

An Office-Based Internet Patient Education System A Pilot Study

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BACKGROUND. Patients' use of the Internet to find medical information is increasing, and physicians are exploring ways to incorporate the Internet into patient education programs and physician-patient encounters. We performed a pilot study of an Internet patient education system to obtain information on the usefulness of, feasibility of, and patient satisfaction with this type of information.

METHODS. We developed a hypertext Web page directory to patient education sites on the Internet and made it available to patients in a community-based family practice residency clinic during their office visit. During a 1-month period, a medical student assisted patients with using the Internet, answered questions, interviewed patients, and collected data. Information was collected on sites visited, level of assistance required, amount of time spent "surfing" on-line versus intense reading on-line, quality of the experience, perceived usefulness of the educational materials, and patients' satisfaction with the materials.

RESULTS. Fifty patients participated in the study. Forty-seven patients (94%) found the Internet information helpful. Most patients spent their time on-line intensely reading, and men spent significantly more time on-line ($P = .007$). Thirty-seven patients (77%) stated they would change a health behavior because of information they had read on the Internet; 45 (90%) were more satisfied with their visit than usual, and 46 (92%) would use the Internet center at the clinic again.

CONCLUSIONS. Patients can obtain useful information from moderated Internet patient education systems and may plan to change health behaviors on the basis of that information. Internet patient information in the physician's office can improve patient satisfaction with clinic visits.

KEY WORDS. Patient education; Internet; family practice; computer-aided instruction. (*J Fam Pract* 1999; 48:123-127)

Patient education is an important part of successful health care programs targeted at changing health behaviors. A vital component of patient education is access to and transmission of health information. The Internet can be a rich source of medical facts, advice, and support for people with personal computers.¹ Patient education methods have successfully applied Internet and network technology for specific patient groups, including people with breast cancer,² diabetes,³ human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS),⁴ and students in undergraduate health clinics.⁵ Internet communications technology has also been used to develop emotional support networks for patients with many different medical problems, including HIV/AIDS,^{4,6} and cancer,⁷ and family members of patients with Alzheimer's disease.⁶ By providing health information, these systems have been shown to

decrease clinic visits, decrease health care costs, and decrease hospital stays.^{4,6,5}

In addition to specific patient populations, the general public is seeking medical information for themselves and their families through the Internet. One study showed more than 37% of America's households with Internet access regularly seek on-line medical information.⁸ Monitored and unmonitored discussion groups for medical problems are popular sources of information and support. Some families are also seeking information from physicians who maintain World Wide Web sites.⁹ Because of the unregulated nature of the Internet, concerns have been raised about the quality of medical information the general public is receiving from Internet sources. On-line information may be incomplete, inaccurate, and misleading, especially in the medical arena.¹⁰ Furthermore, on-line instruments to evaluate health information on the Internet are not completely developed.¹¹

Another problem with Internet technology is limited access by people of lower socioeconomic groups who may not have computers in their homes or who may have limited computer and Internet navigation skills. Most previous studies of patient education systems using Internet or network technology have been

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performed with patients who have previous Internet experience and already have home computers.^{2,3,5,6,7,9} Study samples have not specifically included or identified the medically underserved in their design.

Although there is the potential for the Internet to be used as a source of patient education for the general public, data are currently lacking on patient education trials using information that would be available to anyone using an Internet browser. This is a pilot study of an office-based Internet patient education system in a family practice clinic. Our objective was to collect descriptive information on: (1) the usefulness of the Internet as a source of health information; (2) patient satisfaction with this education method; and (3) barriers to successful permanent implementation of an office Internet connection.

METHODS

This study was done in July 1997 in an urban family practice office in Wisconsin. We created a Web page directory with links to categorized patient education sites for the clinic. Hypertext links were established to Internet sites offering patient education materials that met previously published core standards.^{10,12} Sites needed to state authors, provide references, disclose ownership, and provide dates for posting and updating material. In almost all cases, we chose sites authored by professional medical organizations (eg, the American Academy of Family Physicians) or educational institutions (eg, Duke University). We tried to include as many topics commonly seen in the family physician office as possible. Internet access was provided through our affiliated medical school. The computer had a high-speed connection to the Internet via a local area 10 BASE-T Ethernet network, connected to a central campus Ethernet backbone by a fractional T1 connection (512 kbps with a 1600 pbps burst), which has a full T1 connection to a major state educational Internet service provider.

A computer with Internet access and a monitor were placed in an unused examination room. The Web page directory we created was the Web browser's (Internet Explorer 4.0) default home page. Patients were recruited for the study while they waited for appointments and at the completion of visits. They were informed that a medical student was available to help them use the computer. If not interested in using the Internet, patients were asked the primary reason they did not care to use the Internet patient education system.

Interested patients were introduced to the Internet site by a medical student. Before logging on to the Internet, the medical student asked and recorded patients' perceptions of what the experience would be like. The medical student remained with the patient to assist as needed while he or she perused our chosen

patient education materials. As the patient reviewed Internet materials, the medical student recorded (1) the amount of time spent on-line; (2) the number of sites unavailable because of server congestion; (3) the topics reviewed by the patient; (4) the amount of time waiting for Web pages to appear; (5) the medical student's overall perception of whether the patient was briefly surfing or intensely reading (on a scale of 1 to 5, where 1 = intense reading and 5 = surfing); and (6) the medical student's perception of the patient's computer skills (where 1 = no assistance needed and 5 = unable to do without assistance). Patients could review any of the patient education links offered on our main Web page and any number of links. There were no restrictions on the amount of time they were allowed to spend on-line.

Following the Internet session, the medical student interviewed all patients to assess the quality of the experience and their satisfaction with the patient education materials. Informed consent was obtained to audiotape the interview. Interview questions were reviewed by the affiliated hospital institutional review board. Transcriptions of the audiotapes were independently reviewed by one of the authors to capture the themes of the interview comments.

We performed statistical analyses using the Stata statistical computer software.¹³ Univariate comparisons were made with *t* tests or chi-square tests, and multivariate tests were done using the logistic regression technique.

RESULTS

Seventy-six percent of the population of the family practice clinic were women, 75% of the patients were covered by Medicaid, and 8% were uninsured. Fifty patients completed the Internet pilot project. The 2 most common reasons cited for not being interested in using the Internet patient education system were lack of time and transportation conflicts. Seventy-nine percent of the patients in the Internet study were women; the average age was 27 (range = 8 to 56 years), and the average completed educational level was 10 years (range = 2 to 13+). Twenty-six percent of the study population had a computer at home and 36% had used the Internet before. After controlling for age, there was a tendency for men to be more likely than women to have a computer at home ($P = .09$) and to have used the Internet ($P = .10$).

Before logging on to the Internet, patients were asked their perceptions of what the experience would be like. Eighty-six percent thought the experience would be fun, 88% thought it would be educational, 64% thought it would be challenging, 46% thought it would be easy, and 20% thought it would be hard. After controlling for age, women were significantly more likely than men to feel that the experience would be

challenging ($P = .003$). The average amount of time spent on-line was 17 minutes (range = 5 to 75 minutes). After controlling for age, men spent significantly more time on-line ($P = .007$). No sites were unavailable because of problems with the server connections. Twenty-three percent ($n = 11$) of study patients had problems with waiting for information retrieval. Of these 11 occurrences, 4 were delays in downloading pages and 7 were disconnections from the main Internet server.

The medical student assisting in the center perceived that most patients were intensely reading the information at the patient education sites. Fifty-one percent of patients were perceived to be at level 1, and only 8% were at level 5 ($n = 37$). There was a tendency for patients with home computers to engage in more "superficial surfing" ($P = .06$), after controlling for age, sex, and prior Internet use. There was a wide variance in the computer and Internet skill levels of the study participants. Although the average skill level was 3.1, 28% of patients were initially unable to perform any computer functions on their own. Younger patients and those with home computers tended to require less assistance in using the Internet system ($P = .07$ and $P = .04$, respectively), after controlling for sex and prior Internet use. Patients unable to initially perform any Internet searches on their own (skill level 5) were significantly older ($P = .003$), but not significantly different by sex, educational level, previous Internet use, or having a computer at home. Data on the Internet sites visited is displayed in the Table.

Overall, patients were very satisfied with the Internet patient education system. Ninety-four percent of them felt the information was helpful, with the most common reason cited being that they learned new information. Eighty-two percent felt they had adequate time to spend, 94% felt the information was easy to read, and 94% felt it was easy to understand. Three patients thought it was above their educational level.

Patients were asked if they would change a health habit or their lifestyle on the basis of the information they read at the Internet sites, and 77% thought they would. When asked what change they would make, 97% of these patients were able to state a specific health behavior. Of the changes patients stated they were going to make, 95% corresponded to an Internet site they had visited. For example, patients who stated they would change their diet had visited a site that contained information on healthy diets.

Ninety percent of patients felt more satisfied with their visit to the clinic than with previous visits because of the Internet session. The most common reasons given were that they learned more, the session added more attention or depth to their visit, and they thought they received better information than what the doctor had given. Additionally, 92% wanted to return to our Internet center again. The most common

TABLE

Topics of Internet Sites and the Percent of Patients (N=50) in a Family Practice Clinic Who Visited Them

Topic	Visitors, %
Contraception	18
Preventive health	16
Diet and exercise	14
Sexually transmitted diseases	12
Allergies/sinus	12
General sex/sexual anatomy	12
Colds and flu	8
Puberty	8
Parenting discipline/behavior	8
Stress/relaxation	7
Headache	6
Pediatric nutrition	6
Asthma	6
Cardiac anatomy	4
Hypertension	4
Diabetes	4
Back exercises	4
Acne	4
Menopause	4
Smoking	4
Obstetrics/pregnancy	4
Breast cancer	2
Osteoporosis	2
Depression	2
Drugs/alcohol	2
Ulcers	2
Alzheimer's disease	2
Arthritis	2

response patients gave as to why they wanted to return was to explore more health information. After completion of the interview, several patients added anecdotal comments. These comments included that the Internet system should be available in the waiting room and in every examination room and that the system should have been used a long time ago.

DISCUSSION

Our Internet patient education pilot study reveals several important themes: (1) patients with limited access to computers and a minimal skill level in navigating the

Web can obtain information that they find interesting and helpful from moderated patient education systems; (2) health information obtained from Internet sites may influence patient health behaviors; and (3) adding an Internet experience to the office visit can improve patient satisfaction.

Most previous studies of patient education systems using Internet or network technology have been performed with patients who have previous Internet experience and already have home computers. This study, in contrast, was conducted with patients who most often did not have a home computer, and two thirds of the patients had no previous experience with the Internet. By providing the Internet to the patients through a computer available at the clinic, we were able to overcome the barrier of access to the Internet and the patient education materials available on it. This barrier is a significant one for this patient population.

We addressed the problem of inaccurate and misleading health information available on-line by pre-selecting sites that met quality standards.^{10,12} Thus, we were able to ensure the provision of credible information to the patients. All the information available to the patients in the study is accessible to any Internet user. No private intranets or networks were used.

Having a medical student available to help patients with no Internet experience and to assist with problems that came up during on-line sessions ensured that any patient in the practice could participate if interested. We were also able to show that patients with limited access to computers and minimal skill levels in navigating the Web can obtain useful information from moderated patient education systems with the assistance of an instructor.

Most patients appeared to be intensely reading the information on the screen. This is also reflected by the large majority of patients who were able to state a specific health habit or behavior they wanted to change that corresponded to topics of sites they had visited. Because of the limits of our study and the protection of patient confidentiality, we are unable to determine if any long-term health behavior changes were made. However, these results suggest that information patients are receiving from on-line sources can influence their decisions about health habits.

The variety of health topics visited reflects the health status and concerns of this urban population. Many of the patients in the clinic are young single parents or teens. Their interest in health topics available on the Web suggests that the Internet may be a good method of patient education for young adults and teens, especially as an intervention method for groups considered at risk for health problems, such as unwanted pregnancies or sexually transmitted diseases.

This study also shows that patient satisfaction can be improved by incorporating an Internet session into

an office visit and that patients want to learn more about their health at medical visits. The finding of improved satisfaction with visits is important when paired with previous studies that show improved satisfaction and increased compliance when more information is received at visits.¹⁴ It is interesting to note that some patients thought they received better information from the Internet than they did from their doctor. Ninety-two percent of the study participants wanted to use the Internet again.

Despite the benefits found in this study, one significant barrier was identified. Twenty-eight percent of patients were unable to perform any Internet or computer functions initially on their own. This finding could be anticipated when dealing with a patient with limited access to computers. For our study, a medical student was available to provide assistance to patients. However, to successfully implement the system on a long-term basis, we would require a member of the office staff to provide this assistance and maintain the Web page directory. This could represent a financial barrier for clinics wishing to implement a similar system. The skill level of the patient population will need to be considered as part of the planning and budgeting of offices interested in implementing similar systems. However, given the severity and chronicity of health problems among patients in an underserved area, the provision of Internet guidance may not only be warranted but also justified.

LIMITATIONS

This pilot study has several limitations and potential biases. It was performed on a small sample, and the results may not necessarily be generalizable to all patients in the clinic or patients of differing socioeconomic groups. In addition, social conformity or desirability may have influenced patient responses during the audiotaped interview. We believe providing someone to introduce patients to the Internet system was an important factor in the success of our study. Therefore, these results may not extrapolate to an Internet patient education system that does not provide an orientation. The study is limited in that it did not determine the literacy level of the participants. Finally, to determine if a similar system would work in an office without an orientation, this study would need to be performed with a control group.

CONCLUSIONS

A moderated Internet patient education system can be successfully implemented into family practice offices. Internet access to on-line health information can be provided to patients who may otherwise not be able to obtain this information. Patients can have access to a wide variety of health topics and often show interest in changing their health behaviors on the basis of the

information they obtain from the Internet. Finally, an office-based Internet system can improve patients' satisfaction with encounters in the health care system. The increased satisfaction may potentially lead to more compliance with recommended follow-up visits and increased patient responsibility for health care decisions.

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