An Investigation of the Effects of Preoperative Interdisciplinary Patient Education on Understanding Postoperative Expectations Following a Total Joint Arthroplasty

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This study aimed at evaluating the effect of a preoperative interdisciplinary educational intervention on understanding postoperative expectations following a total joint arthroplasty. The study sample consisted of 156 patients scheduled for elective total joint replacement surgery. The approach for this study was a two-group quasi-experimental design. The treatment group received an additional interdisciplinary educational session whereas the control group did not. Subjects who chose to attend the program were compared with those who received standard outpatient teaching in the preadmission testing center. Subjects who received the interdisciplinary teaching intervention were significantly better at verbalizing and demonstrating postoperative skills, and they rated all aspects of the interdisciplinary educational session as very satisfactory. The study demonstrated that the preoperative interdisciplinary educational program for patients scheduled for total joint replacement surgery had a positive effect on the understanding of postoperative expectations. The educational sessions have continued providing an option that will enhance preoperative education.

In the United States, 32.9 million people have some type of arthritis that limits comfort and function and impairs quality of life (American Academy of Orthopedic Surgeons, 2005). It is estimated that nearly 21 million Americans have osteoarthritis, accounting for 7.3 million physician visits per year and projected costs of $95 billion due to medical costs, extended rehabilitative care, and lost wages (Navarro, 2002; Prouty et al., 2006; Steele, McClean, Gaunt, & Browning, 2000). Nearly a quarter million Americans who are functionally disabled by arthritis choose total joint arthroplasty to improve mobility and comfort (Lichtenstein, Semaan, & Marmar, 1993; Praemer et al., 1992). It is generally the older adult who undergoes total hip and knee arthroplasties; consequently, the number of total joint arthroplasties performed in the United States is expected to increase due to a growing elderly population and a longer life expectancy.

There is empirical support demonstrating the efficacy of preoperative education in minimizing complications in the immediate postoperative period following total joint arthroplasty. Outcomes have included preventing complications, minimizing anxiety, reducing hospital length of stay, and decreasing overall costs of treatment (McGregor, Rylands, Owen, Dore, & Hughes, 2004). For the patient undergoing a total joint replacement, a critical component of the preoperative educational program is understanding the importance of pain control in facilitating the recovery process. Nussenzveig (1999) examined pain management in total joint arthroplasty patients and concluded that adequate pain control allows for early ambulation, facilitates transition to a lower level of care, and prevents postoperative pulmonary and neurovascular complications. Johansson, Salantera, and Katajisto (2006) conclude that in addition to pain management, orthopaedic patients’ greatest postoperative knowledge needs and expectations are in the area of biophysiological and functional issues, such as complications, medications, and postoperative and recovery-related issues. With shorter hospital stays and a growing number of discharges to home, rather than rehabilitation facilities, there is a greater demand for educational preparation and support. Surgical patients must take greater responsibility for their care from advance preparation to rehabilitation. Patients are considered to be empowered when they have knowledge that

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meets their needs, expectations, or preferences, and when they are in the position to make good use of this knowledge.

**Review of the Literature**

**PAIN MANAGEMENT**

Research demonstrates that pain management is less than optimal in orthopaedic patients. Eighty-three percent of such patients reported moderate or severe postoperative pain, and telephone surveys after discharge revealed that pain management needs were not met (Neitzel, Miller, Shepherd, & Belgrade, 1999). Unrelieved postoperative pain continues to be a major clinical problem (Sloman, Rosen, Rom, & Shir, 2005). Inadequate preoperative discussion about the potential negative sequelae of unrelieved pain has correlated with high pain levels postoperatively (Stromberg, Wickstrom, Joelsson, Sjostrom, & Haljamae, 2000). Effective health education can reduce the need for pain medication, help the patients’ rehabilitation, and facilitate functional activity.

At a university hospital in Finland, patients scheduled for hip and knee surgery received information about pain management and measurement of pain intensity and distress than those who did not attend the program (Berge, Dolin, Williams, & Harman, 2004).

One study, during a preoperative session, orthopaedic case managers taught patients how to effectively control their pain postoperatively and to communicate their needs to staff members. They were taught to maintain a pain level of 5 or less so they are comfortable and able to participate in exercises to increase strength and endurance (Nussenzveig, 1999). Results of the study revealed that in 80% of the cases, patient’s postoperative pain intensity was less than or equal to 5. However, activity level, although variable among patients, was not significantly related to inadequate pain management (Nussenzveig, 1999).

At an acute care hospital in Pennsylvania, one researcher evaluated the influence of family education, preemptive analgesia, improved postoperative pain control, and accelerated rehabilitation on the functional outcomes of total hip arthroplasty patients. Results revealed that accelerated physical therapy and improved pain control promoted the ability of patients to ambulate independently or with minimal supervision for longer distances (Pour, Parvizi, Sharkey, Hozack, & Rothman, 2007).

An intervention study examined the outcomes of participation in a pain management program. The program included educating patients about arthritis, hip function, communication of pain, and relaxation to improve the quality of rest, sleep, and activity. After hip replacement, those who attended the pain management program made greater gains in physical function with household activity and reported significantly less pain intensity and distress than those who did not attend the program (Berge, Dolin, Williams, & Harman, 2004).

**Knowledge of Postoperative Routine**

Patients must take greater responsibility for their care from advance preparation to rehabilitation. Patient education must go beyond simple provision of information (Johansson et al., 2006). In a study that evaluated the effectiveness of preoperative education on functional outcomes after total hip replacement surgery, patients in the treatment group received preoperative and postoperative information, a predischarge program, and written information to prepare them for home. Patients in the control group did not receive formal education; only routine information was provided to total hip replacement patients by medical and nursing staff. The treatment group ambulated with a walker 1 day earlier, used less analgesia, performed breathing and leg exercises more frequently, and had a shorter hospital length of stay (Gammon & Mulholland, 1996).

Research suggests that educational interventions should include some component of education and training in performing strength training exercises and position changes to promote early mobility. Patients in a study group received preoperative physical therapy, which included straight leg raises, stretching of hamstring and hip flexors, and strengthening of upper-extremity exercises 8 weeks before total hip replacement surgery. They were instructed to perform the exercises three times daily with 10 repetitions. They also received education on restriction of movement, use of assistive devices, posture, lifting, and carrying. The control group did not receive preoperative physical therapy and education. The treatment group was able to perform transfer activities, walking, and climbing stairs about a day earlier postoperatively than the control group. Education prior to surgery had positive effect on functional outcomes (Thomas, Burton, Winthrop, & Adkisson, 2004).

A study that examined the effect of patient and family education on the outcome of minimally invasive total hip arthroplasty compared patients who received added information as part of an accelerated protocol with those who received standard education as part of a standard protocol. The accelerated educational program included pain management, postoperative rehabilitation expectations including the benefits of early twice-daily ambulation, and discharge planning. The standard program included pain management, postoperative rehabilitation expectations including with-assistance once-daily ambulation, and discharge to home or rehabilitation. The outcome of the study revealed that patients could ambulate independently or with minimal supervision significantly longer distances at the time of discharge in the accelerated educational group (Pour et al., 2007).
A study that reviewed patients’ preoperative and postoperative experiences with total knee replacement surgery revealed that better education and support before surgery influenced decisions about surgery and its outcomes. Jacobson & colleagues (2008) examined the impact of a joint replacement class. Patients wanted more information to increase their understanding of postoperative recovery trajectories. Postoperatively, patients were motivated and participated in transfers and ambulation with assistance. They knew what to expect and the adverse effect on the “implant” if they did not participate.

**INTERDISCIPLINARY EDUCATION**

Patients preparing for elective surgery and hospitalization are increasingly offered educational materials and classes to explain anticipated care. Preoperative education offers the opportunity to address realistic expectations of recovery outcomes. This is particularly important for patients undergoing arthroplasty because fulfilled expectations have been linked to adherence with postoperative recommendations and satisfaction with the outcome of surgery. In a study at an urban orthopaedic referral center, patients scheduled for total hip or total knee arthroplasty participated in a baseline telephone interview and attended a standard multidisciplinary preoperative arthroplasty educational program. The program provided didactic information, demonstration, and active participation for those attending.

Developed collaboratively with nurses, surgeons, therapists, and social workers, the program addressed the admission process, postoperative recovery, pain management, and rehabilitation. In addition, the intervention group received an additional module that focused on expectations during the first 12 months after surgery. Both groups had specific questions concerning recovery that were discussed; the class provided support and increased patient’s confidence and expectations about recovery (Mancuso et al., 2008).

Giraudet-Le Quintrec & colleagues (2003) compared the impact of a multidisciplinary standardized informational session on preoperative and postoperative anxiety of patients scheduled to have a total hip replacement arthroplasty. The intervention group attended an educational session provided by a collective multidisciplinary team (a rheumatologist, orthopaedic surgeon, anesthetists, and rehabilitation staff) as well as received verbal information and a leaflet that reinforced the verbal information. The control group received verbal information and leaflet only. The patients in the intervention group had a better idea of what to expect, experienced less pain before and after surgery, stood sooner, and understood the importance of walking soon after surgery (Giraudet-Le Quintrec et al., 2003).

Satisfaction with a multidisciplinary approach was also demonstrated by Fielden, Scott, & Horne (2003). Patients’ expectations with discharge planning after total hip replacement surgery were obtained through interviews. There were positive results when participants attended a preassessment clinic where they met with a nurse coordinator, an anesthetist, a surgeon, and/or a medical resident and received a written informational packet. This prepared them emotionally and practically for their surgery and recovery. Postoperatively, they focused on mobility and independence demonstrating their ability to manage their recovery with appropriate assistance. Participants clearly articulated the contribution of multidisciplinary members, medical staff, physical therapists, and occupational therapists in planning for discharge and that the above-mentioned functionaries played a significant role in their experience (Fielden, Scott, & Horne, 2003).

**Purpose**

The purpose of this study was to compare knowledge and skill demonstration outcomes in total joint arthroplasty patients receiving different preoperative educational interventions.

The research questions that guided the study were as follows:

1. Were there differences in pain levels between treatment and control subjects during the postoperative interview?
2. Does an interdisciplinary preoperative patient educational program improve postoperative understanding of postoperative exercises, activity levels, pain management, and discharge planning?
3. Does an interdisciplinary preoperative patient educational program improve postoperative demonstration of postoperative exercises and activity levels?
4. How satisfied was the treatment group with the interdisciplinary educational session?

**Methods**

The design for this study was a two-group, quasi-experimental, posttest-only design. All participants attended and received the “standard” education provided in the preadmission testing (PAT) process. The treatment group also attended an interdisciplinary educational program for total joint arthroplasty patients.

Subjects were recruited for participation in the interdisciplinary educational program from two different orthopaedic surgeons’ offices. A brochure describing the program was distributed to individuals being scheduled for arthroplasty. Subjects who chose to attend the interdisciplinary educational program were compared with those who received the standard outpatient teaching in the PAT center. Outcomes for knowledge and skill demonstration were evaluated on the second day after surgery on the orthopaedic unit.

**Standard Education**

Control group subjects received the routine preoperative teaching provided to total joint arthroplasty patients in the PAT center. In this process, patients were given a patient-education packet that includes a booklet explaining the functions of the knee/hip, causes of injury, an overview of arthroplasty surgery, pain management, and what to expect both in the hospital and at home in terms of recovery. A nurse reviewed pre- and postoperative care that includes anesthesia, preoperative medications, pain management, diagnostic tests, medical equipment,
operating/recovery room experience, prevention of deep-vein thrombosis, respiratory care, fluid and food restrictions, incision and dressing, drains, postoperative exercises, intravenous fluids, progressive activity and ambulation, limitations, and demonstration of the operation of the patient-controlled analgesia pump. The verbal education was geared toward all educational levels. Written educational materials were at the sixth to eighth-grade reading level.

**INTERDISCIPLINARY EDUCATIONAL INTERVENTION**

The treatment group received the additional interdisciplinary educational intervention targeting pre- and postoperative care, home exercise program, and posthospital care. Classes were scheduled on the first and third Mondays of the month, alternating between morning and afternoon sessions. A nurse coordinated the classes. The interdisciplinary team was comprised of a nurse, a physical therapist, and a care coordinator.

Table 1 provides a summary of the content areas presented by nursing, physical therapy, and care coordination. In addition, information sharing, demonstration of exercises, and continuous passive motion (CPM) machine (when applicable) were also done. Verbal instruction was geared to all educational levels, and reading materials to the sixth to eighth-grade reading level.

Classes lasted approximately 1 hr 45 min, with an additional 15 min for questions. Subjects’ family members were invited to attend. An additional comprehensive packet designed for the total joint educational program was distributed to all subjects attending the intervention session. The packet included an explanation of the program, information on pain management including patient-controlled analgesia and pain-rating scale, the total joint replacement home exercise program, patient guidelines following a total knee replacement/total hip replacement as applicable, restrictions for hip replacement patients, home healthcare agencies, and skilled nursing facilities.

| TABLE 1. EDUCATIONAL TOPICS BY SPECIALTY IN THE INTERDISCIPLINARY EDUCATIONAL GROUP |
|-----------------------------|-----------------------------|-----------------------------|
| **Nursing** | **Physical Therapy** | **Care Coordination** |
| Preoperative medications and anesthesia | Dorsi/plantar flexion exercises | Skilled nursing facilities |
| Food and fluid restrictions | Heel slide | Skilled home care agencies |
| Intravenous fluids and medications | Quadriceps sets | Obtaining medical equipment if needed |
| Holding area, operating and recovery room | Isometric gluteals | |
| Polar pack | Terminal knee extension | |
| Incision, dressing, drains, tubes | Dos and don’ts following total | |
| Catheter insertion/removal | knee/hip replacement | |
| Respiratory therapy | (as applicable) | |
| Pain management maintaining pain levels | Straight leg raise exercises | |
| less than 5 | | |
| Progressive diet | | |
| Immobilizer | | |
| Progressive activity | | |
| Laboratory work | | |
| Blood transfusions | | |

**SAMPLE**

The study received approval from the institutional review board. The convenience sample was drawn from a population of adults scheduled to undergo elective total joint arthroplasty at a community hospital in the northeastern United States. Consent to participate in the study was obtained during the interdisciplinary educational session (treatment group) or postoperatively on the unit (control group). Inclusion criteria included: any patient scheduled for elective total joint arthroplasty due to degenerative joint disease, cognitively aware, and English speaking or non-English speaking with a hospital-trained interpreter. Subjects who had previously undergone arthroplasty were also invited to participate, but analysis of the effects of this group on the findings was not done because of a small number in this group ($n = 10$). The sample size of 156 was determined on the basis of a power analysis with an effect size of 0.40, an $a$ of .05, and power of 0.80 (Munro, 2004).

The total sample included 156 subjects who underwent elective total joint arthroplasty for degenerative joint disease between April 2006 and May 2007. Seventy-eight percent ($n = 122$) of the sample underwent a total knee arthroplasty, and the remaining 22% ($n = 34$) underwent a total hip arthroplasty. Women accounted for 65% ($n = 101$) of the sample. The age range was 32–88 years with a mean age of 68.7 ± 10.9 years. Half of the sample ($n = 78$) underwent the additional interdisciplinary educational intervention, and the other half underwent only the standard education provided in the PAT.

**MEASURES**

The research nurse interviewed participants and all data are self-report. Three measures were used to collect outcome data for the study: a pain-rating scale, the Orthopaedic Educational Evaluation Tool and a satisfaction tool.
PAIN

Pain was measured with a 10-point visual analog scale with 0 indicating no pain to 10 indicating worst possible pain. Some of the earliest pain assessment tools are one-dimensional pain scales, which were designed to measure pain intensity alone. Prior research and a systemic analysis of 164 studies suggests that visual analog scales are easy to use, reliable, and valid measures of pain (Bijur, Silver, & Gallagher, 2001; Jensen, 2003; Williamson & Hoggart, 2005). For consistency, each subject was asked to rate his or her pain level using this scale at one point in time, which was 2 days after surgery during the interview. All interviews occurred on the day shift but not at the same time because of therapy schedules.

KNOWLEDGE OF POSTOPERATIVE EXPECTATIONS

The Orthopedic Educational Evaluation Tool is a 15-item instrument that was developed for the study on the basis of a literature review. The instrument consists of two subscales. The first subscale consists of 9 items and measures the patient’s ability to verbalize the understanding of 9 topics presented in the educational session (see Table 2). The scores on this subscale range from 9 to 45, with higher scores representing greater understanding of the topic. The second subscale measures the patient’s ability to demonstrate 6 skills taught in the interdisciplinary educational session. Scores on this subscale range from 6 to 30, with higher scores representing greater ability to accurately demonstrate the postoperative skill. Both subscales are rated on a 5-point Likert-type scale from 1 representing unable to verbalize or demonstrate the educational topic or skill to 5 representing fully able to demonstrate the knowledge of educational topic or skill.

Scores were tabulated for each subscale. Reliabilities for the subscales in this study using Cronbach’s α were .94 for the first subscale and .90 for the second subscale. All items were reviewed by two orthopaedic nurses for content validity. The instrument was pilot tested on a sample of 10 arthroplasty patients for clarity. The subjects who were part of the pilot test were not included in this analysis because there were changes made to the instrument on the basis of the initial feedback.

SATISFACTION WITH THE EDUCATIONAL SESSION

Satisfaction with the educational session was evaluated with a 9-item scale. A 5-point Likert-type rating assessed the subject’s satisfaction with each component of the educational session on a scale from 1 meaning not satisfied to 5 meaning fully satisfied. Total scores ranged from 9 meaning not satisfied to 45 meaning fully satisfied with all components of the interdisciplinary educational session. The research nurse interviewed treatment subjects on the second postoperative day. Only treatment subjects were interviewed with this tool to

<table>
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<th>TABLE 2. ORTHOPEDIC EDUCATIONAL EVALUATION TOOL</th>
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<td><strong>Verbalizes the Importance of</strong></td>
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<td>Pain less than 4</td>
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<td>Changing position in chair</td>
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<td>Muscle-strengthening exercises</td>
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evaluate satisfaction with the sessions so that the nurses could modify the educational program, if necessary. Reliability was evaluated with Cronbach’s α and was .99 for this sample.

**DATA ANALYSIS**

Data were entered into SPSS 15.0 (Microsoft Corp., Chicago, IL), and descriptive statistics were computed on all study variables and examined for the presence of random or systematic missing data, significant skewness, and outliers. Nonparametric statistical procedures were performed to answer the research questions because the data remained skewed after transformations were attempted. The Mann-Whitney U test was used to evaluate research questions 1, 2, and 3. An evaluation of satisfaction with the educational session was performed using descriptive statistics. The sample provided adequate power for all statistical procedures.

**Results**

**PAIN LEVELS**

A Mann-Whitney U test was run to answer research question 1. There were no significant differences in pain levels at the postoperative interview between treatment (mean 2.75 ± 1.82) and control subjects (mean 3.5 ± 2.6, p = .18). Overall, subjects in both groups reported fairly low levels of pain (mean 3.12 ± 2.27) on the second postoperative day.

**KNOWLEDGE LEVELS**

A Mann-Whitney U test was performed to answer research questions 2 and 3 that looked at differences in verbalization and demonstration of postoperative education by group. The results demonstrate that subjects who received the interdisciplinary educational intervention were significantly better at verbalizing (p < .001) and demonstrating (p < .001) postoperative skills than subjects in the standard educational group. Subjects in the treatment group had mean scores of 38.23 ± 7.21 for verbalizing, compared with mean control group scores of 26.4 ± 10.1. The greatest differences between the groups occurred in three areas: (1) verbalizing the importance of performing muscle-strengthening exercises, (2) verbalizing the importance of performing dorsi/plantar flexion exercises, and (3) verbalizing the importance of ambulating at least twice a day. Subjects in the treatment group were better at verbalizing the importance of these activities than those in the control group.

Mean demonstration scores were 21.43 ± 6.89 in the treatment group and 15.08 ± 6.94 in the control group. The greatest differences between the two groups in demonstration scores occurred on two items: demonstrating the ability to change position in a chair and ambulating twice a day. Patients in the treatment group were better able to demonstrate these skills than subjects in the control group. There were no significant differences in verbalization (p = .11) or demonstration of skills (p = .28) between subjects by type of surgery (knee vs. hip replacement).

**Satisfaction With the Educational Session**

Descriptive statistics were computed to answer research question 4. Mean ratings for satisfaction with the educational session were quite high (40.8 ± 4.7, range 24–45). Subjects rated all aspects of the interdisciplinary educational session as very satisfactory.

**Discussion**

It has been identified that pain management for orthopaedic patients is less than optimal. Patients have reported moderate or severe postoperative pain, and patient telephonic surveys after discharge reveal that pain management needs were not met. Pain management for orthopaedic surgical patients demands evidence-based content and strategies involving direct care providers to ensure consistent use of pain management principles (Neitzel et al., 1999). In contrast to prior findings, this study revealed that overall both groups reported fairly low levels of pain (less than 4 on a 0–10 scale) on the second postoperative day. This positive finding reflects that nursing practice patterns on the unit support an outcome of effective pain management during hospitalization.

For years, nursing research has attempted to measure the effect of preoperative education on postoperative outcomes (Messer, 1998). Research demonstrates that preoperative teaching is beneficial and affects length of stay, anxiety, pain, and patient satisfaction (Shuldham, 1999). The findings of this study demonstrate that a more comprehensive educational approach was more effective than standard education in improving the knowledge levels of postoperative skills and demonstration of behaviors that reduce postoperative complications. Patients were better able to perform required exercises and functional activities, transfers, and ambulation after participating in an interdisciplinary educational intervention. However, it is difficult to know which aspects of the intervention were most effective, and this would require further study. The study could be extended to patients in their postoperative visits. Immediate pain relief and function could be related to postoperative nursing care or the educational intervention. Longer-term outcomes including improved functional ability and extended pain relief might be related to the educational intervention.

**Limitations**

Although the results of the study supported a more comprehensive education approach, the limitations of the study must be considered. The sampling approach was self-selection into the treatment group. Those who were interested in attending the additional educational session did so. Consequently, one must ask, “is this group different than those who chose not to attend?” It is possible that they are more motivated or that they had less mobility impairment so travel to the hospital for an additional educational session was not problematic. Also, the educational level of the participants was not known and could potentially confound the results of any educational intervention.
The study did compare two educational interventions, but both the verbal education and written education were different so it is not possible to determine what was most effective about the educational intervention. In addition, the instrument used to measure the knowledge and skill outcome variables was designed for the study so that outcomes measured with these instruments should be interpreted with caution.

Although data was collected consistently on the day shift, the second postoperative day, there was no evaluation of pain medication use in this sample and the one point in time pain measurement may not have adequately captured the level of pain.

Conclusions
We have expanded our total joint replacement educational program with great results. The results of this study demonstrate that the preoperative interdisciplinary educational program for patients scheduled for total joint arthroplasty had a positive effect on understanding postoperative expectations. Attendance at the preoperative interdisciplinary educational session provides a greater understanding of postoperative skills and discharge expectations. The interdisciplinary educational sessions were rated as very satisfactory and have continued providing an option for enhanced preoperative education.

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