THE USE OF A COMPUTER WEBSITE PRIOR TO SCHEDULED SURGERY (A PILOT STUDY): IMPACT ON PATIENT INFORMATION, ACQUISITION, ANXIETY LEVEL, AND OVERALL SATISFACTION WITH ANESTHESIA CARE

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Scheduled surgery can often be a stressful time for patients. While anesthesia providers give a full explanation of care to the patient, research suggests that anxiety and time constraints imposed by the system may hinder the amount and quality of information provided. Use of technology to augment dissemination of information may have an impact.

The purpose of this study was to determine the impact of a website on: (1) preoperative patient education, (2) patient anxiety, and (3) patient satisfaction with anesthesia care. The week prior to surgery, 64 ASA class I and II subjects at a 350-bed urban university affiliated hospital completed a demographic questionnaire, State Trait Anxiety Inventory (STAI) and modified Standard Anesthesia Learning Test (mSALT), and the experimental group was given website information. On the day of surgery, all subjects completed the STAI and mSALT. Before discharge, subjects rated satisfaction.

The experimental group had a significant increase in posttest mSALT scores ($P = .004$). Neither the experimental nor the control group had a significant change in posttest state anxiety ($P = .279$ and .762) or trait anxiety ($P = .823$ and .570). The experimental group differed significantly from the control group in satisfaction with teaching ($P = .019$).

Key words: Patient education, preoperative anesthesia information, website.

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cheduled surgery can often be a stressful time for patients and their families. Of major concern is the anesthesia technique and type of care that will be provided. While it is customary and required for anesthesia providers to give a full explanation of care to the patient, research suggests that anxiety and time constraints imposed by the system may hinder the amount and quality of information provided by the clinician. There is no acceptable replacement for the clinician-patient interview; however, methods to augment dissemination of information may have a positive impact on the patient’s preoperative experience. The majority of supplemental information is often provided in the form of written pamphlets. To date there has been no evaluation of a website as a medium to provide supplemental information about the patient’s anesthetic.

The use of website information has been well documented in many educational settings.¹ In the healthcare field, use of the Internet and access to website information has evolved as a vast resource. According to O’Connor and Wright, the Internet has had a powerful impact on anesthesia and critical care providers since the mid-1990s.² The authors note that through the Internet, providers have been able to share and collaborate on information with little delay. Not only is website information of value to practitioners, but it can be of benefit to patients as well. Saba and McCormick³ recommend computer access to website information as an efficient, private, and accessible means to provide health promotion and teaching. A 1999 Louis Harris Poll found that 70 million Americans used the Internet for healthcare-related information.⁴

The use of a website to provide preoperative information prior to surgery may be a solution for the present-day time constraints related to current patient teaching. The website supplemental preoperative instruction may give the patient the opportunity to address concerns about anesthesia and their safety.

The research question that guided this pilot study was: Does the use of a website enhance patient preoperative information acquisition, influence preoperative anxiety, and influence overall patient anesthesia satisfaction? The purpose of this pilot study was to deter-
mine the website’s impact on: (1) preoperative patient anesthesia information, (2) patient anxiety, and (3) overall patient satisfaction with their anesthesia care.

The hypotheses were: (1) subjects exposed to the website will have a higher acquisition of knowledge of preoperative anesthesia information, (2) subjects exposed to the website will have a lower level of preoperative anxiety, and (3) subjects exposed to the website will have a higher overall satisfaction with their anesthesia care in comparison to the group that was not exposed.

The PRECEDE framework was used as the theoretical basis for this research. PRECEDE is used as an acronym for predisposing, reinforcing, and enabling constructs in educational diagnosis and evaluation. Predisposing factors (knowledge, attitudes, beliefs, values, and interests) functionally serve as motivators to the individual during the decision making process that lead to taking action in his or her health. Enabling factors (motor and cognitive skill development) are requisite to the individual carrying out the desired health-related activity. Reinforcing factors, whether real or anticipated, result from societal and peer group influences. The website-based intervention was the enabling factor for this study and its impact on the patient’s level of knowledge acquisition, anxiety, and level of satisfaction was measured.

**Methodology**

Permission to conduct this pilot study was obtained from the institutional review board. The study population consisted of ASA class I and II same-day-surgery adult subjects between the ages of 18 and 75 years of age. All study patients were scheduled for general anesthesia at a 350-bed urban university hospital in the middle Atlantic region of the United States. Exclusion criteria included the following: (1) healthcare providers, (2) vision impairment, (3) multiple prior anesthetics, (4) below a primary school education, (5) a history of psychotic reactions or dementia, or (6) unfamiliar with computer use. During the period of the study, subjects enrolled on even numbered weeks were assigned to the experimental group, and subjects enrolled on odd number weeks were assigned to the control group.

The first phase of this study was conducted at the presurgical assessment office at the university medical center. All prospective subjects were asked to sign an informed consent after the purpose of the study was explained and their questions were answered. The subjects completed a demographic questionnaire, and a review of the demographic data was done to confirm eligibility for participation in the study. Immediately prior to the preoperative physical examination, eligible subjects were asked to complete the modified Standard Anesthesia Learning Test (mSALT), a questionnaire regarding anesthesia information, and the Spielberger State Trait Anxiety Inventory (STAI) in a secluded area of the presurgical office.

Upon completion of the mSALT and STAI, all subjects received structured information regarding anesthesia-related issues deemed essential for all patients having surgery. The researchers followed the same instruction format for all subjects. This included a standardized description of the surgery center, as well as a basic description of the different anesthetic options and related preoperative and postoperative issues that may be expected.

Subjects enrolled in the study on even weeks of the month also completed the website instruction module. The website instruction module content was a replica of the standardized verbal instruction module enhanced with digital photos (Figure). The site was set up on a computer as a “book marked” website that allowed the subjects to log onto easily. Subjects affirmed that they could reach a website by typing in the website address when logged onto the Internet. The session took place in a private office adjacent to the presurgical office. Content of the website instruction module served to reinforce verbal instruction.

Upon completion of the interventions, all subjects received instruction regarding research activities on the day of surgery. On the day of surgery, all subjects completed the STAI, mSALT, and a patient satisfaction survey in the waiting area prior to meeting the anesthesia provider. Since there is no standardized patient satisfaction tool specific to the preoperative anesthesia experience, the researchers developed the patient satisfaction survey. Content validity was established by a review of 5 experts. The tool was pilot tested prior to use and reliability was established.

The demographic data was analyzed using a 2-way \( \chi^2 \) test and descriptive statistics. Data from the preintervention and postintervention mSALT and STAI were statistically analyzed using the dependent and independent group \( t \) test methods. A repeated measures analysis of variance was used to further evaluate the change in mSALT and STAI scores over time. Dependent and independent group \( t \) testing methods also were used to evaluate the postintervention satisfaction scores.

**Results**

The sample of 64 subjects was obtained from the population of eligible patients screened for participation. The experimental group consisted of 25 subjects, and
the control group consisted of 39 subjects. More subjects agreed to participate during the control weeks and thus there was an unequal group size.

Demographic data for the 64 enrolled subjects is presented in the Table. Age ranged from 20 to 75 years with a mean age of 48 years. Greater than 60% of the subjects were 30 to 50 years of age. All 64 subjects completed high school, and greater than 65% of all subjects completed 4 years of college education. Most of the subjects were medically insured by private healthcare plans (93.8%).

The variables of gender, age, education, and private health insurance were evaluated for between group variance. No significant between group variance was identified with regard to the demographic makeup of the study sample.

The first research hypothesis was evaluated by examining the change in mSALT scores between groups. Pretest and posttest scores were evaluated between groups using the independent group t test. No significant difference between groups was identified on the pretest \((P = .923)\) or the posttest \((P = .472)\). Within group analysis using the paired sample \(t\) test was conducted. The experimental group was found to have a significant increase in posttest mSALT scores \((P\)
The control group did not demonstrate a significant increase in posttest mSALT scores \( (P = .069) \). These findings support the hypothesis that subjects exposed to the website instruction about anesthesia would have a higher level of knowledge acquisition.

The second research hypothesis was evaluated by comparing between group and within group changes in anxiety. All subjects enrolled in the study completed the STAI on the day of their preoperative visit prior to any intervention and again on the day of their surgery. Pretest and posttest scores were evaluated between groups using the independent group \( t \) test. No significant difference between groups was identified on the State, pretest \( (P = .162) \) or the posttest \( (P = .0548) \). There also was no significance on the Trait Anxiety portion pretest \( (P = .509) \) or posttest \( (P = .546) \). Following intervention, within group analysis using the paired sample \( t \) test was conducted. Neither the experimental group \( (P = .279) \) nor the control group \( (P = .762) \) was found to have a significant change in posttest state anxiety scores. Change in trait scores also was insignificant within groups for the experimental group \( (P = .823) \) and control group \( (P = .570) \). Both groups had comparable levels of pretest and posttest anxiety, thus the findings do not support the second research hypothesis.

The third hypothesis was that subjects exposed to the website intervention would have a higher overall satisfaction with their anesthesia care in comparison to the control group. Prior to discharge, subjects were asked to complete a satisfaction survey. Mann-Whitney testing was conducted to explore between group variance in subject rating of the satisfaction variables. No significance between group differences was identified regarding overall satisfaction with anesthesia care \( (P = .713) \) or the subjects perception of their understanding of anesthesia procedures \( (P = .406) \).

The website group’s rating differed significantly from the control group when asked to rate overall satisfaction with preoperative anesthesia teaching \( (P = .019) \). Although there was no significance in overall satisfaction, subjects in the website group had an overall higher rating of satisfaction with preoperative anesthesia teaching.

**Discussion**

The primary goal of this pilot research was to test the effectiveness of a computer website as a tool to improve the patient’s acquisition of anesthesia information, anxiety level, and overall satisfaction with anesthesia care. Analysis of the mSALT data, analyzed by independent \( t \) test, demonstrated a significant improvement in posttest mSALT scores for those subjects exposed to the website intervention compared to those in the control group.

The findings of this study could not be compared with other studies related to patient outcomes, as this pilot study is the first to evaluate the use of a website-based educational tool to improve patient's acquisition of preoperative anesthesia information. Websites have been used for educating healthcare professionals about medical information, and this study points to a place for them in patient education. The findings of this study support the use of websites to reinforce the knowledge of patients about their anesthetic. By having the opportunity to review information at one's own pace on a home computer, the patient benefits. The second exposure to information already discussed at their preoperative evaluation visit is reinforced.

This pilot study failed to demonstrate any relationship between the website intervention and patient anxiety and satisfaction. The current findings are not surprising given the subjectivity of interpretation by the subjects, as well as the difficulty to capture abstract topics such as “moods” in a standardized, testable format. Several other researchers have attempted to measure satisfaction and/or “patient moods” after an educational intervention. Two sets of research teams did meet with some success in measurement of satisfaction. Rice et al\(^8\) and Gaskey\(^9\) both studied anxiety or subjects’ feelings in addition to preoperative patient instruction. Both studies found a positive correlation between these 2 areas. These researchers demonstrated an inverse relationship between knowledge and anxiety. The current study was unable to establish such a relationship; however, if the number of subjects in the website group was equal to those in the control group, this relationship may have been seen.

The researchers noted several limitations with this pilot study. These limitations were related to factors beyond the control of the researchers. The primary limitation was related to the time requirement for study participation. The screening of potential subjects and administration of the initial battery of tests required approximately 18 to 30 minutes of the subject’s time. The variation in time was dependent on several factors including patient age, speed of reading, and number of questions about the study. The significant time requirement had a negative impact on subject enrollment. Several candidates on experimental website weeks refused enrollment based on the time commitment, and as a result there was a disparity in the enrollment for the control and experimental groups (39 and 25 respectively). Time constraints of both the patient and the anesthesia provider have been identified as potential barriers to the level of
interaction that occurs preoperatively. Furthermore, preoperative anxiety has been identified as a nonbehavioral factor affecting patients and influencing the efficacy of preoperative information acquisition. Patients’ concerns for their safety and health related to the provision of anesthesia have been identified as predisposing factors influencing individual motivation to acquire information. Preoperative anxiety and perceived impact on the quality of anesthesia care may have been factors that influenced the decision to participate in the study.

Finally, the age stratification of the subject pool is not reflective of the general population at large. These limitations diminish the validity and generalization of the study to larger populations. Further research in this area with larger samples is recommended.

It was demonstrated by this pilot study that websites could be used to positively influence patient’s knowledge of anesthesia information. The researchers recommend inclusion of a website address on printed information materials given to the patient. The patient could log onto the website in the privacy of his or her home to review important information as well as to reinforce information given in preoperative teaching sessions.

Despite the fact that there has been an explosion of website health information offered to patients, a review of the literature revealed that there has been minimal research conducted to evaluate the impact of this information. This pilot study confirms a need for further research in this area to truly appreciate the impact of the website information on patient knowledge acquisition, preoperative anxiety, and satisfaction. Armed with this knowledge, individual departments of anesthesia may make an informed decision of whether a site-specific website would be of value to their patient population.

REFERENCES

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