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READINESS FOR DISCHARGE AFTER TOTAL KNEE REPLACEMENT: EXPLORING PATIENTS' PERCEPTIONS OF DISCHARGE PREPARATION AND PROVIDERS' DESCRIPTIONS OF PRE-OPERATIVE EDUCATION

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READINESS FOR DISCHARGE AFTER TOTAL KNEE REPLACEMENT: EXPLORING PATIENTS' PERCEPTIONS OF DISCHARGE PREPARATION AND PROVIDERS' DESCRIPTIONS OF PRE-OPERATIVE EDUCATION

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Health Sciences
at the University of Kentucky

By

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Lexington, Kentucky

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Lexington, Kentucky

ABSTRACT OF DISSERTATION

READINESS FOR DISCHARGE AFTER TOTAL KNEE REPLACEMENT: EXPLORING PATIENTS' PERCEPTIONS OF DISCHARGE PREPARATION AND PROVIDERS' DESCRIPTIONS OF PRE-OPERATIVE EDUCATION

Discharge readiness following total knee replacement (TKR) has often been defined using quantitative factors, such as knee range of motion or walking a specified distance. These measurements fail to include other features that could impact readiness for discharge, such as social support or patient perceptions. Most patients have positive results following TKR surgery, however others experience negative outcomes such as falls, reduced functional performance, and hospital readmission. Readiness for returning home after TKR begins with pre-operative education to prepare patients for surgery and the post-operative phase. Health care providers must have a clear understanding of patients' perceptions of readiness to return home after surgery. It is also essential to describe the current structure of pre-operative education nationally as a mechanism for better preparing patients to return home following knee replacement.

This dissertation includes three studies that explore aspects of discharge readiness following TKR including patients' perceptions of readiness for discharge as well as the structure of pre-operative education for TKR across the United States. The first study examined patients' experiences preparing for discharge home from the acute care setting following TKR surgery. Results indicated that patients felt prepared overall for discharge and received appropriate supports for returning home after surgery, but some felt unprepared for certain aspects of recovery such as the amount of pain experienced in the post-operative phase. The second study surveyed health care providers who participated in pre-operative education before TKR to identify the current structure of education programs in the United States. This pilot study revealed that pre-operative education teams were commonly interprofessional with education being typically provided in a group format in a single session lasting between 1 and 1.5 hours. Verbal and written instruction were common delivery methods to provide education.

The final dissertation study used mixed-methods to explore the current structure of pre-operative education for TKR in the United States with a large, national sample. Orthopedic nurses completed an online survey to describe their pre-operative education program. The majority of participants provided pre-operative education as part of interprofessional teams in either a group format or a format that included both group and individual education. Verbal instruction was the most common educational delivery method followed by written instruction. Most pre-operative education classes lasted between 1 and 1.5 hours, were delivered in a single session, and included a variety of topics. Ten orthopedic nurses were then interviewed and interview transcripts were analyzed qualitatively for common themes among participants. Participants expressed that pre-operative education was a significant component impacting patient outcomes following surgery. Interprofessional pre-operative education was valued by participants, but pragmatic factors were identified as barriers to the inclusion of other disciplines within these programs. Education programs were constantly evolving based on current evidence-based practice and changes to orthopedic protocols. Descriptions of pre-operative programs nationally combined with providers' perceptions provides a strong basis for determining best practice to support better post-operative patient outcomes. This dissertation research culminated in recommendations for best practice as well as the creation of a model, the ICF-I-EDUCATE, which combines the International Classification of Health, Functioning and Disability (ICF), interprofessional practice, and the EDUCATE model for providing patient and family education. Research is needed to examine the ICF-I-EDUCATE model in clinical practice for patients with planned TKR.

KEYWORDS: Pre-operative Education, Total Knee Replacement, Total Knee Arthroplasty, Readiness for Discharge, Interprofessional

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April 23, 2018
Date

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DEDICATION

This dissertation is dedicated to several individuals who were instrumental in making me the person I am today, without whom this work would not be possible:

- Wayne Causey, my late father, who taught me that life's barriers and obstacles are merely there so that we can overcome them. Our time together was much too short, and I wish you could be here to celebrate with me today.
- Daniel Upton, my amazing husband, who has loved and supported me unconditionally and shown me what it means to have a true partner in life. Let's never stop loving, laughing, and traveling the world together.
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Chapter One

An Introduction to Discharge Readiness for Patients Undergoing Total Knee Replacement Surgery

Introduction

Approximately 750,000 total knee replacements (TKR) are performed annually in the United States, and by 2020, this number is projected to exceed 1,375,574 surgeries (AAOS, 2014; Kurtz, Ong, Lau, & Bozic, 2014). TKR is a common intervention for both osteoarthritis and rheumatoid arthritis of the knee that has been found to be the most successful intervention for reducing pain and improving functional performance, especially for advanced disease (Lee & Choi, 2012; Skou et al., 2015). Most individuals who undergo TKR surgery are between the ages of 50 and 80, with the majority being 60 years of age or older (AAOS, 2014; Kremers et al., 2015). The prevalence of TKR surgery increases with age for both men and women, and is higher for women than men at all age groups (Kremers et al.).

Total knee replacement is a joint replacement surgery where all parts of the knee are replaced with artificial components (Kerrigan & Saltzman, 2017). The tibial component replaces the upper portion of the tibia, the femoral component replaces the femoral condyles and the patellar groove, and the patellar component replaces the lower surface of the patella. TKR is indicated when both sides of the knee are impacted by osteoarthritis. Osteoarthritis worsens over time and causes damage to the articular cartilage, leading to pain and stiffness as the bone structures rub against one another. If only one side of the knee is impacted, either the medial or lateral side, then a unicompartmental or partial knee replacement (PKR) may be performed instead of total joint replacement. A PKR involves replacing only the diseased compartment, preserving

the remainder of the knee tissues (AAOS, 2016). While PKR surgery is less invasive than total joint replacement, lower rates of PKR have been reported in the literature.

A study examining rates of TKR and PKR among Medicare beneficiaries over a 10 year period found that PKR surgeries only accounted for 4.5% of all knee replacement surgeries (Bolognesi et al., 2013). A more recent systematic review conducted by van der List and colleagues (2016) still found lower rates of PKR compared to TKR; for studies included in this review, 10,309 participants had undergone TKR procedures while only 2,218 were unicompartmental replacements. Because PKR is less commonly performed, fewer individuals are impacted by this condition and there is a smaller population available to attend pre-operative education. Due to the lower prevalence of PKR, this diagnosis is not a focus of the dissertation research. Although TKR is a common surgery that is often associated with positive results, some patients may not be fully prepared for discharge home after TKR.

Some patients experience poor outcomes following discharge after TKR surgery, such as functional declines, falls, and hospital readmissions. Recommendations and instructions that seem clear when they are first received in the hospital can become confusing after patients discharge home, leading to reduced safety and less than optimal results (Cain, Neuwith, Bellows, Zuber, & Green, 2012). Patients have reported being unprepared for the limitations they experienced after surgery as well as having trouble completing daily tasks in their home environment after discharging from the hospital following TKR (Cain et al., 2012; Showalter, Burger, & Salyer, 2000) Fall incidence has been reported to be as high as 11.8% in the months after TKR (Swinkels, Newman, & Allain, 2009). At 30 days following discharge after TKR surgery, 4-5% of patients are

readmitted to the hospital and at 90 days after discharge, approximately 8% are readmitted to the hospital (Schairer, Vail, & Bozie, 2014; Welsh et al., 2017). It appears that some patients are discharging from acute care after TKR without having their needs fully met to prepare them for returning home following surgery.

Discharge readiness is often measured quantitatively, such as by assessing pain control, mobility levels, degrees of knee flexion, walking distance, and ability to climb stairs (Chan, Teo, Assam, & Fransen, 2014; Ilfeld et al., 2010; Wegener et al., 2011). These measures may not fully encompass other factors that could impact discharge readiness, such as social support, patients' perceptions of discharge readiness, and psychosocial well-being. There is also inconsistency in the way that readiness for discharge is defined in the literature, with various authors and disciplines conceptualizing this concept differently (Galvin, Wills, & Coffey, 2017). This variation makes it difficult to fully address discharge readiness, with diverse health care providers having different criteria that they may be using to assess preparation to return home from the hospital (Galvin et al.). While patients interact with numerous health care providers before and after TKR surgery, nursing, occupational therapy, and physical therapy may be most integrally involved in preparing patients for discharge following knee replacement.

Nurses, physical therapists, and occupational therapists each have roles to address factors that impact discharge readiness after TKR surgery. Occupational therapists promote enhanced occupational functioning through the use of "occupations and activities, preparatory methods and tasks, education and training, advocacy, and group interventions to facilitate engagement in occupations to promote health and participation" (AOTA, 2014, p. S29). Based on systematic review, there is moderate to strong evidence

supporting occupational therapy as a primary intervention and as part of a multidisciplinary team for patients with lower extremity musculoskeletal disorders including TKR: providing pre-operative education; addressing higher level tasks in the community; and addressing other needs following TKR surgery such as adaptive equipment training, self-care retraining, and functional mobility (Bradshaw & Dorsey, 2016). Physical therapists are "health care professionals who help individuals maintain, restore, and improve movement, activity, and functioning, thereby enabling optimal performance and enhancing health, well-being, and quality of life" (APTA, 2017). The most beneficial interventions for physical therapy after TKR according to systematic review and meta-analysis include early mobilization for functional mobility and lower extremity exercise directed at improving strength and knee range of motion (Henderson, Wallis, & Snowdon, 2018). Registered nurses focus on protecting, promoting, and improving health through the following responsibilities: "perform physical exams and health histories; provide health promotion, counseling and education; administer medications and other personalized interventions; coordinate care, in collaboration with a wide array of health care professionals" (ANA, 2017). Nurses monitor patients and implement interventions to prevent infection, manage pain, mobilize patients, provide ongoing education related to self-care, and address discharge needs to promote safe and successful transitions to home after surgery (Lasater & Mchugh, 2016). Patients' experiences with preparing for discharge following TKR surgery can provide insights that can lead to alterations in clinical practice to better prepare patients for returning home after joint replacement.

Research regarding patient experiences preparing for discharge after TKR is limited. Previous research has examined patient experiences associated with discharge after total hip replacement (THR; Heine, 2004; Hunt et al., 2009), associated with a variety of diagnoses (Cain et al., 2012; Perry et al., 2012), or related to the combined patient experiences of recovery prior to discharge after THR and TKR (Specht, Kjaersgaard-Anderson, & Pedersen, 2016). None of these studies focused solely on patients' experiences with preparing for discharge after TKR surgery. Understanding patients' experiences of preparing for discharge after TKR could guide changes to patient care that may better prepare them for returning to home after surgery. Pre-operative education is a first step in supporting readiness for discharge following TKR.

Pre-operative education for orthopedic surgery has been examined in relation to a variety of patient outcomes, such as: fall incidence (Clarke, Timm, Goldberg, & Hattrup), post-operative pain (Louw, Diender, Butler, & Puentedura, 2013), patient knowledge recall (Bob, Goldsmith, & Gambardella, 2015), length of stay (Jones, Alnaib, Wilkinson, St Claire Gibson, & Kader, 2011), rehabilitation performance (Chen, Chen, & Lin, 2014), and anxiety (Spalding, 2003), among other outcomes. Individual studies have demonstrated benefits of pre-operative education, such as reduced anxiety (Spalding, 2003), increased preparation for surgery (Kearney, Jennrich, Lyons, Robinson, & Berger, 2011), enhanced pain control in the post-operative phase (Chen et al., 2014), and some reductions in length of stay (Jones et al., 2011). However, larger systematic reviews of randomized controlled trials have not found enough evidence to support or refute this intervention prior to surgery (McDonald, Hetrick, & Green, 2004; McDonald, Page,

Beringer, Wasiak, & Sprowson, 2014). Research is needed regarding the best structure of pre-operative education programs to support improved post-operative outcomes.

Systematic reviews have provided some limited descriptions of the structure of pre-operative education in the United States. The reported length of this education has varied from as little as 12 minutes to up to several hours or even half a day (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Some patients received one session only or completed the education independently, while others participated in multiple pre-operative education sessions prior to their surgery. Educational approaches varied with some patients only receiving video or booklet materials, while others were educated in person using multiple methods to deliver the education. Nursing and physical therapy were the most commonly reported providers of pre-operative education (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Louw et al. (2013) listed the providers from the studies included in their systematic review from most to least utilized; physical therapy and nursing were listed first, and occupational therapy was not included on the list. Current pre-operative education programs may be lacking essential health care providers who are necessary for fully preparing patients for discharge home following TKR.

Currently, the literature is lacking a standard of care for pre-operative education. Research articles provide descriptions of the education program associated with the individual study setting, but are only descriptive of single program designs. Broader systematic reviews provide details regarding the studies that were included within these reviews, but are only indicative of the studies that met strict inclusion criteria to be included in the research (Louw et al., 2013; McDonald et al., 2004; McDonald et al.,

2014). While there has been some consistency regarding topics covered presented in these systematic reviews, such as mobility and preadmission procedures, other topics were varied across programs such as complications and pain education (Louw et al.). Additional features reported in the literature, such as the timing and duration of pre-operative education, has varied widely across health care sites (Louw et al.). This variability does not support a clear picture of current practice trends in the United States for education prior to surgery, and may also impede research that explores the efficacy of pre-operative education.

Statement of the Problem

Many patients experience less than optimal outcomes after TKR including falls by 11.8% of this population, hospital readmission of up to 8% of patients, and reduced functional independence in the months following surgery (Levinger et al., 2014; Schairer, Vail, & Bozic, 2014; Swinkels, Newman, & Allain, 2009). These negative results are largely preventable and indicate a need to better prepare patients for discharge home after knee replacement, with preparation that begins through pre-operative education. As foundational knowledge to increase discharge readiness, patient experiences of preparing for discharge home must first be explored. It is then essential to examine the current design of pre-operative education programs for TKR on a national level, which will serve as a basis for determining best practice for this education to support better post-operative patient outcomes.

Statement of Purpose and Research Questions

The purpose of this three-part dissertation was to explore patient experiences of preparing for discharge home after TKR and to describe the content, providers, and delivery methods currently used for pre-operative education in the United States prior to knee replacement surgery. It was assumed that qualitative methods would be required to explore patient perceptions of discharge preparation in detail while a quantitative approach would be needed to describe pre-operative education nationally, followed by qualitative methods to explore these educational designs further with individual health care providers. The following research questions were examined to fulfil the purpose of this dissertation:

Study 1 Research Objectives

The purpose of the first study was to describe patients' experiences of preparing for discharge following elective TKR and to gain an understanding of what factors impacted subjective readiness for return to home following TKR surgery. The following overall question was answered through this qualitative research study: What are patient experiences of preparing for discharge home from the acute care setting following elective total knee replacement surgery? Three additional sub-questions were also answered:

- What physical, psychosocial, and planning processes do patients engage in before surgery to prepare themselves for discharge?
- What physical, psychosocial, and planning processes do patients engage in after surgery to prepare themselves for discharge?
- What factors impact subjective readiness for discharge home?

These questions were answered through interviews with a sample of patients who had recently undergone TKR surgery. From this study, the following was achieved: described patients' experiences of preparing for discharge home after TKR surgery, identified processes patients engaged in both before and after surgery to prepare for returning to home, and described factors that impacted discharge readiness. See Chapter 3 for a full description of study methods and results.

Study 2 Research Objectives

The purpose of the second study was to begin to describe the content, providers and delivery methods currently used by health care professionals who provide pre-operative education for patients prior to TKR. The following overall question was answered through this research: What are the content, providers, and delivery methods currently used by health care professionals to provide pre-operative education for TKR in the United States? Four specific objectives were sought:

- Identify the content currently taught by health care professionals who provide pre-operative education for patients with planned TKR.
- Identify the providers who currently deliver pre-operative education for patients with planned TKR.
- Identify the delivery methods currently used by health care professionals who provide pre-operative education for patients with planned TKR.
- Obtain feedback about the study survey design from participants who provide pre-operative education to guide development of a large, national survey to be implemented at a later date.

These objectives were achieved through a pilot survey study with a sample of occupational therapists, nurses, and physical therapists who participate in pre-operative education prior to TKR surgery. From this research, the following was achieved: described current topics covered in pre-operative education, identified health care providers commonly involved in this education, determined typical delivery methods used to provide education prior to surgery, and obtained valuable feedback that was implemented to alter the survey before administration on a large, national sample. See Chapter 4 for a full description of study methods and results**.**

Study 3 Research Objectives

The purpose of the third study was to identify the current structure of pre-operative education programs for patients undergoing TKR surgery in the United States, and this research was guided by knowledge gained from studies 1 and 2. The following overall question was answered through this research: What are the content, providers, and delivery methods currently used by health care professionals to provide pre-operative education for TKR in the United States? Four specific objectives were sought:

- Identify the content currently included by health care professionals in patient education prior to planned TKR.
- Identify the providers currently involved in providing patient education prior to planned TKR.
- Identify the delivery methods currently used by health care professionals for patient education prior to planned TKR.
- Explore health care providers' perceptions of current pre-operative education and optimal pre-operative education for patients prior to planned TKR.

These questions and objectives were achieved through a large national survey study with a sample of orthopedic nurses who participate in pre-operative education prior to TKR surgery, and interviews with a smaller sample. From this research, the following was achieved: described current topics covered in pre-operative education, identified health care providers commonly involved in this education, determined typical delivery methods used to provide education prior to surgery, and identified perceptions of both current and optimal pre-operative education for patients prior to TKR surgery. See Chapter 5 for a full discussion of study methods and results.

Research Approach

The first study utilized transcendental phenomenology as a qualitative approach to examine patient experiences through semi-structured interviews that allowed shared themes to emerge directly from participants' words. Phenomenology seeks to describe participants' lived experiences with the phenomenon being studied (Creswell, 2013). The transcendental approach to phenomenology utilizes a more objective approach by bracketing out researchers' previous experiences with the phenomenon in order to limit their impact on the research process (Creswell, 2013). Qualitative research provides insights regarding complex topics that cannot be measured in numbers through statistical analysis, but must instead be explored in words and meanings (Creswell, 2013).

The second study was a pilot survey that was guided by the tailored design method developed by Dillman, Smyth, and Christian (2014). This approach seeks to customize the survey design and implementation based on: topic, survey sponsor, types of individuals who will be recruited for the survey, available resources, and timeframe for survey completion (Dillman, Smyth, & Christian, 2014). The tailored approach helps to

reduce survey error and increase motivation for participants to complete the survey (Dillman et al., 2014). Survey research permits gathering descriptive data regarding a topic that has not been studied thoroughly previously, and piloting the survey procedures is necessary to ensure optimal design for future research (Fowler, 2014).

The last study in this dissertation utilized both quantitative and qualitative procedures for an explanatory, sequential mixed-methods design. This approach involves collecting quantitative data in the first phase of the study, analyzing these results, and then building on these results in the second, qualitative portion of the study (Creswell, 2014). The quantitative portion of the study employed a large, national survey that was guided by the tailored design approach discussed previously (Dillman et al., 2014). The second, qualitative component of the study used transcendental phenomenology to explore participants' experiences with pre-operative education. A mixed-methods approach was selected for this final dissertation study because this blending of research designs can provide a stronger understanding of the research topic than either approach can alone (Creswell, 2014).

Theoretical Approach

Much of this research has been guided by social constructivisim, a philosophical framework aligned with qualitative research that recognizes the existence of multiple realities (Creswell, 2013; Creswell, 2014). This worldview posits that the meaning developed from our experiences are complex and varied, and cannot be represented by a single reality. Individuals construct meaning not just from their own experiences, but also through social interactions with others as well as historical and cultural influences (Creswell, 2013; Creswell, 2014). For example, patients in study 1 expressed that their

perceptions of preparing for discharge after TKR were influenced by the experiences of family and friends who had previously undergone the procedure (Causey-Upton & Howell, 2017). The goal of research guided by social constructivism is to uncover participants' views of the phenomenon being studied, and to present the results using participants' own words as much as possible. Social constructivism was selected as an overall theoretical framework to guide this dissertation, specifically study 1 and the qualitative portion of study 3, because it depicts the range of experiences individuals may have with the same phenomenon. Semi-structured interviews used to gather data from patients and health care providers provided insights into individuals' diverse experiences related to preparing for discharge home as well as describing multiple perspectives of pre-operative education.

Quantitative components of this three-part dissertation, specifically study 2 and the survey portion of study 3, were guided by postpositivism. This worldview is reductionistic and attempts to reduce information into units that can be quantified numerically (Creswell, 2014). Using this perspective, it is paramount for the researcher to remain objective and to establish standards for validity and reliability for data collection and analysis procedures (Creswell, 2014). These beliefs guided the development of my survey based on the current literature, review of three pre-operative education programs in Kentucky, expert review from my doctoral advisory committee, and pilot testing. Survey questions were used to identify the current structure of pre-operative education in the United States and to determine the frequency of each aspect of program design across participants. In study 3, the combination of both quantitative and qualitative approaches

allowed for a rich, full description of pre-operative education in the United States and providers' perceptions of this education.

Assumptions

I held several assumptions prior to implementing the research presented in this dissertation. These assumptions developed from my clinical experiences as an occupational therapist working with patients in acute care following TKR, my previous education in a Doctorate of Occupational Therapy (OTD) program, and my PhD coursework. My first assumption was that patients were not fully prepared for discharge home following orthopedic surgery. This assumption was based on experiences with patients who appeared ready for discharge after orthopedic surgery according to quantitative measures, but who did not feel fully prepared to return home after surgery. My second assumption was that patients would be able to describe their discharge preparation experiences, including identifying supports and barriers to this process. I felt this assumption was accurate based on interactions and discussion with patients during occupational therapy sessions as well as through my previous doctoral capstone research project with patients who had undergone THR and TKR surgery. My third assumption was that patients would share their experiences related to preparing for discharge after TKR openly and honestly. My fourth assumption was that health care providers would be interested and invested enough to be willing to participate in a survey study and interview process related to pre-operative education for TKR surgery. My last assumption was that health care providers would respond openly and honestly when responding to demographic questions as well as when describing the pre-operative education program at their respective facility.

Researcher Statement

The studies and literature review in this dissertation were completed to fulfil course requirements in the PhD in Rehabilitation Sciences program at University of Kentucky. I completed this program part-time while teaching full-time in the Department of Occupational Science and Occupational Therapy at Eastern Kentucky University, as well as while working PRN (as needed) as an occupational therapist in an acute care hospital. My coursework as well as other outside experiences guided me toward both qualitative research and survey methods to examine pre-operative education and preparing for discharge after TKR surgery. My past and current experiences as an occupational therapist have involved evaluating and treating clients with a variety of conditions, including TKR surgery. I observed many patients who felt ready to return home after surgery, but others who did not feel fully prepared even when they were functioning at a high level with pain that was well controlled. This led me to question what factors might be impacting their perceptions of readiness for discharge home from the acute care setting.

I began this research journey early in my occupational therapy career by returning to school to complete a post-professional OTD. My doctoral capstone project examined subjective preparedness for discharge from the acute care setting for orthopedic patients who had undergone either TKR or THR surgery. The treatment group received occupational therapy addressing instrumental activities of daily living (IADLs) and activities of daily living (ADLs), versus those in the control group who only received treatment addressing ADLs which was standard practice at my facility. I found that patients in the treatment group felt more prepared to complete specific IADLs at home

than those in the control group, but did not have higher overall perceived readiness for discharge (Crum, 2011). This research project increased my interest in further examining readiness for discharge after orthopedic surgery. I have continued this research journey throughout my time in the PhD program in Rehabilitation Sciences.

Patients' lived experiences of preparing for discharge home after THR surgery has been studied previously in the literature on a limited basis (Heine, Koch, & Goldie, 2004); limited research is also available that has examined pre-operative education for THR surgery nationally and from the perspectives of providers (Rae, 2011). However, the lived experience of preparing for discharge after TKR had not been specifically examined in previous scholarship and pre-operative education for this population had also not been explored and described in detail in the literature to be representative of practice across the United States. The dearth of information in these areas, and my previous interests in readiness for discharge after knee replacement surgery, has guided my current dissertation research. My hope is that my research can be used in the future as a basis for developing stronger pre-operative education programs for TKR that will support improved patient outcomes and increased readiness for discharge home.

Significance of the Study

While most patients have positive outcomes following TKR surgery, others experience decreased functional performance, falls, and hospital readmission in the post-surgical phase (Levinger et al., 2014; Schairer et al., 2014; Swinkels et al., 2009). These poor outcomes indicate that patients may not be fully prepared for returning home following knee replacement. Discharge readiness is often assessed using quantitative measures, such as ability to climb stairs or having pain that is well controlled (Chan, Teo,

Assam, & Fransen, 2014; Ilfeld et al., 2010; Wegener et al., 2011). However, these measures do not fully encompass patients' experiences of preparing for discharge or their subjective readiness to return home after surgery. Areas where patients are not fully prepared, such as completing daily life tasks, fall prevention, and factors that can lead to readmission to hospital, could all be addressed during pre-operative education to prevent poor outcomes. Prior research has demonstrated that pre-operative education is not fully addressing patients' needs, with conflicting evidence to support and refute the efficacy of pre-operative education (McDonald et al., 2004; McDonald et al., 2014). The current literature describes the structure of pre-operative education for a limited number of facilities and is not representative of pre-operative education at a national level.

The limited literature exploring patients' readiness for discharge following TKR surgery as well as the dearth of information available to describe current pre-operative education programs for this population supports the need for this dissertation research. The first study explores patients' experiences with preparing to return home after surgery which will increase health care providers' understanding of this experience as well as identify both supports and barriers to discharge readiness. The second study will provide a beginning description of pre-operative education programs across the United States to support a larger study that examines these programs in more detail with a broad, representative sample. The third study will provide clinicians with a thorough understanding of current pre-operative education programs for TKR surgery on a national level as well as examine providers' perceptions of the adequacy of this pre-operative education to support the future development of more effective education programs.

Delimitations

1. Participants in the first study were male and female patients between the ages of 55 and 80 who had recently undergone elective TKR surgery and were still in the hospital.

2. Participants in the second study were currently practicing nurses, physical therapists, and occupational therapists who provided pre-operative education before TKR surgery in the United States.

3. Participants in the third study were currently practicing orthopedic nurses who provided pre-operative education before TKR surgery in the United States and were members of the National Association of Orthopaedic Nurses (NAON).

Limitations

The first study was conducted with a sample from a single hospital in an urban area, and may not be representative of patient experiences with preparing for discharge home from other hospital settings. Participants were also undergoing their first elective TKR surgery, and their experiences may not be accurate for individuals who have already completed a previous TKR or those who required knee replacement for non-elective reasons. The second study was conducted using a small convenience sample, and thus results have limited generalizability to pre-operative education programs nationally. The third study had large geographic representation across all regions of the United States, but providers from 6 states did not complete the survey. This may mean that the descriptions of pre-operative education provided by participants does not fully represent pre-operative education programs from those specific states. Additionally, orthopedic nurses who provide pre-operative education but were not members of NAON were not able to

participate in the study and their experiences could differ from the sample that was recruited for this research.

Operational Definitions

Activities of Daily Living (ADLs): are defined as "activities oriented toward taking care of one's own body (adapted from Rogers & Holm, as cited in American Occupational Therapy Association, 2014, p. S19)." Some examples include bathing, dressing, feeding, personal hygiene and grooming.

Comprehensive Care for Joint Replacement (CJR) Model: is defined as a model that "tests bundled payment and quality measurement for an episode of care associated with hip and knee replacements to encourage hospitals, physicians, and post-acute care providers to work together to improve the quality and coordination of care from the initial hospitalization through recovery" (Centers for Medicare and Medicaid Services, 2018).

Constant Comparative Analysis: is defined as the "process of taking information from data collection and comparing it to emerging categories" (Creswell, 2013, p.86). This process involves beginning data analysis to confirm and support emerging themes which guide subsequent data collection.

Data Saturation: is defined as when "in qualitative data collection, the researcher stops collecting data because fresh data no longer sparks new insights or reveals new properties" (Creswell, 2014, p.248). Subsequent interviews may be utilized to confirm the study's findings but no new themes emerge from the data.

Explanatory Sequential Mixed Methods Design: is defined as "one in which the researcher first conducts quantitative research, analyzes the results and then builds on the results to explain them in more detail with qualitative research. It is considered

explanatory because the initial quantitative data results are explained further with the qualitative data. It is considered sequential because the initial quantitative phase is followed by the qualitative phase" (Creswell, 2014, pp.15-16).

Horizonalization: is defined as a process of identifying significant statements from qualitative interview transcripts and listing them end to end with no hierarchy to reflect the range of experiences and perceptions that participants have with the phenomenon being studied (Moustakas, 1994).

Instrumental Activities of Daily Living (IADLs): are defined as "activities to support daily life within the home and community that often require more complex interactions than those used in ADLs" (American Occupational Therapy Association, 2014, p. S19). Some examples include home establishment and management, meal preparation and cleanup, and shopping.

Meaning Unit: is defined as an early theme in phenomenology research that has been identified after combining and describing related significant statements based on commonalities. These meaning units will later be further combined and condensed to form the final study themes (Creswell, 2013).

Mixed Methods Research: is defined as **"**an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone" (Creswell, 2014, p.4).

Phenomenology: is defined as "a design of inquiry coming from philosophy and psychology in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants" (Creswell, 2014, p.14).

Postpositivism: is defined as "being reductionistic, logical, empirical, cause-and-effect oriented, and deterministic based on a priori theories" (Creswell, 2013, p.24). This approach reduces information into units that can be measured numerically and is used to guide quantitative research approaches.

Purposeful Sampling: is defined as when "the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study" (Creswell, 2013, p.156). For the purposes of this dissertation research, participants were purposively sampled for having experiences with the phenomenon being studied, either being a patient who had undergone TKR and was preparing for discharge home or being a provider of pre-operative education for planned TKR surgery.

Readiness for Discharge: is defined as "both a state and a process characterized by physical stability and competence to manage self-care at home; adequate support to cope after leaving the hospital; psychological ability to manage the process; and adequate information and knowledge to respond to common problems" (Galvin et al., 2017).

Significant Statements: are defined as initial words and phrases of importance that are identified in the early stages of data analysis for phenomenology that pertain to the phenomenon being studied. These statements are later grouped and organized into early meaning units, and later form the basis of the final study themes (Creswell, 2013)

Social Constructivism: is defined as when "individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences-meanings directed toward certain objects or things. These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrow the meanings into a few categories or ideas" (Creswell, 2013, p. 24).

Survey Research: is defined as a research approach that "provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (Creswell, 2014, p.13).

Tailored Design Method: is defined as an approach to "customizing survey procedures for each survey situation based upon knowledge about the topic and sponsor of the survey, the types of people who will be asked to complete the survey, the resources available, and the time frame for reporting results" (Dillman et al., 2014, p.16).

Theme: is defined as "broad units of information that consist of several codes aggregated to form a common idea" (Creswell, 2013, p. 186).

Total Hip Replacement: is defined as a joint replacement surgery where all parts of the hip joint are replaced with artificial components (Kerrigan & Saltzman, 2017). Total hip replacement involves replacing the stem, which fits into the femur; the ball, which replaces the head of the femur; and the cup which replaces the hip socket or acetabulum.

Total Knee Replacement: is defined as a joint replacement surgery where all parts of the knee joint are replaced with artificial components (Kerrigan & Saltzman, 2017). The tibial component replaces the upper portion of the tibia, the femoral component replaces the femoral condyles and the patellar groove, and the patellar component replaces the lower surface of the kneecap.

Transcendental Phenomenology: is defined as a phenomenology approach where the investigator attempts to bracket out his or her prior experiences in order to limit the researcher's impact on the research process to focus on participants' experiences with the phenomenon being studied (Creswell, 2013).

Trustworthiness: is defined as the methods used to ensure the validity, reliability, and authenticity of qualitative research. These methods might include triangulation of multiple sources of data, peer review or debriefing of the results with an expert researcher, member checking with study participants, and using thick, rich description, among other approaches (Creswell, 2013).

Summary

Readiness for discharge after TKR surgery is an important outcome for all health care professions, especially for rehabilitation providers. Many patients experience negative outcomes in the months after surgery, such as falls and reduced independence, which could be addressed pre-operatively by occupational therapists as well as other members of the interprofessional health care team. It is necessary to describe and understand patient experiences of preparing for discharge in order to provide needed support for optimal outcomes after surgery, including improved occupational performance. Pre-operative education must also be fully explored to determine current program structures as a foundation for implementing effective education to better prepare patients for discharge home after TKR surgery.

Chapter Two

Review of the Literature

Introduction

Currently, more than 750,000 total knee replacement (TKR) surgeries are performed each year in the United States, and this number is expected to increase to more than 1,375,574 by the year 2020 (AAOS, 2014; Kurtz, Ong, Lau, & Bozic, 2014). Total knee replacement has been found to provide many intermediate and long-term benefits, such as improvements in function, quality of life, and reduced knee pain (Shan, Shan, Suzuki, Nouh, & Saxena, 2015). While the majority of patients achieve positive outcomes following TKR, others experience sub-optimal results. Approximately 81% of patients report satisfaction overall with their outcomes following surgery, however a remaining 19% are not satisfied with their overall results after TKR; 14-28% of patients have reported being unsatisfied with pain relief after TKR and dissatisfaction with specific activities of daily living has varied from 16-30% (Bourne, Chesworth, Davis, Mahomed, & Charron, 2010). Poor pain relief and decreased ADL performance, among other factors, may indicate reduced preparation for life at home after surgery.

Patients may not be fully prepared for the decreased independence they experience after TKR. Many patients anticipate returning to full functional performance quickly after surgery, and have demonstrated substantial discrepancies between their expectations and actual functional abilities following TKR (Levinger et al., 2016). Some patients also have complications after surgery, such as infection and falls, that may lead to hospital readmission and further functional declines. Reports of readmission rates in the literature for the months following TKR range from 5% to 8% (Belmont et al., 2016;

Schairer, Vail, & Bozie, 2014; Welsh et al., 2017). In order to reduce the incidence of complications after surgery and increase preparation for returning home, it is necessary to use accurate measures to assess discharge readiness following knee replacement. The purpose of this chapter is to provide health care providers with essential information regarding readiness for discharge following TKR surgery including common complications, factors that influence preparation for returning home after surgery, and measures of discharge readiness.

Complications Following Total Knee Replacement

Fall Incidence

Falls in the hospital are not uncommon and these costly adverse events have serious ramifications for patient function and quality of life. In addition, significant economic and legal consequences can also result from in-hospital falls. Incidence of hospital falls in the United States has been reported to be 3.56 falls per 1000 patient days (Bouldin et al., 2013). Short term costs to health care services in the aftermath of a fall in the hospital have been reported to be as high as $14,591 on average, excluding any costs of potential litigation (Haines et al., 2013). Patients who experience falls in the hospital can incur serious harm, with approximately 30% of all falls resulting in injury (Hill et al., 2010). Falls in hospital may also lead to longer lengths of stay and increased health care utilization. Potential for falling in-hospital after knee replacement is a significant concern as this may lead to other injuries and complications that could negatively impact patient outcomes following TKR.

Patients are at increased risk of falling in the acute phase after TKR and other orthopedic surgeries due to mobility limitations in the early post-operative period

(Memtsoudis et al., 2012). This creates the potential for trauma from possible wound dehiscence at the surgical site or prosthesis dislocation upon impact, among other injuries. Falls in the months after TKR occur in up to 11.8% of this population (Swinkels, Newman, & Allain, 2009). While the surgical site itself would typically be healed in the months following surgery, patients are still at risk for other injuries caused by falling such as fracture or head injury. In a study that prospectively examined fall incidence for TKR patients, approximately 45% of patients who had a history of falling prior to surgery fell again in the year following their TKR surgery (Swinkels et al., 2009). Any reduction in fall incidence for TKR patients both in-hospital and after discharge would be clinically significant due to the ramifications for patient health and functional performance. Patients often have high expectations regarding function following TKR, and experiencing a fall would further reduce functional performance in the post-operative phase.

Reduced Function

Patients anticipate achieving full functional recovery within 3 months after TKR surgery, with some expecting these improvements by 6 weeks post-surgery (de Achaval et al., 2016). However, Hamel et al. (2008) studied clinical outcomes following both total hip replacement (THR) and TKR and found that patients needed approximately 49 days to return to independence with housework and 60 days to complete shopping without assistance; only 30% of participants were independent with outdoor occupations, such as gardening, by 6 months after surgery. Even after 6 months of recovery following TKR, patients have difficulty with bending and stooping, which are required movements for completing many higher level tasks. Leight, Stockwell, Hartnell, Hennessy, and Mullan (2016) found that at 12 months after knee replacement, 28% of patients still perceived

that they were not able to complete kneeling on their surgical lower extremity. Persons undergoing total joint replacement surgery have reported having unrealistic expectations about how well they would function after their surgery and were unprepared for the functional limitations they experienced in the post-operative phase (Showalter et al., 2000; Westby & Backman, 2010). Many patients demonstrate large discrepancies between their expectations and their perception of their actual abilities post-surgery (Levinger et al., 2014). Patients may experience other negative outcomes following TKR that are associated with reduced independence, such as deep vein thrombosis (DVT), which can lead to hospital readmission and further complications.

Hospital Readmission

The main causes of readmission after TKR are infection, DVT, and arthrofibrosis (Belmont et al., 2016; Schairer et al., 2014; Welsh et al., 2017). While infection rates post-surgery following TKR are relatively low in the population at 0.65% in-hospital and 0.41% after discharge, post-surgical and post-traumatic infections are among the top causes for readmission to hospital after TKR (Poultsides, Triantafyllopoulos, Sakellariou, Memtsoudis, & Sculco, 2017; Welsh et al., 2017). Rates of DVT among patients after TKR surgery have been reported to be approximately 0.45%; although this percentage may appear low, those who do develop a DVT have significantly higher rates of mortality (Dua, Desai, Lee, & Heller, 2017). Rates of arthrofibrosis have been reported to range from 1% to as high as 13% following TKR, which reduces functional performance after surgery (Cheuy et al., 2017). Risk for readmission is increased for patients who have a history of transient ischemic attack or cerebrovascular accident, patients who are undergoing a revision TKR, those who had a longer hospital stay, and those who are

female (Belmont et al., 2016; Schairer et al., 2014). Patients who discharge to inpatient rehabilitation or a skilled nursing facility after leaving the acute care setting have more than 40% higher odds to be readmitted to hospital in the months following TKR surgery (Welsh et al., 2017). The largest increases for readmittance to hospital were found in the first 30 days after surgery, indicating that patients are at the greatest risk for being readmitted to hospital in the early phase post-surgery (Welsh, et al.). Because hospital readmission may lead to other negative consequences, such as increased costs, exposure to bacteria that could cause hospital acquired infections, and further functional declines, a 5-8% readmission rate for patients after TKR that is reported in the literature is concerning (Belmont et al., 2016; Schairer, Vail, & Bozie, 2014; Welsh et al., 2017). Hospital readmission may be an indication that patients were not thoroughly prepared for discharge home following surgery and that they may not have fully understood discharge instructions and guidelines for the post-operative phase that could have supported better post-surgical outcomes.

Readiness for Discharge after Total Knee Replacement

Patient Perceptions of Discharge Readiness

Qualitative research regarding patient perceptions of readiness for discharge after TKR is sparse in the literature. Causey-Upton and Howell (2017) examined four patients' experiences of preparing for discharge after TKR surgery and found that patients overall felt prepared for surgery and the post-operative phase before leaving the acute care setting. However, patients did report being unprepared for the amount of pain they experienced after surgery, which may indicate a need for further education in this area pre-operatively. Participants in this study had experiences related to wanting to feel safe

in the hospital and after returning home, feeling confident in their abilities and the expertise of health care staff, and overcoming difficult aspects of the recovery process. Specht, Kjaersgaard-Anderson, and Pederson (2015) examined patient experiences of recovery prior to discharge following fast-track TKR and THR surgery. Patients overall did feel prepared for discharge, but at times lacked confidence because they received inadequate or conflicting information from health care providers. Heine, Koch, and Goldie (2004) examined patients' experiences of readiness for discharge after THR. Participants had similar experiences as the two prior studies, with patients wanting to feel safe at home and in-hospital, as well as finding that patients had increased confidence when they had family and friends at home to assist after surgery. Having knowledgeable staff and feeling safe also increased feelings of readiness for discharge home for the study's participants. Research regarding patients' perceptions of discharge readiness following TKR surgery is very limited, and more research is needed to explore preparation for returning home from the perspectives of patients in addition to examining quantitative factors, such as pain control and mobility.

Factors Influencing Discharge Readiness

Discharge readiness following TKR is typically defined with criteria including independence from needing intravenous pain medication, having pain that is well controlled, achieving 90 degrees of knee flexion, accomplishing a specified walking distance, increasing independence with ambulation, being able to complete stair climbing, and having a shorter length of stay (LOS) in-hospital (Chan, Teo, Assam, & Fransen, 2014; Ilfeld et al., 2010; Wegener et al., 2011). Specific assessments of readiness for discharge have been developed and are discussed later in this chapter.

Several factors have been examined in the literature and were found to impact discharge preparation, such as: education, rehabilitation, social support, individual patient factors, and analgesia approach. These factors may both support and hinder discharge preparation for patients following TKR surgery.

Education. Pre-operative education programs are common for patients undergoing TKR and other joint replacement surgeries, but evidence regarding the effectiveness of these programs on discharge readiness are mixed. McDonald, Page, Beringer, Wasiak, and Sprowson (2014) conducted a systematic review regarding the effectiveness of pre-operative education on a variety of outcomes for patients undergoing TKR and THR. The authors found limited support for the effectiveness of pre-operative education compared to usual care except for minor improvements in post-operative anxiety and pain. Louw, Diender, Butler, and Puentedura (2013) found limited impact as well in their systematic review examining the content and delivery methods of pre-operative education that specifically addressed pain after total joint replacement. Other research studies outside of systematic reviews and RCTs have found that pre-operative education has been associated with increased preparation for surgery, decreased anxiety, improved pain control post-operatively, and reduced length of stay (Kearney, Jennrich, Lyons, Robinson, & Berger, 2011; Spalding, 2003). Clarke, Timm, Goldberg, and Hattrup (2012) have also linked pre-operative education to reducing fall incidence in-hospital after TKR.

While individual studies in the literature have supported benefits of pre-operative education, some patients have reported that pre-operative education was not adequate and that it did not fully prepare them for what to expect after surgery (Goldsmith et al., 2017;

Westby & Backman, 2010). Some patients have also received contradicting educational instructions from various health care providers, decreasing their preparation for discharge as they were unsure which instructions were best to follow at home (Goldsmith et al., 2017; Specht, Kjaersgaard-Anderson, & Pederson, 2015). Ingadottir et al. (2014) examined patients' knowledge expectations prior to TKR and found that these expectations exceeded the knowledge that participants gained by attending pre-operative education. Patients have also reported that they did not fully understand the amount of pain they would experience after surgery, and that the education they received regarding pain was inadequate to prepare them for this aspect of TKR (Chan, Blyth, Nairn, & Fransen, 2013; Goldsmith et al., 2017). Health care providers should encourage patients to attend pre-operative education before TKR surgery to learn as much as possible regarding what to expect to better prepare themselves for surgery and the post-surgical phase. Existing educational programs may need alterations to address areas that are currently lacking, such as pain education and realistic expectations regarding function after surgery, as well as ensuring consistency amongst providers regarding patient instructions.

There is limited information in the current literature regarding the structure of pre-operative education for TKR in the United States. Individual studies that have examined pre-operative education as an intervention have described the components of these programs for a single setting. Some systematic reviews have described the content, delivery methods, and staff involved in pre-operative education for the limited number of randomized studies that met inclusion for these reviews (Louw, Diender, Bulter, & Puentedura, 2013; McDonald, Page, Beringer, Wasiak, & Sprowson, 2014). The

programs described in both individual studies and broader systematic reviews are indicative of only a small number of programs in the United States, and are not representative of national practice for pre-operative education. The literature demonstrates a need to describe the current design of pre-operative education as a baseline to determine the best content, delivery methods, and interprofessional involvement of health care providers to support best practice for improved outcomes. Components of pre-operative education may need to be addressed by multiple disciplines, such as nursing, physical therapy, and occupational therapy, to fully prepare patients for what to expect post-surgery including planned rehabilitation procedures.

Pre-rehabilitation and rehabilitation. Exercise before surgery has been found to improve functional readiness at discharge and increase the likelihood of discharge to home (Evgeniadis, Beneka, Malliou, Mavromoustakos, & Godolias, 2008; Robbins et al., 2010). It has also been shown to improve joint motion after TKR, an important factor as range of motion (ROM) before surgery is the strongest predictor of ROM after surgery (Matassi, Duerinckx, Vandenneucker, & Bellemans, 2014). Pre-operative quadriceps exercise has been found to reduce pain and improve quadriceps strength for patients after TKR, compared to those who do not complete these exercises prior to surgery (Tungtrongjit, Weingkum, & Saunkool, 2012). This improved strength would assist with aspects of discharge readiness, such as walking and stair climbing, among other functional tasks. Coudeyre et al. (2007) recommend multidisciplinary pre-rehabilitation that includes physical and occupational therapy services as well as education, particularly for fragile patients, to achieve optimal outcomes. In addition to pre-rehabilitation, post-

operative rehabilitation including both physical and occupational therapy have been found to increase functional performance for discharge home.

Early mobilization after TKR, defined as mobilization within the first 24 hours post-operatively, and beginning physical therapy within 24 hours after surgery, have been associated with reduced length of stay, improvements in ROM, increased muscle strength, enhanced quality of life, and reduced pain (Guerra, Singh, & Taylor, 2015; Labraca et al., 2011). Patients who receive physical therapy services twice daily rather than once daily may have better functional outcomes with increased preparation for discharge from the acute care setting (Lawson, 2009), although a previous randomized controlled trial (RCT) did not find differences in outcomes based on number of daily therapy sessions (Lenssen et al., 2006). A recent systematic review found that occupational therapy included in perioperative care for TKR resulted in reduced LOS and increased health-related quality of life scores (Dorsey & Bradshaw, 2016). An evidence-based occupational therapy program that included education and training related to higher level tasks, such as caring for pets and meal preparation, found that patients who participated felt more prepared to complete these activities at home after TKR and THR surgery than those who did not receive this training (Crum, 2011). Participation in rehabilitation before and after surgery including occupational and physical therapy has been found to increase preparation for discharge home following TKR. In addition to support from members of the health care team such as rehabilitation providers, having support from family and other individuals from a social network system can also influence discharge readiness following TKR.

Social support. Social support is an important factor that impacts discharge readiness after TKR. Some patients have reported that meeting health care staff in advance, such as during pre-operative education, has increased their confidence for surgery because they knew that they would be able to see familiar faces following their knee replacement (Specht et al., 2015). Having appropriate support from empathetic and knowledgeable health care professionals while in hospital has been reported by some patients to increase their readiness for discharge (Causey-Upton & Howell, 2017; Goldsmith et al., 2017; Johnson, Horwood, & Gooberman-Hill, 2016). Overall, the support of family and friends has also been found to increase discharge preparation. Patients often rely heavily on social support networks in the early post-operative phase, such as for ADL assistance, grocery shopping, and travel to appointments. These more informal social systems provide support when assistance from health care providers diminishes after discharge home from the hospital.

Social support has been reflected as a theme in the qualitative literature that patients value before and during the post-operative phase (Causey-Upton & Howell, 2017; Cheng, Klainin-Yobas, Hegney, & Mackey, 2015; Johnson, et al., 2016). Including the patient's support system in the pre-operative and post-operative process could be useful for optimizing discharge readiness, as this would ensure that both the patient and individual who will support the patient after surgery would have knowledge of important instructions and guidelines to follow in the post-surgical phase. Exposing patients to another individual who has had or is currently undergoing TKR is another form of social support that may increase readiness for surgery and eventual discharge (Causey-Upton & Howell, 2017; Goldsmith et al., 2017; Specht et al., 2015). This could be accomplished

by requesting that previous patients attend pre-operative education classes to share their experiences with those who have planned TKR surgery.

While having social support has been associated with discharge readiness some in the literature, patients have identified that family members, particularly male partners or spouses, are at times not able to provide the social support that is needed after discharge for various reasons such as anxiety or feeling unskilled to provide this assistance (Goldsmith et al., 2017). Both family members and patients have expressed being uncomfortable and overwhelmed at times with changes in their social roles following total joint replacement (Johnson et al., 2016; Showalter, Burger, & Salyer, 2000). Family members need increased education and preparation to fulfill the caregiving role after TKR surgery. When patients do not have a strong support system, they are less prepared for discharge. Lack of social support at home has been identified as the main factor that delays discharge after total joint replacement (Napier et al., 2012). Social support should be assessed early (pre-operatively if possible) by health care providers, and patients' support systems should be involved in the pre-operative and post-operative process for TKR. Nursing and rehabilitation staff should educate caregivers on important discharge instructions as well as how to support the patient best at home to ensure optimal outcomes. Individuals who do not have a caregiver living with them or nearby may be more likely to be discharged to a sub-acute rehabilitation setting rather than to home after TKR, which can negatively impact outcomes.

Rehabilitation setting. Persons who require inpatient rehabilitation after TKR have significantly higher rates of hospital readmission than those who discharge to home from the acute care setting (Jorgenson, Richardson, Thomasson, Nelson, & Ibrahim,

2015). Patients who are discharged initially to an inpatient rehabilitation setting are also more likely to have lower levels of independence in ADL tasks, even after adjusting for the initial level of assistance needed after surgery, with those who discharge from the hospital directly to home health still achieving the greatest discharge outcomes (Mallinson et al., 2011). For another lower extremity joint replacement surgery, THR, receiving home health care has been associated with reduced risk of mortality compared to no follow-up at home (Rahme et al., 2010). Patients who are discharged to another inpatient setting prior to returning home may need additional education and training to mitigate these risks for higher readmission and reduced functional performance. Occupational and physical therapists should encourage increased activity outside of therapy sessions with nursing staff while patients are in-hospital to maintain strength and mobility. Nurses can provide education regarding common causes of hospital readmission and how to avoid these, such as monitoring wound closure and maintaining proper nutrition to support healing structures after surgery. Health care disciplines can also address other factors that impact TKR outcomes across all rehabilitation settings, such as expectations regarding pain following surgery.

Analgesia. Analgesia approaches have been studied thoroughly in relation to discharge readiness after TKR. Patients who have ambulatory nerve blocks have been found to achieve important discharge criteria (appropriate analgesia, independence from intravenous pain medication, and ambulation of >30 meters) sooner than those who receive continuous femoral nerve blocks (cFNB) following TKR (Ilfeld et al., 2010). When cFNB was compared to a single-dose FNB, no statistically significant differences were found in outcomes such as walking or length of stay (LOS) (Chan et al., 2014).

However, when cFNB and single-injection FNB combined with patient-controlled analgesia (PCA) were compared to PCA alone, patients who received either form of FNB had greater odds of achieving 90 degrees of knee flexion on the surgical lower extremity than those who only received PCA (Chan et al., 2014). When local infiltration analgesia (LIA) was compared to cFNB, patients who received LIA achieved better outcomes including achieving greater average walking distance and shorter LOS that was statistically significant (Kirkness et al., 2016). A recent meta-analysis of 170 randomized controlled trials (RCT) related to pain control techniques for TKR found that blocking multiple nerves was most effective for pain management, with combined FNB and sciatic nerve block (SNB) appearing to be the best overall approach for effectively managing pain (Terkawi et al., 2017). All health care providers, including nursing and rehabilitation staff, can provide realistic education pre-operatively and post-operatively regarding pain that can be expected after surgery. Additionally, providers should educate patients on other nonpharmacological pain control options, such as using cryotherapy or relaxation techniques, to help manage pain following TKR. In addition to experiences with pain, other individual patient factors have also been found to impact discharge readiness following TKR surgery.

Patient characteristics. Several patient characteristics have been linked to level of readiness for discharge after TKR. Males and Caucasians are most likely to discharge home after TKR rather than to a non-home setting after surgery (Schwarzkopf et al., 2016). Younger patients are also more likely to be discharged to home rather than to inpatient rehab or skilled nursing facilities (Jørgensen & Kehlet, 2013). Patients who have higher functional levels and lower pain scores before surgery have better post-

operative outcomes for discharge (Judge et al., 2012). Personality has also been found to be related to recovery after TKR, with patients who are more extroverted achieving higher functional outcomes than those who are more introverted, particularly for those with a melancholic personality type (Gong & Dong, 2014). While some factors are linked to increased readiness for discharge, others are linked with reduced preparedness for leaving the hospital setting in a short timeframe.

Older patients who undergo TKR have been found to have longer lengths of stay, are more likely to discharge to inpatient rehabilitation rather than to home, experience increased post-operative complications, and are also more likely to have delayed functional recovery after surgery (Hoogeboom et al., 2015; Schwarzkopf, Ho, Quinn, Snir, & Mukamel, 2016; Yan & Pogoda, 2013). Persons with lower pre-surgical functional levels, including using a mobility aid prior to surgery, often have longer hospital stays and are more likely to experience readmission (Yan & Pagoda, 2013). Additionally, females and those who are obese have also been found to experience increased length of stay and are slower to recover functionally following TKR (Hoogeboom et al., 2015). Post-operative medical and surgical complications, such as infection or the need for blood transfusion, have also been cited in the literature as delaying discharge following joint replacement surgery (Williams, 2010). Additionally, patients who report having lower readiness for hospital discharge are at increased risk for problems at home and have higher risk for readmission (Weiss, Costa, Yakusheva, & Bobay, 2014). Patient characteristics should be assessed by the interprofessional health care team to determine those who may need increased preparation for discharge, such as the elderly and persons who use a mobility aid prior to TKR. This assessment should be

initiated as early as feasible, even beginning prior to surgery when possible, to increase discharge readiness. Other surgeries related to TKR can provide additional insights regarding preparedness for returning home after surgery.

Readiness for Discharge for Other Knee Surgeries

Discharge readiness for additional knee surgeries have been examined in the literature, such as partial knee replacement (PKR) and autologous chondrocyte implantation (ACI). Patients have been found to have higher readiness for discharge with a faster recovery following PKR compared to TKR due to the less invasive nature of the surgical procedure (AAOS, 2016; Fisher, Dalury, Adams, Shipps, & Davis, 2010; Kleebad, van der List, Zuiderbann, & Pearle, 2017). PKR has also been associated with better range of motion, increased return to activity, less blood loss post-surgery, faster discontinuation of pain medication, and shorter length of stay than TKR; however, PKR has been found in some studies to have slightly higher rates of revision that is mostly contributed to the progression of osteoarthritis in the knee (Fisher et al., 2010; Kleebad et al., 2017; van der List, Sheng, Kleebad, Chawla, & Pearle, 2016). While PKR often results in a faster recovery for discharge home, this procedure is performed less frequently than total joint replacement of the knee (Bolognesi et al., 2013) which results in a smaller population who attends pre-operative education compared to patients with planned TKR. Following ACI, approximately 82% of patients have positive long-term results; older age and greater severity of the articular cartilage lesion are associated with poorer outcomes (Pareek et al., 2016). Patients have been reported to have unrealistic expectations regarding recovery time following ACI that do not align with true surgical outcomes (Niemeyer, Porichis, Salzmann, & Sudkamp, 2016). Despite the need for pre-

operative education like other orthopedic surgeries, formalized education prior to surgery is not the current standard of care for patients with planned ACI (Toonstra, Howell, English, Latterman, & Mattacola, 2016). Similar to patients who undergo TKR, patients with ACI have unrealistic expectations regarding the length of recovery time and functional performance in the post-operative phase which may indicate that patients are not fully prepared for discharge. Accurate assessment of discharge readiness for orthopedic conditions, especially TKR, is necessary to guide treatment aimed at improving patient outcomes.

Measures of Readiness for Discharge

Several measures of discharge readiness are available in the literature that can be used to assess patients' readiness for discharge after knee replacement. The following scales will be discussed in this paper: The Readiness for Hospital Discharge Scale (RHDS), the Western Ontario and McMaster University (WOMAC) osteoarthritis index, The Knee Injury and Osteoarthritis Outcome Score (KOOS), and the Oxford Knee Score (OKS). The original RHDS and other versions of this scale are the only measures of patient perceptions of readiness for discharge prior to leaving the hospital setting (Galvin, Willis, & Coffey, 2017). The other assessments (WOMAC, KOOS, and OKS) are specific to populations with knee osteoarthritis and have been utilized for patients undergoing TKR surgery. Psychometric properties of each scale that were available in the literature are presented in the sections that follow and in Table 2.1. Readiness for discharge should be assessed using standardized assessments with strong psychometric properties, as well as qualitatively to include patient perceptions for a holistic perspective of patients' readiness to return home following TKR.

Readiness for Hospital Discharge Scale

The Readiness for Hospital Discharge Scale (RHDS) was developed to examine patients' perceptions of readiness for discharge from the hospital. For the purposes of this assessment, discharge readiness was defined as the patient's perception regarding their current state and their perceived abilities to manage their needs in the home setting (Weiss & Piacentine, 2006). The RHDS includes 21 items within the following four factors of readiness for discharge: 1) personal status, 2) knowledge, 3) coping ability, and 4) expected support. Items are scored numerically from 0 to 10, with higher scores reflecting increased discharge readiness. The RHDS was validated on a variety of populations including adult medical-surgical patients, but has not been specifically studied with the TKR population. The overall internal consistency of the 21-item RHDS for all populations included in validation research was 0.89 for the revised scale (Weiss & Piacentine, 2006). Content validity testing resulted in a content validity index composite score of 0.89 for all items and raters for the total scale for adult medical-surgical patients (Weiss & Piacentine, 2006). See Table 2.1 for psychometric properties of individual sub-scales.

Further condensed versions of the scale have been developed specifically for elderly populations (17 items) and shortened versions (8 items) paralleling each other that were developed for patients and nursing staff (Mabire, Coffey, & Weiss, 2015; Weiss, et al., 2014). The Readiness for Hospital Discharge Scale- Older People (RHDS-OP) includes only 3 factors: Factor 1- self-care readiness, Factor 2- knowledge, and Factor 3- expected support, with reliability of 0.89, 0.72, and 0.88 respectively (Mabire et al., 2015). The overall reliability for the total 17-point scale is 0.87. Mabire et al. (2015)

further condensed the RHDS-OP into a short form (RHDS-OP-SF) that included 9 total items in the three factor areas. Construct validity was assessed by comparing responses on item 1 of the RHDS (patient report of being ready for discharge) to scores on the RHDS-OP-SF. Patients who responded that they were not ready for discharge scored lower on the RHDS-OP-SF. Additionally, patients who scored higher on the RHDS-OP-SF were less likely to be readmitted to the hospital (Mabire et al., 2015). The Readiness for Hospital Discharge Scale/short form for patients and nursing (PT-RHDS/SF and RN-RHDS/SF) demonstrated reliability at 0.79 and 0.75, respectively (Weiss et al., 2014). While the PT-RHDS/SF was not found to be predictive of hospital readmission, when nursing scored patients less than 7 overall (indicating low readiness), patients had up to 9 times the risk of readmission (Weiss et al., 2014). Both the PT-RHDS/SF and the RN-RHDS/SF include 2 items from each of the original four factors from the RHDS.

Western Ontario and McMaster University Osteoarthritis Index

The Western Ontario and McMaster University (WOMAC) osteoarthritis index was developed to measure pain, stiffness, and functional limitations caused by osteoarthritis in elderly populations (Peer & Lane, 2013). The assessment includes 3 domains: pain, stiffness, and physical function. Domains are assessed on a 5 point Likert scale from 0 (no problems) to 4 (extreme problems), with a total converted score ranging from 0 (extreme symptoms) to 100 (no symptoms) (Chan et al., 2014). The WOMAC includes 24 items total, with the majority (17) of these items being in the Physical Function domain. Patients were used during the development of the WOMAC, along with input from rheumatologists and epidemiologists, which helps support content validity (Collins et al., 2011). Collins et al. (2011) reported on the psychometric properties of the

WOMAC from multiple studies in the literature and found adequate internal reliability as well as appropriate construct validity. Internal consistency ranged from 0.67 to 0.98 across sub-scales. Test-retest reliability was found to be variable, with reliability varying from as low as 0.52 for the symptoms sub-scale and as high as 0.98 for the pain sub-scale. See Table 2.1 for further psychometric properties of individual sub-scales.

Knee Injury and Osteoarthritis Outcome Score

The Knee Injury and Osteoarthritis Outcome Score (KOOS) was developed to measure patients' opinions about their knee functioning, specifically for a younger and more active population than which the WOMAC was developed (Roos & Lohmander, 2003). The KOOS consists of 42 items within the following 5 subscales: Pain, other Symptoms, Function in daily living (ADL), Function in sport and recreation (Sport/Rec) and knee-related Quality of Life (QoL) (Roos, & Lohmander, 2003). The ADL scale on the KOOS was taken directly from the WOMAC's Function subscale. Each item on the KOOS is rated on a 5 point Likert scale from 0 (no problems) to 4 (extreme problems), with a total converted score ranging from 0 to 100 with a higher overall score reflecting better knee function. The KOOS has been validated on populations with a variety of knee injuries and knee osteoarthritis.

Peer and Lane (2013) completed a systematic review of the literature to examine the psychometric properties of the KOOS for patients undergoing total knee arthroplasty (TKA). The authors reported moderate to high construct validity overall when the KOOS was compared to other self-report measures that were previously validated in the literature. However, the Sport/Rec sub-scale from the KOOS had poor construct validity. The authors reported appropriate test-retest reliability scores (>.70) overall as well as

adequate internal consistency overall (0.70). Collins et al. (2011) reported on the psychometric properties of the KOOS from multiple studies in the literature and further demonstrated appropriate face and content validity. See Table 2.1 for psychometric properties of individual sub-scales for the KOOS.

Oxford Knee Score

The Oxford Knee Score (OKS) is a questionnaire originally designed to gather information from patients regarding their perception of function and pain after TKR surgery. The scale consists of 12 questions that patients rank from 1 to 5, with 1 being best and 5 reflecting worse outcomes; the modified version of the scale ranges from 0 to 4, with 4 reflecting fewer symptoms and higher functioning and 0 indicating poorer outcomes (Collins et al., 2011). Collins et al. (2011) reported on the psychometric properties of the OKS from multiple studies in the literature and found the OKS to have adequate internal consistency and test-retest reliability. The authors also reported good face, content, and construct validity for the scale. Gagnier et al. (2017) conducted a systematic review of various patient-reported outcomes for TKA including the OKS. They rated internal consistency of the scale as having strong positive evidence, content validity as having moderate positive evidence, and overall reliability as having limited positive evidence. See Table 2.1 for psychometric data for the OKS.

Table 2. 1 Selected Psychometric Properties of Discharge Readiness Scales

Assessment	Population Assessed	Internal Consistency	Test-retest	Average Inter-item Correlation
RHDS (Weiss & Piacentine, 2006)	Adult medical-surgical patients	Factor 1: 0.82 Factor 2: 0.90 Factor 3: 0.85 Factor 4: 0.86	Not available	Factor 1: 0.43 Factor 2: 0.59 Factor 3: 0.65 Factor 4: 0.61
WOMAC (Collins et al., 2011)	Adults with knee osteoarthritis	Pain: 0.67-0.92 Symptoms: 0.7-0.94 Function: 0.82-0.98	Pain: 0.65-0.98 Symptoms: 0.52-0.89 Function: 0.71-0.96	Not available
KOOS (Collins et al., 2011)	Adults with knee osteoarthritis	Pain: 0.65-0.94 Symptoms: 0.56-0.83 ADL: 0.78-0.85 Sport/Rec: 0.84-0.98 QOL: 0.71-0.85	Pain: 0.8-0.97 Symptoms: 0.74-0.94 ADL: 0.65-0.92 Sport/Rec: 0.65-0.92 QOL: 0.6-0.91	Not available
OKS (Collins et al., 2011)	Adults with knee osteoarthritis	0.87-0.93	0.91-0.94	Not available

Summary

While many persons experience positive outcomes following TKR, some individuals experience complications and other negative results such as falls and hospital readmission. Readiness for discharge after TKR has been defined in the literature related to pain control, knee ROM, walking distance, and ability to climb stairs. This limited definition of discharge preparation following TKR may not capture all aspects of function and other factors that impact patient perceptions of readiness for discharge. While no assessment is currently available that measures patients' perceptions of discharge readiness specifically for the TKR population prior to leaving the hospital setting, available assessments such as the RHDS and the OKS can be used to gauge discharge preparation along with qualitative assessment of patient perceptions. Future research should continue to explore patients' perceptions of discharge readiness following TKR to support pre-operative education and other interventions aimed at increasing preparedness for returning home following surgery. Pre-operative education should also be explored to describe current program designs across the United States as a basis for better preparing patients for TKR surgery and the post-operative phase.

Chapter Three

Study 1: Patient Experiences When Preparing for Discharge Home after Total Knee Replacement

Introduction

More than 750,000 knee replacement surgeries are performed annually in the United States (United States Bone and Joint Initiative, 2016). The number of persons projected to undergo total knee replacement (TKR) surgery each year in the United States is expected to increase to 1,375,574 in 2020 (Kurtz, Ong, Lau, & Bozic, 2014). Hospital stays following TKR surgery are shorter, resulting in discharge from the hospital while patients are still in an acute phase of recovery (Jones, Voaklander, & Suarez-Almazaor, 2003). This means that following TKR, patients must be prepared for discharge, via education and rehabilitation, within increasingly shorter timeframes.

Following discharge after TKR, some patients experience poor outcomes including reduced function, incidence of falls, and hospital readmissions. Patients have reported being unprepared for the limitations they experienced after surgery as well as having difficulty completing daily life tasks in their home environment (Cain, Neuwith, Bellows, Zuber, & Green, 2012; Showalter, Burger, & Salyer, 2000). Incidence of falling in the months after TKR have been reported to be 4.3% to as high as 11.8% (Hiyama & Okada, 2014; Swinkels, Newman, & Allain, 2009). These numbers are significant as falls can lead to severe injury, declines in function, as well as hospital readmission. A 5% readmission rate was found for patients who underwent TKR between 2007 and 2010 in the United States (Cram et al., 2012). These sub-optimal outcomes may indicate reduced preparedness for recovery at home following the acute phase after TKR.

In addition to quantitative evidence of poor readiness for discharge home after TKR surgery, patients have qualitatively identified areas of concern that were not fully addressed prior to discharge home following joint replacement. Unrealistic expectations have been reported about the activities patients would be able to complete after discharge as well as difficulty with role reversals while spouses were recovering from total joint replacement (Showalter et al., 2000). Decreased functional independence has been reported frequently in the literature as a concern after patients were discharged home following TKR (Barksdale & Backer, 2005; Cain et al., 2012; Woolhead, Donovan, & Dieppe, 2005). One study examined health-related stressors experienced by patients 7 days after being discharged home following TKR surgery (Barksdale & Backer, 2005). Participants identified several areas of concern post-surgery, such as pain levels, decreased independence with functional transfers and increased dependency on family members. Another study found similar results when examining patient experiences of outcomes following TKR (Woolhead et al., 2005). Overall participants reported positive outcomes, but concerns were identified by these patients related to pain and limitations in mobility. Some patients have also had confusion regarding discharge recommendations after returning to home, even though instructions initially seemed clear in the hospital setting (Cain et al., 2012). Research demonstrates that patient needs are not fully met for discharge home from the acute care setting.

Discharge outcomes following TKR are significant as they impact initial discharge placement and patient safety in the early post-operative phase. Most patients discharge home after surgery, however some persons may require additional care and therapy services in other environments after TKR (Cram et al., 2012). The home

environment is the most complex discharge setting in the early phase after surgery because patients have less time available to increase function prior to discharge and less time to prepare along with their caregivers for any alterations in their function. The home environment can also be fraught with many physical barriers that pose safety hazards that can lead to falls. In addition, patients do not have the same access to health care providers that they experienced while in the hospital to readily answer questions and respond to concerns (Cain et al., 2012). Appropriate discharge preparation is a necessity for patients who are going home after TKR rather than to an inpatient setting for additional health care services.

Discharge preparation following TKR has not been examined thoroughly from a qualitative perspective; however, some studies have quantitatively examined factors that are associated with length of stay following TKR. Medical issues after surgery and lack of social support at home were consistently related to increased length of stay after knee replacement (McGinley, 2008; Napier et al., 2013; Ong & Pua, 2013). The literature also demonstrates factors that can reduce length of stay following TKR. Early mobilization of patients as well as providing comprehensive pre-operative education have been found to decrease time in the hospital after TKR surgery (Guerra, Singh, & Taylor, 2015; Hass, Jaekel, & Nesbitt, 2015). Patients who received local infiltration analgesia during TKR have had better pain relief and shorter hospital length of stay than those patients who did not receive this form of analgesia (Essving et al., 2010).

While there is limited research in the current literature about patient experiences of discharge preparation after TKR, we can learn from studies that have qualitatively examined this transition for patients with other diagnoses. A previous study examined

perspectives of patients regarding early discharge following total hip replacement (THR) and found that patients hid their apprehensions regarding early discharge, such as the impact of early discharge on family and functional mobility concerns (Hunt et al., 2009). When patient experiences of preparing for discharge after THR surgery were studied, factors such as patient confidence and feeling safe were issues that impacted discharge readiness (Heine, Koch, & Goldie, 2004). A recent metasynthesis examined experiences of older adults related to discharge from the hospital after orthopedic surgery or intervention (Perry et al., 2012). Patients' mental outlook was found to both impact and be impacted by pain, limitations in function and activity levels, as well as declines in independence. Three of the 16 articles reviewed did include a population of participants who had undergone TKR surgery; however, none of these studies examined the participants' lived experiences of discharge preparation. Although the experience of preparing for discharge has been examined for patients with THR and other diagnoses, more needs to be known about the transition to home for those who have undergone TKR.

Understanding the experiences of patients as they prepare to return home following TKR will aid rehabilitation professionals to better prepare these clients for discharge home. The purpose of this descriptive study was to describe patients' experiences when preparing for discharge home following elective TKR surgery. Understanding this experience was also anticipated to increase knowledge of factors that may impact subjective readiness for return to home following TKR surgery.

Methods

This study was approved by the Institutional Review Board (IRB) at Eastern Kentucky University as well as the Scientific Review Committee at the study setting in September 2014 through an expedited review process. All participants provided informed consent to participate in the study. All ethical procedures for conduct of research were followed throughout the research study.

Research Design

A descriptive study using transcendental phenomenology methods was conducted. Transcendental phenomenology is a qualitative research approach that seeks to examine the lived experience of a phenomenon for a group of individuals (Creswell, 2013). Phenomenology is the appropriate technique for this study to reveal the collective perceptions and experiences of preparing for discharge home following TKR surgery. The transcendental approach to phenomenology focuses on the participants' experiences and limits the impact of the investigator on the research process through the use of reflexivity (Creswell, 2013; Moustakas, 1994).

Study setting. The study took place on the orthopedic and medical-surgical units at an acute care hospital in Lexington, Kentucky. This is a 217 bed facility that provides both inpatient and outpatient services. At the time of this study, patients undergoing TKR surgery elect whether or not to attend pre-operative education prior to their surgery. Following surgery, patients receive inpatient physical and occupational therapy services throughout their hospital stay until discharge. Physical therapy services are provided twice daily while patients receive occupational therapy services once per day during their inpatient recovery**.** Patients typically discharge from the study setting within 1-2 days after TKR, and the

majority of these patients discharge home rather than to a subacute setting. Patients may receive either home health or outpatient therapy services after discharge from the hospital. These services typically only consist of physical therapy after the acute care setting, but patients who require further inpatient rehabilitation will also receive occupational therapy if needed.

Recruitment. Adults who had undergone elective TKR surgery and were receiving inpatient rehabilitation from physical and occupational therapy in an acute care setting were included in this study. Participants had to be 18 years of age or older. Subjects with a diagnosis of dementia as assessed by medical history review and persons who were unable to provide verbal answers in English were excluded from the study due to potential inability to provide the in-depth answers required of an unstructured interview approach. Patients who required TKR due to traumatic injury or avascular necrosis were excluded because a sudden, non-elective surgery could have had a confounding impact on subjective readiness for discharge. Patients with planned discharge to a subacute facility rather than to home from the hospital were not included in the study as this could impact participant planning processes and views of upcoming discharge from the hospital. Patients who had undergone TKR surgery previously were excluded initially from the study to avoid the impact of prior joint replacement experience on readiness for discharge. Alterations were later made to the research protocol, with IRB approval, to allow those with prior joint replacement to take part in the study. However, no participants were recruited for the study who had undergone a previous TKR. While patients from other states sometimes undergo TKR at the study setting, all participants included in the study were residents of Kentucky.

Purposive sampling was used to identify participants. This approach to identifying participants who have experienced the phenomenon being studied is common for research using phenomenological methods (Creswell, 2013; Starks & Trinidad, 2007). The occupational therapist on the orthopedic and medical-surgical units served as a gatekeeper to identify eligible participants during the occupational therapy evaluation. The gatekeeper was trained in the research protocol by the primary researcher for this process. Some participants received their occupational therapy evaluation the day of surgery, but those who had surgery later in the day may not have received their evaluation until post-operative day 1. Potential participants who wanted to learn more about the study gave permission for the occupational therapist to provide their names and contact information to the researcher. The researcher then contacted potential participants via telephone to explain the study in more detail and to schedule a meeting for those who were still interested in participating. The researcher met with participants in their hospital room to obtain written informed consent and begin data collection. Patients received a copy of their signed informed consent letter. Participants were informed that participation was voluntary and could be discontinued at any time.

Data collection. Semi-structured interviews were used to explore participants' experiences related to preparing for discharge home following TKR and to gain an understanding of what factors impacted their readiness to return home. Interviews began with the following question: How have you prepared for your discharge home related to your total knee replacement sugery? Participants were also asked questions about preparing before and after surgery for discharge, any experiences that made them feel more or less prepared for returning home after surgery, as well as any further arrangements or plans for discharging home from the hospital. Additionally, participants were asked about what was most and least

hellpful in preparing for discharge home (i.e. people, resources, information) as well as anything else patients experienced while preparing for discharge that had not already been discussed. The same interview protocol consisting of 11 questions was used as a guide for each participant's interview. Follow-up questions were asked as needed based on individual patient responses. Interviews occurred within 1-2 days prior to discharge home from the hospital and took place in participants' hospital rooms. Interviews occurred individually with each participant and lasted approximately 30 to 45 minutes in the evening to avoid interferring with nursing and therapy interventions during the day, unless another time was selected by the participant. Following each interview, the researcher recorded brief field notes related to the setting of the interview and emotional responses of the participant to add context to the interview transcription.

Data analysis. Interviews were audio recorded and later transcribed verbatim after the interview was completed by the primary researcher. Data analysis occurred concurrently with data collection procedures as the primary researcher began analysis of completed transcriptions while still gathering data through subsequent participant interviews. Individual transcripts were read completely to obtain initial impressions. Knowledge obtained from previous interviews were used to guide subsequent participant interviews. Non-repeating significant statements were identified from each interview transcript through Moustakas' process of horizonalization. Horizonalization involved listing significant statements end to end with no hierarchy to reveal the range of perceptions regarding the experience of preparing for discharge after TKR (Moustakas, 1994). Significant statements were labeled as formulated meanings and then clustered into meaning units or themes as they emerged from the participants' words. Meaning units were then refined to develop the final study themes.

Trustworthiness. Several methods were employed to ensure trustworthiness. The primary researcher maintained a reflexive journal to bracket out prior experiences with the phenomenon and to record thoughts and feelings during the research process. Prior to data collection, the first author recorded preconceived ideas or areas of concern that could impact the research process in order to increase her awareness and ability to limit their impact on the study's results. Examples of information recorded included the belief that occupational therapy could increase readiness for discharge home and the need to remain objective if participants discussed health care providers that the primary investigator knew from working at the study setting. Another important area was the need to disclose to participants the many roles of the primary researcher that related to the research study including: being a PRN (working as needed) occupational therapist at the study setting, being a doctoral student, and also being a professor of occupational therapy. Journaling was also completed after each interview to record initial thoughts and impressions about the experiences of each participant that were later used to refer back to during the data analysis process.

An audit trail was maintained to describe the research process in detail and to retain a record of how decisions were made throughout the study. The integrity of research data was maintained by beginning a new document for individual participants at each step in the research process before later compiling the data for all participants together in a single document. This allowed the researcher to refer back to original documents to ensure a thorough and accurate analysis. Member checking was conducted with one participant to ensure that results were reflective of patients' experiences. A hard copy of the transcript was not provided to the participant in order to maintain the integrity of the verbatim transcription;

rather the emerging themes were confirmed by the participant to be reflective of the discharge preparation experience (Mero-Jaffe, 2011). Brief field notes were recorded during interviews about the physical environment of the participant's room as well as the behavior and body language of each participant. Notes were referred back to during data analysis and confirmed the patient's demeanor that was both heard in the interview recording and read in the words of each transcript. Peer review was also completed between the first and second author to confirm the findings and decisions made throughout the research process.

Results

There were four participants, three women and one man, ranging in age from 55-80 years old. A common sample size for phenomenology research ranges from 1-10 participants (Creswell, 2013; Starks & Trinidad, 2007). All participants were discharging home with a family member after surgery and are identified here by pseudonyms. Participants were interviewed the day of surgery, or on the first post-operative day following TKR. Three of the four participants (Joseph, Samantha, and Janice) all had a spouse or family member who had previously had a TKR. Only Ruth had no prior experience with TKR.

Table 3. 1 Participants

Pseudonym	**Gender**	**TKR Experience**
Ruth	Female	• 1st TKR • No prior experience
Joseph	Male	• 1st TKR • Experience through spouse's previous TKR
Samantha	Female	• 1st TKR • Experience through spouse's and brother's previous TKR
Janice	Female	• 1st TKR • Experience through sister's previous TKR

Three themes emerged from the data: being supported for discharge home; having confidence in self, family and health care staff; and persevering: overcoming obstacles. Themes and subthemes are presented below in table format. These themes are described in detail in the sections that follow with verbatim quotes for support.

Table 3. 2 Qualitative Themes

Theme	**Sub-themes**
Being Supported for Discharge Home	• Needing Assistance for Discharge Home • Feeling Safe for Discharge Home and In-Hospital
Having Confidence in Self, Family and Health Care Staff	• Knowing What to Expect Before Surgery • Interacting with Friendly and Knowledgeable Staff • Having Prior Experience with TKR
Persevering: Overcoming Obstacles	• Experiencing Pain as Normal • Handling the Unexpected

Being Supported for Discharge Home

Needing assistance for discharge home. Participants overwhelmingly expressed that they would need someone at home with them in the early phase after discharge. Some even stated they could not go home if they did not have assistance. Ruth discussed the importance of having family support at home and said: "My daughter. She is with me every minute, every step of the way. She doesn't have to be there to do everything for me but she, I need somebody right now." She also expressed the following: "I could never go home alone right now. I would have to have somebody, at least somebody there." When Janice was asked how she would feel if she did not have her current support system of her husband and daughters at home she said "I'd be scared alright."

Some participants expressed that they were more secure because their caregiver had previously undergone TKR surgery and would therefore be more prepared to provide them with the proper assistance after discharge. Samantha said the following: "And, I mean, he knows what it is so he knows how to help me. And, uh, take care of me so I feel more secure there. Cause he's been down the road and he knows what it's like." It was reassuring to participants when their caregiver had already experienced TKR surgery and this made them feel more prepared for their own discharge home.

Feeling safe for discharge home and in-hospital. Participants discussed the importance of being safe at home as part of their discharge preparation. This included having another person with them at home, but also ensuring that the physical environment was safe for mobility after discharge. Ruth described her plans to go home with her daughter because her home was "all on one, one level. And still you don't have to take a step which is good because I will be using a walker. And, you don't do steps too good with a walker."

In addition to ensuring that participants could access living areas on lower level floors, participants also expressed concern about other aspects of safety such as tripping hazards in the home. Joseph stated: "Rugs. Carpeting, not carpeting that's fastened down, but they are loose, they could possibly slip. And extension cords. Anything like these we might trip over. Like I say looking to get to the house of what you need to watch out for, this kind of stuff that is really quite important there." Patients were aware of aspects of the physical environment that could potentially lead to falls and had made plans to address these.

Participants also discussed the importance of being safe and supported while in the hospital setting. This included getting assistance when needed and recognizing efforts by staff members to keep patients safe by reducing fall risks. Samantha stated: "They come when the call bell's on, and, my husband sat there and he said if I have my other knee done it's going to be here. He said, he said this hospital is wonderful… If something goes wrong you're going to be taken care of." Her spouse felt comfortable enough to go home for an evening while she was in the hospital because of the level of care she received following her TKR surgery. Another participant talked about the need for assistance with transfers while in the hospital. Joseph said "I do not get up out of this chair or out of that bed until one of the nurses is in here. And they put that strap around me and they hold on to it. And I can get up and walk." He also discussed the use of pressure alarms to ensure that patients did not forget to ask for help before getting up and that nursing implemented these devices to avoid falls.

Having Confidence in Self, Family and Health Care Staff

Knowing what to expect before surgery. The majority of participants attended their own pre-operative education course or had attended the course when their spouse previously underwent TKR surgery. The pre-operative education program at the study setting is interdisciplinary and includes education from the rehabilitation nurse, physical therapist, and case manager. The class includes patients who are undergoing both TKR and total hip replacement and lasts approximately 3 hours. Patients are educated about what to do before surgery, what to expect after surgery, physical and occupational therapy services, adaptive devices for mobility and self-care, as well as home health services for the post-operative phase. Participants in this study reported that attending

pre-operative education increased their confidence by preparing them for the future. Joseph stated: "I really felt that confident of them. After, with talking to the doctor himself, and then talking to, we went to that class about the surgery, and the way they presented it and talked about it, you know with, not pulling, not pulling no punches, it's the way it's going to be, and that's it." Participants also expressed that pre-operative education helped them to know what to expect in their recovery process. Samantha stated: "Well they had us come to classes, uh two of them, prior to the surgery. And we went over everything, both before pre-op and post-op, so that pretty much, you know, gave us an idea of what to expect."

Getting questions answered was another aspect that participants identified as being significant within pre-operative education. Having family present also increased patients' confidence because another person was aware of recommendations and what to expect following surgery. Ruth said: "But you go to see her a week before your surgery and she answers all your questions and shows you the pictures of what knee replacement is and, and the doctor and their way of doing things. You know what you're doing going into it. And I could take my daughter along with me so she knows too, you know."

Only one participant did not attend pre-operative education classes, but she did express that the doctor advised her of what to expect after surgery. She also had learned about the process from the experiences of her sister-in-law who had previously had both knees replaced. When asked about these experiences, Janice stated "Well I knew more of what to expect I think." The combination of education from the physician and having experienced the process through a family member appeared to have prepared Janice for undergoing her own TKR.

Interacting with friendly and knowledgeable staff. The positive attitudes of staff members and the rapport built between professionals and patients was another factor that instilled confidence among participants. Patients interacted with multiple health care providers during their hospital stay including: nurses, physical therapists, occupational therapists, nursing assistants, physicians, and case managers. Individual patients may have interacted with additional staff members, such as dieticians, if their personal needs required care from other health care providers. This positive rapport was expressed by some participants to be even more important than the surgical process itself. Joseph stated the following: "Ah, well of course there's the skill of the surgeon. But really, I think a lot of it came down to the quality of the nursing care that I've received. And I know, I mean, their attitudes, their friendliness, the, the way they, the way they talk to you. It really, makes me feel good about it." Positive interactions with staff members increased participants' confidence both while in the hospital and as they prepared for discharge home.

Staff were considered to be knowledgeable and thorough in their education and instructions to patients. Participants appreciated the depth of this information and felt that all their needs were met for discharge. Samantha stated: "They've been on top of everything, I mean about the discharge and everything. Even, you know, they've talked to you about nutrition and physical therapy and I mean, they just, they cover everything." Patients did not identify any information that staff failed to cover while they were preparing for their upcoming discharge from the hospital.

Having prior experience with TKR. Participants discussed having confidence related to the TKR process as a result of experiencing this previously, either through a

family member or friend. This permitted patients to learn about the recovery process through the experiences of others and made patients feel more prepared for their own recovery post TKR. Overall, having this prior knowledge was a positive experience. Joseph stated: "I'm ready to go. You know, course I guess I am lucky in the fact that my wife had it done 5 weeks ago and I saw how she did it. So that gives me a little more confidence. But I know with her, she was very confident and ready to go."

One participant did express a negative prior experience related to a family member, however her positive experiences with a spouse who previously underwent TKR appeared to outweigh these concerns. Samantha stated the following: "I think the experiences I had with my husband probably, you know. Because we're more ready, I mean we are definitely ready home wise to go. And, so you hear positive and like I said, the only negative was my father, and uh, there's some in the nursing home, where he's at. That, you know, they're usually the more elderly, and my dad, the only thing, he was up walking around doing great, but then he got MRSA [Methicillin-Resistant Staphylococcus Aureus], VRE [Vancomycin-Resistant Enterococci], he had a lot of problems."

One participant reported having confidence in his surgeon because he had undergone a previous orthopedic surgery prior to completing the TKR. This prior surgical experience made the process more familiar even though he was undergoing a different procedure. Joseph said: "Now I did have the fact that this doctor had also, um, prepared my shoulder earlier in the year so I knew how he was and his staff." Another participant had increased confidence in her surgeon because she researched his surgical record and felt that he had performed enough previous surgical procedures that she felt assured of his

skills. Samantha stated: "I researched him because he was a new guy in town from Tennessee. And, uh, I went out and researched him and he had a good record. Cause you never know. You don't know." Samantha also expressed that she would not have felt confident having the doctor perform her surgery if he had not performed the same procedure many times before.

Persevering: Overcoming Obstacles

Experiencing pain as normal. Most patients reported that they expected to experience pain following surgery as part of the recovery process. They also expressed that while they would have some pain, they knew that nursing staff would implement procedures to reduce their pain to a tolerable level. Samantha stated: "It's no bed of roses. They don't paint that, you know, that you're gonna be pain free and that it's going to be, you know, very painful, and that it, the more exercises you do pre-operative will get you ready for the postop phase." Joseph echoed this by stating "There will be pain. That's all there is to it. They will try their best to control it, but, there's still gonna be some no matter what. And there has been." While pain was not experienced as a positive aspect of recovery toward discharge, participants overall anticipated this as a normal and expected part of TKR. Participants also recognized the need to be actively involved in their care and that the recovery process would not be an easy one. Ruth stated: "Well, I know it's, it's gonna be hard work. But I'm not just going to let it sit there and heal itself." Participants acknowledged that they had a responsibility in their progress after surgery.

Handling the unexpected. While most participants expected the recovery process to be difficult, some were unprepared for the pain and complications that followed their surgeries during their hospital stay. When asked if she were prepared for the pain she

experienced post-surgically in the hospital, Ruth stated: “No, I thought it was going to be a piece of cake. And it ain’t.” Samantha experienced some unanticipated complications including significant edema, fever, nausea and pain. She described her edema as: “It, it was going down the front of my, the front of my shin. And, it was in, the effusion was going down that way. He said, you’ve just got a terrible amount of fluids in there.” Initially her pain was well controlled with a nerve block, but pain increased dramatically as the nerve block wore off. Samantha described her experience of the nerve block wearing off as first excitement to regain movement, followed by overwhelming pain. “Yeah, and, and then, and then it’s like it’s got you. And depending on what time your surgery was that day, that’s when it’s going to wear off. And the numbness started, my toes, I could start wiggling my toes about 10:00, 10:30. And I thought wow, I’ve got my toes back, got my goes back! You know, I was thrilled to death, and then about 2:00 I had everything back. I woke up like “ow!” It’s like no, no, it’s here with a vengeance.”

Even when patients did experience complications or pain exceeded their expectations, they did recognize that the condition was temporary and that these issues would resolve. Samantha acknowledged: “This, you know, we’ll get through this, we will get through this. I will get through this. That’s the way, you know, but it don’t come in one day.” Samantha needed an extra night in the hospital due to all of her complications, but she accepted this extended stay as a part of her recovery process. Ruth recognized that “you don’t just come in here thinking that it’s going to be a, a simple little couple days in bed. Huh-uh. You come in here and you work at it.” Participants realized that recovery after TKR is not easy, but is instead a necessary step toward discharge and returning to function post-surgery.

Preparing for the Post-operative Phase

Participants mentioned several things they did prior to surgery to prepare for their discharge following TKR. While this did not emerge as a theme, the processes were described as ways that clients prepared for the post-surgical phase. Many of these preparations addressed higher level occupations that clients would need to complete after surgery, such as meal preparation and home management tasks. Patients prepared for these occupations by preparing and freezing food in advance, buying soup and other simple meals, cleaning the home and completing laundry prior to surgery, and securing paid assistance for home management tasks post-surgery. Other areas included mobility with an adaptive device, pre-operative exercises for strengthening, and setting up physical therapy services for discharge home.

Discussion

This study found that persons who underwent TKR had experiences related to wanting to feel safe while in the hospital and upon return to home, having confidence in themselves and others who were involved in their care, as well as overcoming difficult aspects of the recovery process in-hospital. Participants overall felt prepared for their surgery and the post-operative phase.

Needing Social Support

Support was found to be an important theme for patients who underwent total hip replacement (THR) in previous research, and this is similar to participants in this current study who felt that having someone at home was necessary for discharge (Heine et al., 2004). Participants expressed that they would be reluctant to return home without a caregiver in the early phase after surgery, and considered having social support to be a

necessity for discharge home. Other research has found that having a caregiver at home was a predictor of whether patients were sent home after surgery or to another environment initially; patients were much more likely to discharge to a sub-acute setting if they did not have a caregiver at home (Ong & Pua, 2013; Tan et al., 2014). Previous research has also found inadequate social support to be the most significant factor that delays early discharge following primary joint replacement surgery (Napier et al., 2013). Social support should be assessed pre-operatively so that arrangements can be made for patients who live alone or may have limited support at home in order to increase their preparation for discharge.

Wanting to Feel Safe Before and After Discharge

Feeling safe, both within the hospital and for discharge home, was a major concern for clients in this study. This is similar to concerns expressed by patients who had undergone THR and were preparing for discharge home after surgery (Heine et al., 2004). Participants in both studies felt safe in the hospital and wanted to ensure their safety at home as well. Participants identified having a caregiver present in the home as well as making alterations to the environment to reduce fall risk as ways to increase safety for discharge. Therapists can educate patients on home safety and provide recommendations for modifications, such as training clients in the use of adaptive devices and removing throw rugs as well as other trip hazards, to increase safety in the home environment after TKR surgery.

Having Confidence Due to Previous Experiences with TKR

Participants in this study felt more confident regarding the recovery process due to previous positive experiences with persons who had undergone TKR. Therefore, it

may be beneficial to have clients who have already completed TKR surgery come and speak to future patients during pre-operative education classes. This technique has been used post-operatively to lead a support group after TKR, however this same approach may be useful prior to surgery as well (Lucas, Cox, Perry, & Bridges, 2013). Allowing patients to learn from persons who have already experienced TKR, especially if they do not have a family member who has undergone the surgery, may increase readiness for TKR and discharge home as clients feel more prepared for what to expect in the recovery process. It would also be important to discuss any prior negative experiences patients may have had related to TKR surgery, either from their own previous joint replacement or through the experiences of someone they know who has undergone TKR. This could help to allay fears and provide realistic information regarding what patients should expect after surgery.

Receiving Pre-operative and Post-operative Education

Although evidence is mixed regarding the effectiveness of pre-operative education, the participants in this study found it to be helpful. Some systematic reviews have demonstrated limited support for pre-operative education, while other researchers have shown decreased anxiety before surgery, increased readiness for surgery, improvement in pain control after surgery, and minor reductions in length of stay for persons who attended pre-operative education (Chen, Chen, & Lin, 2014; Jones, Alnaib, Wilkinson, Gibson, & Kader, 2011; Kearney, Jennrich, Lyons, Robinson, & Berger, 2011; McDonald, Hetrick, & Green, 2004; McDonald, Page, Beringer, Wasiak, & Sprowson, 2014; Spalding, 2003). However, other studies have revealed that many patients found pre-operative and post-operative education to be insufficient and that it did

not prepare them for what to expect post-surgery (Fielden, Scott, & Horne, 2003; Jacobson et al., 2008; Westby & Backman, 2010). Some patients have noted inconsistency with education provided by different health care professionals, creating uncertainty about which health care instructions to follow at home (Fielden et al., 2003). The participants in this study found education before their surgical procedure to be beneficial for increasing their awareness of what to expect after surgery and as a result, this increased their confidence for discharge. Participants also felt they received valuable information after surgery and were well prepared for returning to their homes. Patients should be encouraged to attend pre-operative education to improve readiness for surgery and promote confidence for discharge home. Health care providers should also address important areas of instruction after surgery as well, such as safety, adaptive techniques for completing valued occupations, and when to resume normal activities.

Persevering After TKR

One study examined patients' and various health professionals' views on outcomes after both THR and TKR (Westby & Backman, 2010). Many patients felt that clear expectations were not given regarding the amount of pain they would have after surgery. In addition, information on how to prepare for and manage high pain levels was not sufficient. While participants in this study did expect pain and felt that this was a normal part of the recovery process, some were not fully prepared for the amount of pain they would experience after surgery during their hospitalization. These findings would support more education for patients regarding realistic expectations for pain that they may experience post-surgery, specifically after the femoral nerve block has worn off if this anesthetic approach will be used to control pain.

Having Good Communication with Health Care Providers

Some patients and health care professionals have found communication between all members of the patient-provider relationship to be inadequate following THR and TKR (Westby & Backman, 2010). Participants in this study experienced open and thorough communication between staff and patients, which contradicts findings from previous research. Participants felt that all of their needs were sufficiently met during their hospital stay. In fact, Samantha stated: "They've got everything set up and ready. I don't know what more they could have done for me." Interactions with staff has been identified in other research studies to influence confidence and preparedness for discharge (Cain et al., 2012; Heine et al., 2004). The more positive these interactions and the more competent staff were perceived to be, the more confident patients felt for discharge. These same features were identified by this study to increase readiness for discharge home. Members of the health care team, including occupational therapy, should develop strong rapport with their clients using open, clear communication to increase confidence and discharge readiness after TKR.

Preparing for the Post-Surgical Phase

Numerous research studies have identified patient concerns about returning to valued occupations post THR and TKR surgery (Barksdale & Backer, 2005; Jacobson et al., 2008; Macario, Schilling, Rubio, Bhalla, & Goodman, 2003; Rastogi, Davis, & Chesworth, 2007; Showalter et al., 2000). A study conducted to identify patient concerns in the early weeks following TKR found that basic self-care activities were more of a concern during the first week after TKR, and then participation in higher level activities became the main concern during the following weeks (Rastogi et al., 2007). Participants

in this current study revealed many things they did pre-operatively to prepare for life after surgery, such as cooking and freezing meals or hiring help to complete home maintenance tasks post-surgery. It is interesting to note that patients in this study were concerned with higher level occupations, such as cooking and cleaning, even before their surgeries. One evidence-based occupational therapy program found that patients who participated in education and training after surgery related to higher level activities, such as cooking and cleaning, felt more prepared to complete these tasks at home after THR and TKR surgery than patients who did not receive this training (Crum, 2011). Given patient interest in preparing for these valued occupations, these would be areas for occupational therapy to address through education and training both before and after TKR surgery.

Limitations

This was a small study to explore the experiences of these patients, and the results are not intended to be generalizable to all persons undergoing TKR surgery. However, results from this study may be transferrable for patients who undergo TKR in similar facilities as the study setting. Readers should consider their hospital setting, pre-operative education programs, post-operative services including therapy, typical length of stay, and patient population to determine if the results can be transferred to their facility. Further research is needed to determine if the patient experiences from this study are common and to examine the impact of any alterations made to client care as a result of this study to support readiness for return to home. The primary researcher was a PRN occupational therapist at the study setting. The primary researcher did not recruit participants or complete data collection during timeframes when she was scheduled to work to allow

participants to speak openly and honestly about their discharge experiences. While this process was implemented to limit the influence of the researcher on participant responses, eligible participants who may have revealed valuable insights about the experience of preparing for discharge home could have been excluded from the study.

Patient recruitment was a significant issue in this study. Staffing changes and therapists transitioning to different units within the hospital resulted in the gatekeeper changing multiple times throughout the study, which caused delays in recruitment to allow for proper training of new research personnel. Due to an increased patient caseload at the facility during the time of the study, and some surgeries that were scheduled later in the day, initial evaluations for new patients following TKR were sometimes completed the day after surgery. The day after surgery was often the day of discharge due to short lengths of stay common after TKR surgery in the United States. This did not allow the researcher enough time to interview patients prior to their return to home. Some patients who were initially interested in participating in the study later refused due to increased pain or nausea that often accompanies orthopedic surgery. Many eligible participants were likely missed due to the factors discussed above, and thus low participant recruitment may have prevented data saturation. Four patients total were recruited for participation in the study; additional participants were unable to be recruited following extension of the project with IRB approval. Although the four participants did provide similar data, having one or two additional participants could have confirmed the themes or revealed additional information.

The timing and depth of interviews was another limitation. Interviewing patients soon after TKR surgery meant patients could feel ill or tired, which may have impacted

their responses. The short length of stay left little time for interviews. Interviews only occurred during the patient's hospital stay, but adding interviews after discharge home could have revealed information patients forgot to mention during their interview in the hospital or how their perceptions changed once returning to their home environment. Several studies have revealed that many patients have overly optimistic expectations about how well they will function after THR and TKR (Fielden et al., 2003; Showalter et al., 2000; Westby & Backman, 2010). Discrepancies in expectations compared to the reality of how clients actually function at home could be revealed through a secondary interview after discharge.

The barriers to clinical research experienced in this study are similar to those discussed in the literature. When providers in integrative health care clinics were interviewed they expressed that the nature of the patient population as well as staff turnover impeded research activities within this setting (Verhoef, Mulkins, Kania, Findlay-Reece, & Mior, 2010). Logistical challenges limited scholarship as well, as implementing research altered the typical daily routine for health care providers and impacted their ability to complete their other work responsibilities. Occasionally gatekeepers ran out of time to talk about the research study during the initial occupational therapy evaluation and they did not always have time to go back to the patient to discuss the study later, which may have reduced the sample size. Sometimes gatekeepers were also delayed in being able to contact the researcher about potential participants due to their work responsibilities and therapy schedules. This delay may have resulted in the researcher not having time to interview potential participants prior to their discharge home. Patient recruitment has been found to be the highest reported difficulty cited by

many clinical researchers, and this was also found to be a barrier for completing this current study (Cullati et al., 2016). Conducting research within clinical settings can reveal important information about a phenomenon being studied, however there are many barriers that can interfere with the research process.

Summary

This study highlighted the experience of preparing for discharge home following TKR surgery for four patients with planned discharge to home from the hospital. Three main themes were identified: being supported for discharge home; having confidence in self, family and health care staff; and persevering: overcoming obstacles. Implications for health care providers including occupational therapy were discussed for both pre-operative and post-operative recommendations to increase readiness for surgery and recovery following TKR.

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Chapter Four

Study 2: Pre-operative Education for Total Knee Replacement: A Pilot Survey

Background

The prevalence of symptomatic knee osteoarthritis (OA) in the United States has been estimated to include 14 million persons currently living with knee OA (Deshpande et al., 2016). Total knee replacement (TKR) is a common intervention for OA that has been found to have better outcomes than non-surgical interventions, with greater than 750,000 persons undergoing TKR annually in the United States (AAOS, 2014; Skou et al., 2015). TKR has often been associated with reduced pain, increased quality of life, improved functional abilities, and high patient satisfaction following surgery (Shan, Shan, Suzuki, Nouh, & Saxena, 2015). Although most persons who undergo TKR experience these positive results, others do not achieve the same satisfactory outcomes. Reduced functional performance, falling in hospital or at home, hospital re-admittance, and other negative outcomes have been reported in the literature following TKR surgery. The functional limitations experienced in the early phase after TKR have often been greater than patients anticipated, with many individuals expecting to achieve full functional recovery much sooner than actual surgical outcomes reported in the literature (de Achaval et al., 2016; Levinger et al., 2016). In the months after TKR, as many as 11.8% of patients experience a fall and up to 8% of patients are readmitted to the hospital (Schairer, Vail, & Bozic, 2014; Swinkels, Newman, & Allain, 2009).

Patients have reported having unrealistic expectations about the functional tasks they would be able to complete in the early post-operative phase, with some individuals having significant disparities between their expectations and their perceived functional

performance after surgery (Levinger et al., 2016). Many patients are still unable to return to higher level functional tasks, such as gardening, by 6 months after surgery or tasks that require bending and stooping even after 1 year of recovery following TKR (Hamel, Toth, Legedza, & Rosen, 2008; White, Stockwell, Hartnell, Hennessy, & Mullan, 2016). Patients have also reported receiving conflicting information from health care providers, creating confusion regarding which instructions to follow at home (Goldsmith et al., 2017; Specht, Kjaersgaard-Anderson, & Pedersen, 2016). Additionally, the amount and intensity of pain experienced after knee replacement may exceed the discomfort patients expect to experience; some patients have reported having longer recovery times, sleep disturbances, and poor satisfaction due to unexpected levels of pain following joint replacement (Causey-Upton & Howell, 2017; Goldsmith et al., 2017; Westby & Backman, 2010). These previous studies discussing negative experiences following TKR demonstrate that patients may not be as prepared as they need to be to achieve optimal outcomes after discharge. Preparing for discharge after surgery begins with pre-operative education to ready patients for the post-operative phase. Realistic expectations for recovery after TKR, knowledge about how to complete daily life tasks after surgery, strategies for preventing falls, and known factors related to hospital readmission should all be addressed through pre-operative education as a resource for better preparing patients for return to home.

Little research is currently available that explores patient or provider perceptions regarding the adequacy of pre-operative education for TKR. Scant literature is available regarding pre-operative education for other diagnoses. Following an extensive literature review, only one study was found that examined patient perceptions of pre-operative

education before cardiac surgery, and another researched patient perceptions regarding pre-operative education for orthopedic surgery prior to reduction and internal fixation to repair fractures of the upper and lower extremities (Chetty & Ehlers, 2009; O'Brien, McKeough, & Abbasi, 2013). While patients in both studies perceived that they received helpful information prior to surgery, areas identified as needing more education included expectations for the early post-operative phase. Montin, Johansson, Kettunen, Katajisto, and Leino-Kilpi (2010) examined patients' perceptions of knowledge received pre-operatively for total hip replacement (THR) and TKR using a questionnaire design. Montin and colleagues' study identified topics patients felt they received the most and least information about; however, a limitation of this study was it did not examine whether or not patients found this education to be adequate or areas they felt were missing. Ingadottir et al. (2014) found that patients' knowledge expectations before TKR exceeded the knowledge gained through pre-operative education, demonstrating a disparity between knowledge desired and knowledge obtained prior to surgery.

Literature regarding provider perceptions about pre-operative and post-operative education is very limited. A small graduate research project identified occupational therapists' perceptions about the ideal pre-operative education program for individuals with planned THR surgery (Rae, 2011). The author found discrepancies between the current program design for THR and the participants' perceptions regarding the optimal design for pre-operative education with this population. Westby and Backman (2010) examined patient and health care providers' views of rehabilitation practices and outcomes after TKR and THR, and found different but overlapping perceptions among these two groups. Patients found communication with providers to be inadequate, while

health professionals focused more on the inadequacy of communication between disciplines. Both patients and health care professionals expressed that pre-operative education was crucial for providing clarification regarding expectations and empowering the client to be an active participant in their recovery.

The current evidence regarding the efficacy of pre-operative education presents conflicting results. Larger systematic reviews of randomized controlled trials have demonstrated that available research is not strong enough to support or contradict the use of pre-operative education prior to joint replacement surgery (Louw, Diender, Butler, & Puentedura, 2013; McDonald, Hetrick, & Green, 2004; McDonald, Page, Beringer, Wasiak, & Sprowson, 2014). Individual studies have found positive results of pre-operative education such as reduced anxiety prior to surgery, increased preparedness for surgery, decreased fall incidence, better pain control post-operatively, and reduced length of stay (Chen, Chen, & Lin, 2014; Clarke, Timm, Goldberg, & Hattrup, 2012; Jones, Alnaib, Wilkinson, Gibson, & Kader, 2011; Kearney, Jennrich, Lyons, Robinson, & Berger, 2011). However, other studies in the literature have revealed that pre-operative education did not fully prepare patients for what to expect after surgery, with many patients finding both pre-operative and post-operative education to be insufficient (Fielden et al., 2003; Jacobson et al., 2008; Westby & Backman, 2010). Some patients have reported receiving inconsistent or even contradictory information from different health care providers (Goldsmith et al., 2017; Spalding, 2003; Specht et al., 2016). Previous research reflects that patient education is not fully addressing the needs of TKR patients prior to discharge. The structure of pre-operative education programs used nationally for patients prior to TKR surgery has not been identified previously, thus

hospitals across the United States lack a common standard for this education to ensure best outcomes to promote safety, increased functional independence, and improved quality of life for discharge home.

Limited descriptions of educational content, delivery methods, and providers of pre-operative education have been provided in individual research manuscripts and have also been presented in systematic reviews for the studies that met strict inclusion criteria to be incorporated in these reviews (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Descriptions of programs currently found in systematic reviews or individual studies within the literature are not representative of pre-operative education at a national level. A variety of health care staff may participate in pre-operative education such as nurses, physical therapists, occupational therapists, social workers/discharge planners, among other providers who have a role in delivering pre-operative education. These providers, along with the content and methods of educational delivery, can vary significantly by program. An understanding of the current structure of pre-operative education is needed as a basis to develop educational programs that better meet client needs to prepare them for discharge home. The objectives of this pilot survey study were to identify the content, providers and delivery methods of pre-operative education programs for patients undergoing TKR surgery.

Methods

This pilot survey study was approved by the Institutional Review Board (IRB) at Eastern Kentucky University through expedited review in September 2016. All participants provided informed consent to participate in the study and were advised that participation was voluntary and could be stopped at any time.

Research Design

This research included an exploratory, descriptive design with an online pilot survey created by the researcher. The survey consisted of both closed-ended and open-ended question items and was conducted in Fall 2016 and Spring 2017. Survey research is an appropriate technique for revealing descriptive data about a topic that has not been thoroughly researched previously (Fowler, 2014). This method also permits gathering information across a broader audience and geographic area in a more efficient manner than other methods of data collection, such as in-person interviews (Fowler, 2014).

Recruitment. The population for this study includes all health care providers who currently participate in pre-operative education for persons undergoing TKR surgery. An exhaustive list of these providers is not available, which does not permit determining the total number of individuals who are included in this population. Because no comprehensive database exists that lists all providers or facilities that participate in pre-operative education for TKR surgery, potential participants were recruited for the study by contacting providers from hospitals at geographic locations around the United States who provide pre-operative education to this patient population. These hospitals were located through convenience sampling using contacts of the first author as well as an internet search of hospitals that provide TKR and an education program prior to surgery. Hospitals that met this criteria were contacted throughout the study time period to identify an appropriate person at the facility who provided pre-operative education. Potential participants were contacted via telephone and email by the primary researcher. The main hospital number was used as the initial point of contact, if a direct phone number or email address for pre-operative education or total joint replacement were not available on the hospital's website. The primary investigator described

the study in detail and asked if the person would like to participate in the study. The primary investigator then emailed the informed consent letter and a link to the survey for study completion. Forty facilities were contacted for recruitment, and fifteen individuals initially agreed to participate in the study. Through the informed consent letter, email cover letter, and telephone conversation with the primary investigator, participants were advised that participation was voluntary and could be stopped at any time. Completion of the survey was considered as providing informed consent for participation in the study.

Data collection: Methods and instrumentation. Data was collected using an online survey. Participants were emailed a link to complete the survey through the Research Electronic Data Capture (REDCap), a secure system that supports web-based data collection and analysis for research studies (Harris et al., 2009). This program can be accesssed through a university affiliation. The survey included 16 questions total, and took approximately 10 minutes to complete. Refer to Appendix E for a complete copy of the survey questions. Survey items posed questions about demographic information, current program design, ideal program design, and feedback regarding the design of the survey itself. Demographic questions numbers one through three asked respondents to identify their health care discipline, how long they had worked in their discipline, and their educational level. Current program design questions numbers four through 10 focused on the following areas related to pre-operative education: topics covered, persons involved, educational delivery methods, format, timing, number of sessions, and length of sessions. Questions numbers 11 through 13 regarding ideal educational programs asked respondents to identify optimal design for these same areas, as well as asking participants to identify any other needed alterations to their

current program design. Open-ended questions numbers 14 through 16 at the end of the survey sought feedback regarding the survey design itself including the following: any areas of confusion on the survey, feedback regarding additional survey questions or response items that respondents felt should be added, and any additional feedback that respondents wanted to add regarding the design of the survey. Survey questions were developed based on information available in the literature describing pre-operative education, as well as by reviewing three pre-operative education programs in Lexington, Kentucky. The first author either attended a pre-operative education class or met with the primary education provider for each of these three programs. Materials available from these programs, such as booklets and PowerPoints, were also reviewed by the first author.

Data analysis. Data was analyzed using the "Data Exports, Reports, and Stats" feature from REDCap. Descriptive statistics were used for data analysis to determine frequency and percentages for responses on closed-ended survey items. Responses on open-ended survey items were recorded and collated from individual survey responses.

Results

Participant Demographics

Out of 15 providers who initially agreed to participate in the research from the 40 facilities that were contacted, seven participants representing different facilities completed the pilot survey during the study timeframe. Two were nurses, one was a physical therapist, and four were occupational therapists. Three participants had between 2 and 5 years of experience in practice, while four had more than 10 years of experience in their respective health care disciplines. One participant had completed an Associate's

degree, two had completed Bachelor's degrees, three had completed Master's degrees, and one participant had completed a clinical doctorate as their highest level of education.

Current Program Design

Additional providers. The majority of participants reported having a pre-operative education team that included nursing (6; 85.7%), physical therapy (6; 85.7%), and occupational therapy (5; 71.4%) as additional providers involved in pre-operative education at their facilities. Social work and case management were each reported by two participants (28.6%) to be included as part of the pre-operative education team. Providers from dietetics were not involved in any of the pre-operative programs in this study. Three participants reported other health care providers which included providers from pain management, hospital concierge services, and home health care.

Educational topics. Participants educated patients on a wide variety of topics in pre-operative classes at their facilities (See Table 4.1). All participants reported covering how to prepare for surgery, what to expect while in the hospital, adaptive equipment, self-care tasks, home safety, pain management, as well as exercise before and/or after surgery. The recovery process, functional mobility, home modifications, and precautions were also commonly included as educational topics. Anatomy of the knee joint and expected functional outcomes were covered in a little more than half of participants' programs. Topics less commonly included in pre-operative education were instrumental activities of daily living (such as completing laundry and caring for the home), caregiver training, and when to resume normal activities at home. One participant reported an additional area covered during education related to the surgical procedure itself, and

another responded that his or her program provided education on the need to increase protein and fiber intake along with preventing and treating constipation.

Table 4. 1 Educational Topics Included in Pre-Operative Education

Educational Topic	**Number of Respondents** Frequency and Percent
How to prepare for surgery	7 (100%)
What to expect while in the hospital	7 (100%)
The recovery process	6 (85.7%)
Self-care (such as dressing, bathing, toileting)	7 (100%)
Functional mobility (such as transfers)	6 (85.7%)
Instrumental activities of daily living (such as completing laundry and caring for the home)	3 (42.9%)
Adaptive equipment	7 (100%)
Home modifications	5 (71.4%)
Home safety	7 (100%)
Managing pain	7 (100%)
Caregiver training	3 (42.9%)
Exercise before and/or after surgery	7 (100%)
Precautions	6 (85.7%)

Table 4. 1 (continued)	
Anatomy of the knee joint	4 (57.1%)
When to resume normal activities at home	3 (42.9%)
Expected functional outcomes	4 (57.1%)
Other	2 (28.6%)

Educational delivery methods. All respondents reported that both verbal and written instruction were used to educate TKR patients prior to surgery. Demonstration was used by six (85.7%) participants, while video and online education were both used by two (28.6%) respondents. Workbooks were not used by any of the participants in this study. Three respondents indicated that other methods were used for pre-surgical education. Two (28.6%) of these individuals stated that PowerPoint was used as part of the education process. The third response included using the teach-back method, or return demonstration, as an educational technique.

Pre-operative education program structure. Most participants (4; 57.1%) reported that patients typically attended pre-operative education two weeks prior to surgery. The timeframe in which patients usually attended pre-operative education at other facilities varied from less than one week (1; 14.3%), to three weeks (1; 14.3%) and up to 4 weeks (1; 14.3%) before undergoing TKR. Most participants (5; 71.4%) reported that their facility used a group format to provide pre-surgical education. One participant (14.3%) responded that their facility used both an individual and group education format, and the remaining participant (14.3%) reported that pre-operative education was provided

only on an individual basis. The majority of respondents (5; 71.4%) reported that patients attended only one session prior to TKR surgery. One participant (14.3%) worked at a facility where patients attended two sessions before surgery, and the remaining participant (14.3%) worked at a facility where patients attended five or more pre-operative education sessions. Length of pre-operative education sessions varied, but no sessions were shorter than 1 hour or longer than 2.5 hours. Respondents reported sessions lasting 1 hour to less than 1.5 hours (4; 57.1%), 1.5 hours to less than 2 hours (1; 14.3%), and 2 hours to less than 2.5 hours (2; 28.6%).

Optimal Program Design

Recommended additional educational topics. Five respondents reported additional topics they believed would be beneficial to be included in pre-operative education, and two respondents reported that there were no educational topics they would recommend as additions to their current educational programs (See Table 4.2). One participant (14.3%) felt that functional mobility should be added to the educational program at his or her facility, another (14.3%) wanted to include education about the anatomy of the knee joint, and one respondent (14.3%) also wanted to teach patients about home modification before surgery. Two respondents (28.6%) would prefer that instrumental activities of daily living (such as completing laundry and caring for the home) be added as a part of pre-operative education. Two participants (28.6%) also recommended both caregiver training and education about expected functional outcomes of TKR surgery.

Table 4. 2 Additional Educational Topics Recommended for Pre-Operative Education

Educational Topic	**Number of Respondents** Frequency and Percent
How to prepare for surgery	0 (0%)
What to expect while in the hospital	0 (0%)
The recovery process	0 (0%)
Self-care (such as dressing, bathing, toileting)	0(0%)
Functional mobility (such as transfers)	1 (14.3%)
Instrumental activities of daily living (such as completing laundry and caring for the home)	2 (28.6%)
Adaptive equipment	0 (0%)
Home modifications	1 (14.3%)
Home safety	0 (0%)
Managing pain	0 (0%)
Caregiver training	2 (28.6%)
Exercise before and/or after surgery	0 (0%)
Precautions	0 (0%)
Anatomy of the knee joint	1 (14.3%)
When to resume normal activities at home	0 (0%)

Table 4. 2 (continued)	
Expected functional outcomes	2 (28.6%)
Other	0 (0%)
None	2 (28.6%)

Recommended additional health care providers. When asked what additional providers participants felt would be beneficial for their patients, the majority of respondents (4; 57.1%) indicated that they did not have recommendations to add any additional providers to the current pre-operative education program at their facility. Three participants (42.9%) would like to have case management involved in pre-operative education and one participant (14.3%) would like to see social work become involved with the program. One person (14.3%) indicated that they would like to see the physician assistant and/or surgeon become involved in providing pre-operative education before TKR surgery.

Other recommended alterations to pre-operative education. Participants were asked to provide any other additions or alterations they felt were needed to their current pre-operative education program to best meet the needs of their patients. Three individuals (42.9%) provided responses to this question item. One person (14.3%) wanted to see the pre-operative education program expanded to include all physicians at his or her facility, as currently only patients from two surgeons utilize the program. Another participant recommended that their combined orthopedic class be completed separately for TKR patients and those who undergo THR. The remaining participant felt that it

would be valuable to add a video of a TKR patient completing active and passive range of motion exercises with a physical therapist to reinforce the amount of effort required for patients to achieve optimal outcomes after surgery.

Discussion

This pilot study found that current programs for pre-operative education included a variety of educational topics, with some areas being covered less frequently among programs than others. Other aspects of program design varied as well, such as when pre-operative education was provided prior to surgery. Several participants had suggestions to improve the current structure of their pre-operative education programs related to topics covered, providers involved, as well as other recommendations. Participant responses also provided insight to improve the design of the survey for future implementation on a larger scale.

Current Pre-operative Education Program Design

Health care providers. Nursing and physical therapy have commonly been reported in the literature in systematic reviews that have described providers included in pre-operative education, which is similar to the results of this pilot research; these same studies have not found occupational therapy to be commonly involved in pre-operative education after total joint replacement surgery which contradicts the findings of this study (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Louw and colleagues (2013) listed the top ten providers involved in pre-operative education for the studies included in their systematic review, and occupational therapy was not among those disciplines listed. The discrepancy between this pilot study and the literature could be due to participant demographics which included four out of seven respondents who were

occupational therapists, as well as the use of convenience sampling methods. Occupational therapy may be beneficial to include in pre-operative education prior to TKR surgery to address areas related to self-care as well as higher level functional tasks following surgery (Rastogi, Davis, & Chesworth, 2007). More research is needed to determine the best interprofessional involvement of health care providers for pre-operative education.

Educational topics. Similar to this current study, common topics covered in pre-operative education that have been reported in previous research include: preparing for surgery, what to expect after surgery, the recovery process, self-care, functional mobility, adaptive equipment, managing pain, precautions, safety at home, and exercise (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Other programs have covered additional aspects, such as finances related to surgery, advice from previous patients who underwent joint replacement, and the roles of medical support staff (Heikkinen, Helena, Nummela, Kaljonen, & Sanna, 2008). Including an "other" option for respondents on this pilot survey and on the revised survey for future implementation will capture additional topics covered at individual facilities. While pain management was addressed by all participants in this study, previous research has demonstrated that this education may be inadequate to prepare patients for the frequency and intensity of pain that they experience after surgery (Causey-Upton & Howell, 2017; Goldsmith et al., 2017; Westby & Backman, 2010). Pre-operative pain education should be examined to determine the best approach for better preparing patients for this aspect of the recovery process, and patients should be provided with more realistic information regarding the discomfort they may experience after surgery.

Patients need to be educated about when most individuals are able to resume various activities following surgery as patients often have unrealistic expectations regarding their functional outcomes and the timeframe in which they can return to their regular activities after surgery (Chetty & Ehlers, 2009; O'Brien et al., 2013). Caregiver training is not a common education topic either, however, some patients have identified that including their support system during pre-operative education increases their confidence for discharge following surgery (Causey-Upton & Howell, 2017; Specht et al., 2016). Patients should be provided information regarding adaptive equipment or techniques that may assist daily activities post-surgery. Surprisingly, individual differences among TKR patients, such as related to medical history, were not identified as being addressed in the pilot study or as a common theme in the literature. For example, a systematic review examining the content of pre-operative education addressing post-operative pain for THR and TKR did not identify differentiating pain between patients with rheumatoid arthritis and osteoarthritis in pre-operative education (Louw et al., 2013). Further research is needed to determine the most important topics that should be addressed in pre-operative education programs to better prepare patients for discharge home following TKR surgery.

Educational delivery methods. Verbal and written instruction were the most commonly reported methods for delivering education before surgery in the literature, as well as in this pilot study (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Some studies have also examined the impact of video education combined with verbal instruction versus verbal instruction alone, but did not find significant functional differences in favor of the addition of video (Rastogi et al., 2007; Leal-Blanquet et al.,

2013). Heikkinen and colleagues (2008) compared internet-based education alone to face to face education, and found some evidence that web-based education provided a higher level of knowledge pre-operatively than face to face education with staff. The literature does not provide a clear best method for educational delivery. Further research is needed to determine the most effective technique for providing pre-operative education to support the best outcomes after surgery.

Timing and format of pre-operative education. Similar to results in this pilot study, the timing of pre-operative education varies widely in the literature. Previous research studies have reported pre-operative education occurring as much as six weeks before planned total joint replacement with most scheduled within four weeks prior to the procedure, and as late as the evening before surgery (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014; Sjoling, Nordahl, Olofsson, & Asplund, 2003; Williams, 2010). The timing of education prior to TKR surgery has not been studied specifically in the literature, and warrants examination. Providing education too early could mean that patients forget important information by the time of their surgery, while providing this education too late can mean that patients do not have time to absorb new information that is important for their recovery. Patients may also not have time to ask questions that could better prepare them for surgery and the post-operative phase.

The majority of participants in this pilot study reported that pre-surgical education was provided in a group format. However, most research reported in the literature reflected that education sessions were more evenly divided between one-on-one verbal education and group sessions, with the least common format using methods that did not include face-to-face contact with a health care provider (Clarke et al., 2012; Louw et al.,

2013; McDonald et al., 2004; McDonald et al., 2014). Individual versus group format for educational delivery has not been studied extensively in the literature, and is another area that should be examined to determine the effectiveness of delivering educational content to a single patient, compared to providing this same information to multiple patients at a time.

Length and number of pre-operative education sessions. Length of pre-operative education sessions varied widely in the literature from 12 minutes (video format only) to half a day, compared to a range of one hour to 2.5 hours in this study (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Attending one educational session prior to surgery was commonly reported in the literature and this pilot research, with few programs including more than one pre-operative education session; however some studies examining pre-operative education included multiple pre-surgical exercise sessions as part of the intervention (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). More research is needed to determine the most effective design for pre-operative education related to the timing, length, and format of these programs.

Limitations

One limitation of this study is a small sample size. While forty facilities were contacted and 15 providers initially agreed to participate, only seven participants completed the survey in the study timeframe. However, given the pilot nature of the survey, a large sample size was not the goal of this research. Other health care research reported in the literature has used small sample sizes from six to ten participants for the initial pilot study prior to administration of the survey on a much larger population (Csajka et al., 2014; Hawkins, Osborne, Egbeare, Williamson, & Lambert, 2014). The

recruitment method for this current study is another limitation, as convenience sampling used for this pilot research may not provide the substantial number of participants required for a large scale study in the future. The study also included a disproportionate ratio of health care providers who participated in the survey, with four respondents being occupational therapists. The first author is an occupational therapist and has more contacts who belong to this discipline. Even though participants from multiple disciplines were recruited across the United States, the first author's status as an occupational therapist may still have led to greater recruitment of these providers as potential participants compared to other disciplines. Additionally, the geographic location of participants was not recorded on the surveys. While participants from across the United States were recruited for the study, surveys were completed anonymously and it is not possible to determine the geographic representation of the study sample. A question item will be added to the survey for future research to obtain geographic location by state for respondents. Another limitation was evident based on responses from participants on the question item related to additional providers who were involved in pre-operative education. For example, four out of seven occupational therapists completed the survey but five respondents indicated occupational therapy as additional providers involved in pre-operative education at their facilities. This suggests that either more than one occupational therapist was involved in pre-operative education at a portion of these facilities, or that some participants included themselves in their response to this question. Altering this question for the final survey should ensure that participants have a similar understanding of this item when they respond to this question.

Summary

This pilot research study was needed to begin to describe the nature of current pre-operative education programs for TKR surgery in the United States, as well as to pilot the survey and mode of survey delivery for future research. Seven participants completed the survey and provided insight regarding how program structures varied across health care sites. Changes will be made for future implementation of the survey based on analysis of responses on the survey items. There are currently limited descriptions of pre-operative education programs provided in the literature, and these program designs vary across settings. This pilot research provided a beginning framework for establishing usual practice, which can later be used as a basis for determining best practice for pre-operative education prior to TKR surgery. A large, national survey is needed to fully describe the content, providers, and delivery methods of pre-operative education for TKR patients across the United States using a representative sample. Results of this larger survey could be used to inform future research to examine the effectiveness of various program designs once their structures are fully known in order to develop programs that will support better post-operative outcomes. Additional future research could examine other related areas such as patient understanding, perceptions, and expectations regarding pre-operative education for TKR surgery.

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Chapter Five

Study 3: A Mixed-Methods Study of the Content, Providers, and Delivery Methods of Pre-operative Education for Persons Undergoing Total Knee Replacement

Introduction

Total knee replacement (TKR) is a common surgical intervention for advanced knee osteoarthritis that involves replacing the knee joint with prosthetic components. Approximately 750,000 TKRs are performed yearly in the United States with projections of 1,375,574 by the year 2020 (AAOS, 2014; Kurtz, Ong, Lau, & Bozic, 2014). The majority of patients (81%) report being satisfied with the outcomes of their TKR surgery (Bourne, Chesworth, Davis, Mahomed, & Charron, 2010). This population typically experiences increased quality of life, acquires functional knee range of motion, and improves performance in daily life activities (Shan, Shan, Suzuki, Nouh, & Saxena, 2015). However, a sizeable amount of patients are not fully prepared to return home and have less than optimal outcomes following surgery which may include falls, reduced function, and being readmitted to hospital in the months following TKR. Although TKR surgery is often highly successful, a substantial portion of the population does not achieve optimal outcomes in the post-surgical phase.

Patients have reported having higher expectations regarding their functional levels after TKR than outcomes that are presented in the literature. Levinger et al. (2016) report significant discrepancies between patient expectations and their actual functional performance after surgery. Another indication of reduced preparation for discharge includes falls in the early post-operative phase. As many as 11.8% of patients fall in the months after undergoing TKR surgery (Swinkels, Newman, & Allain, 2009). Falls can

result in injury and additional expenses to recover from this avoidable trauma, as well as hospital readmission. Readmission rates reported in the literature are approximately 5% to 8% in the months after surgery (Belmont et al., 2016; Schairer, Vail, & Bozie, 2014; Welsh et al., 2017). Returning to hospital after TKR is concerning because it may increase patients' risk for hospital acquired infections and further functional declines. Pre-operative education may be a mechanism for reducing the incidence of poor outcomes after TKR and increase readiness for discharge home.

Pre-operative education is commonly provided for patients prior to planned TKR surgery. Some evidence regarding the efficacy of education prior to TKR surgery has reflected positive results, while other studies have not found strong enough evidence to support this education as a standard of care. Individual studies have found that education prior to TKR surgery reduced falls while in-hospital (Clarke, Timm, Goldberg, & Hattrup, 2012), decreased anxiety (Spalding, 2003), increased preparation for surgery (Kearney, Jennrich, Lyons, Robinson, & Berger, 2011), improved pain control (Chen et al., 2014), and also reduced length of stay (Jones et al., 2011), among other positive outcomes. Larger systematic reviews have found no difference between patients who attend pre-operative education and those who do not, or only minor differences such as with small variations in anxiety level (McDonald, Hetrick, & Green, 2004; McDonald, Page, Beringer, Wasiak, & Sprowson, 2014). In addition to conflicting evidence regarding the efficacy of pre-operative education, limited descriptions of program structures for this education are available in the literature. These descriptions do not provide a thorough understanding of pre-operative education across the United States.

Some descriptions of providers, topics, and methods of educational delivery are described in the literature. Individual studies may present the details for the study setting, but do not provide information regarding national practice trends. Systematic reviews describe program designs for the studies that met inclusion criteria for the review, but these descriptions are only limited to a few programs (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Pre-operative education is often interprofessional, and can include diverse disciplines such as nursing, physical therapy, occupational therapy, case management, and dietetics. Louw et al. (2013) described the providers utilized in the studies within their systematic review in descending order of frequency which included: physical therapist, nurse, psychologist/psychiatrist, physician, none (packet or video only), research assistant, multidisciplinary team, rheumatologist, and anesthesiologist. A series of Cochrane Reviews assessed the efficacy of pre-operative education for orthopedic surgery studies, and the research included nurses and physical therapists most frequently in pre-operative education. The composition of the pre-operative education team can vary significantly by program, along with other features such as the timing of education and content covered. Length of education sessions reported in the literature was diverse from 12 minutes to lasting half a day (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Many patients from these systematic reviews participated in one session or completed the education independently, but some received multiple pre-operative education sessions to prepare for TKR surgery. Educational delivery methods varied as well from only receiving video or booklet materials, to receiving in-person, multimodal education.

Pre-operative education has been identified in the literature as an intervention that can address areas of deficit and concern after surgery, such as falls and functional performance, but does not currently have a standard protocol to implement for best practice. The evidence regarding the efficacy of education prior to TKR reports variable findings. Additionally, pre-operative education has not been described nationally to determine current practice trends and variations. An understanding of the current structure of pre-operative education is needed to guide development of effective educational programs to better meet patient needs to prepare them for discharge home. Therefore, the purpose of this research study is to describe the current structure of pre-operative education in the United States including content, providers, and delivery methods. Additionally this study explores providers' perceptions of pre-operative education.

Methods

This study was approved by the Institutional Review Board (IRB) at Eastern Kentucky University (EKU) through expedited review on October 18, 2017. All participants provided informed consent to participate in the study and were advised that participation was voluntary and could be stopped at any time. This research was financially supported by the University-Funded Scholarship Program at EKU. This research was conducted in partial fulfilment of a PhD in Rehabilitation Sciences at University of Kentucky as well as to fulfil scholarship requirements for the primary researcher as a tenure-track faculty member at EKU.

Research Design

This research study utilized both quantitative and qualitative procedures for an explanatory, sequential mixed-methods design. This approach involved collecting quantitative data in the first phase of the study, analyzing the results, and then building on these results in the second, qualitative portion of the study (Creswell, 2014). Combining quantitative and qualitative data provides a stronger understanding of the topic of study than either approach can provide alone (Creswell, 2014). The initial study phase was completed through survey methods and the second portion of the study was completed using transcendental phenomenology, described further in the Data Collection section.

Recruitment

Potential participants were identified through the National Association of Orthopaedic Nurses (NAON). NAON was selected for recruitment because nurses are one of the most commonly involved providers in pre-operative education, based on the limited literature that has been published to date to describe clinicians who provide this education (Louw et al., 2013; McDonald et al., 2014). It was anticipated that narrowing nursing providers to those who were members of an orthopedic nursing organization would further refine the sampling frame to those who would be most likely to provide pre-operative education prior to TKR.

A comprehensive list of all members of NAON was used to determine potential participants, and this list was further condensed by eliminating individuals who identified pediatrics (rather than adults) as their practice area, as well as eliminating individuals who identified themselves as being retired on their NAON profile.

Additionally, individuals who identified as practicing outside of the United States were also eliminated leaving a total of 3,955 members. NAON compiled the final list allowing participants to remain anonymous to the researchers. For individuals who completed the survey, participants were asked to self-identify as potential participants if they were interested in completing a phone interview.

NAON permitted broad access to members for completing the survey in online format through email rental. Online surveys are more efficient and permit data to be collected in a format that is ready for data analysis (Dillman et al., 2014). Additionally, approximately 89% of adults in the United States use the internet indicating that most potential participants would have the access and ability to complete an online survey (Pew Research Center, 2018). Other national organizations, such as the American Physical Therapy Association (APTA) and American Occupational Therapy Association (AOTA) do not allow access to their members' email addresses for commercial use including research, and would have required mailed surveys instead of online format as planned for this study. Additionally, no comprehensive database of facilities or providers who participate in pre-operative education for TKR exists to the author's knowledge; thus, it was necessary to recruit through an organization that would be most likely to have members who provide education prior to TKR surgery.

Potential participants were contacted directly via email from the NAON (see Appendix F). The email list was maintained by the NAON, and the researchers did not have access to members' names or contact information. The recruitment email was developed by the primary researcher and included a description of the study, contact information for the primary researcher, information regarding informed consent, and a

link to complete the survey. Text instruction at the beginning of the online survey stated that completion of the survey was considered as providing informed consent. For individuals who completed the survey, participants were asked to provide their contact information for further recruitment to the second portion of the study if they wanted to be contacted for a phone interview. The first round of email recruitment was sent on November 14, 2017 and a total of 296 individuals responded to this initial recruitment invitation.

Following the initial mailing, NAON requested additional information to be included in the recruitment email. As requested and with IRB approval, revisions were made to add more information about the following: the primary researcher, how the research data would be used, how confidentiality and anonymity would be maintained, where the data would be stored for security, and any conflicts of interest. This change to the recruitment email was submitted to the IRB at EKU and approved as a revision on December 18, 2017. Due to the holidays and the NAON Research Committee's meeting schedule, the second round of email recruitment was not approved until January 2018 and was sent to potential participants on January 31, 2018. There were 174 additional participants who responded to the survey during this round of recruitment. The third and final recruitment request was sent on February 15, 2018 with 129 additional participants completing the survey at that time for a total of 599 respondents combined from all three recruitment email requests

Participants for the qualitative portion of the study were selected from the survey sample. More than half of participants (263) indicated on the survey they would be willing to consider participating in a telephone interview with the primary

investigator. This list of potential interview participants was separated into groups according to the national regions (West, Midwest, Northeast, and South) identified by the United States Census Bureau (n.d.). For each region, participants were further divided by years of experience providing pre-operative education for TKR surgery into the following three groups: 1) less than 1 year and up to 2 years, 2) more than 2 years and up to 10 years, and 3) more than 10 years. Within each group, participants were ordered by their survey ID number (determined by order of completing the survey). A random number generator was used to select one individual from each of these three groups to contact for recruitment from all four regions of the United States who had varying levels of experience providing pre-operative education. This process of participant recruitment continued until data saturation was achieved with no new themes emerging from participants. The last participant was purposively selected because they were a recent respondent who had completed the survey in full and they were from the West region, which had previously only included one individual who had completed an interview, to ensure that at least two participants participated from each region. This participant also had a different number of years of experience providing pre-operative education than the other participant from the West region to seek diverse experiences. Participants were asked to provide verbal confirmation of informed consent and willingness to participate via telephone before beginning the interview. Data saturation was achieved with the eighth participant, and two additional providers were recruited and completed an interview to confirm the study's themes for a total of 10 participants.

Participants

Participants were orthopedic nurses who were currently practicing in the United States. Participants also had to currently provide pre-operative education for patients prior to TKR surgery. Because NAON was utilized to distribute the email recruitment invitation, participants had to be a current member of the organization to take part in the study. Individuals were excluded from participation in the study if they were not members of NAON or if they were not currently practicing in the nursing field. Individuals were also excluded if they did not provide pre-operative education prior to TKR surgery or if they provided pre-operative education in another country rather than inside the United States.

Data Collection

Quantitative data. Survey questions were uploaded to the Research Electronic Data Capture (REDCap), which is a secure system that supports web-based data collection for research studies that is accessed through a university affiliation (Harris et al., 2009). Web-based surveys permit responses to be gathered from a large number of participants in a relatively short timeframe, and with lower cost than other forms of data collection (Dillman, Smyth, & Christian, 2014). Online surveys also make it easier to employ skip logic, meaning that questions available or unavailable to participants for completion can be based on their previous responses, which is more difficult to implement accurately for paper surveys (Guo, Kopec, Cibere, & Goldsmith, 2016). The primary investigator sent the email recruitment letter and link to the survey to the NAON, and the organization distributed these to the individuals on the email list for the study. The first question on the survey asked: Are you currently practicing as a nurse

within the United States? This question item was intended to prevent individuals who were not being targeted for the survey from completing the questionnaire. Potential participants were also advised in the email recruitment script to avoid forwarding the survey link to others. Through the email recruitment letter and instructions at the top of the electronic survey, participants were advised that participation was voluntary and could be stopped at any time. Results from the survey were used to guide the qualitative portion of the study.

Data collection instrument. The survey that was administered in this study was developed by the primary researcher based on a thorough review of the literature to determine what was known about common topics and other aspects regarding the structure of pre-operative education. The primary researcher also reviewed three pre-operative education programs in Lexington, Kentucky, and either attended the program or met with the primary educator from each of these programs to gather information about the program structure at these facilities. Additionally, this survey was reviewed by the co-investigators of this study and was piloted with seven health care providers as described in Chapter four. Revisions were made to the survey based on participant feedback and responses on the pilot survey. The survey consisted of 26 items total and included questions regarding demographics, current design of pre-operative education, and the optimal design of pre-operative education (see Appendix G). Demographics included items regarding experience in the nursing field, level of education, what state in which the participant practices as a nurse, years of experience providing pre-operative education for TKR, and other diagnoses for which the participant provides pre-operative education. When asked about the structure of their program, participants

were asked to provide information such as the content covered, educational delivery methods, and timing of the education such as length and number of sessions. Participants were then asked to respond to question items to identify what they would consider to be the optimal program design in these areas. Additionally, participants were asked at the end of the survey if they would be willing to consider participation in a short phone interview, and were asked to provide contact information if they were interested in further participating in the study.

Qualitative data. After interested participants were determined through the previously identified recruitment procedures for the telephone interview portion of the study, the primary investigator contacted potential participants via telephone to verbally explain the research study in detail and ask if participants would still be interested in completing a phone interview. If so, the researcher scheduled a future time to conduct the interview unless the participant wanted to go ahead and begin the interview at that time. When participants were not reached directly, the researcher left a voicemail and provided her contact information. The investigator verbally sought informed consent from all participants before beginning each interview. Participants were advised that participation was voluntary and could be stopped at any time. Verbal agreement was considered to indicate voluntary participation for the second portion of the study. Recruitment continued from those who identified interest in the interview on the survey until data saturation was reached.

Participants completed a semi-structured interview with the occupational therapy researcher. This interview began with a simple request: Please describe the current pre-operative education program at your facility for TKR. The researcher asked

follow-up questions as needed based on participants' responses to gain appropriate information regarding their perceptions of pre-operative education and followed an interview guide (see Appendix H). The interview guide consisted of 12 questions total that asked participants to describe their facility's pre-operative education program in detail and provide information about their perceptions of both the current program design and what they perceived to be the ideal design for pre-operative education prior to TKR. The interviews ranged from approximately 25 to 60 minutes per participant, with an average of 45 minutes. Interviews were recorded and transcribed verbatim to permit analysis of common themes. Data collection and analysis were concurrent, and the researcher utilized knowledge gained from previous interviews to guide interviews with subsequent informants.

Data Analysis

Quantitative data was analyzed using SPSS (Version 24) and through using the "Data Exports, Reports, and Stats" feature from REDCap. Descriptive statistics were used for data analysis to determine frequency and percentages for any closed ended responses on the survey, while open-ended survey responses (such as "other" answer options) were collated from all participants. Qualitative data was analyzed through thematic analysis of the interview transcriptions to identify significant meaning statements that were then organized into shared themes among participants. Data collection and analysis were concurrent, meaning that the researcher began analysis of interview transcripts while still continuing to collect data through additional interviews. Each transcript was read through completely to obtain initial research impressions from the data. Non-repeating significant meaning statements were then recorded without a

hierarchy to reflect the range of participants' experiences through Moustakas' horizonalization process (Moustakas, 1994). Significant statements were further labeled as formulated meanings, clustered into intitial themes, and further refined into the final study themes that emerged from participants' words and experiences (Creswell, 2013).

Rigor

The survey for the quantitative portion of this research was developed based on a review of three pre-operative education programs in Kentucky, literature review, expert review from a PhD doctoral advisory committee, and pilot testing. The primary researcher either attended an education session or met with the lead provider and also reviewed education materials from the course. The survey was pilot tested on a previous sample of seven health care providers that included nurses, physical therapists, and occupational therapists. Pilot testing is an important step to ensure validity of the survey instrument (Creswell, 2014). Participants were asked to provide feedback regarding the design of the survey such as any questions that were confusing, any additional questions or answer options they felt should be added to the survey, as well as any other feedback they had regarding the structure and content. Only one respondent provided feedback about the design of the survey. This individual stated that they were unsure if the educational topic items related to self-care, functional mobility, and ADLs were referring to pre-surgical education about functioning in these areas pre-operatively or post-operatively. The survey was revised to clarify that these answer options related to pre-operative education about these topics for the post-operative phase. This respondent also reported that the length of the survey was appropriate.

Based on participants' "other" responses on survey items, additional answer choices were added to three questions on the survey. For the question regarding additional providers, the following answer options were created: pain management, home health care, and hospital concierge. For the question regarding topics covered currently in pre-operative education, details of the surgical procedure and nutrition (such as increased protein and fiber intake) were both added as answer choices. PowerPoint and client demonstration/ teach back were also added as options for the survey item about current educational delivery methods. Because one participant recommended to provide pre-operative education separately for TKR patients rather than together with THR patients, a question was added to the revised survey to determine if educational programs include multiple diagnoses or only TKR patients. An item was also added to the survey to determine the location of the facilities where participants work to demonstrate the geographic representativeness of the survey responses. Another change was made to the survey question regarding additional providers currently involved in pre-operative education. This item was altered to ask respondents to identify all members of the health care team who were involved in education prior to surgery, including the participant. On the pilot survey, this question was intended to identify providers besides the participant who provided education before TKR surgery. Based on participants' answers on this item, respondents may have been unclear regarding whether or not to include their own discipline in their response. By asking respondents to identify all members of the health care team, including themselves, this ensures that all participants on this current survey will have a similar understanding when responding to this question.

Additionally, the survey portion of the study was guided by the tailored design method (Dillman, Smyth, & Christian, 2014). The tailored design method includes customizing the design of the survey as well as research procedures based on a variety of factors such as: topic, survey sponsor, types of individuals who will be recruited for the survey, available resources, and timeframe for survey completion (Dillman et al., 2014). For example, the survey recruitment was sent to potential participants through an official NAON email address as a legitimate organization that members would recognize. The survey used simple language that was easy to understand to avoid complexity and only required approximately 10 minutes to complete which reduced burden for participants. Including an active link to the online survey that respondents could simply click to enter made it convenient for completion. These approaches reduce survey error and can also increase response rate by improving motivation for participants to complete the survey (Dillman et al., 2014).

Multiple methods were implemented to ensure trustworthiness of the qualitative research included in this study, as recommended by experts (Malterud, 2001; Morse, 2015; Shenton, 2004). A portion of the study population (three participants) who agreed to participate in member checking were contacted by telephone for a short follow-up interview in the weeks following their initial study participation to verify the meanings derived from their interview transcript and to provide any additional insights (Creswell, 2013). All three participants confirmed the study themes and overall findings from the research, but did not provide any new or additional data for the study. Peer debriefing between the researcher and an expert qualitative investigator was conducted to confirm the study's themes, sub-themes, and overall essence of the data (Shenton, 2004). An

audit trail was maintained to record all steps of the data analysis process (Creswell, 2013). The original transcripts, significant statements separated by individual participants, combined significant statements, initial meaning units, beginning themes, and final study theme documents are maintained and stored by the researcher. This audit trail allowed the primary researcher to continually return to the data at all phases to ensure a complete and accurate analysis process. Triangulation was also used to compare themes from the interview transcripts to survey responses for the question related to additional alterations that participants wanted to make to their facility's program. Using these multiple sources of evidence strengthen the results of the study (Creswell, 2013). Additionally, rich, thick description was used to describe interview participants and their clinical settings. These descriptions allow readers to determine if the research can be generalized to their own clinical setting.

Researcher reflexivity was also essential to maintain trustworthiness of this study. Bracketing, the process of setting aside one's biases (Tufford & Newman, 2012), was used via a reflexive journal maintained by the researcher throughout the study. Bracketing was used prior to beginning the study to identify any experiences and perceptions of the primary researcher related to the research topic in order to limit their impact on the results (Creswell, 2013; Tufford & Newman, 2012). Examples of these experiences identified by the researcher included providing care to patients after TKR surgery as an occupational therapist, and perceiving that occupational therapy would be an important member to add to the pre-operative education team. The researcher considered these factors when designing survey and interview questions. Bracketing continued throughout the study, such as when interacting with interview participants,

and when analyzing the data to ensure that questions were objective as well as that themes emerged from the participants' own words and perceptions rather than that of the researcher.

Results

Survey Findings

Response rate. Out of 3,955 individuals contacted for participation in this survey, 600 responded, by opening the survey, completing a portion of the survey, or completing the entire survey. One person entered and submitted the survey, but did not complete any question items, so they were not included in the sample size for calculating response percentages. Eight individuals were excluded from further participation on the survey after the first question item where they indicated that they were not currently practicing as a nurse within the United States. This resulted in 591 participants who completed additional survey questions for a 15% response rate. Reports for survey response rates vary in the literature, but a recent 2016 study examining multiple modes of survey delivery found an overall response rate of 27.9% with general web-based survey response rates at 17.1% (Guo et al., 2016).

Participant demographics. The vast majority of participants had been working in the nursing field for more than 10 years (488; 82.6%), followed by more than five years and up to 10 (65; 11.0%), more than two years and up to five (35; 5.9%), and one to two years (3; 0.5%). There were no participants who had been in the nursing field for less than one year. The majority of respondents had obtained a bachelor's degree as their highest level of education (276; 46.7%), followed by a master's degree (200; 33.8%) and associate's degree (91; 15.4%). Few individuals had completed a clinical

doctorate (5; 0.8%) or research doctorate (1; 0.2%). Two individuals did not respond to this question item, however, percentages were calculated out of the 591 respondents who were eligible to complete this question to provide a more accurate reflection of the proportion of levels of education among the study sample. Sixteen individuals responded "other" to this question item, and responses included: orthopaedic nursing certification (ONC, 2; 0.3%), nursing diploma (8, 1.4%), licensed vocational nurse (LVN, 1; 0.02%), DNP (doctorate of nursing practice, 1; 0.02%), and Juris Doctorate (1; 0.2%). Three participants who selected "other" did not complete the open-ended question item that followed to describe their education level. Participants represented 44 states of primary regions of practice for the 586 nurses who completed this question item, and there were no respondents who indicated the following as their primary state of practice: Vermont, Montana, Nevada, North Dakota, Oklahoma, and West Virginia.

Pre-operative education. Out of of the 591 participants, 469 (79.4%) indicated they currently provided pre-operative education for TKR, and 122 (20.6%) indicated they did not. Answering yes to this survey question permitted participants to complete the remainder of the survey, as this was the intended sample. The remaining percentages of responses on survey items are calculated out of 469 participants to reflect the number of respondents who continued survey participation, even if some individuals skipped an individual survey item, to more accurately reflect the proportion of characteristics among providers and their facilities. This provision will also prevent the results from overestimating the prevalance of responses among the participants who completed the remainder of the survey. These 469 individuals included 79% of the

participants who were currently practicing nurses in the United States and comprised 12% of the original orthopedic nurses (3,955) contacted for survey participation.

The majority of respondents provided pre-operative education for other diagnoses in addition to TKR which included: THR (460; 98.1%), total shoulder replacement (174; 37.1%), rotator cuff repair (64; 14.1%), and back surgery (134; 28.6%). Thirty-nine participants (8.3%) selected the "other conditions" response option, and the following additional orthopedic surgeries were identified: partial knee replacement; total joint replacement of the shoulder, elbow, and ankle; reverse total shoulder replacement; complex joint reconstruction; surgery of the neck, hand, elbow, foot, and ankle; arthroscopy of the knee and shoulder; hip resurfacing; fracture repair; carpal tunnel release surgery; anterior cruciate ligament (ACL) repair surgery; and Bankart lesion repair surgery (following shoulder dislocation and labral tear at the shoulder). Two participants (0.4%) responded by stating they provided pre-operative education before all orthopedic surgeries. Only three participants (0.6%) provided pre-operative education solely for patients who were undergoing TKR surgery. Most respondents had been involved in pre-operative education for TKR for more than 10 years (169; 36.0%), followed by greater than five and up to 10 years (115; 24.5%), and greater than two up to five years (105; 22.4%). Fewer participants had been involved between one and two years (57; 12.2%) or less than one year (23; 4.9%).

Current program design.

Heath care providers. There were 396 (84.4%) participants who reported that pre-operative education was delivered as part of an interprofessional team with at least one other provider involved in addition to nursing. Nursing was the most common

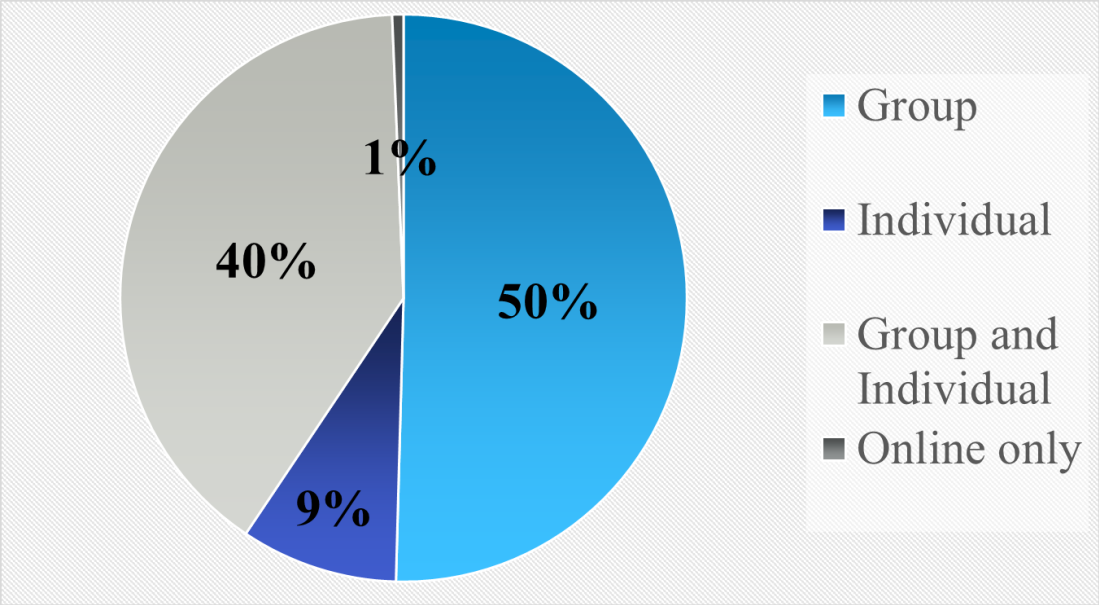
provider involved in pre-operative education (450; 95.9%), followed by physical therapy (387; 82.5%), and occupational therapy (200; 42.6%; see Table 5.1). Sixty participants (12.8%) responded "other" to this question item and identified the following providers through an open-ended response option in order of frequency: pharmacy (15; 3.2%), anesthesia (12; 2.6%), pre-operative services staff (7; 1.5%), physician assistant (6; 1.3%), surgeon (5; 1.1%), physician (4; 0.9%), care coordinator/discharge planner (3; 0.6%), nurse practitioner (3; 0.6%), administration (2; 0.4%), environmental services (2; 0.4%), infection prevention (2; 0.4%), respiratory (2; 0.4%), dietician (1; 0.2%), joint camp (1; 0.2%), nurse educator (1; 0.2%), OR staff (1; 0.2%), speech therapy (1; 0.2%), volunteer program (1; 0.2%), and alternative comfort such as massage therapy (1; 0.2%). Two respondents did not complete this question item. Because only 450 out of 469 participants responded that nursing was involved in pre-operative education, it is possible that some participants only identified providers besides themselves, rather than including all members of the pre-operative education team. Additionally, this may have accounted for some providers whose program was only delivered online and not in-person.

Table 5. 1 Health Care Providers Involved in Pre-operative Education

Health Care Providers	**Respondents** Frequency	**Respondents** Percent
Nursing	450	95.9%
Physical Therapy	387	82.5%
Occupational Therapy	200	42.6%
Case Management	192	40.9%
Social Work	99	21.1%
Home Health Care	75	16.0%
Other	60	12.8%
Pain Management	55	11.7%
Dietetics	34	7.2%
Hospital Concierge	10	2.1%

Pre-operative education program structure. Pre-operative education was most commonly provided in a group format (236; 50.3%). One individual skipped this question item. See Figure 5.1 below for frequency of various program formats across participants.

Figure 5. 1 Current Format of Pre-operative Education



Participants most frequently reported educating patients with planned TKR together with other surgical patients (287; 61.2%), while others educated TKR patients alone (147; 31.3%). For others, this question did not apply because they only provided individual education (24; 5.1%) or only educated patients online (4; 0.9%). Seven participants did not complete this question item. When patients with planned TKR were educated with patients who had other planned surgeries, THR was the most common (283; 98.6% for those who educated diagnoses together, 60.3% of all TKR education participants) followed by total shoulder replacement (61; 21.3% of those who educated diagnoses together, 13.0% of all TKR education participants), rotator cuff repair (8; 2.8% of those who educated diagnoses together, 1.7% of all TKR education participants), and back surgery (15; 5.2% of those who educated diagnoses together, 3.2 % of all TKR education participants). Additional diagnoses were reported by three participants, with unicompartmental knee replacement being identified by one participant (0.3% of those who educated diagnoses together, 0.2 % of all TKR

education participants), while total ankle replacement was identified by 2 respondents (0.7% of those who educated diagnoses together, 0.4 % of all TKR education participants). Three participants who responded that TKR patients were educated together with other diagnoses did not complete this question item.

Educational topics. How to prepare for surgery was most frequently included as an educational topic by participants (466; 99.4%), followed by the recovery process (460; 98.1%). The least commonly included topics were caregiver training (226; 48.2%) and information about the CPM or continuous passive movement machine (115; 24.5%). Other topics identified by respondents that were included in the pre-operative education program at their facility included: signs and symptoms as well as prevention of complications, such as DVT, infection, and falls (57; 12.2%); constipation prevention and bowel regimen (9; 1.9%); discharge and rehab plans after surgery including expectation for discharge to home (8; 1.7%); medication management (6; 1.3%); wound care and dressing changes (6; 1.3%); anesthesia (5; 1.1%); driving and traveling after surgery (5; 1.1%); dental care before surgery (3; 0.6%); and pre-operative testing (2; 0.4%). The following items were identified by one (0.2%) participant each: stem cell treatment, frequently asked questions, new technology such as robotics, returning to work, consertative treatment options, advanced directives, sleep changes after surgery, nausea/vomitting after surgery, importance of hydration post surgery, insurance coverage benefits, use of the incentive spirometer post surgery, chlorhexidine gluconate (CHG) bathing prior to surgery, and managing blood levels following TKR. One participant did not complete this question item. See Table 5.2 for frequency of responses.

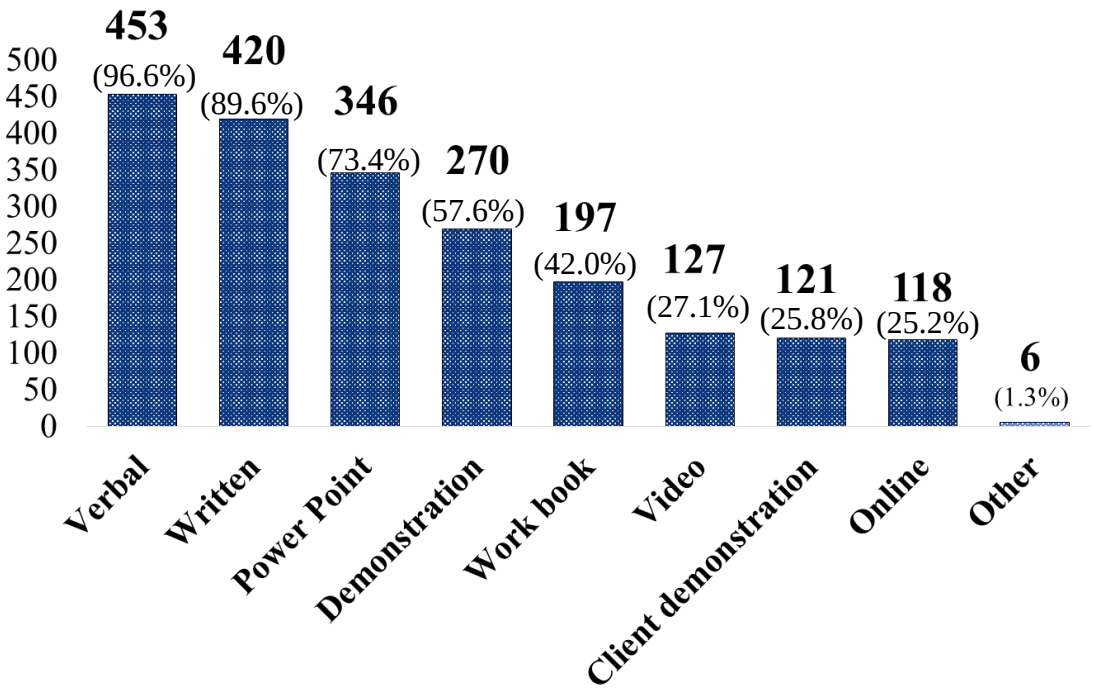
Table 5. 2 Educational Topics Included in Pre-operative Education

Educational Topic	**Respondents** Frequency	**Respondents** Percent
How to prepare for surgery	466	99.4%
The recovery process	460	98.1%
What to expect while in the hospital	458	97.7%
Managing pain	452	96.4%
Exercise before and/or after surgery	423	90.2%
Home safety	418	89.1%
Adaptive equipment	388	82.7%
Self-care (such as dressing, bathing, toileting) for the post-operative phase	375	80.0%
Precautions	370	78.9%
Home modifications	367	78.3%
Functional mobility (such as transfers)	355	75.7%
Expected functional outcomes	312	66.5%
Weight-bearing status	312	66.5%
Nutrition (such as increased protein and fiber intake)	302	64.4%
Details of the surgical procedure	266	56.7%
Edema management	264	56.3%

Table 5. 2 (continued)		
Instrumental activities of daily living (such as completing laundry and caring for the home) for the post-operative phase	245	52.3%
When to resume normal activities at home	237	50.5%
Anatomy of the knee joint	230	49.0%
Caregiver training	226	48.2%
Information about the continuous passive movement machine (CPM)	115	24.5%
Other	52	11.1%

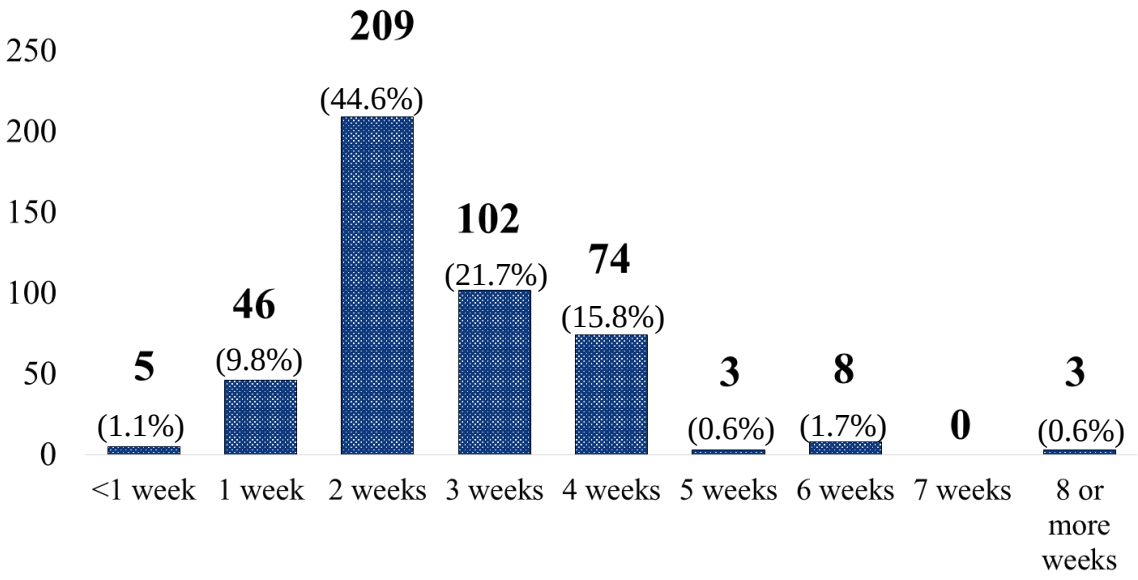
Educational delivery methods. There were 461 (98.3%) participants who used multiple modes of educational delivery, consisting of two or more delivery approaches. Participants identified that verbal instruction was the most common method for delivering pre-operative education (453; 96.6%), followed by written instruction (420; 89.6%). Online education (118; 25.2%) was the least commonly used method to deliver education. While six participants (1.3%) responded "other" for this question item, three answers did not apply to this question, resulting in three additional methods identified: crossword puzzles (1; 0.2%), a recorded DVD of the PowerPoint for those who cannot attend class (1; 0.2%), and Prezi (1; 0.2%). Two participants did not complete this question item. See Figure 5.2 for frequency of responses.

Figure 5. 2 Current Pre-operative Educational Delivery Methods



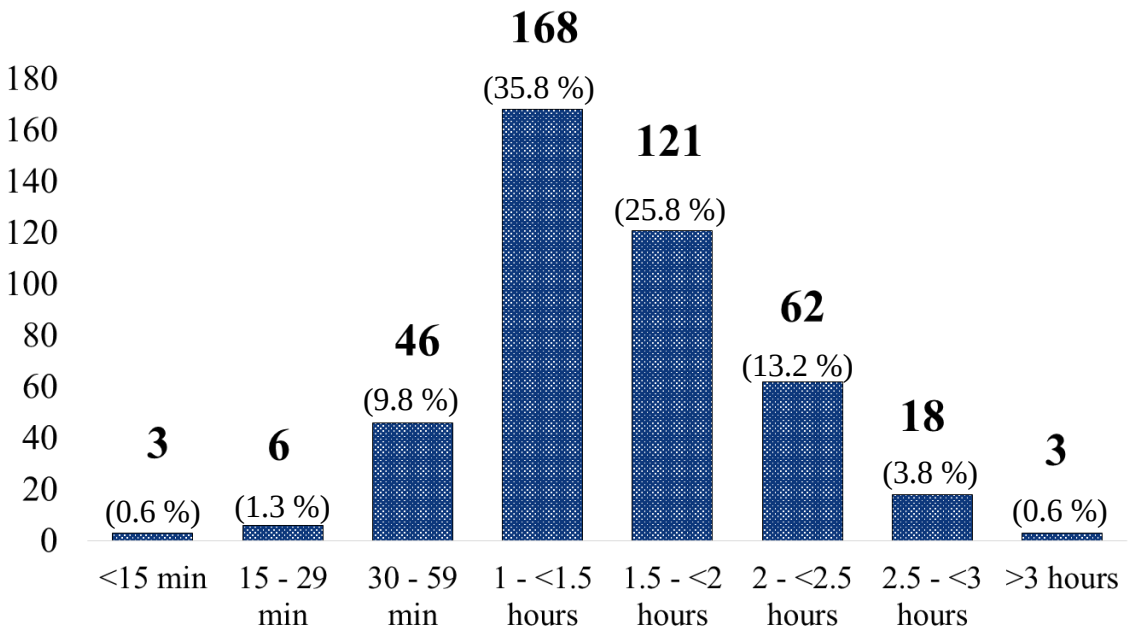
Timing of pre-operative education. There were 431 (91.9%) orthopedic nurses who provided pre-operative education within four weeks prior to scheduled TKR. The majority of respondents provided pre-operative education two weeks before the planned surgery (209; 44.6%). Sessions scheduled closer or farther in advance of the surgery date were less common (See Figure 5.3). Sixteen participants (3.4%) indicated that they were unsure how long before the planned TKR surgery that patients attend the course. Three participants did not complete this question item.

Figure 5. 3 Weeks Education Provided Before Surgery



The majority of participants reported that patients attended one pre-operative education session total (407; 86.8.%). Some reported having patients attend two pre-operative education sessions (25; 5.3%), one participant (0.2%) each reported that patients attended three or four sessions before surgery, and a few (10; 2.1%) reported having patients attend five or more education sessions prior to surgery. Four (0.9%) participants responded not applicable to indicate that education was provided online instead of in-person. Twenty-one participants did not complete this question item. There were 372 (79.3%) participants who reported providing pre-operative education sessions lasting one or more hours. Most participants reported that pre-operative education sessions at their facility lasted one hour to less than 1.5 hours (168; 35.8%). The least frequently reported course lengths were less than 15 minutes (3; 0.6%) or more than 3 hours (3; 0.6%). Forty-two participants did not complete this question item. See Figure 5.4 for frequency of responses.

Figure 5. 4 Current Length of Pre-operative Education



Optimal program design.

Optimal health care providers. There were 260 (55.4%) participants who identified at least one additional provider they wanted to add to the pre-operative education team. Respondents most commonly identified that they would like to add case management as an additional provider to their current pre-operative education team (138; 29.4%), followed by pain management (105; 22.4%). A few participants (19; 4.1%) responded "other" to this question item. Some participants wrote in responses that were already provided for this item as closed-ended answer choices, but new providers that were identified to add to pre-operative education included: anesthesia (4; 0.9%), pharmacy (3; 0.6%), diabetes educator (2; 0.4%), financial planners (2; 0.4%), physician assistant (1; 0.2%), dietician (1; 0.2%), durable medical equipment provider (1; 0.2%), former patients (1; 0.2%), nurse navigator (1; 0.2%), laboratory (1; 0.2%), and enhanced recovery after surgery provider (1; 0.2%). One

respondent (0.2%) answered with "all," which may indicate the desire to add all disciplines who will interact with the patient after surgery to the pre-operative program. While many professionals were identified as important to add to the current pre-operative education team, 157 (33.5%) of respondents felt that they did not need to add any additional providers. Ten participants did not respond to this question item. See Table 5.3 for response frequency.

Table 5. 3 Optimal Providers to Add to Pre-operative Education

Health Care Providers	**Respondents** Frequency	**Respondents** Percent
None	157	33.4%
Case Management	138	29.4%
Pain Management	105	22.4%
Home Health Care	77	16.4%
Social Work	74	15.8%
Dietetics	73	15.6%
Physical Therapy	67	14.3%
Occupational Therapy	61	13.0%
Nursing	30	6.4%
Other	19	4.1%
Hospital Concierge	15	3.2%

Optimal educational topics. When asked what additional topics were not currently included in their pre-operative education program that would be valuable for patients prior to TKR, nutrition was the most commonly desired topic to add (95; 20.3%), followed by caregiver training (68; 14.5%). More than half of participants felt that there were topics that would be beneficial to add to their current pre-operative education program, but 199 (42.4%) did not identify any topics to add to their program. Twelve (2.6%) participants responded that they had "other" additional topics they thought could benefit patients, although three participants did not provide a new content area for education in their response. The additional content areas were each reported by 1 (0.2%) participant each which included: anesthesia, addressing difficulty with sleep, mental health issues, managing constipation after surgery, anticoagulants, driving after surgery, insurance guidelines related to discharge planning, criteria for various discharge settings, and emphasizing home as best plan for discharge. Thirty-five participants did not complete this question item. See Table 5.4 for response frequency.

Table 5. 4 Optimal Educational Topics to Add to Pre-operative Education

Educational Topic	**Respondents** Frequency	**Respondents** Percent
None	199	42.4%
Nutrition (such as increased protein and fiber intake)	95	20.3%
Caregiver training	68	14.5%
Edema management	58	12.4%
Instrumental activities of daily living (such as completing	53	11.3%

laundry and caring for the home) for the post-operative phase		
Table 5. 4 (continued)		
Expected functional outcomes	52	11.1%
When to resume normal activities at home	43	9.2%
Anatomy of the knee joint	38	8.1%
Self-care (such as dressing, bathing, toileting) for the post-operative phase	35	7.5%
Details of the surgical procedure	30	6.4%
Functional mobility (such as transfers)	27	5.8%
Weight-bearing status	26	5.5%
Exercise before and/or after surgery	25	5.3%
Home modifications	24	5.1%
Home safety	21	4.5%
Adaptive equipment	20	4.3%
The recovery process	17	3.6%
Managing pain	16	3.4%
Other	12	2.6%
How to prepare for surgery	10	2.1%
What to expect while in the hospital	9	1.9%
Precautions	8	1.7%

Optimal educational delivery methods. Respondents most frequently identified that they would like to add online education as an additional delivery method for their pre-operative class (222; 47.3%). Video (137; 29.2%) and client demonstration or the teach back method (104; 22.2%) were also commonly identified. The following other methods were also reported by respondents to add to their current program design: workbook (48; 10.2%), health care provider demonstration (22; 4.7%), verbal instruction (12; 2.6%), and written instruction (11; 2.3%). Some respondents (12; 2.6%) identified additional delivery methods for pre-operative education that they would like to add which included the following: PowerPoint (3; 0.6%), web-based apps such as for iPads (3; 0.6%), Telemedicine (2; 0.4%), pre-rehabilitation (1; 0.2%), and follow-up phone calls (1; 0.2%). Several respondents reported that they would not recommend adding any additional educational delivery methods to their educational program (103; 22.0%). However, there were 349 (74.4%) participants who wanted to add at least one additional delivery method to their current program. Seventeen participants did not complete this question item.

Optimal pre-operative education program structure. Participants were almost evenly split regarding their preference for educating patients with planned TKR separately from other diagnoses (233; 49.7.%), or together with patients who were scheduled to have other surgeries such as THR (222; 47.3%). Fourteen participants did not complete this question item. The majority of participants preferred educating patients with planned TKR in either group format (178; 38.0%) or in a combination of group and individual education (253; 53.9%) which was most commonly reported. Thirty (6.4%) participants preferred individual only and six (1.3%) felt that online

education was the optimal design for pre-operative education. Two individuals did not complete this question item.

Optimal timing of pre-operative education. The majority of participants felt that the ideal pre-operative education course should be provided within four weeks prior to the planned surgery (435; 92.8%). Participants most commonly identified that having patients attend pre-operative education two weeks before surgery was ideal (192; 40.9%), followed by four weeks (113; 24.1%), three weeks (89; 19.0%), and one week (41; 8.7%). No-one selected five, or seven weeks as ideal and few respondents identifed 6 weeks (19; 4.1%), less than one week (4; 0.9%), or eight or more weeks (6; 1.3%) as the optimal timeframe before surgery to attend pre-operative education. Five participants did not complete this question item. The majority of participants felt that attending one session before surgery was ideal (372; 79.3%), followed by attending two sessions (82; 17.5%) or three (6; 1.3%). No respondents selected four sessions, but one (0.2%) individual recommended five or more pre-operative sesssions and another recommended that participants only have online sessions and no in-person education. Only 89 (19.0%) participants expressed that attending more than one education session prior to surgery was optimal. Seven individuals did not complete this question item. Most participants indicated that having education sessions last between one hour and less than 1.5 hours was ideal (189; 40.3%), followed by 1.5 hours to less than two hours (121; 25.8%) and then 30 minutes to less than one hour (84; 17.9%). Shorter or longer session lengths were less commonly identified as being optimal timeframes for pre-operative education: less than 15 minutes (3; 0.6%), 15 minutes to less than 30 minutes (9; 1.9%), 2 hours to less than 2.5 hours (41; 8.7%), 2.5 hours to less than 3 hours (11;

2.3%), and more than 3 hours (1; 0.2%). Most participants (363; 77.4%) reported that ideal pre-operative education would last one hour or longer. Ten participants did not complete this question item.

Additional alterations desired for pre-operative education. Several (161; 34.3%) respondents identified additional alterations they would like to implement to their current pre-operative education program. Due to diversity of responses, these could not all be collated for frequency. These responses included changes such as adding additional providers to the education program, combining preadmission testing and education into one day, making the class mandatory, offering more course education time slots, adding Telemedicine/online education, and including family and caregivers in the education program. See Appendix I for all additional alteration responses from participants in their own words.

Telephone interview participation. The last question item on the suvey asked participants to indicate whether or not they would consider participating in a telephone interview at a later date. More than half responded yes (263; 56.1%) and 194 (41.4%) responded no. Twelve participants did not respond to this question item. Of the 263 participants who indicated considering further participation in the study, 260 entered their phone numbers on a follow-up question to allow the researcher to contact them if they were selected for the qualitative portion of the study.

Qualitative Findings

Ten participants completed qualitative interviews, 1 male and 9 females, which is similar to the percentage of male nurses (9.6%) nationally in the United States (United States Census Bureau, 2013). Participants ranged from less than one year of

experience providing pre-operative education before TKR surgery to more than 10 years. All participants had five or more years of experience working in the nursing field. Orthopedic nurses from all regions of the United States were included in the qualitative portion of this study. The following states were represented by participants: Florida, Illinois, New Jersey, North Carolia, Michigan, Mississippi, Missouri, Oregon, Pennsylvania, and Idaho. See Table 5.5 for a description of participants, listed in the order they were interviewed.

Table 5. 5 Description of Interview Participants

ID	Sex	Region	Level of Education	Years in Nursing	Years in Pre-operative Education
1	Female	Northeast	Bachelor's Degree	More than 10 years	>2 years to 5 years
2	Female	Northeast	Bachelor's Degree	More than 10 years	Less than 1 year
3	Female	South	Master's Degree	More than 10 years	1 year to 2 years
4	Female	Midwest	Master's Degree	More than 10 years	>5 years to 10 years
5	Male	West	Associate Degree	More than 10 years	More than 10 years
6	Female	Midwest	Diploma	More than 10 years	More than 10 years
7	Female	Midwest	Master's Degree	>5 years to 10 years	1 year to 2 years
8	Female	South	Bachelor's Degree	>5 years to 10 years	>5 years to 10 years
9	Female	South	Bachelor's Degree	More than 10 years	>2 years to 5 years
10	Female	West	Bachelor's Degree	>5 years to 10 years	>5 years to 10 years

All participants except one provided education in conjunction with a hospital setting, while one participant's facility was an orthopedic ambulatory surgery center. All pre-operative education programs included interprofessional components, and the majority involved multiple providers delivering education directly to patients. For facilities where only nursing provided the education pre-operatively, these programs included materials developed by multiple disciplines even if they could not attend the class, or other providers were included for different aspects of the program such as pre-admission testing. Further descriptions of participants' education programs are provided in Table 5.6.

Data analyis progressed from the minutes of interview recordings to the pages of transcripts, significant meaning statements, meaning units, early study themes, and to the final study themes. This progression is presented below in Figure 5.5.

Figure 5. 5 Qualitative Analysis Progression

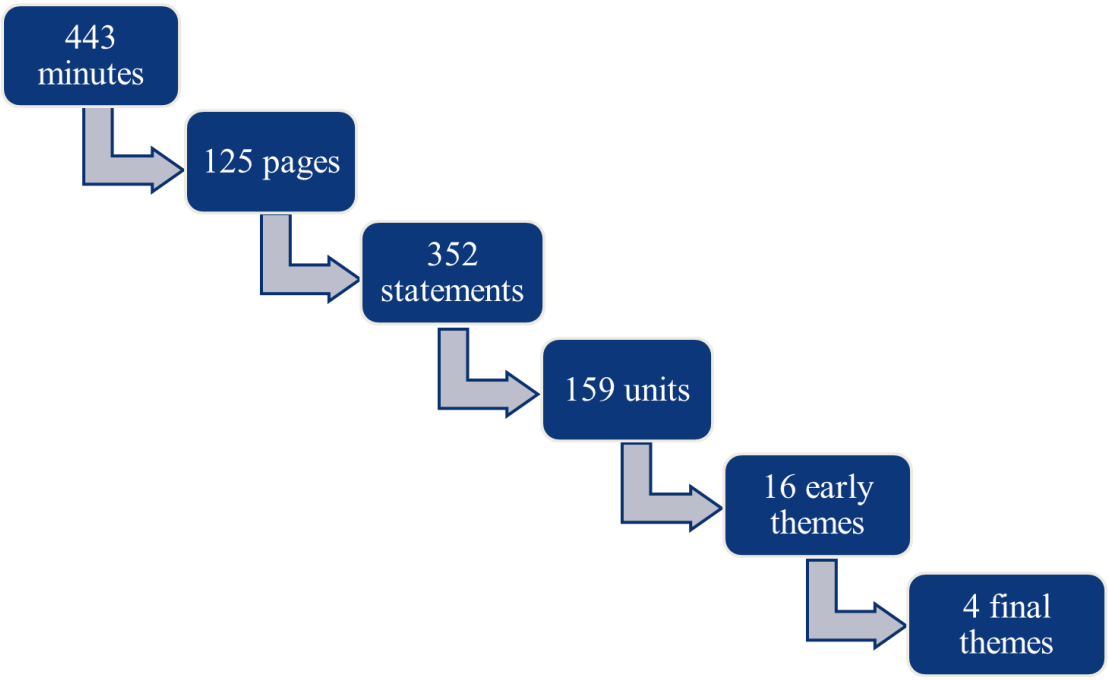


Table 5. 6 Description of Participants' Pre-operative Education Program

ID	Setting	Weeks Before Surgery	Number of Sessions	Length of Session	Format
1	Hospital	1 week	1 session	1 hour to less than 1.5 hours	Individual
2	Hospital	4 weeks	1 session	1.5 hours to less than 2 hours	Group
3	Hospital	2 weeks	1 session	1 hour to less than 1.5 hours	Individual
4	Hospital	3 weeks	1 session	1 hour to less than 1.5 hours	Group
5	Hospital	1 week	1 session	1.5 hours to less than 2 hours	Group
6	Hospital	3 weeks	1 session	1.5 hours to less than 2 hours	Group and individual
7	Hospital	2 weeks	1 session	1 hour to less than 1.5 hours	Group and individual
8	Hospital	2 weeks	1 session	2 hours to less than 2.5 hours	Group
9	Orthopedic Ambulatory Surgery Center	2 weeks	1 session	30 minutes to less than 1 hour	Individual
10	Hospital	2 weeks	1 session	1.5 hours to less than 2 hours	Group and individual

Four themes emerged from the data: knowledge is power for patients and providers; education should be consistent, individualized, and evidence-based; interprofessional practice is important but is limited by barriers; and the structure of pre-operative education is guided by pragmatic considerations. Themes and sub-themes are presented below in Table 5.7. These themes are presented in detail in the sections that follow with verbatim quotes from participants' interview transcripts.

Table 5. 7 Qualitative Themes

1) Knowledge is Power for Patients and Providers	• Pre-operative Education Is Highly Valued and Has Many Positive Benefits • Providers Need Proper Training to Provide Pre-operative Education
2) Education Should be Consistent, Individualized, and Evidence-Based	• Education Must be Consistent From Pre-operative to Post-operative Care • Pre-operative Education Should be Individualized to Each Patient's Needs • Pre-operative Education Requires Continuous Quality Improvement Based on Evidence
3) Interprofessional Practice Is Important but is Limited by Barriers	
4) The Structure of Pre-operative Education is Guided by Pragmatic Considerations	

Theme 1: Knowledge is power for patients and providers. Participants expressed the importance of education for both patients and the individuals providing this education. Overwhelmingly, all orthopedic nurses who completed qualitative interviews believed that pre-operative education resulted in positive outcomes for patients and that this education was highly valuable. Participants also perceived that education providers needed to have the right training and experience themselves to

provide effective education for their patients prior to surgery. The quote below from Participant 3 expresses this overall theme:

> I have been able to get a lot of feedback from the doctors, you know, the patients themselves. And then even the hospital where we do our joint replacements, some of the case workers and that type thing talk about how well prepared our patients are, so that's been a good feeling to know that our patients are going in with the knowledge. And I just think it is the knowledge factor. Every little thing that you know about something that's going to be done to you makes all the difference in the world, in your rehab, in your mental and your physical well-being after surgery.

Pre-operative education is highly valued and has many positive benefits.

Participants expressed many positive benefits of attending pre-operative education prior to TKR surgery. Nurses reported that those who attended the class pre-operatively were better prepared for their hospital stay. Participant 8 expressed: "Before it was mandatory, I could walk in a room and tell you if somebody had done the class or not done the class. Therapy would say oh, my gosh. They didn't even bring clothes with them." Patients who attended pre-operative education were also perceived to have more accurate expecations and were more prepared for what to expect in the post-operative phase. Participant 6 said: "And if you ask any of the nurses on the floor, they think that the people who come to the class do better afterwards. Because they know, they have expectations, how long they're gonna be there, that they're gonna have some pain, things to do to reduce that other than narcotics. Because we talk about ice, we talk about all kinds of different things." Participant 5 expressed similar perceptions that nursing and other staff, such as therapists, can tell which patients attended class and those who did not: "The nurses and for sure the therapists, would definitely know the difference between someone that had come to class and someone who didn't come to class. Just because of how prepared they felt, or unprepared they were, or, I didn't know

I was supposed to get up today, you know that kind of thing, because they didn't come to class." Participants discussed that patients also had more accurate perceptions regarding other aspects of the post-surgical phase, such as expected discharge to home, due to attending pre-operative education. The facility where Participant 4 worked had experienced a 15% decline in skilled nursing facility usage post-surgery in the past year after taking additional steps during one-on-one sessions with patients pre-operatively to help better plan for discharge to home. Overall, respondents reported that patients were highly satisfied with pre-operative education. Participant 1 expressed this by stating:

> When they walk out, my question is was this helpful. They say absolutely, I am so glad I came to this class. In fact when we had our first joint commission survey, and the surveyor went in and she spoke to the patients, she came and said "Wow," I just interviewed two people who absolutely raved about this pre-op teaching class.

In addition to more accurate expectations, orthopedic nurses also saw improvements in both physical and mental performance in the pre-operative and post-operative phase for those who attended pre-operative education. Participant 2 stated that: "A lot of the patients who have gone to class and who have actively participated in the suggestions, they seem like they don't need as much rehab postop in order to return to a better physical condition." This same participant felt that patients who attended education prior to surgery were more involved and invested in their rehabilitation post surgery. Participant 4 had noticed improvements in upper body strength for those who attended pre-surgical education classes, as upper extremity exercise was an included component of the education program at her facility. Another perceived outcome of pre-operative education was improved nutrition and weight loss for some patients prior to surgery:

> We have the dietician and therapist talk to the patient and we've had some patients who have actually managed to lose some weight before therapy or who have actually managed to improve their health before they come in for surgery because of the information that they received during class. It benefits them postop because they're in better physical condition and they seem to recover better and they rehab faster. **Participant 2**

Additionally, patients were also able to get any important questions answered prior to surgery. Participant 4 expressed that this makes "the patient even more happy to hear that they've got their question answered, they've gotten everything taken care of and it was addressed."

Another benefit of pre-operative education that was observed by participants included lower rates of post-surgical complications. Participant 4 had implemented a research study at her facility as a requirement for a graduate degree and found fewer negative outcomes following surgery, with emergency room visits reflecting a statistically significant difference between those who attended education prior to surgery and those who did not. Other complications were also lower for patients who attended pre-operative education, but did not achieve statistical significance:

> My study was over a 6 month period of time. But in my field study, it was statistical significance for patients that went to class and had less emergency room visits. It was the only one that was statistically significant. All the other ones were definitely lower. I looked at complications of blood clots, readmissions, emergency room visits…and infection, that's a big one. But definitely the patients who went to class had lower incidences of the bad outcomes compared to those who didn't go to class. **Participant 4**

Participant 3 also reported lower rates of wound infections among her patients, which she attributed to attending pre-operative education classes. She stated "I do a wound complication section, just things to report to me, you know like a fever, a sudden onset of a fever, an incision that doesn't look good around the redness… So that has really kept our infection rate down, you know, postop infections. So knock on wood, but I

can't tell you the last time we had one." While physical therapy also monitored wound healing after surgery, the participant still felt that pre-operative education was a contributing factor in these low rates of post-surgical infections.

Because of the many perceived benefits of pre-operative education, this intervention was highly valued by all participants and respondents expressed that they enjoyed providing this education. Participant 4 stated "It definitely gives me a warm fuzzy feeling to know that I've been able to help people, and I guess that's why we go into nursing is because we want to help people. To know that you're being helpful and that you're bringing down some of their anxiety and answer their questions." When asked about the importance of pre-operative education, Participant 6 expressed: "I am an extreme advocate of that. I think that it has really made a difference in the outcomes." Participant 8 even stated:

> I make less money than I ever have when you figure out my salary and how many hours I work. But at the end of the day, it's not the money. It's seeing our outcomes and seeing how good they are. Every year I do a NAON poster presentation, because I feel like, we're a small little community hospital in the middle of the state of Florida and all these other posters are teaching institutions where they're doing 3,000 joints a year and we're doing like 5 or 600. Which is actually a lot of surgeries for four surgeons.

All participants acknowledged the many benefits of pre-operative education, and their passion for providing this education prior to TKR surgery in their nursing role.

Providers need the proper training to provide pre-operative education. All participants expressed different ways that they had prepared to fulfill their role as a provider of pre-operative education. This preparation included both formal and informal training and education. Several participants prepared for their educator role through observation, such as learning from other pre-operative education programs.

Participant 7 stated "When I started in this role I actually didn't meet the outgoing navigator. She had left a few months before I started. So I reached out to another hospital in the area and talked to their ortho navigator and went to their class and that was actually really helpful to see what her packet looked like and the flow that she had done." For those who were transitioning into this role while the previous educator was still present, participants observed the pre-operative education class several times before leading it themselves. Some participants also observed various disciplines within their own facility to gain a better understanding of the surgical and rehabilitation process:

> Before I became involved in that program, we actually went through a fairly intensive training and we went through each part. I had to spend time with physical therapy. I actually observed several of the surgeries. I spent time on the nursing unit, I went to physical therapy. So, we were physically involved in each of these pieces before we put that together so that we had real experience to talk about. **Participant 2**

Participants expressed that they were more comfortable educating patients about topics and equipment they had personally observed and experienced themselves. Orthopedic nurses also found online resources from other facilities to be helpful tools to prepare for teaching pre-operative education courses. Participant 7 "looked online for what other hospitals are doing for education just to make sure that [she] was covering the high points."

In addition to this more informal training, several participants had also completed additional academic preparation and certifications. Multiple participants had trained as clinical nurse leaders, orthopedic nurse navigators, had obtained the orthopaedic nurse certified (ONC) credential, or had completed a graduate program such as a Master's degree in education. Some respondents had previously held other

education roles, such as a unit based educator, before switching to pre-operative education. Participants felt that these additional credentials and education had further prepared them to transition into their teaching role. One participant had unique experience working previously as an occupational therapy assistant for 18 years prior to becoming a registered nurse. Participant 8 found this previous career experience to be invaluable for her current teaching role:

> I think that the biggest thing for me that has been helpful is seeing perspectives from a therapist side and seeing this perspective from the nursing side. I'm a big believer that I have to understand where somebody comes from and where they're going to make it all make sense. So I have worked in every setting as a therapist so that I could understand what my role was where I was working. I try to transition that into our program.

While many participants had trained either formally or informally to prepare to provide pre-operative education, practice experience in orthopedics was considered by many respondents to be most important. Participant 5 described the importance of having the right individuals who were well prepared to provide pre-operative education:

> I would especially want somebody that has worked with the patients in our program, maybe was even involved in some of the therapy aspects of the program too so that if they have certain questions about the content or what's gonna happen while I'm in the hospital, they would be familiar with that process. Wouldn't want a nurse who just kind of knows the content because it's there on the slide. But, you know, be able to kind of speak to elements of our program, maybe elaborate on certain things that we discuss in class.

This was confirmed by other nurses who expressed that their background in orthopedics was what prepared them the most to provide pre-operative education. Participant 3 stated:

> Through my nursing career I have had, I have worked on the orthopedic floor, so that gave me the orthopedic experience. The last 8 years before I came to this position I was an emergency room nurse. So that actually gave me another spectrum of the pre-surgery side of orthopedic injuries and things like that. So I do feel like that just my varied nursing career, I was fortunate enough to be able to

> work in a lot of different areas. I feel like working ER and working the orthopedic floor helped me just to understand the terminology, to know about the injuries, to know about what we were going to be doing and that type thing. I feel like that my background really helped. I was not just a green nurse in orthopedics when I started teaching.

Participants expressed that they continued learning over time, through clinical practice if they still worked as a nurse on an orthopedic unit, as well as through other experiences and additional opportunities for education that guided their pre-operative teaching.

Theme 2: Education should be consistent, individualized, and evidence-based. Participants expressed that consistency for education was important to ensure patient understanding and to increase their confidence. Individualized, client-centered care was recognized as necessary for fully addressing patients' needs to prepare them for surgery and the post-surgical phase. Orthopedic nurses also used evidence to guide their pre-operative education programs, both from assessing their own programs as well as incorporating research to support evidence-based practice.

Education must be consistent from pre-operative to post-operative care. Participants expressed the importance of providing accurate information pre-operatively to patients before TKR that would be reinforced consistently across all stages of recovery. Participant 8 stated "We have great reviews from our patients for our total joints that the program's great…Everything was communicated well. What they were told prior to surgery is absolutely what happened after surgery." Some facilities provided a discharge class in addition to pre-operative education, and purposefully ensured that the same important information that was provided pre-operatively was reinforced again after surgery. Participant 2 expressed that patients

began receiving consistent information even before attending pre-operative education: "Patients know what the plan is from day 1 when they're meeting the physician in the office and that same message is just reinforced at every opportunity with people that are involved in the care and in that process." Orthopedic nurses discussed the importance of providing the same information across all providers that interacted with each patient, as described below:

> We work together, the hospital and myself so that everybody's on the same page, and we're not telling patients two or three different things from two or three different people. We're all on the same page, we all tell them the same instructions. **Participant 3**

Respondents reported that patients were appreciative of this consistency, and found that it increased their confidence according to a patient reaction relayed by Participant 8:

> I did the preop class and everything was exactly like she had said. And then the nurse in pre-anesthesia services told me exactly what I had heard from everybody else prior to. Then I hit the floor and they continued to tell me all the same things. And I just feel very confident in the care that I've received and everything has just been so wonderful.

Participant 10 described the importance of consistency for avoiding confusion and alleviating patient fears: "We're giving them a consistent message. We've found that that's really important. Because if you start telling them different messages different places, they get confused and it kind of scares them a little bit. They think that people don't know what they're doing."

Participants also discussed the significance of having consistency across educational delivery modes, such as verbal and written instructions. Participant 3 stated: "The hospital and I correlated our discharge instructions so that I'm telling them the same thing that's going to be printed out when they get ready to go home with all the discharge paperwork. So we work, we've been doing that for probably about a year

now and it really has made a difference. There's no confusion to the patient and that type thing." This consistency was found to increase patient understanding of important instructions. Another benefit of consistency was patients' comfort level in-hospital when they were able to meet some of the clinical staff that would treat them after surgery. According to Participant 2: "The patients respond to it very well. They seem more comfortable coming to the hospital because they've met some of these people and they know what to expect from them." For the facility where Participant 6 worked, multiple nurses provided pre-operative education and took turns leading the class. To ensure consistency, Participant 6 stated: "We have a set PowerPoint that we all talk about. You know, so that we each touch on the same things in each class."

Having consistent orders and protocols from surgeons were factors that were found to support consistency of pre-operative education. This allowed educators to provide the same information to all patients attending pre-operative education, which limited confusion:

> I don't have to do 4 different knee instructions because they have 4 different doctors that do them. I think that is probably the biggest help to the program. You know, it just creates less confusion for everybody. You know, if you've got a knee that needs a new dressing, you don't have to say now who's doctor, everybody gets the same, what we use the brand name is AQUACEL and it's just a big band-aid that seals, so it has just made it absolutely wonderful and much easier to get everybody on the same page. I think that has made a lot of difference in the program. **Participant 3**

Participant 3 followed up by stating that "If a patient stops and asks me a question, they're all gonna get the same answer. So I think that consistency has made a big, big difference in that every patient does the same thing. So it's been easier to keep everybody on the same page." Participant 1 echoed this sentiment stating: "All physicians use the same order sets. We have standard orders, that all physicians use the same order sets.

Now there are choices they can make on certain things, but it's a standard order set for any patient having a total knee replacement, that's what gets pulled up under total knee replacement." For providers who worked at facilities using bundled payments through the Comprehensive Care for Joint Replacement (CJR) Model, consistency was expressed to be even more important. Participant 8 stated: "We've also, because our hospital falls under the bundle payment for the CJR, we have talked about the importance of the doctors also saying the same thing all the way through. Because if one person says something different, you're done." The CJR Model was expressed as an incentive to ensure consistency and effective care coordination across the health care spectrum.

While many participants expressed that their program had achieved consistency overall, some acknowledge that there may be inconsistencies across related facilities. Participant 5 expressed: "I've networked with enough orthopedic nurses that work in health systems that they may all, all four hospitals may be under the same umbrella but they all do things differently and how that challenge is from one hospital to the next. So I don't have those kinds of challenges which I'm grateful for." Participant 10 had a different experience related to being part of a health system of five hospitals that all provided pre-operative education. To ensure consistency, these facilities got together and "decided on a list of topics and what we were going to cover in those topics, with some minor differences about the way it's done site to site." These facilities provided consistent information, with only small alterations based on location or individual facility needs. Additionally, when surgeons wanted to use different orders or protocols, this was recognized as a potential barrier to consistency. However, providers overcame these barriers by individualizing education to each patient:

> I think content will always kind of be in flux because we are trying to do a better job of standardizing our dressings that we use. We have one surgeon that doesn't want to use the dressing that we use, yet the rest of them do. You know, those kind of things. And how that relates to teaching the class, because I may be in class and I'll say ok, for you guys, this is the type of dressing that you're going to have on your knee, and you two over here, your surgeon doesn't like to use this dressing and so you're gonna have this dressing instead. **Participant 5**

While providers were able to routinely circumvent differences in protocols and orders within their own facility, it required more planning to do so when clinicians outside the facility wanted to follow other protocols. Participant 8 described this related to inconsistencies with dressing changes completed by homecare agencies:

> We go over with them, if somebody comes out to your home and wants to change [the dressing] before this date, just remind them that your doctor likes it to be changed on postop day number seven. Because we were having some odd homecare companies that aren't our normal homecare companies because of insurance going out and telling people we need to see the incision or admission. No you don't. Don't be touching my incision. So we've also tried to work with those different companies to say listen, this is what we do. I'll send the AQUACELS home with these patients so that we make sure that they get these on and not another dressing.

Providing this reinforcement to patients regarding the proper dates for dressing changes, as well as sending patients home with the correct bandages, ensured that patients received the care ordered by their surgeons. These steps also provided consistency with the instructions that were previously described to patients.

Pre-operative education should be individualized to each patient's needs.

Participants acknowledged the importance of individualing education for clients related to multiple factors, such as learning style. Participant 2 stated: "We have a varied population that attends, so I think we kind of hit…some people are more visual, some of them just want to read it, some of them need one-on-one instruction so I think we're trying to cover the majority of them." Having diverse patients necessitated providing

education through multiple delivery methods to address the ways that individual patients might learn best. Another participant described the importance of addressing individual knowledge needs to guide content and timing of education, stating:

> It depends on the patient, depends on how much education the patient needs, how much they understand, and how much questions and fears they have. Some patients, 40 minutes and we could be done because they're quite knowledgeable, they've already watched videos on the internet, and all this other, you know. So some people come in very, very knowledgeable and some people come in with a lot of anxieties. And that's how I determine how long, and where my needs are. Sometimes I have to determine, you know what, this is going to scare the patient more than it's going to help them. And what you need to not include as you are talking to them, you get that sense. **Participant 1**

If a patient had attended pre-operative education within a certain recent timeframe, several facilities allowed class attendance to be optional, as these patients had already received the education previously and did not have the same knowledge needs as those who had not attended the education course. Another important way that education was individualized was by addressing language needs:

> When I developed these booklets, these first patient education booklets, we did a lot of our education in three things. In English, Spanish, and Korean, because we have a high Korean population. So my booklets, and my education materials, is in any of these languages depending on the patient. That's how they get their education. **Participant 1**

Participant 10 found it difficult to include individuals who spoke a different language into group in-person classes due to the translation process being distracting for the rest of the class; however, nurses provided individual education to these patients to meet their needs: "The pre-surgical nurse will schedule a time with them and a translator and do that on an individual basis and cover the same material."

Respondents also discussed providing diagnosis-specific education for patients when possible. Participant 3 stated: "If they're a diabetic, we talk about the difficulty in

wound healing, you know, and some things that they can do." Other conditions were identified such as incontinence and allergies patients might have. Participant 4 described the need to provide individualized education and care for these conditions below:

> I had one patient who was concerned that she had incontinence, and she said well is ok to bring my pads with me, and of course that's not something she's going to want to ask in front of a big group of people. So it, I think it helps for the patients to open up and let us know kind of what to, what's going on. I feel that having these one on ones has helped improve our patient care overall. There was one of the patients that came through that had had surgery at a different hospital and she was severely allergic to Betadine, and the drapes that were used during her surgery at the other hospital were impregnated with Betadine. And she had these huge rashes all over her leg after her surgery, and she didn't have a good outcome from that surgery, regardless of just the skin issues that she had had. It worked out really well that I found those things out because I called and talked to our manager of our OR and she found out that we also had these same impregnated drapes that this patient was allergic to, and they were able to make sure that non-impregnated drapes were used when this patient came back for their surgery. And, luckily she didn't have any issues like she had during the last surgery. So she was just very satisfied with her care, the fact that we were able to intervene and get those things taken care of ahead of time because we knew.

Participant 9 echoed this, stating: "Specific to the history information I obtained from you, you're going to get different teachings." She followed up by saying:

> You can have standardized procedures and education, and things like that. That's okay for a broad level subject matter. But it never removes the fact that you have to be able to provide the patient with individualized patient education. That you still have to be able to provide them an individualized care plan. That is what the State Board of Nursing in North Carolina requires anyway as in many states.

Participant 9 also explained that this individualized education was very important when addressing medications based on diagnoses: "We really have to tailor the medication education based on other comorbidities and what they currently take."

In addition to being able to address diagnoses more specifically, some providers also felt that individual education allowed them to better meet needs related to housing and other personal factors. Participant 3 stated: "So that's why I favor individual

education. And that way, I can kind of tweak their education into what their home situation is, or if they're going to be going to a child's house, maybe their daughter's house after surgery or something like that then I can, I kind of tweak it as I go along, you know apply it to whatever situation that they're going to be in." Participant 10 also expressed how pre-operative education allowed individual social needs to be met for better discharge preparation. She stated: "What we found was that a lot of times some folks would stay longer because of social issues, not so much that they needed it physically. So identifying those folks in the doctor's office and then working with them when they come to the class, and then having that same discharge planner come visit them in the hospital I think has made a huge difference."

Other pragmatic aspects that were considerations related to providing education included time constraints for individual patients associated with traveling to the health care facility and needing to attend multiple appointments. Some nurses discussed how their program included both the education class and other additional testing as well as physician sessions on the same date to decrease geographical burdens:

> But I think it does help having some of those same visits at the same time. Especially, we have patients coming from outlying areas that may make it challenging for them to come back and forth to the hospital if they're having appointments throughout the week. And they're having to come back and forth to the hospital, so by consolidating some of this…they also see their surgeon and then they have their preadmission testing and then class. And so it can be kind of a long day for them. But we haven't had too many complaints about that. **Participant 5**

Participant 4 also discussed consolidating appointments into one day to decrease the number of days that patients had to travel back and forth to the health care facility. To reduce the length of time that patients were spending at the facility on that date, her facility developed stations to complete various labs, diagnostics, and electrocardiograms

(EKGs) before the education class begins at 9:30 am. These stations allowed patients to move through each required component more efficiently:

> What we incorporated was we wanted to make it a little more patient centric for our patients…we realized that patients were running to this facility to get their lab work done, running to a different facility to get their diagnostics done, and then coming into our facility to do their education, and there was just a lot of, seemed like a lot of wasted time where they're running around and spending at least 2 hours with our education. And then who knows what other time waiting and getting all those other things done. So we wanted to do whatever we could to bring all of that together for our patients, like I said to make it patient centric for them so they can just make it one stop. So we decided to change, our class was always called Joint Works. But, we are now calling it One Stop Pre-op and Joint Works. **Participant 4**

Another way that many providers individualized care was by providing their contact information in case patients had additional questions or concerns that they thought of later, or questions they may not have wanted to ask in front of a group of patients:

> And I am also on call for these patients 24 hours a day, 7 days a week. So they have my number to call for any questions. So I am a contact person that they can call when they get home, and they think of something that they wanted to ask. **Participant 3**

Participants acknowledged that patients received a significant amount of information in a short amout of time during pre-operative education, and that they might need more time to process information before asking questions. Nurses offerred to answer questions both before surgery as well as after once patients were discharged home. Participant 9 summarized individualized care by saying that pre-operative education providers should "take the information that you received from the patient. Then you make the patient feel like they're your only patient. They're your only patient."

Pre-operative education requires continuous quality improvement based on evidence. Orthopedic nurses discussed how pre-operative education was constantly

changing in response to a variety of factors. Participant 4 stated: "It's just always gonna be an evolving process. Keeping our eyes open, seeing what's changing, so that we can continue to evolve and improve with the changes." Respondents made changes following scheduled reviews of the program and also continually on an as-needed basis. Some reviews occurred as frequently as multiple times per month:

> We, as an orthopedic team, we meet a couple times a month and as we change things in our program, we will change the class to accommodate that. So, we review that class a lot. **Participant 6**

In addition to adaptations guided by program review, changes in clinical practice also resulted in the need for program revisions. Participant 3 stated: "If the physicians change the way they're doing things, in the course, I do have to come back and maybe tweak my instructions. Just kind of reword something or make it to where it's not quite so confusing. And certainly if the hospital changes something that they do, you know at discharge, I'll come back and kind of reword mine to be consistent with them." Changes in practice from a variety of providers necessitated change in the content of pre-operative education. An interesting factor mentioned by one participant that had guided a change in the content of pre-operative education was product availability in her geographic area. A bodywash that had previously been recommended for patients to use to cleanse themselves prior to surgery was no longer available in her region:

> We have always told patients that we wanted them to use an antibacterial bodywash, like the Dial, like the gold Dial soap. And within the last month here, I had a patient tell me that they told her at Walgreens that they no longer make the antibacterial Dial bodywash. And some of our surgeons had started to just use Hibiclens. So we started telling our patients just to use the Hibiclens, and we're kind of trying just within the last month here, trying to steer away from telling them to use the antibacterial body wash because we're not sure if it's just our area, or if it's like gone everywhere. **Participant 4**

Participants also recognized the importance of incorporating research evidence into their pre-operative education program. This process of responding to new evidence was considered to be continual, and never fully completed:

> I think that we're providing information that they're looking for even though I think that will always...like I said be in a state of flex as far as new practices, new evidence-based practices that we would use and how that would relate to what we teach. **Participant 5**

Orthopedic nurses also used evidence to guide other aspects of orthopedic care for TKR, which resulted in changes to their pre-operative education program. One participant recounted a surgeon who continued to use the continuous passive movement (CPM) machine with his patients, despite her perception that this protocol was not supported by evidence. The participant gathered program data and presented this to the surgeon, and no longer provides education regarding the CPM:

> We had one physician out of the 4 that could not give up the CPM machine. So, only his patients were getting the CPM. Well, we collected some data and also from insurance companies, how they were paying for it, how much it was ending up costing the patient, and we were trying to get him to stop using it. And, in order to do that, we had to prove it to him. So we collected the data, and he did see those patients were not rehabing any faster than any of our other patients. So when we presented him with that, he stopped doing the CPM machine. So now, nobody gets CPM. **Participant 3**

Participants were also interested in measuring and tracking the outcomes of their pre-operative education program. Participant 4 had conducted her own research to assess the impact of the pre-operative education program at her facility: "I did mine on, my field study, I did it on pre-operative education and how it effects the outcomes of our patients." Providers discussed using multiple online programs to track the outcomes of their pre-operative education such as DatStat and Stryker Performance Solutions. Outcomes

were utilized to determine what aspects of a program were working, as well as areas that needed improvement:

> I would never give up that data abstraction part. That all really comes from what I report for joint commission. Because that is the true insight to, how well are we doing? Are we missing out on something? Who do I need to be a little bit pushier on? Do I need to get with our therapy manager and go hey, why did three people not get their eval the day of surgery? Or, is it a flow issue? Oh, the patients are staying in PACU too long? Which that was one of our issues and so now we've opened up our ambulatory surgery unit, so therapy can see the patient, their families can see them, they can eat if we're having flow issues. So yeah, if I did not abstract data in real-time, I can't even imagine the mess. **Participant 8**

Many participants who completed interviews expressed that they enjoyed contributing to the research process, and were interested in reading about the results from this study in the future. Participant 4 stated: "I think, just because of lack of being able to see other people's programs to know what other people are doing. I mean, I'm kind of jealous. I'd like to be in your seat, to be able to find out what else, what other people are doing to see what is out there. What other things are people teaching about that could increase and make our program even better." Orthopedic nurses wanted to learn from other programs, in order to continue improving their own pre-operative education. Participant 1 explained:

> I think one of the most important things is with the orthopedic and with the joint programs is that we share with each other. And I think, joining NAON and people willing to share, I think is one of the best things. Originally, I was the coordinator, manager, for our stroke unit, and at that time I put together the whole thing to go for stroke certification, which is one of the reasons I then went on to doing it for the joints. But we had a consortium in our state, in the state of New Jersey of people from, that were coordinated from all the hospitals in New Jersey, and we got together every quarter. And wow, what a helpful thing that was. And I wish we had something similar with our joint program. But I think sharing it is one of the best things we can do for each other.

Participants expressed already having plans to make future changes to their program or that they would continue to make changes as needs arose in order to improve pre-operative education to support better outcomes.

Theme 3: Interprofessional practice is important, but is limited by barriers.

Participants expressed that they valued collaboration and communication with other members of the health care team, both before and after surgery. Participant 8 expressed that "interdisciplinary communication is super, super important. I mean, that's probably the biggest thing." Strong communication was reported to ensure carryover of recommendations from one provider to the next, such as for needed adaptive equipment for discharge:

> I put a note in the chart, in the patient's chart after we're done with the education and then when those patients come back in, our discharge planners go back and look at my note, and so I'll usually put in there saying my patient's going to need a walker or whatever their needs are in regards to equipment. It's really helpful to them because, they'll still need to go in and do their screening of the patient but if they know already that the patient needs a walker, then they can go ahead and get the order in there and get that started to help facilitate things a little faster.
> **Participant 4**

Participant 10 felt that the pre-operative education program at her facility was more powerful because of its interdisciplinary composition and allowing patients to get to know some of their providers before surgery: "I think it's stronger because the patient gets to know someone, and they say "oh hey, you taught the class." So I think it's stronger that way." Interprofessional collaboration was also perceived to improve patient outcomes. Participant 3 discussed how a combination of the education she provided before surgery about wound healing, along with physical therapy monitoring the incision during their post-operative sessions and communicating any concerns to the physician, had significantly reduced the incidence of infections for TKR patients at her

facility. Participant 9 described how patient outcomes improved with the addition of rehabilitation providers to the pre-operative education team for outpatient TKR patients:

> We found improved patient outcomes with the implementation of a physical therapy class before surgery. We went to a total joint class off-site that is mandatory. Once they attend that class, it covers a full physical therapy/ OT assessment to make sure the patient is home. That they're home in a safe environment. It was an excellent time to assess basically their overall physical condition; meaning had they not walked in some time because their knee was so bad that they became physically deconditioned all over? Which would make it hard for them maybe with the loss of body strength. That they would have difficulty using a DME equipment like a walker, a cane, or anything of that nature. Therapy class is instrumental in being another set of eyes to assess the patient.

Additionally, the ability to bill for rehabilitation services pre-operatively in an outpatient setting for Participant 9 was a support for interprofessional practice to include therapy providers within the pre-operative education program. Participant 8 had a different experience where she recounted needing to advocate for occupational therapy to receive orders to provide post-operative services. This experience reflects both a desire to engage in interprofessional practice as well as limitations that could impede this collaboration if not addressed:

> For the program I came from, some of our doctors didn't want their patients to have OT. They thought it was a waste. It didn't make sense. So in those instances, the nurses were getting those patients ready for that particular doctor. I'm like this is just not good. Even for shoulders. I'm like, you're not treating for OT. Who's teaching this patient how to put her shirt on before they go home? But like I said, all of our doctors here have been great and it's like, listen. This is what we want to do. All these people need these skills. We want to prevent readmissions. We want to have good outcomes. We don't want somebody doing something silly at home because they've not had the education.

Despite being valued, participants reported experiencing many barriers to providing interprofessional pre-operative education. The setting was expressed to make it difficult if classes were provided off site from the hospital location. Participant 5

stated: “We kind of narrowed it down to just nursing doing it. Especially when we moved our class off campus, cause initially we taught at the hospital and then the executive team asked that we teach over at a community health and education building, which is not far from the hospital but it’s off campus from the hospital.” The pre-operative education program for Participant 5 has since returned to being on-site at the hospital, but continues to experience other barriers to interprofessional practice. Also due to the large amount of content that must be covered in educational sessions prior to surgery, some orthopedic nurses felt that it would be difficult to add any additional providers to the course. The surgical volume was another concern when classes were already large in size. Participant 6 explains: “We've tried to add [providers] at different points in time, but as it is, it’s about an hour and a half when you go through all the material. And we have a very high volume of total joints and we can have up to 40 people in the class. So, the more people you add the longer it lasts and all that kind of stuff.”

Coordinating the timing of interprofessional involvement was also perceived to be difficult, with various providers sometimes only able to come to class for their specific portion of education rather than attending for the duration of the course. Additionally, providers often only had a short amount of time allotted during the course due to other patient care responsibilities. Participant 7 said: “We did have PT and OT come to the classes for a while. They would pretty much just kind of swing in and say a little bit about inpatient PT and OT for about 5-10 minutes. And ultimately that stopped, one because they're weren't therapists that were able to do it, and I think kind of a lack of…I don't know if the 5-10 minutes was worth it.” When asked about

providing pre-operative education using an interprofessional team, Participant 1 expressed that "staffing and timing is the biggest barrier to achieving that. There is no way that I can get a physical therapist again, staffing wise, at every meeting, every class." Orthopedic nurses reported that when other providers did arrive to provide education, they sometimes experienced time conflicts due to patient questions or waiting for another discipline to finish. Because disciplines outside of nursing were providing clinical care to patients in addition to participating in the pre-operative education course, these delays were difficult to manage:

> When we first started teaching, we had nursing do a portion and then rehab came in and did a portion, talked about their therapy and exercises. And we had dietary come in kind of speak to their nutritional aspect and we had a case manager come in and talk about their discharge plan. I think initially, that seemed to work ok but as things started to kind of grow, and the challenge that came with that was coordinating the disciplines to come in at the time that they needed to, and then if there were questions, dietary was still answering their questions when rehab was there to talk about their aspect of it, and they're still working so they're in-between patients and then they have to leave, that kind of thing. So then we kind of narrowed it down to just nursing doing it. **Participant 5**

In contrast, Participant 10 found having multiple providers for specific allotted times to be beneficial in reducing the individual time burden for providers and for maintaining patients' interest: "You're not having one person give up two or two and a half hours every week, and by putting someone else in there every 20 or 30 minutes, you're kind of breaking it up and keeping their attention."

Another concern about interprofessional pre-operative education that was expressed by one participant related to maintaining professional identity. Participant 1 said: "If we got in multiple people, if we brought in multiple people, they would take a little part of what I already do." Some participants perceived that they were able to cover

components that would typically be addressed by other disciplines when time and other barriers interfered. According to Participant 4:

> I'm not sure why nutrition stopped coming. I don't know if there was other job responsibilities that maybe pulled them away from it and such, as to why they have stopped. Of the information they were giving, it wasn't pieces that were difficult for us as nurses to provide to the patients about eating your protein and those kind of things. So, that is the other discipline that we had in the past as part of our program. But for the most part, things work pretty well.

Participant 3 discussed how she filled multiple roles as a nurse related to pre-operative education. "I'm kind of like the social worker, a case manager, along with patient educator. I love to patient teach. So that is what I do, that's kind of my title, but we all know that titles don't mean anything. You do a lot more than what your title says." Participant 7 shared similar thoughts regarding nursing's overlap with other disciplines, but expressed that he wanted more involvement from other health care providers: "I think that it could definitely be more involvement from them, but I cover a lot of the information that PT, I guess, would cover. But I would love it if they did, but at this point it's just kind of a little bit of a struggle to get that involvement." Participant 7 also described how while there is overlap, there is some pre-operative content that is more related to specific disciplines:

> I think it's, you know, to me it seems like maybe it's mostly kind of nursing driven content. Certainly we talk about therapy and what they'll be doing with occupational therapy and physical therapy, but there's a lot about preventing complications and just the process of going through surgery, recovery, and then the rehab that follows once they're done with surgery. So, I think it's not a bad idea to have a therapist kind of maybe teach a portion of the class. I don't think they'd want to speak to much of the nursing aspect of it since that's really not their forte.

Participant 10 shared this view that while disciplines are able to cover content related to other providers, a provider from that specific discipline may be better prepared to give

more detail or answer questions. She stated: “I’m not expert on occupational therapy stuff. I can do the basics and I can cover that part, but if someone asks me a question I’m going to have to say, you’re going to have to ask the therapist. So it does definitely I think make a difference having them in there.”

When other disciplines could not be involved in the pre-operative education program directly, orthopedic nurses collaborated with the interprofessional team in other ways. Participant 1 described a committee that collaborated to both develop and continually update pre-operative education materials that are used in the course:

> Everyone, everyone that you could possibly think of. We have pharmacy, nursing educators, OR educators, OR staff, OR directors, our… you know we have from the top down. We have our chief of anesthesiology, our chief of orthopedics, I mean we have a really good committee that works together.

Participant 3 expressed that a lot of disciplines were involved in the pre-operative visit, even if not directly a part of the education class itself. “I do have a lot of people that help me. Reception makes all the appointments. I do strictly just the information, the education, and then when they go to [facility name], they’re doing all their lab work, anesthesia consult, that type thing. There's a lot of hands in that one hour visit.”

Several participants expressed that they had considered or were making plans to add other disciplines to their current pre-operative education program. Participant 5 discussed the importance of including providers who would work with the patient after surgery: “My thoughts on that, is I would especially want somebody that has worked with the patients in our program, maybe was even involved in some of the therapy aspects of the program too so that if they have certain questions about the content or what's gonna happen while I'm in the hospital, they would be familiar with that process.” Participant 8 felt that her experience working as both an occupational therapy

assistant and as a registered nurse involved in pre-operative education provided her with a unique perspective regarding interprofessional practice that allowed her to better appreciate multiple views:

> I think that the biggest thing for me that has been helpful is seeing perspectives from a therapist side and seeing this perspective from the nursing side. I'm a big believer that I have to understand where somebody comes from and where they're going to make it all make sense. So I have worked in every setting as a therapist so that I could understand what my role was where I was working. I try to transition that into our program and say hey, listen. I've noticed this. I've noticed that. Or is it something we can think about doing. Again, going back to teamwork, everybody has been very open to that and been agreeable to changing. Then I follow our doctors around like a little puppy and it's like, what can I do for you? What are your issues? So that I have built up a rapport and a trust so that when I ask for things, I can get what I need and they will make changes necessary. Which is like I said, I think why we do as good as we do for a small program.

Participant 10 also described a program that was very interprofessional, and she believed the success of this multidisciplinary approach was related to having frequent collaboration and communication through a regular interprofessional meeting. She expressed: "Those meetings we do monthly were the best things we ever did. It has made the program night and day from what we had before." Participant 10 followed up by describing how these relationships were fostered between disciplines through these meetings: "We have all those representatives there who have a say in what's going to happen and what we talk about. So if anything comes up, you know your nurses are not plugging in the cryo[therapy unit] and we're getting leaks or something like that, so we all work together to fix it. So there's just not a lot of tension between any of them, it just kind of naturally, we work together to figure it out." There was acknowledgement from participants that interprofessional practice was difficult due to barriers, but that that it could lead to many positive outcomes. Participants also recognized that interprofessional

practice may require increased time commitment and flexibility from all providers to implement for pre-operative education.

Theme 4: The structure of pre-operative education is guided by pragmatics.

Participants expressed that all aspects of pre-operative education, such as providing group or individual education and the timing of education, were impacted by multiple pragmatic and contextual factors. The decision to provide group education was guided by social factors such as the benefits of learning from other patients and developing a relationship that could be carried over after surgery. Participant 2 stated: "I think the group format is good in a way, they go approximately 30 days before their surgery, so some of the patients that are there will also be at the hospital at the same time and they go through therapy together." If a patient was returning for a second knee replacement, they were also able to share their experiences with newer patients in a group class:

> And I kind of also encourage, if someone had their knee done previously maybe it's their other knee they're having done. And how they kind of felt about certain things that we're discussing in class as it related to their first knee. So that sometimes is helpful too. I even had a patient that had purchased the raised toilet seat and they decided that they didn't need it after all. Either it wasn't what they wanted, or maybe they had the elevated toilet seat at home which probably made their seat too tall. So in class they're mentioning that, and they ended up giving it to this other patient that wanted it, so there's some of that. There's a little bit of that kind of support even from patient to patient that I think you get in a group setting that you wouldn't get one on one. **Participant 5**

Another perceived benefit from the group setting was that one patient's question might answer concerns for other patients, or spark additional questions from the class. Participant 7 said: "The other thing too is I try and encourage questions of course, there may be questions that a patient asks that another patient in the room maybe never even thought of. And so when there's a group setting, you have that kind of questions that

maybe you may not think of that someone else thought of so you're hearing kind of the response to their question."

Orthopedic nurses also recognized that grouping patients together allowed education providers to be more efficient in their teaching. Participant 5 stated: "I like the group setting. I think certainly for, you know, cost-effectiveness by teaching a group we can teach a lot more than trying to do a one-on-one session." While group pre-operative education was not currently utilized in her setting, Participant 9 expressed that "I would like to make things as efficient for the physical therapist as possible. If I had the option to group more of the total joints together so that when she met with the patient or patients, that it was more in a group setting. I found previously in the hospital setting that patients are very competitive. They thrive off the interaction with each other." Due to the setting of her facility as an ambulatory surgery center, it was more difficult to schedule patients in a group setting and provide the home-based evaluations that were important to ensure readiness for discharge when TKR was provided as an outpatient surgery. Participant 9 described differences in pre-operative education guided by setting as: "There are some things that work well in a hospital setting that don't work as well outpatient. But sometimes if the process worked really well in one or the other you could pick and choose, and tailor the program to more what you need in your environment." Participants acknowledged that their personal setting would guide what features of pre-operative education program structure would work best for their programs.

While participants did recognize many benefits of providing education in a group setting, they also acknowledged that patients may be less willing to ask more personal questions in front of other patients. Participant 3 stated: "I also just feel like they will

ask more questions if it's just me and them. I feel like they won't be embarrassed, or think that their questions are dumb, or not want to ask the question in a group setting." Additionally, some providers felt that patient education provided one-on-one was more thorough than what could be delivered in a group format. Participant 3 explained:

> We do individual. We have talked about several times having a group, like a total knee replacement night where people come and listen. But we don't feel like, my clinic, myself, and the physicians, just do not feel like that the patients are going to get as much information or, absorb as much information as when they sit down one-on-one with me. So, individually seems to work really well for us, so I think that we would continue that, you know, as long as that's working good.

A few facilities addressed the limitations of a single educational format by offering a combination of group and individual education in their pre-operative program. This allowed them to achieve the benefits of both approaches by including a group portion for important information that would be shared across patients, but also meeting individually to gather specific information about each individual and to answer more personal questions. For programs that were only designed to be group based, participants were able to stay after class to ask more sensitive questions and many were provided with the orthopedic nurse's contact information so that they could call later with questions for more personalized learning. Additionally, for some classes that were only individual, some providers gave patients information about commonly asked questions or facts that were developed based on previous patient concerns.

For those facilites that did include group classes, many participants felt that educating patients together who had a variety of diagnoses was practical and did not interfere with learning. Participant 5 stated:

> The way the class is set up, is we give a basic overview of procedures, both hip and knee. And that's at the beginning of the class and then the remainder basically relates to all the similarities with joint replacement as far as preventing complications,

> dressings that we use, therapy, discharge planning, and all those things that would relate to either surgery. And it doesn't seem like the patients are really bothered by learning about both.

Additionally, it was difficult to schedule separate classes for TKR and other diagnoses, because TKR was much more common and it was harder to predict when these other surgeries would occur. Participant 5 said: "There's some weeks where we do all total knees and there's not a total hip scheduled and then other weeks where it seems to be heavier on total hips than total knees. It's just not anything that we can predict so it makes it a challenge." While not as different as a TKR compared to a THR, Participant 4 discussed educating patients who would be having an outpatient TKR surgery compared to those who would be receiving the procedure as an inpatient:

> With the outpatients, they just have one surgeon that's doing it and she started it this fall. So there's probably only been 10-15 that have come through, so it hasn't been a huge amount. I feel that if more of our surgeons decide to go toward doing these total joints in outpatient, I feel that it would be a benefit to break the class into something separate for them just because of the fact that I don't want them to be confused all the time, when we're talking about the inpatient people. But as for all the pre-operative infection things, what to do to prevent blood clots, those pieces, I feel that those are important pieces for all the patients. So I mean, that's luckily the one common ground amongst them all.

Participants expressed that if other surgeries became more common compared to the typical TKR, then this might warrant providing separate education classes prior to surgery. Participant 7 felt that because the class sizes at her facility were small, that combining TKR and THR was not a problem because she was still able to individualize her teaching to the class. She stated that "I try to keep them smaller class sizes just so they have a little more personal attention." Other orthopedic nurses also discussed the influence of class size on the dynamics of pre-operative education. Participant 1 stated:

> My patients have 15-20 questions per patient. When it's that big, they don't have the opportunity to ask that question that they want to ask. Or to express their fears.

> Patients use this opportunity with me [individual education] to let me know what their fears are, what it is they're most afraid with having the surgery, what it is that they expect or want to have come out of surgery.

Class size also influenced whether or not it was feasible for patients to combine pre-operative education with preadmission testing. At Participant 4's facility, using this combined process limited the class size to six patients. Combining these commitments allowed pre-operative procedures to all be completed within a single day. Another factor that influenced class size was family attendance. Most providers encouraged a family member or caregiver to attend the class so that another person would be aware of important instructions and recommendations for discharge home. This also addressed whether or not patients had the support they would need following surgery. Participant 3 summarized this by saying: "They are welcome to bring any family members that want to come, especially whoever's going to be assisting them in their care, we encourage that. Anybody that wants to listen, my philosophy is, the more sets of ears you have, the better, you know the information and everybody can listen, and everyone's going to know what's going to be happening to mama or whoever."

Another practical feature that influenced class size was whether or not class attendance was mandatory. Some facilities, particularly those that were CJR programs, made attendance mandatory and surgeries would be cancelled if patients did not complete the required pre-operative education program. Participant 9 required attendance due to the outpatient nature of TKRs performed at her facility. The limited amount of time to prepare for discharge home after surgery necessitated pre-operative attendance. For other facilities, providers encouraged attendance and presented the class as mandatory, but may not have fully enforced mandatory attendance due to time conflicts in patients' personal

schedules. Implementing a system to schedule patients for the course and get them to commit for a time to attend, rather than allowing them to call to schedule later, was also found to increase attendance:

> Because I think we've now started scheduling our patients and the only ones that have opted out of class are usually the ones that've already been through our program at this point. Prior to the launch of our joint center, we were doing joint replacement, total knee, and the class was, even though it was encouraged and kind of on an honor basis to attend and the surgeons asking them to attend, we just weren't seeing the attendance. **Participant 5**

Because providers valued pre-operative education as a mechanism to better prepare patients for the post-operative phase and to support improved outcomes, all orthopedic nurses highly encouraged class attendance even if it was not mandatory.

The timing of pre-operative education was found to be guided by many pragmatic factors, and this timing varied depending on which factor was being considered. One of these related to preadmission testing to determine if the patient was eligible to undergo TKR surgery. Several participants mentioned that the time between this session and surgery needed to allow for this testing to be complete, and associated interventions to be implemented. Participant 1 stated: "They have to be in the hospital at 7-10 days in order to do their MRSA testing and have 5 days of treatment should they become positive. Now it could be anywhere, 2 weeks, but minimum 7 days." For facilities with higher volumes of surgeries, this timeframe needed to be extended to allow all patients to have their laboratory tests completed and analyzed. Participant 4 reported that education was provided 3 weeks prior to surgery and explained: "Our volume overall is usually about 1,400 surgeries a year, so we, in order to get the labs back in time for the offices to make sure that they've got everything they need, it helps us to have enough time to get everything back." Examples of some laboratory values

that physicians would be concerned about and want to treat were described by Participant 4:

> And then also, depending on what labs come back and how they come back, our doctors do like to optimize our patients. So if there's things, for instance, insufficient Vitamin D level or if they have a low hemoglobin, those kinds of things, the doctors want to take action for, if it's a Diabetic and they have an elevated A1C, that they want to take action for those beforehand and if there's anything they can do since their surgery's already scheduled, between the time that they've got the pre-operative education and they come in for surgery, if they can take care of that then that's what they prefer.

Providers were also concerned about other factors such as patients' ability to recall important information from pre-operative education. Participant 2 stated: **"**I actually like when the patients attend it a week or two before the surgery, because I think they don't forget as much information if they attend it closer to surgery." Participant 7 also was concerned about longer timeframes before surgery saying that "three weeks, sometimes I feel like they tend to forget that they saw me." Allowing enough time for patients to implement suggestions prior to surgery also was a factor orthopedic nurses considered in the design of their program. Participant 3 tries to "educate them 2 weeks ahead of time because that gives them time to get everything organized, get their aftercare, whatever they're gonna have done." Participant 7 echoed this saying that she chose the pre-operative education timeframe to allow participants enough time to obtain any needed equipment and set up the home environment. Allowing enough time for patients to implement exercise and realize strength gains was also considered when designing the timing of the education program. Some participants, such as Participant 7, felt two weeks was sufficient, while others would prefer additional time for exercise implementation. Participant 4 stated:

> When we created this newer format, we wanted to try and get the patients about 3-4 weeks out if we could, just because of the fact that we were giving them those pre-operative exercises that they're learning during therapy. And if they can have a couple extra weeks to work on that, then we figure that would be more of a benefit to them.

The number of sessions for pre-operative education was guided by time constraints experienced by patients. Participant 3 explained: "I personally believe that one session, do everything you can because you're lucky to get them in here. Some of our patients, you're lucky to get them in here that one time, and you certainly would be cutting your chances significantly to get them in here a second time." Geography was a factor that could limit patients' ability to attend multiple sessions for pre-operative education, or to attend preadmission testing on a separate date:

> I think one session is, you know any more than that could become, I think, you know, for patients to go back and forth more than one time. Cause they are already coming at different times to the surgical evaluation center, and then, if they have to come more than one session, it could become problematic for some patients. Especially that live, we have a surgeon that does a very, very high volume of total knees. And he has people that will come quite a distance away, from you know, we've had them up to 250 miles away, and that would become very problematic for those patients. Those patients, we try to have them come and get their testing the same day as the class too.
> **Participant 6**

However, Participant 7 expressed: "But I almost wish that there was a chance to provide some information before the class or maybe have two smaller classes because it is a lot of information to cover in one time, and I think they get information overload." There was a recognition that pre-operative education includes a significant amount of information in order to better prepare patients for surgery and discharge home. Some providers supplemented this education course by providing other materials in advance or at the course that patients could review to account for the limited time available for education.

Another time factor that was described by participants was the length of the class session. Patients' physical comfort was considered when determining how long sessions would last. Participant 5 stated: "I've been trying to keep it about an hour and a half. Previous to our program, our class took 2 hours. And I do have my patients, they're challenged with their hip or knee, so I tell them during class, if you need to stand and stretch or move around a little bit feel free to do so. And there's a few that do that." Participant 4 also recommended for patients to stop and stretch during pre-operative education due to soreness and stiffness:

> I think they get uncomfortable because these are patients that have a sore hip, they have a sore knee, so sitting in one position for much more than an hour, they're going to start getting stiff. And then, when they have to get up and walk again they're not going to be very comfortable or happy. So it seems like that hour period works pretty well.

Participant 5 also described previously allotting time for patients to have a break to stretch to increase their comfort during the education session when the class was longer. Now that the class time had been reduced, he felt that the timing was more comfortable for patients. In addition to comfort, attention span was a concern that could limit the length of the course. According to Participant 4: "I think if you keep the patients there for much longer, then that, you know, I think you lose their attention." Aiming for a shorter class length was also related thought to assist TKR patients who might still be engaged in paid employment. Participant 7 said: "I think an hour is good. I think you lose a lot of patients if it's much longer than an hour and they wouldn't be able to come for work requirements or what not."

The amount of material to cover was another factor that influenced class length. Participant 8 felt that a two hours class was needed to cover important topics and provide the appropriate expectation that patients should plan to discharge home after surgery:

> When I started, the class was barely an hour. So when we have patients fill out after class what they like about it, didn't like about it, what they would like to know more about. That is how our class has become two hours. Do I think it's ideal for any person that is having to have a joint replacement sit for two hours? No, not really. But there's so much information that I think that they need to know to alleviate stress and anxiety pre-op. Give them an understanding and an expectation of, our plan is discharge to home. Not to a skilled nursing facility.

If multiple diagnoses were involved in the education session, this was also perceived to lengthen the class time. Participant 5 said: "Previous to our program, our class took two hours. I've been trying to think about maybe what I can do to cut it down to an hour, but no matter how hard I try, especially if I'm talking to both hip and knees then it always ends up being about an hour and a half." The type and amount of questions patients had also influenced the class length. Participant 4 has narrowed her pre-operative education class down to an hour, but "sometimes it goes closer to an hour and a half depending on questions, concerns, things that are discussed during class." Participant 5 provided a similar response:

> I've tried to cut it back to an hour, it just works out to be an hour and a half. And a lot of it depends too on their questions. I could probably get through the content and keep it an hour, but they have questions or I may elaborate on something because of a question and then it ends up kind of working out to be about an hour and a half.

Because the amount of patient questions could vary, these could lead to either shorter or longer class sessions depending on the patients in attendance.

The content of pre-operative education was also impacted by multiple contextual factors, including areas that were associated with previous study themes. Some of these previously discussed factors include: changes in physician or other

practice protocols; review of program outcomes and research evidence; changes in product availability; the need to maintain consistency across providers, education materials, and time points; and based on individual patient needs. An example of pre-operative education being guided by one of these previously discussed factors is presented below related to the content needs of individual patients:

> And the things I'm going over with when I have the one-on-one with them, it's more kind of finding out their setup at home. Do they have a 1 story house, 2 story house, do they have access to a bathroom and a bedroom, if they have a 2 level house do they have access on the first level. What equipment do they have at home. **Participant 4**

This personal information was gathered to guide the content of teaching as well as recommendations. An additional feature that was found to impact content was related to the need to present essential information in a way that it could be remembered, such as by reiterating the content for emphasis, but without being too repetitive. Participant 4 stated:

> We kind of narrowed it down to, like I said we had a 2 hour class beforehand, but it was a lot of things that were just very, very repetitive. When you're teaching the class, I mean it's not a bad thing to be repetitive but it was kind of to the point where it was 2 hours of repetitive. And we wanted to try to narrow it down, so we really got to the nitty gritty of what they need to know without repeating it 20 times. And we put it of course on PowerPoint, because in the beginning it was never on PowerPoint. It was just someone standing at the front of the class talking and they got a binder that we would explain to them where things were in the binder as we were explaining the class. But now we've got it on a PowerPoint where they've got something to look at, something to reference as they're looking in their binder. So we've narrowed that down to about an hour.

Narrowing content down to the most significant information, repeating important topics, and using multiple methods to deliver education were perceived to increase understanding and recall of information. Participant 1 also discussed the importance of the right timing to provide information to patients: **"**Now can we do this pre-operatively, can we have them watch this pre-operatively, yes but where would it be more beneficial,

pre-op or post-op? Beneficial pre-op, may not be as beneficial to do it pre-op as well as post-op. So that's my feeling on it." Because patients receive a significant amount of information before surgery, and they may not be able to remember all of this content, some providers chose to save portions of educational topics for after surgery.

An interesting factor that was found to guide pre-operative education for the health system that Participant 10 belonged to was variations in durable medical equipment (DME) coverage. One of the facilities within her health system was in a different state, and this influenced some of the content covered within that facility's program:

> [Facility location], they don't have access to their durable medical equipment, DME, so they actually give it to them in the pre-op class because Oregon has different rules than we do here. So they have them set up with that right in there and they fill out their paperwork. So they actually spend more time and talk more about financials, but that makes sense for them because a lot of their folks are traveling a long distance to get to them so they have to do everything all at once. They actually have PT evaluating them right in there, but they are only dealing with 1 or 2 people. There is enough flexibility so that they can adapt it to their own site and still follow the care continuum.

Several providers identified topics that were harder to teach patients prior to TKR surgery. Accurate pain expectation was found to be difficult to relay to patients in a way that they could understand. Participant 7 expressed that it was hard to "convey pain threshold, in that you're gonna hurt but you're still gonna move, and that is different for a lot of patients. That they think they're either gonna be able to do everything and they're gonna push themselves too hard. Or they think they're not gonna be able to do anything and therefore they don't work with PT." Participant 7 also expressed difficulty educating patients about how short length of stay in the hospital would be prior to discharging home:

> I think one of the hardest things is to know exactly how to convey to patients that the plan is for home and that it is a quick turn-around. Because I think a lot of patients

> will have experiences from family members 5 years ago, and 5 years ago they stayed in the hospital for 5 days. And it's really hard to convey that that has changed and is no longer the case. So that piece, it would be helpful to know how people navigate that. I know that there are surgeons that will prep the patient in their office and says you're going to go home, and it's really helpful to have the doctors be the one to initiate that instead of just, it's coming from the nurses. I've talked to several patients in the class that are like oh yes, I definitely want to go home. And I think they hear that because they ultimately want to go home, but then they didn't hear me say you're going to go home in one or two days. Because in their head they think I'm going to go home in 2 weeks. So that's a different picture.

Education information that might not align with patients' expectations, or differed from the experiences of someone they knew who had previously undergone TKR, was more difficult for patients to process, understand, and remember by the post-operative phase.

Discussion

This mixed-methods study sought to provide a detailed description of pre-operative education prior to TKR surgery in the United States, as well as to explore providers' perceptions of this education. Results demonstrated that pre-operative education varied across facilities, although some aspects of program design were common among settings. Providers expressed they valued education prior to TKR surgery, perceived many benefits for patients, and also felt they needed to be prepared to provide this education through the appropriate training and/or practice experience. Good pre-operative education was perceived to be consistent, individualized to patients, and supported by evidence. Interprofessional practice was valued, but was met with barriers to full implementation. Pragmatic features were also found to influence other aspects of program design, such as the length of education sessions. The results of this study, and review of the literature, led to the development of recommendations for the structure of pre-operative education, presented below in Table 5.8.

Table 5. 8 Pre-operative Education Recommendations

Recommendation	Data Support
Education should be interprofessional (Fewster-Thuente & Velsor-Friedrich, 2008; White et al., 2013; World Health Organization, 2010)	• Survey: 396 (84.4%) of nurses were already part of an interprofessional team and 260 (55.4%) wanted to add at least one additional provider • Survey Question 24: 14 participants recommended interprofessional education (see Appendix I) • Qualitative Theme 3
Sessions may be best provided within 1 to 1.5 hours, but no more than 2 hours for patient comfort and attention span	• Survey: 363 (77.4%) of nurses recommended sessions lasting one hour or more, and 189 (40.3%) of nurses recommended sessions lasting between 1-1.5 hours • Survey Question 24: 4 participants recommended similar session lengths (see Appendix I) • Qualitative Theme 4
Education may be best provided 2-3 weeks before surgery, but no more than 1-4 weeks prior to surgery	• Survey: 435 (92.8%) of nurses felt education should be provided within 4 weeks of surgery and 192 (40.9%) identified 2 weeks as ideal • Survey Question 24: 3 participants recommended similar timeframes (see Appendix I) • Qualitative Theme 4
Essential content should be covered (Crum, 2011; Goldsmith et al., 2017; Kennedy et al., 2017; Westby & Backman, 2010)	• Survey: Participant responses for topics covered and desired topics to add that were reported in the Results section • Survey Question 24: 5 participants recommended essential topics to cover (see Appendix I) • Qualitative Theme 2 and Theme 4
Provide a combination of group and individual education (Edwards et al., 2017)	• Survey: 253 (53.9%) of nurses felt a combination of group and individual education was ideal • Survey Question 24: 11 participants preferred a combination of individual and group education (see Appendix I) • Qualitative Theme 2 and Theme 4
Separate TKR from other diagnoses, or limit to THR	• Survey: THR was the most common diagnoses educated together with TKR (283; 60.3%), and 233 (49.7%) preferred educating patients separately from those with other diagnoses compared to 222 (47.3%) who wanted to educate together • Survey Question 24: 8 participants reported the need to separate diagnoses or to limit to THR (see Appendix I) • Qualitative Theme 4
Provide multimodal education (Edwards et al., 2017; Kennedy et al. 2017; Kolb & Kolb, 2005)	• Survey: 461 (98.3%) of nurses used multiple methods of educational delivery and 349 (74.4%) wanted to add at least one additional method

	• Survey Question 24: 10 participants reported the need to add additional modes of educational delivery (see Appendix I) • Qualitative Theme 2
Table 5. 8 (continued)	
One or a maximum of two sessions should be provided due to travel burdens, and provide materials for review outside of class	• Survey: 407 (86.8%) of nurses reported that patients attended one session, and 372 (79.3%) felt that one session was ideal for education • Survey Question 24: 6 participants supported one session, or a maximum of two, with outside learning opportunities (see Appendix I) • Qualitative Theme 2 and Theme 4
Include caregivers in pre-operative education (Edwards et al., 2017; Napier et al., 2013; Tan et al., 2014)	• Survey Question 24: 3 participants wanted to include caregivers in the pre-operative education class (see Appendix I) • Qualitative Theme 4
Invite previous patients to attend pre-operative education to share their experiences (Causey-Upton & Howell, 2017; Kennedy et al., 2017)	• Survey Question 24: 1 participant recommended having previous patients attend the education class (see Appendix I) • Qualitative Theme 4
Education should be mandatory, or at least highly encouraged (Clarke et al., 2012; Chen et al., 2014; Edwards et al., 2017; Spalding, 2003)	• Survey Question 24: 10 participants wanted to make pre-operative education mandatory (see Appendix I) • Qualitative Theme 1 and Theme 4
Provide online or other distance options for those who cannot attend in-person	• Survey: Online education was reported by 118 (25.2%) nurses and nurses most frequently wanted to add online education as a delivery method (222; 47.3%) for optimal education • Survey Question 24: 10 participants wanted to offer distance options for those who could not attend (see Appendix I) • Qualitative Theme 2 and Theme 4
Assess knowledge to ensure understanding or pre-operative education	• Survey Question 24: 3 participants felt it was important to assess learning (see Appendix I) • Qualitative Theme 2
Address health literacy, language barriers, and learning styles (CDC, 2016; Cutilli, 2006; Dreeben, 2010; Falvo, 2011)	• Survey Question 24: 4 participants wanted to address health literacy, language barriers, and/or learning styles (see Appendix I) • Qualitative Theme 2

Benefits of Pre-Operative Education

Participants in this study expressed that patients who attended pre-operative education had increased preparation for the post-surgical phase, more accurate expectations, improved functional status, and lower rates of post-operative complications. Some of these perceived benefits have been supported by prior research. Improved rehabilitation performance has been previously linked to attending pre-operative education before orthopedic surgery, as well as reduced anxiety, better patient knowledge recall, and increased preparation for surgery (Bob et al., 2015; Chen et al., 2014; Kearney et al., 2011; Spalding, 2003). Additionally, fall risk while in the hospital was found to be reduced for patients who attended pre-operative education before TKR (Clarke et al., 2012). Previous systematic reviews have not found strong evidence to support pre-operative education over standard patient care for patients undergoing TKR and THR, however, these reviews did not capture studies completed below the randomized-controlled trial level that have demonstrated improved outcomes post-surgery for these populations (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Future research should continue to assess the efficacy of pre-operative education to improve patient outcomes following TKR.

Despite the need for continued research regarding the outcomes of education before surgery, pre-operative education was perceived by participants in this study to provide many positive benefits for patients both before and after surgery. Based on results from survey responses and qualitative interviews, it is recommended that pre-operative education be mandatory or highly encouraged for patients with planned TKR surgery. This would necessitate support from orthopedic surgeons to require patient

attendance prior to the surgical procedure. For settings where education is not mandatory, the lead education provider or coordinator should contact patients to encourage attendance and schedule patients for pre-operative education to increase attendance rates.

Interprofessional Practice and Pre-operative Education

The majority of participants reported providing pre-operative education as part of an interprofessional team. Nursing was the most frequently reported provider, followed by physical therapy and occupational therapy. Previous literature has found nursing and physical therapy to be most commonly involved in pre-operative education before TKR, however, occupational therapy has not been reported as often as a pre-operative education provider for this population which contradicts the findings from this current study (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Previous systematic reviews that have described the disciplinary composition of pre-operative education have only described programs from the study settings that were included in the review, and may not have provided a representative picture of program design nationally. Participants in this study reported factors such as time conflicts or difficulty managing both clinical patient care with teaching responsibilities that limited involvement from multiple disciplines at some facilities; similar barriers are reported in the literature (White et al., 2013). Additionally, some providers felt that they were able to cover content from other disciplines in addition to nursing specific information. Others participants described understanding where role overlap might occur across disciplines, but also recognized that some disciplinary-focused knowledge might be better covered by a specific health care discipline for more depth. Having more members of the health care team represented in

pre-operative education may lead to more thorough preparation and the ability to better answer patient questions.

Participants in this study reported through both quantitative and qualitative data that they valued the use of interprofessional teams for pre-operative education and felt that this collaboration strengthened the education program. It is recommended that multiple disciplines participate in providing education before surgery, with essential members including nursing, physical therapy, and occupational therapy, among other providers. A common role for nursing includes coordinating care with a wide variety of disciplines (ANA, 2017), and this positions the profession to be a lead provider of pre-operative education. Nurses are essential for organizing and guiding pre-operative education, and should be supported with the participation of other health care providers. For facilities where it is not possible for some providers to participate in-person, it is recommended that providers use other methods to participate such as: assisting with developing written materials for the education program, creating videos that can be shown in class regarding important areas of disciplinary instruction, providing patients an avenue to ask questions for specific providers outside of the class, and contributing in other ways such as assisting with the development of online education materials.

Interprofessional collaboration has been associated with many positive health outcomes such as shorter length of stay, fewer hospital readmissions, lower cost, reduced errors, and even reduced mortality (World Health Organization, 2010). Some participants in this current study expressed ways that they had maintained strong interprofessional involvement for their orthopedic program, such as meeting regularly, having frequent communication with other health care disciplines, and respecting other members of the

health care team. Having regular, open communication has been previously identified as an important feature of effective interprofessional collaboration (Jacob, Roe, Merrigan, & Brown, 2013). It is also important to have a strong understanding of one's own role, as well as the roles of other health care disciplines (White et al., 2013). Previous research reflects strong outcomes associated with interprofessional collaboration, supporting the use of multiple providers for pre-operative education. However, the most effective team of health care providers has not yet been determined. This is an area for future research.

Pre-operative Education Program Format

Group education was the most common educational format in this study, followed by a combination of group and individual education. Previous research has reported that education sessions were more evenly divided between programs that provided individual education or group education, rather than a combination of both approaches (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Participants in this study reported benefits of various program formats, such as the ability to address sensitive questions in one-on-one sessions as well as learning from other patients' questions and experiences when educated together. Additionally, more than half of participants in this study reported educating patients with TKR together with other diagnoses. This was perceived overall to be successful due to an overlap of content across diagnoses, however nurses expressed that if other surgeries (such as TSR or THR) became more frequent at their facilities, this might cause difficulty in the future with this design. Research is needed to determine the optimal format of pre-operative education, such as group or combination approaches, in relation to patient outcomes following surgery.

Based on survey responses and interviews from this study, it is currently recommended that education be provided in a combination of group and individual format to allow participants to benefit from both program designs (Edwards et al., 2017). It is also recommended that patients either be educated separately from other patient diagnoses before surgery, or that combined education classes be mainly limited to only including those who are scheduled for THR. Participants overall reported that other surgeries, such as TSR, varied too much regarding precautions and adaptive techniques for functional tasks compared to TKR surgery. If surgical caseload for patients undergoing THR increased at an individual facility, it is then recommended to separate classes for those undergoing TKR and THR procedures.

Additional areas related to the format of pre-operative education include asking caregivers and previous patients to attend. Whether education is provided to individuals or a larger class, it is recommended that caregivers participate so that they can hear and understand the same information that is being provided to the patient. Participants in this study reported on surveys and through interviews that it was important to have caregiver involvement to help the patient remember essential information related to their surgery and the recovery process, and this has also been recommended in the literature as social support is one of the most important factors influencing length of stay and discharge disposition (Edwards et al., 2017; Napier et al., 2013; Tan et al., 2014). Nurses in this study also reported that patients valued hearing from those who had previously undergone TKR to answer patient questions and provide realistic information regarding their own personal experiences with the procedure; these benefits have also been previously reported in prior research from patient perspectives (Causey-Upton & Howell,

2017; Kennedy et al., 2017). Therefore, it is recommended based on this current research study that patients who have previously undergone TKR be invited to attend pre-operative education class sessions to share their story and answer questions. This may provide comfort to patients as they learn from someone else who has successfully navigated the recovery process before them.

Educational Topics

Previous research has reported the following common topics being addressed in pre-operative education for TKR, which aligns with a higher frequency of reported inclusion in this current study: preparing for surgery, the recovery process, what to expect while in the hospital and after surgery, self-care, functional mobility, adaptive equipment, managing pain, safety at home, exercise, and precautions (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Even though these topics were addressed in pre-operative education, previous research has shown that patients do not have accurate expectations regarding some of these areas, such as pain levels after surgery and expected functional performance (Goldsmith et al., 2017; Westby & Backman, 2010). Additionally, orthopedic nurses in this study reported that these topics were difficult to cover in pre-operative education in a way that patients could understand and remember.

Providers reported through both survey and interview data, important topics that were currently included in education as well as content areas that should be added to their current program design. These responses provide a beginning foundation for recommended content areas to include in education before surgery, however, education must also be individualized per patient. For example, participants in this study reported needing to cover additional content, such as nutritional information for patients who have

a co-morbidity like diabetes, to fully meet patients' needs. Shared content areas could be covered in group education while information for specific patients could be provided during an individual portion. Other options include adding a decision tree to online components of education where patients are asked to respond to questions about their circumstances that would lead them to specific educational information. Workbooks provided to patients before surgery could follow a similar format, with patients being guided toward certain sections of the workbook based on their personalized needs. Further research is needed to determine the optimal topics that should be included in pre-operative education as a baseline to support readiness to return home after surgery, as well as how to accurately relay expectations regarding difficult concepts such as pain intensity and short length of stay with expected discharge to home, for the post-operative phase.

Educational Delivery Methods

Most participants in this study reported using multiple instructional methods to deliver pre-operative education at their facilities. Verbal instruction was most common, followed by the use of written educational materials which aligns with previous research (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Patients have reported verbal education, followed by video, as their main preferred educational delivery format (Chetty & Ehlers, 2009). Some studies have examined the combination of video and verbal education, but did not find significant outcomes compared to verbal instruction alone (Rastogi et al., 2007; Leal-Blanquet et al., 2013). Orthopedic nurses in this study expressed that multiple delivery methods were useful to ensure patient understanding through repetition, as well as to provide material resources for patients to

refer to following the course. Providers also reported that utilizing diverse methods allowed them to address multiple learning styles, which have been reported previously to relate to ways of receiving information that may support individuals best for learning (Edwards et al., 2017; Kennedy et al., 2017; Kolb & Kolb, 2005). Offering multiple methods of educational delivery, such as online education, may also address the needs of individuals who may be unable to attend pre-operative education due to pragmatic barriers like geographic distance or work schedules. Based on participants' survey responses and qualitative interviews, it is recommended that education be provided through multiple formats to address various learning styles, to increase retention, and to provide distance options for those who are unable to attend in-person. The best combination of methods for proving pre-operative education prior to TKR has not been determined in the literature and should be examined in future research.

Any written information must be tailored to patients' health literacy levels in order to be effective, which was acknowledged by some participants in this dissertation study (Dreeben, 2010; Edwards, Mears, & Barnes, 2017; Falvo, 2011). Only 12% of adults in the United States are able to fully understand all health information provided to them by their physician (CDC, 2016). Based on combined survey and interview results from this study, it is recommended that education materials provided to patients be assessed for readability, such as using tools like the Suitability Assessment of Materials (SAM), and that materials should be written at a lower reading level to increase understanding (Cutilli, 2006). Additionally, it is also recommended that language barriers be addressed through the appropriate use of interpreters and providing written materials in the patient's preferred language based on participants' responses in this study.

Addressing cross-cultural communication is essential to ensuring patient understanding of important information and instructions (Falvo, 2011). Pre-operative education providers must ensure their competence for providing education to patients with diverse cultures and health literacy levels, which may require additional training and professional development.

Timing of Pre-operative Education

The majority of participants reported providing pre-operative education within four weeks of the scheduled surgery, similar to previous systematic reviews that have documented the timing of pre-operative education for included studies (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). In this current study, two or three weeks was most commonly reported, but the range of timeframes varied from less than one week in advance of surgery to eight weeks or more. However, most participants reported on the survey that two weeks prior to surgery was ideal, followed by three weeks. Patients reported similar optimal timeframes for education to be provided in the qualitative interviews. Based on these responses, it is recommended that education be provided between two and three weeks before surgery and no more than one to four weeks in advance of the scheduled procedure. The two to three week timeframe would allow enough time for patients to implement suggestions, begin achieving strength gains from exercise, and purchase needed adaptive equipment, but may not be so far in advance that patients would be likely to forget important information. However, some facilities may need to adjust timeframes due to pragmatic features, such as needing to schedule education further in advance to allow a larger surgical caseload of patients enough time to complete pre-admission laboratory testing. The length of time before surgery that

education should be provided has not been examined previously, and presents an area for future research to determine the best timeframe for this education.

Most pre-operative education sessions were provided in a single visit and lasted between one and two hours. Descriptions of program length reported in the literature have varied from 12 minutes to half a day (Louw et al., 2013; McDonald et al., 2004; McDonald et al., 2014). Participants in this study reported that class length was determined by multiple factors, such as the amount of information that needed to be covered, the number of patient questions during the session, and considerations for patient comfort due to having advanced osteoarthritis. Most participants reported through survey responses and qualitative interviews that education sessions should last one hour or more, but that longer sessions were not ideal for learning and retention. It is recommended that education sessions last between 1 and 1.5 hours to allow enough time to cover important content and provide patients opportunities to ask questions, as well as to avoid overwhelming patients or causing discomfort due stiffness from osteoarthritis that could limit learning. It is also recommended based on nurses' responses in this study that education be provided in a single session or a maximum of two sessions along with providing additional resources for patients to continue learning outside the course, in order to limit the burden of travel for patients. The length and number of optimal sessions for education prior to TKR surgery should be examined to determine guidelines for best practice.

Limitations

Because the survey link was universal (to maintain anonymity), it was possible that participants could have forwarded the survey to another provider outside the

nursing field, although not initially targeted for the sample. Participants were advised not to forward the survey link to others in the recruitment email to allow the researchers to determine an accurate response rate for the survey. It is also possible that some participants may have taken the survey more than once due to receiving multiple emails to increase response rate throughout the three phases of recruitment. However, participants were advised in the recruitment email not to complete the survey again if they had already done this previously. The longer timeframe between the initial recruitment email and the second survey invitation may have impacted response rate. If potential participants forgot about receiving the email request in November 2017, they may have inadvertently completed the survey twice because they may not have remembered completing it previously. Additionally, potential participants may have ignored the urgency of the reminder emails from the second and third round of recruitment, perceiving these instead to be initial or secondary requests, and may have chosen not to complete the survey at that time.

Another limitation of this study is the sampling frame used for study recruitment. Because there is not a single database or registry that lists all facilities or all providers who participate in pre-operative education before TKR surgery, it was necessary to select an organization that would include members who would be most likely to be involved in education prior to knee replacement surgery. However, recruiting through NAON meant that some orthopedic and other nurses who provide this education were excluded from participation in this research, as well as other disciplines such as occupational and physical therapy.

Participants from 44 states completed the survey, but pre-operative education programs in the remaining six states could differ from the study sample. All geographic regions of the United States were included in this research, which limits the impact of these missing locations. Additionally, the survey was previously piloted on a small sample of interprofessional health care providers, which differed from the sample in this study. Targeting orthopedic nurses for the pilot survey may have resulted in different suggestions for additional question or response items, or other diverse feedback, than the nurses, physical therapists, and occupational therapists who participated in pilot testing provided. However, the pilot process did ensure that the online delivery mode of the survey through REDCap would be successful and also allowed participants to provide feedback to increase understanding of the survey for respondents in this current mixed-methods study.

Summary

This mixed-methods study was needed to provide a thorough description of pre-operative education programs across the United States as well as providers' perceptions of these education programs. A total of 599 participants completed a portion of the survey, with 469 providing detailed information about the program at their facility as providers of pre-operative education for TKR. Ten orthopedic nurses from this sample participated in follow-up telephone interviews to provide their perceptions regarding pre-operative education. Previous descriptions of pre-operative education programs in the literature are limited, and present variable program designs. This large, national survey was needed to fully describe the content, providers, and delivery methods of pre-operative education for TKR patients across the United States with a representative

sample. The combined results of the quantitative and qualitative portions of this study could be used to inform future research to examine the effectiveness of various program designs in order to develop programs that will support better post-operative outcomes. Other future studies could examine pre-operative education for diagnoses that have not been commonly studied, such as total shoulder replacement. Patient perceptions of the adequacy of pre-operative education for various diagnoses should also be explored to guide changes to program design to better meet their needs.

Chapter Six

Synthesis of Dissertation Results

Introduction

This dissertation research sought to explore aspects of readiness for discharge related to total knee replacement (TKR) surgery, including pre-operative education as a beginning step in this preparation process. The first qualitative study explored patients' experiences when preparing to discharge home from the acute care hospital after TKR surgery. This research was followed by a pilot survey study to begin to describe pre-operative education programs for TKR across the United States. The last study examined pre-operative education for TKR through a large national survey and qualitative interviews with orthopedic nurses to describe their experiences with providing education before surgery. This chapter will briefly review the procedures and results from each study and will discuss the implications of this dissertation research as well as identify areas for future research.

Research Studies

Study 1

The first study examined patients' experiences when preparing for discharge home from the hospital following TKR surgery. Four patients who had undergone TKR participated in semi-structured interviews either the day of surgery or on post-operative day 1. These interviews explored the physical, psychosocial, and planning processes patients engaged in before and after surgery to prepare for returning home. This research also examined patients' perceived supports and barriers for discharge preparation following surgery. Phenomenology methods were employed to examine these

experiences from the views of participants, allowing themes related to the phenomenon being studied to emerge directly from their words (Creswell, 2013).

The following overall three themes related to preparing for discharge home emerged from the study: being supported for discharge home; having confidence in self, family and health care staff; and persevering: overcoming obstacles. Overall, patients felt prepared for discharge home following their knee replacement. Patients expressed that they need someone to support them at home after discharge and that feeling safe both in the hospital as well as for discharge were important for their preparation. Attending pre-operative education, having friendly and knowledgeable staff, and having prior experience with TKR through others increased confidence for returning home. Patients found pain to be a normal experience after TKR and handled unexpected events as a part of the recovery process for discharge home, however some were unprepared for the amount of pain they experienced. Patients also completed preparation before surgery to address higher level occupations, such as cooking and cleaning, to be ready for the post-operative phase.

When patients discussed pre-operative education, they expressed that this education increased their confidence because it prepared them for the future and what to expect related to their recovery after surgery. Being able to ask questions and have these answered during pre-operative education was also highly valued by patients in the pre-surgical phase. Some patients expressed the importance of having a family member with them during pre-operative education so that another person would be aware of recommendations and what to expect after surgery in addition to the patient. For one patient who did not attend pre-operative education, she still felt prepared for her surgery

because the surgeon provided some education before surgery and she also learned about TKR through the experiences of a family member who had already undergone the same procedure.

The results from study 1 impact rehabilitation providers by identifying factors that increase readiness for discharge, as well as those that might hinder this preparation such as unexpected levels of pain. Pre-operative education emerged as an important first step in the process of readying patients for returning home following knee replacement. This study, along with a review of the literature, guided the next step of this dissertation to examine the current structure of pre-operative education programs across the United States. Participants in study 1 identified pre-operative education as significant for their discharge preparation, yet the design of these programs vary across settings and a standard of practice for this education has not been identified in the literature. The current structure of pre-operative education needed to be described as a basis for future research to determine the efficacy of these program designs once they were identified, beginning with a small pilot study using an online administration format.

Study 2

The second study explored the content, providers, and delivery methods of pre-operative education programs for TKR surgery across the United States. This research was conducted using an anonymous pilot survey that was administered online via the Research Electronic Data Capture (REDCap). The survey consisted of both closed-ended and open-ended questions related to demographic information, the current structure of pre-operative education at the participant's facility, the ideal structure for pre-operative education programs, and feedback on the design of the survey itself. Seven participants

total including occupational therapists, physical therapists, and nurses completed the survey during the study timeframe.

Participants reported that pre-operative education for TKR was most frequently provided by nurses, physical therapists, and occupational therapists. Education was typically provided two weeks before surgery in a group setting, with most programs providing this education in a single session that lasted between 1 and 1.5 hours. Verbal and written instruction were the most commonly utilized methods to deliver education. The most common topics included in these programs were: what to expect while in the hospital, self-care, adaptive equipment, and home safety. A variety of other topics were included, with some variation of content across programs.

Participants identified some discrepancies between their current program design and the optimal design for pre-operative education. Functional mobility, anatomy of the knee joint, home modifications, instrumental activities of daily living (IADLs), caregiver training, and expected functional outcomes were all identified as content that some participants felt should be added to the education program at their facility. Additional providers were also identified that would be valuable to add to the pre-operative education team including case management, social work, and the physician assistant or surgeon. Participants did not have recommendations for any alterations to the timing of pre-operative education, however one participant did identify that video could be a valuable delivery method to add as well as separating the class for patients who are undergoing TKR and total hip replacement (THR).

Study 2 impacts rehabilitation providers by beginning to describe the current structure of pre-operative education programs as well as identifying providers'

perceptions of potential alterations to program design that may improve the efficacy of this education. Additionally, alterations to the survey for a future study were guided by participants' responses on survey items as well as by recommendations provided by participants to further improve the design of the survey. Information gained from study 2 was used to guide study 3, which sought to identify the content, providers, and delivery methods of pre-operative education in the United States on a large, national scale using a representative sample. Additionally, this study was needed to qualitatively explore providers' perceptions of providing pre-operative education as well as the optimal design for education prior to TKR surgery.

Study 3

The final dissertation study explored the content, providers, and delivery methods of pre-operative education programs in the United States for TKR surgery. Additionally, this study also explored providers' perceptions of the optimal program structure for pre-operative education prior to TKR. This research was conducted using an anonymous survey completed through REDcap. The survey was comprised of closed-ended and open-ended questions regarding the following: demographic information, the structure of current pre-operative education programs at participants' facilities, and their perceptions of the ideal pre-operative education program structure. There were 599 participants total who were orthopedic nurses and members of the National Association of Orthopaedic Nurses (NAON) that completed some or all of the survey. The survey was followed by qualitative interviews with 10 orthopedic nurses who indicated their interest in completing a follow-up telephone interview at the end of their survey. Interviews were

transcribed verbatim and analyzed for common themes using transcendental phenomenology.

The most common pre-operative education provider reported by participants was nursing followed by physical therapy, occupational therapy, case management, and social work. This education was most often provided in a group format, followed by a combination of both individual and group education. The majority of orthopedic nurses reported that patients with planned TKR were educated together with patients who had other diagnoses, most commonly THR. Education was most frequently provided two weeks before surgery followed by three weeks, and education that occurred less than 1 week before surgery or more than five weeks prior to TKR was less commonly reported. Classes lasting between 1 hour and less than 1.5 hours were most common, followed by classes that were 1.5 hours to less than 2 hours in length. Verbal and written instruction were the most frequently utilized methods to deliver education, while client demonstration/teach back method and online education were least common. The most common topics included in these programs were: how to prepare for surgery, the recovery process, what to expect while in the hospital, managing pain, exercises to complete before and/or after surgery, and home safety. A variety of other topics were included, with some variation of content across programs.

Participants provided information regarding what they perceived to be the optimal program design for pre-operative education, which differed at times from current program design. Case management was most commonly identified as a provider that participants wanted to add to their education team, followed by pain management, home health care, social work, dietetics, physical therapy, and occupational therapy. Several

additional providers were also identified that participants wanted to add to their education team such as anesthesia, pharmacy, physician assistant, and diabetes educator. The most common topics that participants wanted to add to their pre-operative education program included in order of frequency: nutrition, caregiver training, edema management, and instrumental activities of daily living. The most frequent educational delivery method that participants wanted to add was online education, which was followed by video and client demonstration/teach back method. Participants were close to evenly split regarding their preferences for educating patients with planned TKR together or separately from others who had different planned surgical procedures. Two weeks was the most preferred timeframe for providing education prior to surgery, followed by three weeks. One session of pre-operative education was considered to be optimal by the majority of respondents and most participants felt that the ideal session length would be 1 hour to less than 1.5 hours, followed by 1.5 hours to less than 2 hours.

Four overall themes emerged from the qualitative portion of the final dissertation study: knowledge is power for patients and providers; education should be consistent, individualized, and evidence-based; interprofessional practice is important, but is limited by barriers; and pre-operative education is guided by pragmatic considerations. Participants felt that education prior to TKR surgery was valuable and perceived many positive benefits of pre-operative education for their patients, such as increased preparation for the post-operative phase, fewer complications, and improved functional outcomes. Orthopedic nurses also felt that training was important for themselves to ensure that they were prepared to provide education for TKR patients prior to surgery. Preparation included many avenues, such as additional academic preparation,

certifications, observing other pre-operative education providers within their own facilities, and learning from other outside programs. Orthopedic nurses felt that good pre-operative education was consistent, individualized, and evidence-based. Providers perceived consistent education to have the following properties: being the same across all time points, providers, and educational materials. Individualized education accounted for each patient's knowledge level, learning style, language needs, and other factors such as co-morbidities. All participants acknowledged that pre-operative education should be continually updated based on patient outcomes and research evidence.

Participants identified barriers that impacted their ability to include multiple members of the health care team within the pre-operative education course, but expressed that they valued interprofessional practice. Some of these barriers included time conflicts, other provider role responsibilities, and the large size of the education class. If providers were not able to be involved directly in the course, orthopedic nurses tried to involve disciplines in other ways such as developing materials for the course, scheduling post-operative visits prior to surgery, or worked together to communicate after surgery to ensure that patient needs were fully met through a multidisciplinary approach. Participants reported that the structure of pre-operative education was influenced by various contextual factors. The size of a class was found to impact the number and type of patient questions. Patient comfort related to advanced osteoarthritis was a factor that influenced course length as well as the need to incorporate breaks to account for discomfort while sitting for long periods of time. If multiple patient diagnoses were included together in a course, this was found to lengthen the education class. Many other

contextual and environmental factors were found to influence course design for pre-operative education.

Study 3 impacts clinicians by providing a thorough description of current pre-operative education programs for TKR surgery across the United States as well as identifying providers' perceptions of these current programs and the optimal design for pre-operative education. This final dissertation study was guided by the results from study 1 and study 2 that identified pre-operative education as a factor impacting patients' preparedness for returning home after TKR and that piloted the survey which was needed to describe pre-operative education with a broad, representative sample. Information from the final dissertation study can be used to guide the development of more effective pre-operative education programs to increase readiness for discharge home following TKR surgery. It can also be used as a basis to compare to patients' perceptions of pre-operative education prior to TKR surgery in future research studies.

Overall Summary

Each study from this dissertation added to the current knowledge base regarding pre-operative education and patient readiness for discharge. Both patients and providers recognized the importance of pre-operative education as a factor that supported preparedness for returning home from the hospital by increasing knowledge regarding what to expect after surgery. While patients overall felt ready for discharge following TKR, they did identify some aspects of recovery that they were not fully prepared to experience. Pain was an aspect identified by both individuals who underwent TKR and providers that may not fully align with patients' expectations for the post-surgical phase and needs to be more adequately covered in education provided prior to surgery.

Descriptions of pre-operative education varied across participants, but commonalities were identified for each aspect of program design along with common perceptions regarding the optimal structure of pre-operative education. These results can be used to guide future research as well as to develop a model for providing pre-operative education prior to TKR surgery. Detailed implications of these dissertation studies along with a proposed model and plans for future research are discussed in the sections that follow. Some main recommendations from this combined research for rehabilitation providers are presented below:

- Rehabilitation providers, including occupational and physical therapy, should be involved in pre-operative education before TKR surgery due to their expertise regarding content areas that are important to patients as well as topics that are commonly included in pre-operative education programs.
- Occupational and physical therapists are essential providers in the post-operative phase after TKR surgery to increase readiness for discharge as well as to support safe and optimal functioning for the home environment.
- Rehabilitation providers should include caregivers in education both before and after TKR surgery. It is essential for the patient's support system to have accurate expectations regarding the post-surgical phase and to understand important recommendations to support the patient's safety and independence after surgery.
- Occupational therapists should address higher level occupations both before and after surgery, as these have been identified as important patient concerns and as an area that many providers want to add to pre-operative education programs.

- Physical and occupational therapists must provide patients with information regarding typical recovery and when patients can expect to return to normal activities after surgery, as many patients have unrealistic expectations regarding expected function in the months following TKR surgery.

Implications

This dissertation study provides perspectives of both patients and providers regarding readiness for discharge and pre-operative education. Based on the combined results from study 1, study 2, and study 3, the following recommendations are proposed:

- Patients should be required or highly encouraged to attend pre-operative education before TKR surgery. Those who attend pre-surgical education may benefit by having reduced risk for falling, improved pain control, less anxiety, shorter length of stay, and increased readiness for surgery (Chen et al., 2014; Jones, et al., 2011; Kearney et al., 2011; McDonald et al., 2004; McDonald et al., 2014; Spalding, 2003). Increased attendance may be achieved by scheduling patients for pre-operative education, strongly encouraging attendance, or by making courses mandatory. Offering multiple class times and dates can promote better alignment with patients' schedules. For patients who cannot attend in person, offering online education and mailed handouts would support those in distant geographic locations as well as those who have work conflicts.
- Multimodal education should be utilized for pre-operative education to address diverse learning needs and styles. Individuals may learn best from different approaches, such as auditory or tactile learning, and utilizing multiple approaches allows educators to support a wider range of learners (Kolb & Kolb, 2005).

Additionally, providing education in multiple formats provides an opportunity to reinforce content, which has been found to increase understanding and retention (Edwards et al., 2017).

- Written materials for pre-operative education should be assessed to determine readability, and health literacy should be evaluated for individual patients. Tools such as the Suitabilty and Assessment of Materials (SAM) can be utilized to evaluate health education materials (Cutilli, 2006). Only about 12% of all adults in the United States have been found to be at a proficient level for understanding all text and numerical content they receive from a health care setting (CDC, 2016). Education materials must be written at a lower level of readability and learning should be assessed during pre-operative education to ensure patient understanding, such as by asking patients to repeat back information or demonstrate skills learned in class.
- Pre-operative education should incorporate interprofessional practice to capitalize on each provider's knowledge and skills to prepare patients for discharge home. Multiple positive outcomes have been associated with interprofessional practice such as shorter length of stay, increased patient satisfaction, fewer hospital readmissions, and lower mortality rates (Fewster-Thuente & Velsor-Friedrich, 2008; White et al., 2003; World Health Organization, 2010). Nurses in the third study often felt as though they could cover information in pre-operative education for other providers, although some expressed that they are not able to do this at the same level of depth as other disciplines. Providers who are involved in pre-operative education should receive education and training regarding the benefits

of interprofessional practice and how to implement this successfully for TKR patients. Providers need to schedule regular meetings with other disciplines to ensure frequent open communication and collaboration. Additional staffing may need to be scheduled to free up representatives from each discipline to attend these meetings as well as to participate in pre-operative education classes.

- While there is no definitive best timeframe for pre-operative education to be delivered that has been identified in the literature, this education may be most useful if delivered between one and four weeks prior to surgery. Nurses in the third dissertation study reported that patients who received education closer to their surgery date, such as less than one week, felt unprepared and wished they had received the information sooner. Using a one to four week timeframe may allow time for patients to implement recommendations from pre-operative education, but also limit the amount of time available for patients to forget important content from the course.
- Patients may benefit most from a combination of group and individual education, and the recommendation from this dissertation is to provide this combination when possible. Individual education can be used to address sensitive questions or to tailor education to patient's comorbidities or other individual needs, while group education allows patients to learn from other patients' questions and develop social relationships that may last after surgery (Edwards et al., 2017).
- Social support should be assessed pre-operatively to meet the needs of patients who may have limited support after discharge. Social support has been found to be the most important factor that delays discharge after joint replacement and also

influences discharge position, with those who do not have support at home being significantly more likely to discharge to a sub-acute setting rather than directly to home after surgery (Napier et al, 2013; Ong & Pua, 2013; Tan et al., 2014). Pre-operative educators must assist patients in making plans to receive assistance and support in the post-operative phase, particularly for those who live alone.

- Patient support systems should attend pre-operative education to learn important instructions and expectations for the post-operative phase. It is recommended to have a family member or caregiver attend pre-operative education with the patient to better prepare for surgery. Individuals undergoing TKR have also reported that it is helpful to have another individual hear and remember important instructions for the post-operative phase (Causey-Upton & Howell, 2017; Edwards et al., 2017).
- Providers should educate patients about essential topics, such as functional performance after surgery and realistic pain levels, to ensure that patients have accurate expectations for the post-surgical phase. Patients have reported being unprepared for the pain levels they experience after surgery, as well as having unrealistic expectations regarding post-operative functioning, even though these topics are commonly addressed in pre-operative education (Goldsmith et al., 2017; Louw et al., 2013; McDonald et al., 2014; Westby & Backman, 2010). It is recommended that additional education be focused in this areas, including covering adjunct methods to address pain beyond just pain medication as well as discussing the typical return time for normal activities in the post-operative phase.

- Patients should be exposed to others who have undergone TKR, such as through having previous patients attend pre-operative education classes. Additionally, practitioners should address any previous experiences patients may have with TKR, both positive and negative. These previous experiences may influence patients' current expectations regarding recovery after surgery (Causey-Upton & Howell, 2017; Kennedy et al., 2017). Protocols and length of stay have changed significantly over the last few years with patients staying on average less than 2 days (Barad, Howell, & Tom, 2018), and patients may not have a realistic understanding of how brief the typical hospital stay is after TKR. Providers should educate patients on typical length of stay and expected discharge position for the early post-operative phase, and all health care disciplines must begin discharge planning from the moment of first contact with the patient.

ICF-I-EDUCATE Model

The need for a model to guide pre-operative education specifically for TKR patients became apparent after synthesizing the results of the three dissertation studies. Results indicated a need for interprofessional collaboration to fully address patient needs, as well as individualized care that acknowledges variations in patients' preparedness for discharge home following TKR. Education should also be communicated in a way that addresses cultural and literacy needs, and must be assessed to ensure patient learning. The ICF-I-EDUCATE model is proposed as a mechanism for providing client-centered and evidence-based education to support better patient outcomes. This proposed model combines interprofessional collaboration and the EDUCATE model within the context of

the International Classification of Functioning, Disability, and Health (ICF) to guide multimodal pre-operative education for TKR, and potentially other orthopedic conditions.

International Classification of Functioning, Disability, and Health

The International Classification of Functioning, Disability, and Health (ICF) was developed by the World Health Organization (WHO) in 2001 to provide an international standard for measuring and describing health in the absence or presence of disability (Falvo & Holland, 2018). This model updates older models, such as the International Classification of Impairments, Disabilities, and Handicaps (ICIDH), which failed to recognize the impact of the environment on health and functional performance. Through the lens of the ICF, health is recognized as occurring along a continuum and is influenced by a variety of factors rather than being a linear process that results in the same level of impairment for all individuals. Components of the model include the health condition (such as undergoing TKR), body functions (such as how well the knee structure bends), body structures (such as the replacement of the knee itself with prosthetic components), activity (such as ability to complete lower body dressing) and participation (such as returning to work) (Falvo & Holland, 2018). Additionally, environmental factors (such as the physical and social environments) as well as personal factors (such as age, past experiences, and other health conditions), are considered to influence health status and functional performance. The ICF guides health care providers to address patients holistically, considering the interactions of biological, psychological, and social factors as influencing functional abilities. Environmental and personal factors can be both fixed and modifiable, which will determine whether or not health care should take a compensatory or remediation approach to improve functional performance (Bartlett et al., 2006).

Individuals who have undergone TKR surgery will need care from multiple disciplines and providers to achieve successful post-surgical outcomes.

Interprofessional Practice and Collaboration

Interprofessional practice is an integrated approach to patient care from evaluation to discharge that involves providers from diverse professional backgrounds. This integrated approach is more than just practitioners sharing information, but instead involves a team of health care providers who are working together toward common goals with shared responsibility and accountability for patient outcomes (Green & Johnson, 2015). Many benefits of interprofessional practice have been reported such as cost-effectiveness, avoiding duplication of services, reducing errors, and increasing satisfaction for members of the health care team (White et al, 2013; World Health Organization, 2010). Improved patient outcomes have been demonstrated in the literature for interprofessional practice, such as increased patient satisfaction, reduced length of stay, lower rates of hospital readmission, and even reduced mortality rates (Fewster-Thuente & Velsor-Friedrich, 2008; White et al., 2003; World Health Organization, 2010). Effective interprofessional teams have the following characteristics: open communication, collaboration, a strong understanding of the roles of other disciplines as well as one's own discipline, regular team interactions, respect for other members of the team, equal standing of all members, and participation from each discipline (White et al., 2013, World Health Organization, 2010). Interprofessional practice and collaboration are necessary features of providing care for patients before and after TKR surgery due to the diverse needs of patients as well as the variety of providers

and disciplines involved in this care, such as nursing, occupational therapy, physical therapy, physicians, case management, and dieticians.

EDUCATE Model

The EDUCATE model was developed based on a literature review and survey of nursing staff to determine best practices for providing verbal education to patients and their family members or caregivers (Marcus, 2014). The model consists of 6 components which include: **E**nhance comprehension and retention; **D**eliver patient-centered education; **U**nderstand the learner; **C**ommunicate clearly and effectively; **A**ddress health literacy and cultural competence; and **T**eaching and **E**ducation goals. Marcus (2014) presents recommendations for each aspect of the model to improve verbal education. To enhance comprehension and retention, providers can ask patients to bring a list of questions that they can answer, the educator can reiterate the most important information multiple times, and patients can be asked to repeat the information in their own words. Delivering patient-centered education involves individualized approaches such as acknowledging the patient's fears and concerns as well as considering patients' life experiences. Understanding the learner requires providers to assess the patient's current knowledge as well as involve family members in the education. In order to communicate clearly and effectively, educators should present the most important information first and provide concrete instructions using easy to understand language. When providers address health literacy and cultural competence, they must ask patients if they need help understanding health information and provide supports such as an interpreter if needed due to a language barrier or disability. Additional materials should be provided to supplement, but not replace, verbal education and may include handouts and other

educational delivery methods. Goals for teaching and education should include the educator being appropriately prepared to teach, patients being prepared to learn, using strong teaching methods, and assessment of patients' learning. The EDUCATE model guides client-centered education that considers the individual needs of patients as well as potential barriers to this education, and can be used for a variety of conditions (Marcus, 2014).

ICF-I-EDUCATE Model Discussion

The ICF-I-EDUCATE model promotes effective teaching approaches that are delivered through an interprofessional team. Incorporating the ICF model ensures that providers consider environmental and personal factors that will determine individual patient needs after surgery as well as variations in discharge readiness (Falvo & Holland, 2018). The ICF should be considered as the underlying component of the model to assess patients' health and functional status. This would include asking patients about their physical home environment, social support, other health conditions, previous experiences, education level, learning style, and additional factors that could impact discharge readiness as well as rehabilitation potential. Features of body functions and structures, such as pre-operative strength and range of motion, could be assessed along with discussing activities and occupations that the client currently has difficulty with or has concerns about performing after surgery. The EDUCATE model does not address interprofessional collaboration directly, however involvement of multiple providers is addressed by the proposed model from this dissertation to allow patients to achieve the many benefits of collaborative practice that has been previously reported in the literature. Inclusion of multiple providers, including rehabilitation, would allow patients to have

concerns related to physical deficits and occupational performance addressed both before and after surgery.

The recommendations from the EDUCATE model should be incorporated to guide the education session to promote learning. While education should be individualized to meet patient needs, using a combination of both individual and group education would allow patients to achieve the benefits of both approaches. Educational approaches to ensure recall may include using multiple educational modes which could address preferred learning styles identified through the application of the ICF. The EDUCATE model also promotes understanding the learner and addressing health literacy along with cultural competence, which could be explored through applying the ICF model for individual patients pre-operatively. Educators should present information clearly and effectively such as by discussing important information first and allowing time for patients to ask questions. Teaching and education goals should be established both at the program level as well as the individual patient level, based on needs identified through assessing the patient through the lens of the ICF. The combination of the three parts of the ICF-I-EDUCATE model can guide effective education that is individualized and that is provided through a collaborative approach to support improved patient outcomes. This model should be expanded and further explored as a support for education prior to surgery to better prepare patients for discharge home.

Future Research

This dissertation research should be expanded for future scholarship to further explore readiness for discharge and pre-operative education. An assessment could be developed to examine discharge readiness specifically for patients who have undergone

TKR surgery and/or other joint replacements with planned return to home. This assessment would need to be studied to establish psychometric properties and scores that would correlate with how prepared patients are for discharging home following TKR. The assessment could be further examined in relation to patient outcomes, such as predicting hospital readmission, fall risk, and other complications post-surgery. Discharge readiness should also be explored for other surgeries, such as total shoulder replacement, rotator cuff repair, and ankle replacement. Additionally, pre-operative and post-operative rehabilitation procedures for TKR and other diagnoses should be explored to describe current practice trends as well as to further examine the efficacy of these approaches. In particular, research regarding occupational therapy is not well established for orthopedic conditions both prior to and following surgery. When CINAHL was used to search the literature using "occupational therapy" and "total knee replacement," this only resulted in 9 returned articles; however, using "physical therapy" and "total knee replacement" resulted in 83 articles returned at the time of this dissertation. When the same search was conducted using "total knee arthroplasty," five articles were identified for occupational therapy and 203 articles are returned for physical therapy. Describing and establishing occupational therapy's role within the interprofessional team for orthopedic clients may result in improved outcomes for patients following orthopedic surgery. Additional research should be conducted to determine the best methods for interprofessional collaboration both pre-operatively and post-operatively for patients who undergo TKR surgery. The ICF-I-EDUCATE model should be explored as a guide for pre-operative education to determine its impact on post-surgical outcomes. Exploring

providers' perceptions of the roles of other disciplines for pre-operative education may also provide important information related to interprofessional practice.

This dissertation research described current pre-operative education for patients with planned TKR surgery, and should be expanded to establish best practice methods. Intervention studies should be conducted to determine the most effective content, timing, and delivery methods for this education. Pre-operative education should also be described nationally for other diagnoses such as total hip replacement and total shoulder replacement. This research could be followed by studies to examine the efficacy of these program designs once their structures are fully known. Post-operative education should be explored for TKR and other orthopedic conditions to establish its impact on patient readiness for discharge and to describe current practice trends for this education. In addition to exploring providers' perceptions of pre-operative education, patient perceptions should also be studied to determine what components of education are most helpful in preparing patients for surgery and discharge home, as well as areas where patients are not as prepared that should guide alterations to current program designs to improve outcomes after surgery.

Conclusion

This dissertation research began by exploring patients' experiences when preparing for discharge home following TKR surgery. Results from this first study guided the remainder of the dissertation to examine the structure of pre-operative education nationally as a mechanism for preparing patients for surgery and the post-surgical phase. Providing consistent information to patients pre-operatively and post-operatively as well as ensuring that patients have accurate expectations following surgery

were identified as significant components of discharge readiness. Pre-operative education should include individualized, client-centered approaches that are guided by evidence to support improved patient outcomes. Perioperative inteprofessional collaboration is necessary to ensure readiness for discharge for patients who undergo TKR surgery. The ICF-I-EDUCATE model can be used as a guide for better preparing patients for discharge home through pre-operative education.

Appendix A: Discharge Readiness Informed Consent

Consent to Participate in a Research Study

Discharge Readiness After Total Knee Replacement Surgery

Why am I being asked to participate in this research?

You are being invited to take part in a research study about readiness for discharge after total knee replacement surgery. You are being invited to participate in this research study because of your recent surgery and experiences preparing for discharge home. If you take part in this study, you will be one of about 10 people to do so.

Who is doing the study?

The person in charge of this study and the sole researcher is Renee Causey-Upton at Eastern Kentucky University.

What is the purpose of the study?

The purpose of this study is to describe patients' experiences of preparing for discharge following total knee replacement and to gain an understanding of what factors impact subjective readiness for return to home following orthopedic surgery. By doing this study, I hope to learn about the experiences of patients who complete the process of preparing for discharge after total knee replacement.

Where is the study going to take place and how long will it last?

The research procedures will be conducted at Saint Joseph East Hospital. The researcher will come to your hospital room to complete an interview regarding your experiences. This visit will take about 30 minutes. The total amount of time you will be asked to volunteer for this study is one time over the next two-four days, depending on your length of stay in the hospital. You may be contacted by the researcher after discharge for one 15-30 minute phone call if you agree to this follow-up contact.

What will I be asked to do?

You will be asked to participate in a 30 minute interview. The researcher will ask questions regarding your experiences related to preparing for returning home after total knee replacement. The interview will be tape recorded and the researcher will later transcribe the interview word for word.

Participants will be chosen for this study based on having undergone a recent total knee replacement and having experienced the process of preparing for discharge home following surgery. Attempts will be made to include participants who have a variety of experiences, such as shorter and longer lengths of stay. Some participants who agree to follow-up by the researcher after discharge will be contacted by telephone to confirm the accuracy of the researcher's understanding of their experience.

Are there reasons why I should not take part in this study?

To the best of my knowledge, there are no known medical reasons that you should not take part in this study. Participants who are under age 18 and who have undergone total knee replacement in the past will not be asked to participate in this study.

What are the possible risks and discomforts?
To the best of my knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life.

Although I have made every effort to minimize this, you may find some questions I ask you to be upsetting or stressful. If so, I can tell you about some people who may be able to help you with these feelings.

You may, however, experience a previously unknown risk or side effect.

Will I benefit from taking part in this study?

You will not get any personal benefit from taking part in this study. Participation in this study will not impact your length of stay in the hospital or any resources that you will be provided with during your stay.

Do I have to take part in this study?
If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering.

If I don't take part in this study, are there other choices?
If you do not want to be in the study, there are no other choices except to not take part in the study.

What will it cost me to participate?
There are no costs associated with taking part in this study.

Will I receive any payment or rewards for taking part in the study?
You will not receive any payment or reward for taking part in this study.

Who will see the information I give?
Your information will be combined with information from other people taking part in the study. When I write up the study to share it with other researchers, I will write about this combined information. You will not be identified in these written materials.

I will make every effort to prevent anyone who is not on the research team from knowing that you gave me information, or what that information is. For example, your name will be kept separate from the information you give, and these two things will be stored in different places under lock and key.

However, there are some circumstances in which I may have to show your information to other people. For example, the law may require me to show your information to a court or to tell authorities if I believe you have abused a child or are a danger to yourself or someone else. Also, I may be required to show information that identifies you to people who need to be sure I have done the research correctly; these would be people from such organizations as Eastern Kentucky University.

Can my taking part in the study end early?
If you decide to take part in the study, you still have the right to decide at any time that you no longer want to participate. You will not be treated differently if you decide to stop taking part in the study.

The individual conducting the study may need to end your participation in the study. I may do this if you are not able to follow the directions I give you, if I find that your being in the study is more risk than benefit to you, or if the agency funding the study decides to stop the study early for a variety of scientific reasons.

What happens if I get hurt or sick during the study?
If you believe you are hurt or if you get sick because of something that is done during the study, you should call Renee Causey-Upton at (859)519-0861 immediately. It is important for you to understand that Eastern Kentucky University will not pay for the cost of any care or treatment that might be necessary because you get hurt or sick while taking part in this study. That cost will be your responsibility. Also, Eastern Kentucky University will not pay for any wages you may lose if you are harmed by this study.

Usually, medical costs that result from research-related harm cannot be included as regular medical costs. You should ask your insurer if you have any questions about your insurer's willingness to pay under these circumstances.

What if I have questions?
Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Renee Causey-Upton at (859)519-0861. If you have any questions about your rights as a research volunteer, contact the staff in the Division of Sponsored Programs at Eastern Kentucky University at 859-622-3636. I will give you a copy of this consent form to take with you.

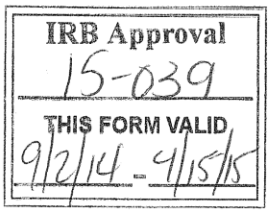
What else do I need to know?
You will be told if any new information is learned which may affect your condition or influence your willingness to continue taking part in this study.

I have thoroughly read this document, understand its contents, have been given an opportunity to have my questions answered, and agree to participate in this research project.

_____ _____
Signature of person agreeing to take part in the study Date

_____
Printed name of person taking part in the study

_____
Name of person providing information to subject



Appendix B: Discharge Readiness Interview Protocol

Discharge Readiness after Total Knee Replacement

Time of interview:

Date:

Place:

Interviewer: Renee Causey-Upton

Position of interviewee:

Description: The purpose of this study is to describe patients' experiences of preparing for discharge following total knee replacement and to gain an understanding of what factors impact subjective readiness for return to home following orthopedic surgery. By doing this study, I hope to learn about the experiences of patients who complete the process of preparing for discharge after total knee replacement.

Questions:

Initial:

1) How have you prepared for your discharge home related to your total knee replacement surgery?

2) What things did you do before surgery, if any, to help prepare yourself for discharge from the hospital after surgery? (pre-operative exercise, arrangements for assistance or care of home/yard, psychological preparation)

3) What experiences did you have before surgery that make you feel more ready to come home after surgery?

4) What experiences did you have before surgery that make you feel less ready to come home after surgery?

5) What things did you do after surgery, if any, to help prepare yourself for discharge from the hospital? (rehabilitation, arrangements for getting assistance at home, preparing yourself psychologically to return home after surgery, arrangements for rehabilitation after discharge from the hospital)

6) What experiences have you had after surgery that make you feel more ready to come home upon discharge from the hospital?

7) What experiences have you had after surgery that make you feel less ready to come home upon discharge from the hospital?

8) What other plans do you have to further prepare for discharge, if any?

9) What was most helpful to you throughout this hospital stay to prepare to leave from the hospital? (people, resources, information)

10) What was least helpful to you throughout this hospital stay to prepare to leave from the hospital?

11) What else have you experienced during your preparation for discharge that we have not already discussed?

Appendix C: Pilot Pre-operative Education Survey Questionnaire

A Pilot Study of the Content, Providers, and Delivery Methods of Pre-operative Education for Persons Undergoing Total Knee Replacement

Thank you for your participation. As you complete the survey, please take note of any questions or response options that were confusing, any additional questions or answer options that you feel should be added, and any additional feedback that you may have about the design of the survey.

1) What is your primary health care discipline?

- Nursing
- Physical Therapy
- Occupational Therapy
- Social Work
- Case Management
- Dietetics
- Other:

2) How long have you been working as a health care provider within your primary discipline?

- Less than 1 year
- 1-2 years
- >2 years to 5 years
- >5 years to 10 years
- More than 10 years

3) What is the highest level of education that you have completed?

- High School
- Some college
- Associate degree
- Bachelor's degree
- Master's degree
- Clinical Doctorate
- Research Doctorate
- Other

4) What additional disciplines or providers are involved in the pre-operative education program at your facility?

- Nursing
- Physical Therapy
- Occupational Therapy
- Social Work
- Case Management
- Dietetics
- Other (Please list):

5) What topics are covered in the pre-operative education program at your facility?

- How to prepare for surgery
- What to expect while in the hospital
- The recovery process
- Self-care (such as dressing, bathing, toileting)
- Functional mobility (such as transfers)
- Instrumental activities of daily living (such as completing laundry and caring for the home)
- Adaptive equipment
- Home modifications
- Home safety
- Managing pain
- Caregiver training
- Exercise before and/or after surgery
- Precautions
- Anatomy of the knee joint
- When to resume normal activities at home
- Expected functional outcomes
- Other (Please list):

6) What methods are used to deliver pre-operative education at your facility?

- Verbal instruction
- Demonstration
- Written instruction (such as handouts)
- Video
- Workbook
- Online education
- Other (Please list):

7) How long before the planned total knee replacement does pre-operative education typically occur at your facility?

- Less than 1 week
- 1 week
- 2 weeks
- 3 weeks
- 4 weeks
- 5 weeks
- 6 weeks
- 7 weeks
- 8 or more weeks
- Not sure

8) In what format is pre-operative education typically provided at your facility?

- Individual
- Group
- Both group and individual
- Not applicable (if education does not occur in-person)

9) How many pre-operative education sessions do clients typically attend at your facility?

- 1
- 2
- 3
- 4
- 5 or more
- Not applicable (if education does not occur in person)

10) How long do pre-operative education sessions typically last at your facility?

- Less than 15 minutes
- 15 minutes to less than 30 minutes
- 30 minutes to less than 1 hour
- 1 hour to less than 1.5 hours
- 1.5 hours to less than 2 hours
- 2 hours to less than 2.5 hours
- 2.5 hours to less than 3 hours
- More than 3 hours

11) What topics are not currently covered in the pre-operative education program at your facility that you feel would be beneficial for your clients?

- How to prepare for surgery
- What to expect while in the hospital
- The recovery process
- Self-care (such as dressing, bathing, toileting)
- Functional mobility (such as transfers)
- Instrumental activities of daily living (such as completing laundry and caring for the home)
- Adaptive equipment
- Home modifications
- Home safety
- Managing pain
- Caregiver training
- Exercise before and/or after surgery
- Precautions
- Anatomy of the knee joint
- When to resume normal activities at home
- Expected functional outcomes
- Other (Please list):

12) What additional disciplines or providers are not currently involved in the pre-operative education program at your facility that you feel would be beneficial for you clients?

- Nursing
- Physical Therapy
- Occupational Therapy
- Social Work
- Case Management
- Dietetics
- Other (Please list):
- None

13) Are there any other additions or alterations needed to the current pre-operative education program at your facility that you feel would be beneficial for your clients? If so, please list these additions or alterations.

Additional survey items:

14) As you completed the survey, did you notice any questions or response options that were confusing? If so, please list the number related to these questions on the survey and explain how these items were confusing.

15) Are there any additional questions or answer options that you feel should be added to the survey? If so, please explain.

16) Please describe any additional feedback that you may have regarding the design of the survey.

Appendix D: Mixed-Methods Recruitment Email

Dear NAON Member,

I am completing a survey to examine current designs of pre-operative education programs (content, providers, and delivery methods) for persons undergoing total knee replacement surgery. The survey is coming to a close, and this is a final request for participation. **If you have already completed this survey, thank you for your participation and please do not complete the survey a second time.** This study is being completed as part of my dissertation research toward a PhD in Rehabilitation Sciences at the University of Kentucky. I am an occupational therapy professor at Eastern Kentucky University and I also work PRN in an acute care hospital as an occupational therapist with orthopedic clients. Total knee replacement is an area of practice that relates to both my clinical and research interests.

I am contacting you because you are an orthopedic nurse and may be involved in providing pre-operative education for this population. If you currently provide pre-operative education for persons undergoing total knee replacement in the United States, then you are eligible to fully complete this brief survey using the link below. Even if you do not currently provide pre-operative education before total knee replacement, please enter the survey link below to respond to the first few question items on the survey to assist with accurately tracking the proportion of individuals who do provide this education. Please do not forward the survey link to others, as this would make it difficult to track response rate for the survey.

Participating in this study would provide information about current pre-operative educational programs and could help guide future research about the most effective programs for preparing patients for surgery and discharge home. **Completing the survey is expected to take about 10 minutes**, and is completely voluntary. The link to the survey is included below in this email. This research is being conducted through REDCap, the Research Electronic Data Capture. This is a secure electronic system that supports web-based data collection for research studies and results are password protected. Only the researchers involved in this study will have access to the data. Completing the survey will be considered as providing informed consent to participate in the study.

This research will be submitted for publication in a national peer-reviewed journal as well as for presentation at state and national conferences. Participants of this research will remain anonymous in all written and oral dissemination of results. Because this survey is being distributed by NAON, the researchers will not have access to the list of members who are being contacted during recruitment for the study, supporting anonymous participation in the research. The primary researcher reports no conflicts of interest.

If you have any questions about the survey, please email me at renee.causey-upton@eku.edu or you can call me at 859-622-8297.

Take The Survey

Sincerely,
Renee Causey-Upton, OTD, MS, OTR/L

**NAON is not involved with the research conducted in survey. This e-mail was paid for by Renee Causey-Upton.*

Appendix E: Pre-operative Education Survey Questionnaire

A Survey of the Content, Providers, and Delivery Methods of Pre-operative Education for Persons Undergoing Total Knee Replacement

Thank you for your participation. Completion of this survey will be considered as providing informed consent to participate in this research.

Demographics:

1) Are you currently practicing as a nurse within the United States?

☐Yes

☐No (End survey participation)

2) How long have you been working in the nursing field?

☐Less than 1 year

☐1-2 years

☐>2 years to 5 years

☐>5 years to 10 years

☐More than 10 years

3) What is the highest level of education that you have completed?

☐Associate degree

☐Bachelor's degree

☐Master's degree

☐Clinical Doctorate

☐Research Doctorate

☐Other (Please list):

4) In what state do you primarily practice as a nurse?

*Drop down box of all 50 states

5) Do you currently provide pre-operative education prior to total knee replacement surgery?

☐Yes

☐No (End survey participation)

6) For what other conditions besides total knee replacement do you currently provide pre-operative education?

☐Total hip replacement

☐Total shoulder replacement

☐Rotator cuff repair

☐Back surgery

☐None

☐Other (Please list):

7) How long have you been involved in providing pre-operative education for patients with planned total knee replacement?

☐Less than 1 year

☐1-2 years

☐>2 years to 5 years

☐>5 years to 10 years

☐More than 10 years

Current Design of Pre-operative Education at Your Facility:

8) What disciplines or providers are involved in the pre-operative education program at your facility for total knee replacement, including yourself?

☐Nursing

☐Physical Therapy

☐Occupational Therapy

☐Social Work

☐Case Management

☐Dietetics

☐Pain Management

☐Home Health Care

☐Hospital Concierge

☐Other (Please list):

9) In what format is pre-operative education typically provided at your facility for total knee replacement?

☐Individual

☐Group

☐Both group and individual

☐Not applicable (if education does not occur in-person)

10) Are patients with planned total knee replacement educated separately from other orthopedic diagnoses in the pre-operative education class?

☐Yes

☐No (Automatic skip to 10B)

☐Not applicable because education is provided to individual patients rather than in a group

10B) What other orthopedic diagnoses are included in the pre-operative education class?

☐ Total hip replacement

☐ Total shoulder replacement

☐ Rotator cuff repair

☐ Back surgery

☐ Other (Please list):

11) What topics are covered in the pre-operative education program at your facility for total knee replacement?

☐How to prepare for surgery

☐Details of the surgical procedure

☐What to expect while in the hospital

☐The recovery process

☐Self-care (such as dressing, bathing, toileting) for the post-operative phase

☐Functional mobility (such as transfers) for the post-operative phase

☐Weight-bearing status

☐Edema management

☐Information about the continuous passive movement (CPM) machine

☐Instrumental activities of daily living (such as completing laundry and caring for the home) for the post-operative phase

☐Adaptive equipment

☐Home modifications

☐Home safety

☐Managing pain

☐Caregiver training

☐Exercise before and/or after surgery

☐Precautions

☐Anatomy of the knee joint

☐When to resume normal activities at home

☐Expected functional outcomes

☐Nutrition (such as increased protein and fiber intake)

☐Other (Please list):

12) What instructional methods are used to deliver pre-operative education at your facility for total knee replacement? Check all that apply.

☐Verbal instruction

☐PowerPoint

☐Health care provider demonstration

☐Written instruction (such as handouts)

☐Video

☐Workbook

☐Client demonstration/ Teach back

☐Online education

☐Other (Please list):

13) How long before the planned total knee replacement does pre-operative education most often occur at your facility?

☐Less than 1 week

☐1 week

☐2 weeks

☐3 weeks

☐4 weeks

☐5 weeks

☐6 weeks

☐7 weeks

☐8 or more weeks

☐Not sure

14) How many pre-operative education sessions do clients typically attend at your facility for total knee replacement?

☐1

☐2

☐3

☐4

☐5 or more

☐Not applicable (if education does not occur in person) (Automatic skip to 16)

15) How long do pre-operative education sessions for total knee replacement typically last at your facility?

☐Less than 15 minutes

☐15 minutes to less than 30 minutes

☐30 minutes to less than 1 hour

☐1 hour to less than 1.5 hours

☐1.5 hours to less than 2 hours

☐2 hours to less than 2.5 hours

☐2.5 hours to less than 3 hours

☐More than 3 hours

Recommended Design of Pre-operative Education at Your Facility:

16) What additional disciplines or providers who are not currently involved in the pre-operative education program for total knee replacement at your facility do you feel would be beneficial to add to the program?

☐Nursing

☐Physical Therapy

☐Occupational Therapy

☐Social Work

☐Case Management

☐Dietetics

☐None

☐Other (Please list):

17) What topics are not currently covered in the pre-operative education program for total knee replacement at your facility that you feel would be beneficial to add to the program?

☐How to prepare for surgery

☐What to expect while in the hospital

☐The recovery process

☐Self-care (such as dressing, bathing, toileting)

☐Functional mobility (such as transfers)

☐Instrumental activities of daily living (such as completing laundry and caring for the home)

☐Adaptive equipment

☐Home modifications

☐Home safety

☐Managing pain

☐Caregiver training

☐Exercise before and/or after surgery

☐Precautions

☐Anatomy of the knee joint

☐When to resume normal activities at home

☐Expected functional outcomes

☐None

☐Other (Please list):

18) What instructional methods are not currently being used to deliver pre-operative education at your facility for total knee replacement that you feel would be beneficial to add to the program?

☐Verbal instruction

☐PowerPoint

☐Health care provider demonstration

☐Written instruction (such as handouts)

☐Video

☐Workbook

☐Client demonstration/ Teach back

☐Online education

☐Other (Please list):

19) When pre-operative education for total knee replacement is provided in a group format (either partly or in full), which structure do you think is best for providing this education?

☐Educating patients with planned total knee replacement separately from other diagnoses

☐Educating patients with planned total knee replacement together with other orthopedic diagnoses

20) What format do you feel would be best for providing pre-operative education before total knee replacement?

☐Individual

☐Group

☐A combination of group and individual

21) How long before the planned total knee replacement do you feel that pre-operative education should occur?

☐Less than 1 week

☐1 week

☐2 weeks

☐3 weeks

☐4 weeks

☐5 weeks

☐6 weeks

☐7 weeks

☐8 or more weeks

☐Not sure

22) How many pre-operative education sessions do you feel that patients should attend before total knee replacement surgery?

☐1

☐2

☐3

☐4

☐5 or more

☐Not applicable (if education does not occur in person)

23) How long do you feel that pre-operative education sessions should last for total knee replacement?

☐Less than 15 minutes

☐15 minutes to less than 30 minutes

☐30 minutes to less than 1 hour

☐1 hour to less than 1.5 hours

☐1.5 hours to less than 2 hours

☐2 hours to less than 2.5 hours

☐2.5 hours to less than 3 hours

☐More than 3 hours

24) Are there any other additions or alterations needed to the current pre-operative education program at your facility for total knee replacement that you feel would be beneficial for your clients? If so, please list these additions or alterations.

25) If you are willing to consider participation in a short phone interview to provide further information about your perceptions of pre-operative education for total knee replacement, you will be entered into a drawing and five persons will be randomly selected to receive a $50 gift card. Only some individuals will be contacted to participate in the interview. Are you interested in completing a phone interview to provide more information about your experiences related to providing pre-operative education?

☐ Yes

☐ No (End survey participation)

26) If you are willing to participate in a phone interview, please provide your preferred telephone contact information with area code included.

Appendix F: Pre-operative Education Interview Protocol

A Mixed-Methods Study of the Content, Providers, and Delivery Methods of Pre-Operative Education for Persons Undergoing Total Knee Replacement

Time of interview:

Date:

Interviewer: Renee-Causey-Upton

Do you provide informed consent to participate in this interview? Yes ☐ No ☐

Questions:

Initial:

1) Please describe the current pre-operative education program at your facility for total knee replacement.

2) What providers (besides yourself) are currently involved in the pre-operative education program at your facility for total knee replacement? Do you feel that this is the best team to provide pre-operative education for total knee replacement? Why or why not?

3) Is pre-operative education typically provided in an individual, group, or online format at your facility? Do you feel that this is the best format to provide pre-operative education for total knee replacement? Why or why not?

4) Are patients with planned total knee replacement educated separately or together with other orthopedic diagnoses in the pre-operative education class? Do you feel that this is the best format to provide pre-operative education for total knee replacement? Why or why not?

5) What topics are covered in the pre-operative education program at your facility for total knee replacement? (Use list from survey as a guide). Do you feel that these are the best topics to cover in pre-operative education for total knee replacement? Why or why not?

6) What instructional methods are currently used to deliver pre-operative education at your facility for total knee replacement? Do you feel that these are the best instructional methods to deliver pre-operative education for total knee replacement? Why or why not?

7) What is the timing of pre-operative education for total knee replacement at your facility (length of time before surgery and the length of the education class)? Do you feel that this is the best timing for pre-operative education for total knee replacement? Why or why not?

8) How many pre-operative education sessions do patients typically attend before total knee replacement at your facility? Do you feel that this is the best number of sessions for pre-operative education before total knee replacement? Why or why not?

9) How adequate do you feel that your facility's current pre-operative education program is for preparing patients for surgery and for discharge home after total knee replacement? Please explain.

10) What differences in level of preparation do you see, both before and after surgery, between patients who attend pre-operative education for total knee replacement and those who do not? Please explain.

11) Are there any other additions or alterations you would like to make to your facility's current pre-operative education program? Please explain.

12) What else would you like to add about your experiences with providing pre-operative education for total knee replacement at your facility?

Appendix G: Additional Pre-operative Education Program Alterations

Offer variety of times including nights and weekends. These are the best attended classes at our facility
Being able to do PAT and the class on the same day. This does not always workout.
On-line option of a taped class would be helpful
1) Better incorporate a "just-in-time" education opportunity to deliver education in snippets at appropriate time frame 2) More effective use of on-line education options and documentation of learning using this mode 3) Adapting content to better meet the needs of the Outpatient or Enhanced recovery patient compared to more traditional experience
Aquatic therapy preop to increase activity level w/o increasing pain (eg walking in the pool)
We do not use CPM that is why we do not teach it We do not have an edema management problem, not really sure what is meant by that
We need to add more discharge information since we have such a short length of stay.
Questionnaire at the end to test knowledge and address needs after.
We are ever evolving and take patient feedback and change the presentations as needed.
No
DME examples that patient can touch and feel, understanding what they will be using after surgery. Especially important with shoulder slings. *Answers above refer to my employment within a private orthopaedic practice, not a hospital or outpatient facility.
Online education for patients that live further away. Encouraging discharge to home vs. ecf after surgery. Stressing to call the Surgeon before going to the Emergency room.
Live demos of OOB, exercises, back into bed etc.
Making the class mandatory
I currently email our booklet to patients when requested. I would love to have all of this information on the web site rather than emailing the information.
On-line education or web based options for those who cannot attend the class in person.

Separating classes for Total Hips and Total Knee would be ideal but it's challenging in some ways. But contents pretty much cover everything that patient needs. Details if surgical procedure should be explained by the surgeon and they typically do this at their office/clinic appointment and at the holding area the day of surgery. Our facility do not use CPM and we are already in the process of identifying patients who are same-day discharge or rapid recovery (shorter home health or no home health at all - direct to outpatient therapy). As you all know, some patients having Total Knee Replacement starting January of 2018 will be coded as outpatients.
None
I do feel it would be helpful to have a representative from case management there to explain DME, HH and SNF coverage because there are so many variables. Also, OT to demonstrate some of the additional equipment for ADL's
Web-based program for patients who live far away or are limited with their mobility.
We currently give class on TKA, THA and TSA at the same time, may be beneficial to separate.
Would like to show an example model of total joint. Should be mandatory.
Offer online education so that patients who are unable to come to the class will have access.
We educate THA and TKA patients in the same group setting; Group is preference but if patient is traveling from great distance, will try to coordinate a 1:1 education session when in area for preop/PACE. If unable to connect with patient, will try to education in the preop area and see if appropriate to participate in joint center program.
I think the groups are beneficial for everyone because they all tend to have the same questions and they interact with each other also.
We teach the total hips and knees together. I would like to see spine classes.
No
I would like to mention a combination of in person education classes with at home videos would be advantageous
Return demonstration
N/a
We are working on a video presentation of the hospital and are having some other video materials added into the power point.
None

We are in the middle of trying to become an orthopedic floor of Excellence. I am not the main educator. I am a charge nurse on an orthopedic floor, and I work with the educator when asked to attend an education orthopedic group meetings my input is asked for intermittently. I also did the online classes with the educator for the voice over with an animation. I believe, most patients must attend a class before they can have their surgery at our Hospital.
Tele Medicine, live video classes for outlying areas
Class or 1:1 for family prior to discharge to review and clarify instructions and provide assistance with concerns.
Pre-hab visit with physical therapy
None
Educational sessions are combined with preop workup, eval with hospitalist, PT and myself -APRN
More individual therapy time
We use to have physical therapy occupational therapy and social service come but their departments no longer take the time. I feel they should be there.
How to obtain DME before surgery
To have preop testing and medical clearance at same time as education. To also have a 1 on 1 meeting with case manager at same time of education.
We taught our TKA and THA separately for 22 years but then we had to combine due to room being under construction. We actually felt it did not compromise the class as so many elements are the same and it combined resources as well. We have pain management attend our total shoulder class but this class only has nursing teach all components. Our spine surgery class is taught by the nurse's entirely as well. We also offer on-line for total hip and knee and spine surgery in order to increase participation.
I think we should have an online education piece. Also, we should have the head of the program give a little video to share. Videos of exercises online would be great. Diets also.
Video for patients unable to attend class
A live class with both hip and knee preop information has been taught at our facility for >20 years. Having both groups has worked well as most of the topics apply to all except the surgery and precautions. We also familiarize them with any equipment they will or may use postop, such as gowns, Foley, SCDs, inspirometer, drains, etc. which we pass around. CPMs are used infrequently but we still present it. We encourage caretakers to attend too. All questions are encouraged. Often many discussions are begun by the participants. I have learned a lot from these conversations. We have models of the knee and hip with removal implants on the table. When asked the instructors give a brief overview of the surgery. All the participants are happy to have attended and tend to do well post op.
Addition of a nurse navigator.

We have classes 3x a month we probably need to add another class. Sometime they get too big with family etc. I wish class was mandatory for patients they really do better if they attend
Add more individualized education for high risk patients. I alone educate 2,000 total joint patients a year. More nurse educators would be needed to do this.
Adding therapy to go over pre-op exercises, equipment etc.
We are developing online based education for the select patient population who would benefit from this type of education and as a complement to our class. Our physical therapists are creating videos of the pre-op exercises to reinforce technique. These will be listed on the website with the online education. This is still in development. Also looking at web-based apps as a compliment to education.
Multidisciplinary shared education
I think most of patient over 70. We might continue regular education of joint. That might be people health better and control weight thing that one might be prevent and chose early decision for surgery until they become horrible situations.
In-person sessions offered more often.
None
Need to reinforce all education across the continuum. Written materials, 1 on 1 session, group learning and have refresher available as videos or online formats.
Pharmacy
We like the group session best as it allows us to create a congenial atmosphere and reduce some anxiety as well as gives us the opportunity to provide a wide variety of speakers who may not be available to meet individual patients. Individual instruction is provided when a patient cannot attend a class. Having a variety of speakers is more engaging and allows our patients to ask questions of the experts of that domain...and we have a lot of patients who recognize their OR RN or PT from class when they are assigned to care for them. Having hip and knee replacement patients together has not been an obstacle for us.
More exercises before and nutrition weight loss.
Note patients attend class 1-4 weeks pre op. Looking into video fir reinforcement of class information
Our patients attend a preoperative optimization clinic. They meet with an RN, PT and PA
Currently we offer the Total Joint Replacement class every Tuesday with 3 different time slots, 3hours long. We teach hip and knee replacement together which some patients do not like. We are in the process of condensing to 2 hours including the PT component which will hopefully be in place before the new year. We are also in the process of updating the online class, which unfortunately has to hit 2018 budget. When all things are hard wired and we have 2 ways of teaching i.e.: class or online, we hope to make the class mandatory.

Ability to stream the class online for patients unable to attend in person.
N/A
None at this time.
I would prefer the class be mandatory for all patients
I think more optimization needs to be done like adding prehab, diet classes for overweight pts, counseling for anxiety, catastrophizing, depression.
I think it would be helpful for family members or those caregivers mainly responsible for caring for the patient to be present to hear the information too
CPM demonstration and return demonstration by patient. Pain management especially with people who have chronic pain. Discussion about postoperative common side effects of anesthesia, and common side effects of pain medication. Expectation when a person is on epidural and PCA.
The pre-op education is currently optional, and I believe it should be mandatory for all patients. I feel our setting needs to be changed as well. We currently hold our class in an auditorium, and patients have a hard time hearing the presentation
To clarify, our pre-op education session includes a one hour group presentation, combined with a book that includes more detailed information given at their pre-admission appointment at the hospital. We would like to include short video vignettes such as how to move after surgery, putting on TEDs, etc We have found that longer than one hour is too much for our patient population.
Prehab session
Having other disciplines present
I usually spend about 50-55 minutes with the knees/hips, 40 with the shoulders
This is not the practice at my facility, but I wish attendance to the pre-op classes was mandatory, if you don't show up your surgery is canceled or rescheduled. There seems to be a correlation with length of stay and attendance, those that do not show up to the class seem to need more time to become independent and have more pain control issues.
Having other disciplines teach part of the class and having other nurses teach the class too. Separate TKA from THA when teaching.
We are looking into online for younger patients that can’t get away from work or patients from out of the area.
The questions that do not show a response do not offer one additional choice that I think is important. My response is "It depends on the individual patient as to how frequently they need education, how long the session should be."

Clarifications as to length of stay in hospital. This should be discussed in terms of meeting milestones or goals, not a certain number of days.
I do wish we could implement some online or video education for those who cannot attend the preoperative class. I also would like to see preoperative home assessments for TJR patients
None
We do a group session for general education and then an individual session with the care manager and PT to further explain precautions and exercise instructions. The group session may be 4 weeks out and then a pre-op session with anesthesia to discuss their type of anesthesia/blocks needed, the care manager and PT is closer to the date of surgery.
We are in the process of developing a web-based program so that patients who live out of area/out of state can at least be able to access the basic of the education but our goal is the face-to-face education
We do say that we don't use the CPM machine
Making class mandatory & requiring patients to bring a support person with them to class
I feel PT should also join the class for more preoperative exercises
Teach back would be helpful. Exercise demonstrations with the "why" behind them
In the time allotted I feel we cover a lot of concerns. Patients are scheduled for Joint Class on the same day as Pre-Admission Testing. Thus, we try to keep the time in mind. We also feed these patients and family members - they enjoy the lunch or coffee and snacks, which makes the time spent more tolerable!
No
N/a
Pain management and constipation management.
All patients should attend 1 pre therapy class for exercises and home set up. 2nd class is Joint class and it should be mandatory.
Language barriers
I feel the program is fairly comprehensive at this time but would like to see more involvement of case management as we move to shorter length of stay to ensure arrangement of needed services.
I have mixed feelings on teaching class having only knees or a mixture of knees and hips. Sometimes it is good to have others in class for more questions? But on the other hand knees having to listen to all the precautions for hips, the patient looks bored. It's a toss-up.

There should be multiple options for patients. Some enjoy the "in-person" class, while others would like on line education. Pre-op PT evaluation and instruction should be required- to assist in surgical prep, home prep and decreased length of stay in the hospital.
None
HOOS/KOOS scale
Pre-op classes should be made mandatory and scheduled prior to scheduling surgery to allow as much time as possible for the patient and their caregivers to make recommended adjustments to the home, complete prehab exercises.
Longer program with refreshments to provide a relaxed atmosphere which usually opens up dialogue. Not rushing what is usually an older population and allowing for return demonstration and participation
None at this time
I'm in an ortho office practice setting. Preliminary individual education is provided in the office and re-enforced at a hospital-based pre-op class that covers most of the disciplines listed & almost all the topics listed.
I have had a few patients that stated they would have liked to have had more information regarding the type of anesthesia they may be having.
I have been teaching the Pre op Joint Class since its inception >10 yrs ago...We have adapted the program and power point to stay updated with technology and MD preference. It is quite successful. All knees and hips are included .A separate Pre op class for shoulder surgery is being developed presently
None
Some patients would like to have a Physician be there to talk to them or answer any questions. .
What to expect, and that pain is part of the experience. Pain is managed for the most part but everyone is different. In most cases older patients get confused.
We go back and forth between having knees in their own class vs combined with hips--most of the info is relatable to the other hips---we're going back and forth in discussions (we're in the 1st year of classes and have seen our attendance sky rocket; that may make the decision for us); thus I couldn't answer the above question--we're not sure which is best---attendees have also had mixed opinions-some have said they think it would be good to only have knees with knees, yet others have said they like listening to the other section because their friends had their hip done or they're thinking about getting their hip done.
Education needs to be required prior to TKA our physicians do not require, some patients come from as far as 300 miles away

Our anesthesia department is going to be starting a Wellness Program and will target the joint replacement patients for their trial. Their wellness program will offer nutritional counseling, massage, yoga and meditation to patients during the pre-operative period (their goal is to establish contact with patient 4-8wks pre-op).
None
None
Our joint program includes group therapy while in the hospital. The sessions are led by a PTA and the patients learn from each other in a group setting.
1) Refresher course for those having alternate joint to update on practice changes, discharge planning 2) Review of insurance's influence on care plan 3) The importance of self-care to achieve goals 4) The importance of medical optimization to minimize risk of complications
Would like to add CGI videos or more instructional videos
Mandatory class attendance
NEED TO ADD ONLINE FORMAT
Tour of the room and the PT room might help
We do combine total hip and knee arthroplasty together, the patients do complain about that. Currently, our pre-op ed class is 3 hours long, we are trying to condense. I would love for case management to have some involvement, but that has not been a success. The patients have too many questions and sometimes we can have 20 patients in a class. As you all know the drive is to d/c home and the patients can't wrap their head around that idea. We have visited other facilities to get ideas, the last facilities ed class was 1 hour, they complete PST, and meet with a case manager on the same day. That process I would love.
A workbook to make a little more interactive for patients and family
None
No
Offer Skype, often our pt. have to drive an hour or more for the classes and then must walk a long distance to the class. When and individual has limited function in lower extremity this can deter the individual to attend these classes which are important before during and after this type of surgery.
Discussing prior authorizations on medications before surgery
I would like to see our team support a mandatory class - and to clarify, I think any time between 2-4 weeks pre-op is ideal for the class since they have time after that to make final preparations based on what they learn
We inform patients regarding anesthesia and regional nerve blocks

Offer classes more frequently. Currently we do the second and the fourth Tuesday of the week.
Insurance information specifically prior approval and Medicare information
Currently our Social Workers do not actually teach but they have information in the book. I think it is best when they attend. I would also like for the class to be available online for patients that cannot come to class. I would also like to teach hips and knees separate but we just do not have the staff to teach that many classes.
We try to coordinate the class with pre-operative testing visit. This is not always possible. We would like to add staff to assist patients with way finding from the PAT department to the preoperative class. Would like to have a better space for the class. We presently are limited in our class size due to the room utilized. It's nice that the class is provided on the unit so that the patient and coach can see the post op unit and therapy gym however there are times when there is not an open room to view.
NA
We are adding a prehab program in addition to our preop education class (total joint academy). Prehab will focus on PT meeting 1:1 with the patient to discuss the importance of returning home post op and identifying and trying to resolve any barriers to discharge to home vs SNF
I think it would be beneficial to have a Physical Therapist present at the end of class to discuss and demonstrate exercises.
None
Our Pre-operative education program last almost all day, they come in for their labs, then have prehab visit with PT, then right after we have 2 presentations, I (RN) do the pre/during/post procedure teaching and our surgeon then comes in and does anatomy of the knee/what he does in surgery/risks/benefits and goes over new things out on the market ID Robotics/stem cell etc. We follow up with a "breakout" session which is individual meeting to discuss any questions and every patient gets Iovera if insurance allows for better pain control after surgery.
No
Tele Medicine for patients outside our area that come to us for their joint replacement surgery
We currently use an interact web based program that sends out Care Cards with patient education information over a 4 week period on all the components we go over in class and it creates a library for them to refer back to as well as ability to communicate with the Joint navigators when questions arise.
We are working towards on line, since we have patients that drive a distance, and decrease in available hours devoted to education.
Smaller groups with PT teaching walker use prior to surgery
Discussing postoperative plans and realistic expectations

We give our total joint replacement patients a notebook with everything clearly outlined. The notebook is individual to the campus (We have 3 separate campuses in our hospital system in which we perform Total Joint Replacements). In addition, the notebooks are specific to either total knee replacement, total hip replacement, or total shoulder replacement. We offer group classes once per week. You can attend more than one class, but only one class is mandatory. The class is co-led by a nurse and an occupational therapist. We have a video from physical therapy instructing on how to perform exercises. (The exercises are also in the book). They have close ups when necessary. There is a section in the book that talks about Social Work/ Case Management issues. I do think that it would be helpful to have a Social Worker/ Case Manager actually present during the class. After class, there is a period that patients can stay for individual questions or education.
DVT precautions
We are investigating video options combined w call back.
Initiate relationship based care by phone 8-12 weeks prior to surgery create a more relaxed atmosphere in a longer class, with more specialist coming in for segments, followed by return demonstrations, break time with refreshments, then the 2nd half. Followed up by access to videos and phone calls.
We offer our class at different locations so that the patients can have their choice of locals - but we do not have a way of tracking who has participated. We would also like to make it mandatory or the surgery is canceled but the doctors will only agree to "strongly encouraging" the patient to attend.
Right now we are re-doing our book that we give all the total knee and hip patients. I think that an online education, would be nice so patients could look at it again prior to surgery to refresh. The group education can be hard because most of our doctor's use the same order set, however we do have a few outliers. This is true with anticoagulant therapy.
None
Mandatory educational sessions for the total knee/total hip patients. I think teaching these 2 groups together work well.
I think total knee/total hip arthroplasty education works well together. We had total shoulder patients come a couple of times and that was not helpful to them. I think the education should be mandatory, so on-line will work well for adults to cannot get off of work to attend. Patients who do not attend the class, and ask many questions on admission that are answered in the class. RN's do not have time to do this teaching 1:1 on admission. Physicians say they can tell who has attended the class by the questions that the patients ask them.
NONE
I'm planning to remove OT and discharge planning from class due to sporadic attendance. I am tired of telling patients they will be there to answer questions and they have less than 50% participation rate. As an ortho navigator I can change the format in a more cohesive order without other disciplines and with 25 years of experience can cover their area. I felt initially that the more staff patients were familiar with the less anxiety they would have; but, since struggling with their attendance since 2014 I'm thru.

None
We do one joint class per week and one spine class each week which serves us well.
No
Patients meet with joint navigator twice and attend class. I would like to incorporate pharmacy and case management into our class
Insurance Coverage for surgery & all related services i.e. HH PT, OP PT, etc.

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Vita

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EDUCATION

2012- 2013	Marketing Strategy for Business Leaders Certificate *Cornell University (eCornell), Ithaca, NY*
2010-2011	Doctor of Occupational Therapy *Chatham University, Pittsburg, PA*
2006-2008	Master of Science in Occupational Therapy *Eastern Kentucky University, Richmond, KY*
2002-2006	Bachelor of Science in Occupational Science *Eastern Kentucky University, Richmond, KY*

PROFESSIONAL POSITIONS

August 2013-Present	Assistant Professor, *Eastern Kentucky University, Richmond, KY*
July 2011-Present	PRN occupational therapist, *Saint Joseph East Hospital, Lexington, KY*
August 2013-May 2015	PRN occupational therapist, *Functional Pathways, Kentucky*
July 2011-August 2013	Clinical Manager and occupational therapist. *Functional Pathways, Grand Haven Nursing Home, Cynthiana, KY*
August 2008-July 2011	Full-time occupational therapist, *Saint Joseph East Hospital, Lexington, KY*

PROFESSIONAL HONORS

- Founding Associate Editor, editorial board member, and reviewer, *Journal of Occupational Therapy Education* (JOTE), Spring 2016 to present.
- Nominated as a 2018 Faculty Inductee to Phi Kappa Phi by the Executive Committee of the Phi Kappa Phi National Honors Society, EKU Chapter #122, Spring 2018.

PEER REVIEWED PUBLISHED JOURNAL ARTICLES

1. Wigginton, A., Skubik-Peplaski, C., **Causey-Upton, R.**, & Custer, M. (2017). The impact of caring for persons with stroke on the leisure occupations of female caregivers. *Physical and Occupational Therapy in Geriatrics, 35*(3-4). https://doi.org/10.1080/02703181.2017.1350778

2. Wagner, M., & **Causey-Upton, R.** (2017). Perfectionism and occupation: Time-use of occupational science students. *Irish Journal of Occupational Therapy, 45*(2), 62-77. https://doi.org/10.1108/IJOT-06-2017-0014

3. **Causey-Upton, R.**, & Howell, D. M. (2017). Patient experiences when preparing for discharge home after total knee replacement. *Internet Journal of Allied Health Sciences and Practice, 15*(1). Retrieved from http://nsuworks.nova.edu/ijahsp

4. **Causey-Upton, R.** (2015). A model for quality of life: Occupational justice and leisure continuity for nursing home residents. *Physical and Occupational Therapy in Geriatrics, 33*(3), 15-188. https://doi.org/10.3109/02703181.2015.1024301

PEER REVIEWED PUBLISHED BOOK CHAPTER

1. **Causey-Upton, R.,** Balentine, C. B., & Benthall, D. H. (2018). Cardiopulmonary conditions and treatment. In A. Mahle & A. Ward (Eds.), *Adult physical conditions: Intervention strategies for occupational therapy assistants* (pp. 668-703). Philadelphia, PA: F.A. Davis Company.

PEER REVIEWED ACCEPTED JOURNAL ARTICLE

1. **Causey-Upton, R.**, Howell, D. M., Kitzman, P., Custer, M., & Dressler, E. **(manuscript accepted).** Pre-operative education for total knee replacement: A pilot survey. Submitted to *Internet Journal of Allied Health Sciences and Practice.*

NON PEER REVIEWED PUBLISHED ARTICLES

1. Hayden, C., **Causey-Upton, R.,** & Howell, D. M. (2018). The editors' perspective: A successful first year of the *Journal of Occupational Therapy Education. Journal of Occupational Therapy Education,* 2(1). https://doi.org/10.26681/jote.2018.020101

2. Howell, D. M., **Causey-Upton, R.**, & Hayden, C. (2017). The editors' perspective: Launching the *Journal of Occupational Therapy Education. Journal of Occupational Therapy Education, 1*(1). https://doi.org/10.26681/jote.2017.010101

3. **Causey, R.** (2013). Breathing easier: Pulmonary rehabilitation in skilled nursing facilities. *OT Practice, 18*(21), 13-17.

4. **Crum, K. R.** (2011). Readiness for discharge: Occupation-based treatment in the orthopedic setting. *OT Practice, 16*(14), 14-18, 23.