Impact of a Preoperative Education Program via Interactive Telehealth Network for Rural Patients Having Total Joint Replacement

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Traditional preoperative education programs have demonstrated the beneficial effects for orthopaedic patients. However, attending preoperative education classes became too difficult for patients, their families, and their friends who traveled great distances from their homes in rural Kentucky. A multidisciplinary continuous quality improvement team from the University of Kentucky Chandler Medical Center created a pilot project to provide preoperative education programs for their total joint patients via an interactive telehealth network. The use of telecommunications technology in providing patient preoperative education was successful in attracting patients from remote areas who otherwise may not have participated. The program has continued for 2 years.

KEY WORDS: Preoperative education, Telehealth network, Total joint replacement

Research has demonstrated that preoperative teaching is beneficial and affects length of stay, anxiety, pain, and patient satisfaction (Shuldham, 1999). During the past several years, total joint programs have offered a variety of preoperative patient education classes. The classes provide information regarding what the patient can expect to experience in the hospital and after discharge. Mauer, Abrahams, Arslanian, Schoenly, and Taggart (2002) surveyed 5,000 randomly selected National Association of Orthopaedic Nurses members to identify national practice patterns for patients with total joint replacement. In response to questions related to the setting and personnel involved in preoperative education, the most common setting at facilities, regardless of size, was one-on-one teaching by a nurse at the preadmission visit. Group classes were less common than one-on-one teaching, but they were more likely to be held in medium and large facilities than in small facilities.

The beneficial effects of preoperative orthopaedic education programs have been demonstrated. In Claeys, Mosher, and Reesman (1998), patients who underwent total joint replacement were surveyed biannually to evaluate prehospitalization, hospitalization, and posthospital care. Survey results about the prehospitalization educational session were favorable. Patients indicated that they were prepared for what to expect and the information they received was useful. Staff also noted that patients who had been through the preoperative educational session were more prepared for surgery, eager to begin ambulation and exercises, and more realistic about the expected length of stay.

Pellino et al. (1998) conducted a study to identify differences in outcomes between two groups of patients undergoing orthopaedic procedures. The method and environment for the preoperative teaching was different for the two groups. The control group had traditional preoperative teaching in the clinic, where the provider decided what the patient needed to know. The experimental group had preoperative education in the learning center, where an empowerment model of teaching was used, and teaching was based on the patient’s specific learning needs. The patients in the experimental group had higher self-efficacy scores and reported more confidence in their ability to perform preoperative and postoperative care than the control group. There were no differences between the two groups in objective measures of pain control, complication rate, and length of stay. The authors concluded that factors in
the learning center, such as dedicated teaching time and an environment conducive to learning, might be responsible for the improvement of patients’ perceptions of their preparation for surgery.

In a study that evaluated the effectiveness of preparatory information on physical outcomes after total hip replacement (THR) surgery, patients in the experimental group received preoperative teaching related to preoperative and postoperative information, a predischarge program, and written information to prepare patients for home (Gammon & Mulholland, 1996). Patients in the control group did not receive formal education, but they did receive the usual information provided by the ward staff. The researchers found significant differences between the experimental and control groups. The experimental group used less intramuscular analgesia, ambulated with a walker 1 day earlier; performed breathing and leg exercises more frequently, had a shorter hospital length of stay, and perceived that they would cope more effectively with the THR than the control group. Thus, providing information preoperatively had positive physical outcomes, as well as positive psychologic outcomes for the experimental group. There were no significant differences between the experimental and control groups in the use of oral analgesics and rate of postoperative complications.

Recognizing the benefits of preoperative education for orthopaedic patients, the orthopaedic staff at the University of Kentucky Chandler Medical Center (UKCMC) created a preoperative educational program for their total joint patients. UKCMC, a 450-bed teaching hospital in central Kentucky, serves patients and their families from a large geographic area covering the central and eastern half of the predominately rural state. Because of the barriers confronting total joint patients and their families/friends, who may have to travel 150 miles or more from home for their operation, UKCMC created a pilot project to provide preoperative education programs for their total joint patients via an interactive telehealth network.

**History**

In 1995, nursing staff from the orthopaedic unit at UKCMC and an orthopaedic physician met to identify problems and issues, as well as to discuss ways to improve care for orthopaedic patients. Problems identified included inconsistencies in the information given to inpatients and outpatients by the various members of the healthcare team, unrealistic expectations by patients/families, and gaps in patient preparation and education. As a result, a multidisciplinary continuous quality improvement (CQI) team was formed. The CQI team included clinic staff, the surgery coordinator, a hospital nurse, the patient care manager, inpatient and outpatient physical therapists, occupational therapist, physician assistant, physicians, and social services. The team decided to focus on the total joint replacement patient population. The team developed total hip replacement and total knee replacement information booklets for patients and families and implemented a preoperative teaching class. Total hip replacement and total knee replacement clinical pathways were developed. The clinical pathways were initiated in the clinic and followed the patient through the surgical and postoperative periods. They were also adapted and written in an understandable language, and copies were provided to patients and families.

The face-to-face preoperative total joint replacement education classes for patients and their families have been ongoing for 6 years. The orthopaedic case manager, the orthopaedic physician assistant, a physical therapist, and an occupational therapist teach the class once a month.

The goals of the class are to:

1. Provide information to patients and families to assist them in developing realistic expectations of total joint surgery.
2. Decrease patient/family anxiety.
3. Enhance early discharge planning to decrease prolonged length of stay.

Attendance at the preoperative class is not mandatory to proceed with the operation. However, the orthopaedic case manager or the orthopaedic surgery coordinator contacts the patients to invite and encourage them and a caregiver to attend the education class 2 to 4 weeks before surgery. Statistics on class attendance have been recorded since 1999, and this information is reviewed at least once a year.

During a clinic staff meeting in summer 2000, the orthopaedic case manager and the patient education manager discussed the decrease in total joint class attendance and possible reasons for this decline. Reasons given by patients and families for not attending the preoperative education class included the amount of pain they were having, and the distance they would have to travel for what they perceived as a nonessential program. Some other reasons given for not attending class included having a revision of a previous total joint replacement or prior knowledge from previously having the opposite side replaced.

The patient education manager suggested that the class could be offered via the Kentucky Telehealth Network in an effort to reduce the amount of travel, cost, and discomfort to the patient. This would enable patients to go to a telehealth site near their home and be linked to a real-time interactive videoconference education class at UKCMC via high bandwidth telecommunications lines. In its capacity to promote UKCMC’s mission “to help people of the commonwealth and beyond to gain and retain good health through creative leadership and quality initiatives in education, research and service” (Mission of the UKCMC, 2001), Kentucky TeleCare and the members of the Kentucky TeleHealth Network offer their services to facilitate business in today’s healthcare environment. Thus, there were no additional costs to provide preoperative education to total joint patients at remote sites while simultaneously teaching a class to patients locally at the medical center.

**Telehealth Network Intervention**

Interactive videoconferencing has been used extensively in the provision of education for business and industry, public schools and universities, healthcare administrators, healthcare providers, and patients. Telehealth has been defined as a “comprehensive term for the support of long distance clinical healthcare, patient and professional health-related education, public health, and health administration” (White & Krousel-Wood, 2001). Early pa-
Patient consultation and education using two-way closed-circuit television systems began in 1959 between the University of Nebraska and Nebraska Psychiatric Institute (Benschoter, Wittson, & Ingham, 1965; Wittson & Benschoter, 1972). With the evolution of telecommunications links for voice, data, and video into telehealth networks in almost every state in the nation, many healthcare facilities have used these communication tools in patient education. Telehealth has been used for nutrition counseling (Johnson et al., 2001), pharmacy counseling on metered-dose inhaler technique (Hopkins, Thomas, Bynum, Copeland, & Irwin, 2001), and diabetes education (Yip & MacKenzie, 2002).

To test this mode of preoperative patient education at a distance, the Kentucky TeleCare clinical coordinator assisted in a collaborative pilot in September 2000 to conduct a preoperative total joint class with patients at the medical center, concurrently with patients located at remote telehealth sites. This monthly telehealth educational program was so successful in attracting patients from remote areas who otherwise may not have participated, that it has continued for 2 years.

**Methods of Telehealth Total Joint Educational Programming**

Before contacting patients about attending the education class, the orthopaedic case manager determined the telehealth site nearest to the patient. Patients were contacted and given the option of attending class at the medical center or at a telehealth site closer to their home. Some patients initially stated that they could not attend class because of the distance; however, when they were given an option of attending at a site closer home, they agreed to attend at the telehealth site. Patient education materials were mailed to the telehealth patients’ home address before class, and patients were asked to bring the materials to the telehealth site on the day of class.

The names of patients attending total joint class at telehealth sites, along with their telephone numbers, were

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>1. Did the information help you understand:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. The importance of preparing for surgery?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. What to expect while in the hospital?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. What you need to do to recover (exercises, walking)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Was the information presented in a way that was easy to understand?</td>
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<td></td>
</tr>
<tr>
<td>3. Were medical terms explained?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Did you feel free to ask questions?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Would you recommend this class to others scheduled for this same operation?</td>
<td></td>
<td></td>
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<tr>
<td>6. If you attended class at a TeleCare site close to your home (not Lexington):</td>
<td></td>
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<tr>
<td>a. Do you feel like this is an acceptable way to get information?</td>
<td></td>
<td></td>
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<tr>
<td>b. Did you like having a choice of attending class in Lexington or closer to home?</td>
<td></td>
<td></td>
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<tr>
<td>7. Comments or suggestions for improvement</td>
<td></td>
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FIGURE 1. Total joint replacement class evaluation.
forwarded to the Kentucky TeleCare clinical coordinator, who confirmed the patient’s address and the closest telehealth site. The clinical coordinator contacted other Kentucky TeleCare network site coordinators to verify their facility availability and their ability to accommodate the patient and to confirm schedule times. Only after site and schedule confirmation did the telehealth coordinators contact patients.

Telehealth staff introduced themselves to the patient at the request of the orthopaedic surgeon to arrange for them to attend the total joint replacement education class closer to their home. The patient was given a brief simple explanation about what the educational experience would be like when interacting with staff at the medical center over the telehealth videoconference network. The staff provided the patient with the name of a contact person, directions to the telehealth site, a toll-free telephone number to the Kentucky TeleCare office for any additional questions or help they may require, and they asked patients to arrive 30 minutes before the start of the class. Telehealth staff asked patients about any special transport needs, and they notified remote telehealth site coordinators of those needs.

On the day of the class, Kentucky TeleCare staff connected with all the telehealth sites 30 minutes before the program to address any audiovisual problems and set-up the PowerPoint presentation for the instructor from the CD containing class content. The staff remained in the room to manipulate equipment/cameras and for technical support during the class.

At the remote telehealth sites, the site coordinator escorted patients and families to the telemedicine room. They were made comfortable and given instructions on how to ask a question or make comments to the presenter at the UKCMC through the telehealth system equipment. The instructors at UKCMC made an effort to actively involve the patients at telehealth sites by addressing them individually during the class.

After the first telehealth preoperative class, team members revised the course content, adding more pictures to improve the presentation for the telehealth patients. This change decreased the number of times local telehealth staff had to switch from one camera to another during the presentation to capture the presenters’ demonstration of certain points. Presenters also used an overhead document camera to show examples of total joint implants, epidural catheters, and a Lovenox syringe.

Another change implemented in the education program is that the orthopaedic case manager, a physical therapist, and an occupational therapist are currently teaching the class.

## Results

All patients attending the total joint preoperative patient education class were asked to complete an evaluation of the class (see Figure 1). Despite including a self-addressed stamped envelope in the mailed materials, patients attending the class at telehealth sites had a poor evaluation return rate. Of the 20 (out of a total of 46) (43%) surveys returned by patients who attended class at telehealth sites, 100% of these patients believed that the use of the telehealth network was an acceptable way to obtain the information. They also liked having the choice of attending class at the medical center or closer to home, and several patients wrote specific comments, stating that they liked being able to attend closer to home and that it decreased travel. One patient who attended at a remote telehealth site indicated that he or she did not feel free to ask questions; otherwise, the responses to all of the questions from patients who attended locally and those who attended at remote sites were positive. One patient, who attended at a telehealth site, commented that he or she had previously attended the face-to-face class for joint replacements. This patient indicated on the evaluation that obtaining the class information at a telehealth site was as acceptable as attending the face-to-face class and included a comment that it was “hard to travel”; therefore, the telehealth class was more convenient for him or her.

When patients in the hospital were informally asked about the telehealth preoperative class, they replied that it was an acceptable way to obtain the information; none have said they would have preferred to attend the class in person at the medical center. Table 1 shows class attendance before and after implementation of interactive telehealth education classes.

The average length of stay for total joint replacement patients has decreased since incorporating the use of telehealth for preoperative education classes in September 2000 (see Table 2). However, it is likely that this is only one of several variables that may have contributed to decreased length of stay, and more research is needed to determine how much telehealth preoperative education contributes to this positive outcome.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Number of Total Joint Replacements (Knees and Hips)</th>
<th>Number of Patients (%) Attending Total Joint Class</th>
<th>Number of Patients (%) Attending Total Joint Class at Telemedicine Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>January–December 1999</td>
<td>92</td>
<td>69 (75)</td>
<td>0</td>
</tr>
<tr>
<td>January–December 2000</td>
<td>118</td>
<td>55 (47)</td>
<td>6 (11)*</td>
</tr>
<tr>
<td>January–December 2001</td>
<td>180</td>
<td>89 (49)</td>
<td>28 (31)</td>
</tr>
<tr>
<td>January–June 2002 (6 months)</td>
<td>98</td>
<td>43 (44)</td>
<td>12 (28)</td>
</tr>
</tbody>
</table>

*Started September 2000.
**Recommendations**

Based on experience and comments from patients attending at telehealth sites, the authors have the following recommendations for others who are considering using telehealth networks for patient education:

1. Include as much class information as possible on slides or video clips to decrease frequent switching from slide presentation to camera (i.e., to show how to use equipment and adaptive equipment, operating room, and postanesthesia care unit).
2. Wear lavaliere microphones to avoid loss of audio when moving away from fixed microphone on podium.
3. Position camera to show patients and/or family asking questions at local site.
4. To reduce distractions, instruct remote sites to mute their microphones during presentation and inform patients and families that although they may forget they are on camera, that other sites can see them.
5. To keep patients/families at remote sites engaged in the presentation and to assist patients and families at the remote sites who might be hesitant to speak, directly ask patients or their family, by name, if there are questions and/or comments.
6. Schedule teleconference facilities so that there are no back-to-back conferences that may cause presenters to rush to finish the presentation and may prohibit patients from having enough time to ask all the questions that are important to them.
7. Maintain good communication between orthopaedics personnel and local and remote telehealth personnel, as well as with patients at local and remote sites.
8. To improve the return rate of evaluations, arrange for the remote site coordinators to collect the evaluation form from the patient at the end of the program and fax it to the presenting personnel.

**Conclusion**

This pilot project was developed to increase attendance at orthopaedic total joint preoperative education classes by improving access to the classes for patients from distant locations through use of the interactive telehealth network. Some patients, who may not have attended class because of pain or other reasons that were compounded by traveling long distances, did attend when they were able to do so closer to home. Patients who attended at telehealth sites reported satisfaction with this method of education, and there were no differences between their evaluations of class content and recommendations when compared to other patients scheduled for the same operation who attended the class locally. More empirical research must be done on the effect of using telehealth networks for orthopaedic patient education. Because of the success of this project, telehealth education has now become an ongoing process for total joint preoperative education for rural patients/families. Understanding the beneficial effects of preoperative teaching, the staffs involved have made a commitment to use this method to improve access to the education class for patients in rural Kentucky.

**REFERENCES**


