

Using the Internet to Provide Information Prescriptions

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ABSTRACT. *Introduction.* An information prescription is the provision of specific information to a patient on how to help manage a health problem. The Internet is being used increasingly as a source for information prescriptions, with clinicians directing patients to specific Web sites. As with any health care intervention, patients' lack of compliance is a barrier to the effectiveness of Web-based information prescriptions (WebIPs). WebIPs cannot be helpful if patients do not review the information prescribed for them.

Objective. The main objective of this study was to quantify the percentage of families who visit a Web site that was specifically prescribed by their physician. In addition, the use of an e-mail reminder was used to determine if it increases the likelihood that families will visit the prescribed Web site. Finally, barriers to accessing the prescribed Web site were identified.

Methods. Children were eligible if they presented to the pediatric gastroenterology clinic with chronic constipation and/or encopresis and their family had an active e-mail account and access to the Internet in their home. During their clinic visit, physicians instructed families to visit a Web site that provided educational information pertinent to their child's problem. Families were given a form with the Web-site address and a log-in identification number. Two days after their clinic visit, half of the families received an e-mail reminding them to visit the Web site. Families were contacted 1 week after their clinic visit to identify barriers to accessing the Web site.

Results. Eighty-three families participated in the study. Of the 83 families, 54 (65%) visited the prescribed Web site within 1 week of their clinic visit. Families who received e-mail reminders were significantly more likely to visit the Web site than families who did not receive an e-mail reminder (77% vs 53%). This difference could not be explained by the type or speed of Internet connection or how frequently they accessed the Internet or e-mail. The most common reasons that families cited for not accessing the Web site were "I forgot" and "I didn't have time." Few families cited technical reasons for not accessing the Web site.

Conclusions. Almost two thirds of the families given a WebIP logged on to the prescribed Web site. The probability that families would access the site was increased by 45% with an e-mail reminder. Clearly, e-mail prompts

improve compliance to WebIPs. As content and treatment programs continue to proliferate on the Web, it is important to identify barriers and solutions to them to improve overall compliance. *Pediatrics* 2005;116:e643–e647. URL: www.pediatrics.org/cgi/doi/10.1542/peds.2005-0404; *information prescriptions, Internet, World Wide Web, encopresis, behavior change, compliance.*

ABBREVIATION. WebIP, Web-based information prescription.

The Internet has become an important source of health and medical information. Seventy percent of parents with children under the age of 18 use the Web in the United States,¹ with seeking health information as one of the most common activities. Seventy-five percent of people 15 to 24 years of age have searched for health information on the Web.² Some clinicians have begun to take advantage of the wealth of health-related information on the Web by giving their patients Web-based information prescriptions (WebIPs).³ Information prescriptions are "prescriptions of specific, evidence-based information to manage health problems."³

One of the main advantages of WebIPs is that patients can receive additional information about their problem that they can review as often as necessary, at their own pace, and whenever and wherever they choose. WebIPs have additional advantages in that (1) the information can be updated or added to quickly and easily, (2) the information is accessible anywhere there is a computer with Internet access, (3) the information can be presented in an interactive and engaging manner through the use of animation and video, and (4) the information can be personalized through the use of algorithms generated by data provided by the user. However, a significant amount of health-related information on the Web is inaccurate or misleading. By using WebIPs, clinicians can direct patients and their families to Web sites that contain information that is of high quality, appropriate to their condition, and consistent with their clinician's approach to treatment.

Although using computer/Web-based educational materials from one's own home can be convenient and acceptable to some patients,⁴ WebIPs cannot be helpful if patients do not review the information prescribed. The only published study examining how frequently families visit Web sites that are prescribed by their providers found that 32% of families visited 1 of the prescribed Web sites. However, this study relied on a self-report measure of Web use,

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Accepted for publication May 19, 2005.

doi:10.1542/peds.2005-0404

No conflict of interest declared.

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encouraged patients to visit at least 1 of many sites that typically contained general health information, and enrolled patients who were presenting at well-child care visits as opposed to children in need of care for a specific problem.³

The current study was conducted to determine if families of children suffering from chronic constipation and/or encopresis will visit an educational Web site that is specifically prescribed by their physician and whether an e-mail reminder increases the likelihood that they will visit the Web site. In addition, barriers to accessing the prescribed Web site were identified.

METHODS

Subjects

Families were approached for participation in the study if they had a child who was being seen for the first time in the pediatric gastroenterology clinic at the University of Virginia with a chief complaint of chronic constipation and/or encopresis. To be eligible, families had to have access to the Internet in their home and have an active e-mail account. This study was approved by the University of Virginia Health System Institutional Review Board.

Experimental Procedure

At the conclusion of the patient's clinic visit, 1 of the 2 attending gastroenterologists (S.B. or J.S.) provided a form with the Web-site address and a log-in identification number (Fig 1). The handout, signed by the physician, stated: "It is important to learn as much as you can about bowel problems and how to manage them. As part of your child's care, I want you to go to this Web site and review the relevant material. This should be beneficial to your child's treatment." The study coordinator was notified about newly recruited patients, and families were assigned randomly into a "prompt" group or "no-prompt" group. Two business days after the clinic visit, an e-mail containing the Web-site address and

a reminder to visit the Web site was sent to those in the "prompt" group.

Approximately 1 week after the clinic visit, an attempt was made to contact the primary caretaker of each patient by telephone or e-mail to ask about their experience accessing the Web site. Families who did not access the Web site were encouraged to identify barriers that they may have experienced in accessing the prescribed Web site. They were presented with a list of potential barriers and were asked whether the item had been a barrier for them to accessing the Web site. The barriers are listed in Fig 2 and include both personal/family/behavior (items in dark gray) and technical issues/obstacles (items in white).

Web Site

The Web site used in this study was an abbreviated version of a larger Web-based program for the treatment of pediatric encopresis.⁵ On the Web page, users read the following instructions: "We hope you find the information in this website to be helpful. Before you can begin, please enter the ID number you were given in the space below, and then click the button to begin." When the "submit" button was clicked, the 2-digit identification number and the date and time were logged in a database. The 2-digit identification number identified the family as a member of the e-mail-prompt group or no-prompt group. This was the only information captured in the database.

The Web site contained 3 modules: (1) "How to Strain"; (2) "Giving and Getting Enemas"; and (3) "The SuperCleanout game." The "How to Strain" module reviewed proper defecation dynamics, including proper positioning, straining, and muscle-control/strength-building exercises. The "Giving and Getting Enemas" module reviewed techniques for administering enemas. "The SuperCleanout game" is an arcade-style game for children with a learning message. The parents and children were able to view as much of the site as they wanted and could come back as often as they liked.

Data Analysis

Descriptive statistics were computed for all principal variables. Parametric *t* tests were used to compare continuous variables (eg,

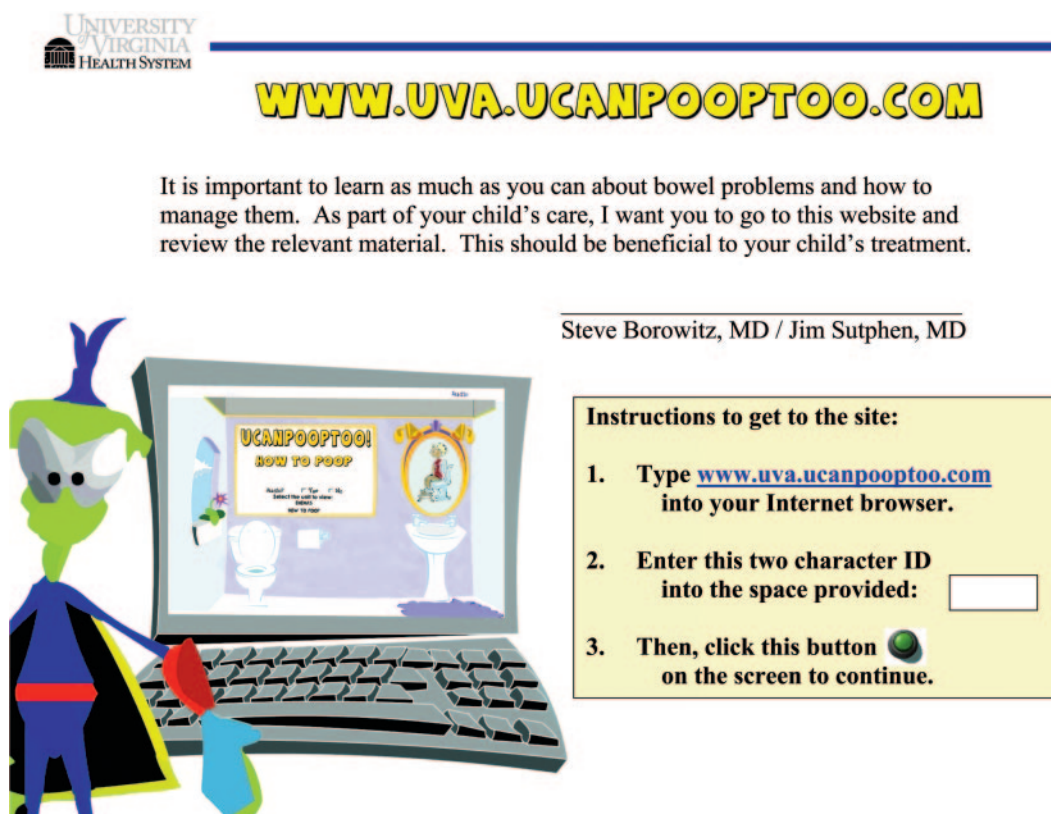


Fig 1. WebIP form handed to patients at the end of their pediatric gastroenterology clinic visit.

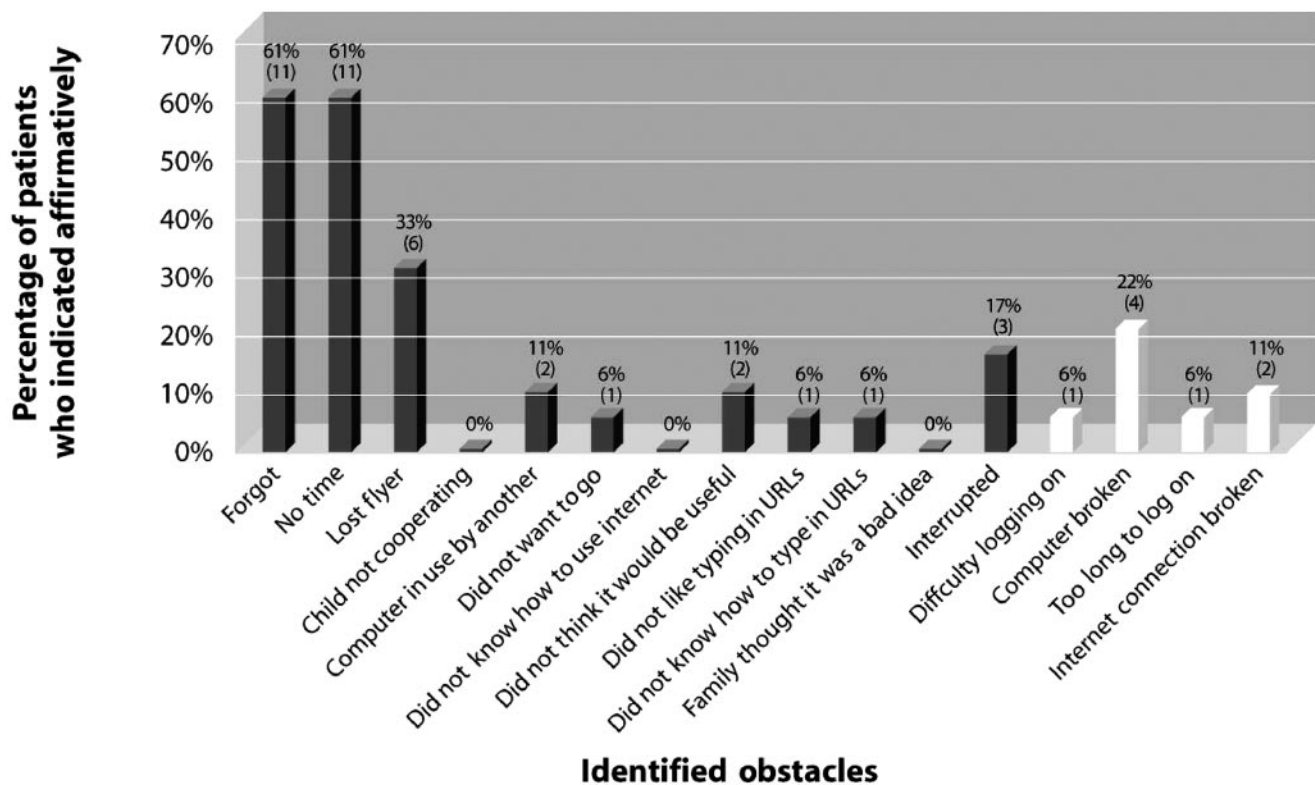


Fig 2. Obstacles identified by those who did not go to the Web site (the total number of included interviewed subjects is 18).

age) across the 2 groups. Nonparametric cross-tables, including a Mann-Whitney test as a measure of association, were computed for the noncontinuous demographic and descriptive variables. This choice of nonparametric tests was determined by the need to handle noncontinuous variables for which the assumptions of the parametric tests are not fulfilled. Because the sample size for posthoc analyses was small, we used Fisher's exact test, which is another nonparametric test suitable for comparisons of small groups.

RESULTS

Eighty-three families enrolled in the study between January 2003 and December 2004. The children ranged in age from 25 months to 14.5 years, with a mean age of 7 years 10 months (94 ± 38 months). All families were seen by 1 of 2 pediatric gastroenterologists (S.B., 59%; J.S., 41%). Families were assigned randomly to either the "e-mail-prompt" ($n = 43$) or "no-e-mail-prompt" ($n = 40$) group. There were no significant differences between the 2 groups on type and speed of Internet connection (see Table 1), the number of times they reported checking their e-mail, or frequency of using the Internet (see Table 2). There were no significant differences in the ages of the children between the 2 groups (95.4 vs 92.9 months; $P = .77$ from the t test)

TABLE 1. Type of Internet Connection According to Group

Type (Speed)	Prompt	No Prompt
Dial-up (low)	21	16
Cable (high)	3	11
DSL (high)	3	0
LAN (high)	1	1
Satellite (high)	1	0
Unknown	6	4

DSL indicates digital subscriber line; LAN, local area network.

or in which clinician they saw ($P = .25$ from the Mann-Whitney test).

Of the 83 families, 54 (65%) visited the prescribed Web site within 1 week of their clinic visit. Families who received e-mail reminders were significantly more likely to visit the Web site than were families who did not receive an e-mail reminder (77% vs 53%; $P = .01$), which represents a 45% improvement from those who did not get the prompt to those who did. Using Mann-Whitney tests, type or speed of Internet connection or frequency in which the families accessed the Internet or e-mail did not explain this difference.

The study coordinator attempted to contact families 1 week after their clinic visit. Of the 83 families, 67 (81%) were contacted by telephone ($n = 57$) or e-mail ($n = 10$). The purpose of this interview was to identify perceived barriers to accessing the Web site. Individuals were able to select multiple barriers, if applicable. Of the 18 interviewed subjects who did not go to the Web site, the 2 most common obstacles reported were "I just forgot" and "I didn't have much time" (see Fig 2 for a graphic summary of these

TABLE 2. Number of Times E-Mail and the Internet Are Generally Checked According to Group

No. of Times	E-mail		Internet	
	Prompt	No Prompt	Prompt	No Prompt
<1 per wk	2	2	2	1
1-2 per wk	8	6	5	4
3-6 per wk	6	8	10	8
1 per d	14	9	13	11
2 per d	2	1	2	1
>2 per d	1	0	1	0

data). No significant differences were found in identified obstacles between the families who received the e-mail reminder and those who did not, as shown by Fisher's exact test, which was used to compare these relatively small groups.

DISCUSSION

Increasingly, parents want to participate more in decisions regarding their child's health and health care. Although the exact role that any given family wishes to play in health-related decision-making varies, the desire for information about their child's care is usually very high. In some cases, families do not believe that their doctors are providing them with all the information they want or need.⁶ This does not mean that physicians are not spending adequate time talking to their patients. Physicians tend to spend a significant amount of time performing patient education across many different clinical settings.⁷ Comprehension and retention of the information discussed, however, is variable and often quite disappointing.⁷

Many families are turning to the Web to find health-related information.¹ WebIPs are one way of directing families to reliable information sources. However, physicians must be selective about the Web sites that they recommend to their patients, because a significant amount of health-related information on the Web is inaccurate or misleading.⁸ In response to the variable quality of health-related information on the Web, many academic and commercial organizations have generated criteria to judge the quality of health-related Web sites and have given awards or seals of approval to be posted on the approved Web pages.⁹

Traditionally, clinicians have been the primary source of health information, and although millions of people are searching the Web for health-related information, most patients still trust clinicians to provide the most credible answers to their health questions. Patients who get information on the Web typically use it either as an adjunct to the information they have received from their physician or as a means of opening a dialogue with their clinicians.¹⁰ Patients have much more confidence in a Web site if their doctor has recommended it or created it.¹¹ Using WebIPs, clinicians can direct patients and their families to Web sites that contain information that is of high quality, appropriate to their condition, and consistent with their clinician's approach to treatment.

In this prospective study, 83 families were given a verbal and written prescription to visit a Web site created specifically to help them manage the chronic illness for which they had brought their child into the clinic. They were told that there was information on the Web site that would help them treat their child's problem. Of the 83 families, 54 (65%) visited the prescribed Web site within 1 week of their clinic visit. This percentage is higher than what probably would have occurred if only verbal instructions or a verbal WebIP was given, because instructions that are provided to patients in writing have been found to boost compliance over instructions that are only given verbally.¹² This percentage is also much higher than that found in the only previous study examining WebIPs,

in which only 32% of families visited the prescribed Web sites.³ This difference is likely because the families in the current study were being seen for an identified problem and were encouraged to go to a specific Web site that addressed this particular problem rather than recommended to view more general health sites. In addition, the family's use of the system was tracked directly (use of a log-in identification number that was registered in a database) rather than by self-report.

Families who received e-mail reminders as a way of boosting compliance in the current study were significantly more likely to visit the Web site than were families who did not receive an e-mail reminder (77% vs 53%). This difference could not be explained by the type or speed of the families' Internet connection or how frequently they accessed the Internet or e-mail. Potentially further boosting compliance for the "prompt" group, the reminder e-mail contained the Web-site address, which may have further eased the process of going to the site.

In this study, the most common reasons that families cited for not accessing the Web site were "I forgot" and "I didn't have time." Few families cited technical reasons for not accessing the Web site. Although an attempt was made to be consistent in providing the WebIP to patients, some patients may have discussed it in more detail during the office visit. This was not controlled for in the design of this study and may have influenced some families to visit the Web site more than others. Moreover, we did not specifically ask whether families had additional questions at the conclusion of the visit. It is possible that the group of families who did not visit the Web site perceived less need for additional information than those who went to the Web site.

There are some additional limitations of this study. Participants had to have access to the Internet from their home, which may have limited or biased the sample. We imposed this inclusion criteria to enable us to assess whether families with easy access to the Internet would utilize a WebIP. This inclusion criteria may have removed a major barrier to the use of WebIPs: access to the Internet in and of itself. Another limitation was the relatively small sample size used in this study. It was also fairly specialized in that the participants had all been referred for treatment to a tertiary care setting. These families may have been more motivated to seek care and may have been more in need of expert care than families seen in other health care settings. Finally, the results of this study may not be broadly generalizable. Encopresis is a disorder associated with a great deal of social stigma. As a result, families with children suffering from encopresis may be more likely to seek information or treatment on the Web than families who have children who suffer from disorders considered less embarrassing. Additional studies examining the use of WebIPs with a broad range of disorders is necessary before any final conclusions can be made.

As the Internet is used more and more as a means of providing patients with health information, it is vital to minimize any obstacles to patients accessing

that information. Lack of compliance is a barrier to information prescriptions as it is with any health care intervention.¹³ Information prescriptions cannot be helpful if patients do not review the information prescribed for them. Additional research is necessary to determine how to improve compliance further. It is possible that Web-site content, including tailored recommendations and/or information, may further boost compliance if the parents know what information is obtainable. In this study, almost two thirds of the families visited a Web site that was specifically designed for their child and prescribed in writing by their physician, and an e-mail reminder made it significantly more likely that the family would visit the prescribed Web site.

ACKNOWLEDGMENT

This research report was partially supported by National Institutes of Health grant RO1 HD28160.

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Pediatrics 2005;116:e643

DOI: 10.1542/peds.2005-0404

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