

# Using the Web to Reduce Postoperative Pain Following Ambulatory Surgery

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*To test the hypothesis that educational information provided via the web would not only be accessed by our patients, but could also reduce postoperative pain following ambulatory surgery, we enrolled 195 patients into a randomized controlled study. Fifty-two percent of our ambulatory surgery patients already knew how to use and had access to the Internet. Eighty-five percent of our study patients accessed the resources made available to them on the web site. Patients who had access to the pain management information on the ambulatory surgery web site reported significantly less postoperative pain on arrival to their home after surgery ( $p < 0.016$ ) and into the night after surgery ( $p < 0.013$ ). These patients also reported significantly less postoperative pain for the day immediately following surgery ( $p < 0.037$ ). We conclude that using the Internet to provide just-in-time patient education can significantly effect the clinical outcome of care.*

## Introduction

More and more patients are having complex surgical procedures on an outpatient basis and assisting these patients with managing their own care has become very difficult. At Beth Israel Deaconess Medical Center (BIDMC) in Boston we have developed an ambulatory surgery patient web site that provides reliable, accurate and relevant health care information [1,2]. As a result, essential information necessary for a successful ambulatory surgery experience, is now more easily and conveniently available to our patients.

Patients and their caregivers will use the computer to access information about their clinical condition [3,4,]. Furthermore, by improving access to information using the world wide web, patients are encouraged to become active participants in their own care [5]. Providing web-based access to information allows us as clinicians to overcome barriers of both time and distance in the care of our patients. Very little information is available however regarding the usefulness and effectiveness of the Web as a clinical tool for patient education. In this study we evaluate whether or not our patients have access to the Internet and if they do whether or not they have

the skill to use it. We also evaluate the extent to which our patients access relevant web pages once they are made available to them. We also attempt to determine if access to the pain management information on our web site impacts the postoperative pain experience of the ambulatory surgery patient.

Inadequate postoperative pain management is a common reason for unplanned hospital admissions following ambulatory surgery [6]. Consequently preparing for pain management following surgery is an integral part of the patient's preoperative education. Having access to pain management information early, and throughout their surgical experience, allows patient's time to plan, consider alternatives, and identify and ask questions important to their individual situation.

A patient's perception of their postoperative pain experience is a crucial component of their overall level of satisfaction with care. Patients who consider themselves well informed are more likely to have positive outcomes and increased satisfaction with their care [7]. Patients report, however, that they are not adequately told how they will feel after their surgical procedure, that they do not recall receiving pain medication instructions, or if they do, they do not understand them [8,9]. In addition, patients often need to clarify information at a time when clinical staff may not be available. By providing web-based postoperative pain management information our patients have access to information in a more convenient way and at a time when the information may have more relevance and importance to them.

## Setting

The Ambulatory Surgery Center is an ideal setting in which to evaluate the impact of providing educational information to patients via the World Wide Web. The Ambulatory Surgery Center at BIDMC performs a wide array of outpatient surgical procedures including gynecological, laparoscopic, and orthopedic procedures. Nurses in this unit provide primary nursing care to patients and are actively involved in the educational component of care during all phases of the patient's surgical experience.

Preoperative education, which has been shown to reduce both patient anxiety and postoperative complications [10], is an integral part of the care provided in the BIDMC ambulatory surgery center. Current nursing practice at BIDMC provides for preoperative teaching during an on-site patient visit or, for selected patients, over the telephone. However, important information provided during these sessions may become lost or forgotten by the patient who may need to refer to it at a time when their clinicians are not available.

To address these concerns we designed a web site that is customized to the needs of our ambulatory surgery patients [11]. Available information includes, when to arrive, what to bring, what to eat or not eat, what medication to take or not take, what happens when it is time for surgery, and where family/significant others will wait. Important discharge information includes what to expect when you go home, managing discomfort, and who to call if a problem arises. The deployment of our web site has made this information readily and conveniently available to our patients. The top-level table of contents for our web site is shown in Table 1.

Table 1. Table of Contents

<ul style="list-style-type: none"> <li>• About the Center</li> <li>• At A Glance</li> <li>• Preparing For Surgery</li> <li>• Day of Surgery</li> <li>• Going Home</li> <li>• Family and Friends</li> <li>• Other Resources</li> </ul>
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## Methods

Study participants include a prospective cohort of ambulatory surgery patients scheduled for preoperative screening who had the knowledge and the access to the Internet at home during the study period. Patients who met these eligibility requirements and who consented to participate were randomized into an intervention or control group.

Patients assigned to the control group received ‘usual care’ and were given access to the Ambulatory Surgery Nursing web site. Usual care for these patients consisted of a preoperative interview with an experienced ambulatory surgery nurse who reviewed essential information and answered patients’ specific questions. This session took place either in the medical center or by telephone.

Patients assigned to the intervention group received the same ‘usual care’ provided to the control group and were also given access to the Ambulatory Surgery Nursing web site. Unlike the control group, these patients were provided password-protected access to a pain management information section of the web site (Table 2). Other than the pain management section, there was no difference in what both groups had access to on the web site.

Table 2. Pain Management Section of the Web Site

<p><b>Managing Your Discomfort</b></p> <ul style="list-style-type: none"> <li>• Before Surgery</li> <li>• After Surgery</li> <li>• At Home</li> <li>• About Your Pain Medications</li> <li>• Filling Your Prescriptions</li> </ul>
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Potential benefits for patients participating in our study included improved access to reliable and accurate information concerning the ambulatory surgery process including preoperative preparation and discharge care needs, improved understanding of post-discharge pain management, and overall improved satisfaction with the ambulatory surgery process.

The URL of the web site was provided on a card to all patients, including an explanation on how to get to the site. The URL card for the study patients included information on how to use their password. The generic purpose of the site was explained to the patients and they were encouraged to use it. In addition, it was explained that no patient specific clinical data was to be included on the web site.

Both control and intervention groups were asked to complete a postoperative questionnaire regarding their use and opinion of the site, as well as their postoperative pain experience. The questionnaire, a stamped, self-addressed envelope, and a second URL/password information card was sent home with the patient upon discharge from the center. Follow-up reminder cards and a second mailing of the survey were both undertaken to encourage completion and return of the survey.

Information was collected with regards to the age, sex, surgical procedure and the American Society of Anesthesiology (ASA) status of the patient. ASA status, a measure of patient acuity, was determined by a board-certified anesthesiologist who had reviewed the patient’s medical history and documented such in the patient’s medical record.

Table 3. ASA Classification

I	No systemic disturbance
II	Mild to moderate systemic disturbance
III	Severe systemic disturbance
IV	Life threatening systemic disturbance

The patients' postoperative pain score was measured using a 5-point Verbal Rating Scale (VRS) which consisted of a list of adjectives that describe different levels of pain (Table 4). The 5-point VRS is part of the widely accepted McGill Pain Questionnaire [12]. A series of factor analyses indicates that the VRS scale is considered a useful measure of subjective pain intensity [13].

Table 4. The 5-point Verbal Rating Scale

( 0 )	Mild
( 1 )	Discomforting
( 2 )	Distressing
( 3 )	Horrible
( 4 )	Excruciating

Statistical Analysis Software (SAS) version 6.12, was used to analyze patient questionnaire results. Univariate analysis includes summary statistics of the study population and web page utilization. To determine if inclusion in the intervention group is associated with the patients' reported pain intensity, a Wilcoxon test is applied.

## Results

To determine if patients had access to the world wide web at home and the skill to use it, nurses in the Preoperative Testing Center interviewed 791 English-speaking patients who were scheduled for surgery. Of the patients questioned 410 (52%), had both the access and the self-reported skill to use the web. One hundred and sixty-seven of these patients were scheduled to be admitted to the hospital after their surgery and therefore were not included for the purpose of this study. Of the remaining 239 outpatients, 44 (11%) did not provide consent to participate. The most common reason cited for not participating was a 'lack of time'.

The remaining 195 patients who did consent to participate were enrolled in the study and randomized into a study arm (Table 5). Ninety-seven patients were randomized to the control group and 98 patients were randomized to the intervention group.

Table 5. Patient Recruitment

Patients Interviewed	N=791	
No Access/Skill	381	48 %
Access & Skill	410	52 %
Inpatient	167	41 %
Refused	44	11 %
Enrolled	195	48 %

Study participants ranged in age from 18 to 82 years old. Seventy-one percent of the participants were female. There was no statistical difference between the study and control groups with respect to age, gender, or ASA status. A summary of the study participants can be found in Table 6.

Table 6. Description of Study Participants

		Enrolled Group (n=195)	Study Group (n=98)	Control Group (n=97)
Age	mean range	44.8 18-82	45.2 19-82	44.5 18-74
Sex	male female	56 (29%) 139 (71%)	31 (32%) 67 (68%)	25 (26%) 72 (74%)
ASA	I II III	105 (54%) 78 (40%) 4 (2%)	51 (52%) 43 (44%) 1 (1%)	54 (56%) 35 (35%) 3 (3%)
Response Rate		80 (41%)	32 (33%)	48 (50%)

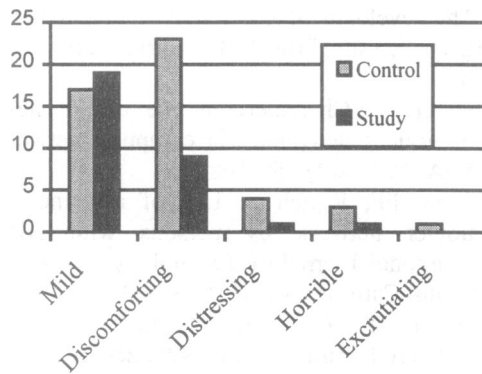
Of the 195 surveys distributed, 80 were returned. Neither gender nor ASA status was related to whether a participant returned their survey, however those who did return their survey tended to be older ( $p < 0.01$ ).

Overall 85% of the survey respondents accessed the web site resources made available to them. Patients in both the control group (91%) and the study group (89%) reported that the information on the web site was useful to them. There was no difference in the reported frequency with which either group accessed the web site.

Qualitative analysis of patient comments revealed the following common themes: 1) organization and ease of use, 2) extent and usefulness of information, 3) psychological/emotional affect of the page, 4) recommendations for more specific information. The majority of the patient comments were favorable (74%) and the less favorable comments referred mostly to the need for access to the site prior to the pre-procedure visit and the desire for more procedure specific information.

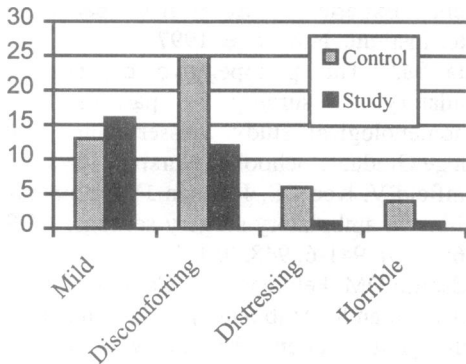
Patients who had access to the pain management section of the ambulatory surgery web site reported significantly less postoperative pain on arrival to their home than did the control group ( $p < 0.016$ ) (Table 7).

Table 7. Pain Scores on Arrival to Home ( $p < 0.016$ )



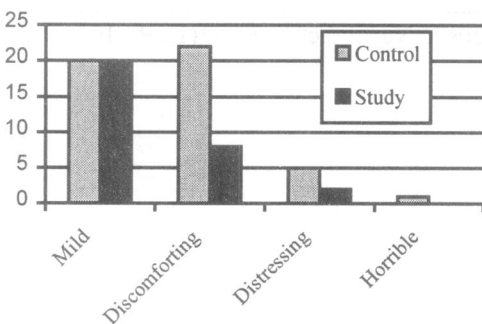
Reported pain scores from the first night after surgery were also significantly less in the intervention group than in the control group ( $p < 0.013$ ) (Table 8).

Table 8. Pain Scores Night After Surgery ( $p < 0.013$ )



On day after surgery a significant difference in the reported pain scores continued between the two groups ( $p < 0.037$ ) (Table 9). No association was found between age, gender, ASA status, and the responses on the patient questionnaire.

Table 9. Pain Scores Day After Surgery ( $p < 0.037$ )



## Discussion

A patient's perception of their postoperative pain experience is a crucial component of their overall level of satisfaction with care and an important marker for measuring quality of care. In this randomized controlled study, patients with access to web-based pain management information reported significantly lower postoperative pain intensity scores. Patients reported significantly lower pain scores on their arrival to home, for the night of surgery and for the day following surgery. By providing conveniently available, just-in-time, web-based information, we have significantly enhanced the outcomes of care for our ambulatory surgical patients.

Consistent with the work of others we have also demonstrated that patients will use the computer to access personally relevant healthcare information. Eighty-five percent of our study participants accessed the web-based information made available to them. Those patients who used the ambulatory surgery web site reported that providing information in this way was very useful to them. Responses from patients included "very effective at easing fears", "a great help and very informative", "well organized and easy to read", "helpful to be able to get information at my convenience", "made the experience much less threatening", and "the pictures made me feel more comfortable." This feedback is significant when considering that patients who believe themselves well informed are more likely to have positive outcomes and increased satisfaction with their care. One patient wrote, "Had I visited before my preoperative tests, I would have had all my questions answered."

There was much to be learned during the process of developing an ambulatory surgery web site designed specifically for patients. Most important was the necessity to maintain consistency with other written materials, with what was being told verbally to the patient and with other web sites relating to the same topic. Also crucial was the need to encourage input from many people. To develop a clinically sound and credible site, nurses, surgeons, anesthesiologists, pharmacists, social workers and patients, all participated in the development.

Since we have confined ourselves to a small sample of current Internet users our results may not be reflective of the general ambulatory surgery patient population. The study sample may represent patients with higher levels of education, income or even motivation to learn. It is also possible that some

patients may have incorrectly represented their abilities with regards to their knowledge of and access to the Internet. Other variables such as the complexity of the surgical procedure, positive or negative outcomes of the procedure, past surgical experiences of the patient, as well as the patient's pain history and attitude towards pain, could also be confounding the results.

When we began this project we could only estimate the extent to which our patient population might have access to, or use, the Internet. As a result of our investigation we have identified that more than fifty percent of our patients already know how to use and have access to the Internet. Since we can reasonably expect that this number will increase over time this finding has significant implications for our strategic plan of meeting patients' educational needs into the next century. For the short term and to promote the use of this patient resource, computers with browsers set on the ambulatory surgery web site are provided in both the ambulatory surgery waiting area and the preoperative testing area.

Providing personally relevant healthcare information using the Internet as a delivery tool was intended to complement other nursing activities that support a positive surgical experience for our patients and their families. The results of this study have demonstrated that the Internet can successfully be used as "a platform on which to deliver interventions to patients" [14]. By providing conveniently available, just-in-time, web-based information, nurses can significantly enhance the outcomes of care for patients and their families. The results of this study are an important addition to the current body of knowledge in this area and it is our hope that they will be used as a foundation for future research.

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