (n=88) of the participants support the federal government's efforts to pass more laws, 7% (n=9) thought the current laws were sufficient, and 28% (n=37) had no opinion.

**Most critical issues facing the medical Internet**
Participants were asked to rank the most critical issues facing the Internet, especially the medical Internet. Findings from this research indicate that 58% (n=79) of the participants selected accuracy of information, 51% (n=69) checked trustworthiness, 43% (n=59) reported privacy, 37% (n=50) selected "junk" Web sites, and 32% (n=43) mentioned finding information.

Table 6
Health Topics Sought by Participants on the Internet*

| Topic | Number | Percent |
|---|---|---|
| Diet and nutrition | 38 | 32 |
| Fitness exercise | 24 | 20 |
| Other | 19 | 16 |
| Sexual activity/contraception | 10 | 8 |
| Cancer | 6 | 5 |
| Sexually transmitted diseases | 4 | 3 |
| Alcohol and drug use | 3 | 2.5 |
| Heart disease | 2 | 1.7 |
| Mental health issues | 2 | 1.7 |
| Tobacco and smoking | 2 | 1.7 |
| Sexual or physical abuse | 2 | 1.7 |
| Parenting/children's health | 2 | 1.7 |
| Pharmaceuticals/medicines | 2 | 1.7 |
| Violence | 2 | 1.7 |
| Dating violence or rape | 1 | 0.8 |
| Illness support group | 0 | 0 |
| Total | 119 | 99.2 |

* Percents total less than 100 because of rounding

**Discussion**
More than 50% of the participants in this research had searched the Internet for medical information. A relatively small number of participants had bought pharmaceutical products on the Internet, joined a health support group, or used e-mail to communicate with healthcare providers. Most participants in this research expressed concern about the accuracy of health information found on the Internet. Similarly, the majority of participants expressed concern about the privacy of personal information disclosed on the Internet.

Although healthcare professionals are recognized as the most reliable source of health information, the Internet offers an abundance of health-related material that might help people understand better the evolution of a disease, how to manage an illness, how to prevent a disease, and ways to adopt a healthy lifestyle. When using the Internet as a secondary source of medical information on health issues, consumers have the responsibility to critically question the information sources posted on the health web sites.

Even though e-mail is widely used for keeping in touch with relatives, friends, and other acquaintances, only a small number of participants (7%) had used the medium to communicate with their healthcare providers. Similarly, in a survey of 220 New Jersey physicians, 18% had used e-mail to communicate with patients (Rice & Katz, 2001). Issues other than communication are involved in the use of e-mail between patients and physicians. The most important issues are time and cost. How do physicians get compensated for the time spent reading and responding to patients' e-mails? As much as they would like to care for their patients, physicians are reluctant to publish their e-mail addresses.

The Health Insurance Portability and Accountability Act (HIPAA), which was passed in 1996 and became effective on April 14, 2003, should appease or quiet consumers' concerns about the privacy of their medical information.

HIPAA is a privacy law that regulates electronic transactions of medical information. All healthcare providers are required by law to protect the privacy of medical information stored in their databases. Any disclosure to a third party without the written authorization of the patient is considered a violation of the law.

Finally, most healthcare organizations are embracing technology and electronic capability to reduce administrative cost by equipping health web sites with self-directed information tools that help consumers take charge of their own healthcare needs. Findings from this research suggest that there is a need to encourage and educate college students regarding retrieving health-related information from health web sites. It is of great interest to the community at large to promote the use of health Web sites among the student population.

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# Appendix A
## Participants Demographics

| Demographic | Number | Percent |
|---|---|---|
| Year in school | | |
| Freshman | 34 | 25 |
| Sophomore | 32 | 24 |
| Junior | 27 | 20 |
| Senior | 36 | 26 |
| Graduate | 7 | 5 |
| Total | 136 | 100 |
| Ethnicity | | |
| White | 55 | 40 |
| Asian | 34 | 25 |
| Hispanic | 24 | 18 |
| Other | 13 | 10 |
| Black | 9 | 7 |
| Total | 135 | 100 |
| Gender | | |
| Female | 90 | 66 |
| Male | 46 | 34 |
| Total | 136 | 100 |
| Age | | |
| < 20 | 58 | 43 |
| 20 – 29 | 71 | 52 |
| 30 – 39 | 4 | 3 |
| 40 – 49 | 0 | 0 |
| 50 – 59 | 1 | 1 |
| 60 and over | 2 | 1 |
| Total | 136 | 100 |
| Have a Job | | |
| No | 50 | 37 |
| Yes | 86 | 63 |
| Total | 136 | 100 |
| Income | | |
| < $10,000 | 100 | 76 |
| $10,000 – 24,999 | 22 | 17 |
| $25,000 – 49,999 | 6 | 5 |
| $50,000 – 74,999 | 2 | 1 |
| $75,000 – 99,999 | 0 | 0 |
| > $100,000 | 2 | 1 |
| Total | 132 | 100 |