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Reducing Preoperative Anxiety in Adolescents Facing Spinal Fusion Surgery

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Final DNP Project Report

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Dedication

I dedicate this Final DNP Project to my husband, Harris. I could not have accomplished this goal without your constant support and encouragement. Second, to my son, Nicholas-thank you for your understanding for all the meals I did not cook when I was studying and time away from home. You two are my family and my motivation. Thank you.

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Table of Contents

List of Tables

Manuscript 1

Manuscript 3

List of Figures

Manuscript 2

Introduction to Final DNP Project Report

Reducing preoperative anxiety for adolescents facing spinal fusion surgery for the treatment of scoliosis has significant implications for clinical practice and patient outcomes for this specific population. The reality of a pending surgery creates a difficult, uncomfortable, and exhausting state of being that can lead to increased postoperative pain, sleep disturbances, and maladaptive behaviors. This final capstone project inquiry report presents three manuscripts which focus on the reduction of preoperative anxiety in adolescents facing spinal fusion surgery. The first manuscript is a literature review examining current evidence related to preoperative anxiety, adolescents undergoing spinal fusion surgery, and teaching programs aimed at decreasing preoperative anxiety. The second manuscript is an account of the development of a formalized, comprehensive, multidisciplinary preoperative teaching protocol. The goal of this protocol is to provide optimal preparation for adolescents undergoing spinal fusion surgery in order to reduce preoperative anxiety and to increase basic knowledge of scoliosis and spinal fusion surgery. This research led to the implementation of the Spinal Fusion Care Protocol (SFCP). The third manuscript is a report of the one-group pretest-posttest study conducted to evaluate the SFCP. The study seeks to determine if the SFTP significantly reduces preoperative anxiety for adolescents facing spinal fusion surgery. Practical implications for clinical practice are presented to improve preoperative teaching for adolescents in order to reduce preoperative anxiety and increase basic knowledge of scoliosis and spinal fusion surgery.

Manuscript 1

Integrative Literature Review

Anna Gayle Parke

Abstract

Purpose: The purpose of this review was to describe the current literature regarding preoperative anxiety in adolescents facing surgery and the effectiveness of preoperative teaching programs to reduce anxiety in this population. Specifically, research related to the (a) occurrence of preoperative anxiety in the adolescent population, (b) coping skills used to manage this anxiety, (c) preoperative teaching programs, and (d) adolescents undergoing posterior spinal fusion.

Method: Twelve studies revealed evidence that focused on preoperative anxiety in adolescents and clinical methods to alleviate the resulting stress before the surgical procedure. A literature search was conducted utilizing CINAHL, Medline, PubMed, and Google Scholar.

Findings: Of the eighty-seven studies examined, twelve met the criteria for this review. Five studies utilized a variety of standardized intervention programs. They provided extensive information explaining a comprehensive collection of teaching points regarding the surgical experience. Three studies used humor to describe a method to engage adolescents in order to reduce preoperative anxiety. One of these studies also emphasized the use of positive teaching points to guide adolescents to a less anxious outlook on the surgical experience. The remaining four studies introduced methods to improve current preoperative teaching programs in order to decrease anxiety.

Recommendations for Practice: The development and implementation of a comprehensive, formalized, preoperative teaching program that employs a multidisciplinary approach to provide optimized preparation for adolescents facing spinal fusion surgery is a quality recommendation to improve care for this specific population. The evidence provided in this review confirmed that a teaching program that provides answers to the questions adolescents are interested in and offers

them the knowledge and coping skills to manage their anxiety are successful in reducing preoperative anxiety. The innovation of utilizing humor in preoperative teaching with adolescents provided a fresh approach to ease anxiety during the preoperative period. The incorporation of such strategies in practice can take the form of preoperative clinics in which adolescents facing surgery spend time with anesthesiologists, nurses, child life specialists, physical therapists, and nutritionists to gain an understanding of their treatment. Computer-aided learning provided a captivating approach to preoperative teaching for this population.

Keywords: Preoperative anxiety, adolescents, preoperative teaching programs, posterior spinal fusion, nurses, patient education, and family education.

Background and Significance

Surgery is a traumatic experience for anyone but especially for adolescents facing spinal fusion surgery for idiopathic scoliosis. Scoliosis is a deviation in three dimensions of the spinal axis. The most common surgery performed for adolescents with a scoliotic curve greater than 50 degrees and significant skeletal growth remaining is posterior spinal fusion (PSF). PSF involves correction of the lateral curve and the rotational component of the spine with the use of internal instrumentation comprised of hooks, screws, and rods. The apparatus holds the spine secure until bone graft placed in vertebral spaces fuses the spine in the corrected position (Hresko, 2013). Those providing care for adolescents in this situation must prepare this population with knowledge and coping skills to complete treatment without a detrimental interruption in development.

One of the most significant issues an adolescent faces during the process of PSF surgery is anxiety beginning in the preoperative period. As PSF is an elective surgery, the period between deciding to undergo PSF and the actual surgery can be 3-4 months long. Such a length of time can produce anxiety and significant suffering for the adolescent and family. Evidence also points to the correlation between preoperative anxiety and postoperative pain, sleep disturbances, and maladaptive behaviors in adolescents. Such maladaptive behaviors include violent outbursts, withdrawal, crying, and depression (Berger, et al., 2014; Hilly, et al., 2015). An intervention is needed to teach this population to alleviate anxiety and develop coping skills (Berger, Wilson, Potts, & Polivka, 2014; Fortier, et al., 2010).

Research Question (PICO)

A PICO question defines a patient population (P) provided with an intervention (I) and comparing (C) the outcome (O) to the original state of the population (Hastings & Fisher, 2014). This question can help direct a researcher to useful information that provides parameters for methods of data collection and analysis, with the ultimate goal of developing evidence-based practice. The PICO question used to guide the following review was: Can a multidisciplinary preoperative teaching program for adolescents facing PSF decrease their level of preoperative anxiety and increase their basic knowledge of scoliosis and PSF?

Method

To identify the most relevant and timely research from the current literature, the above-noted PICO question was used to conduct an extensive search of the following databases: Cumulative Index of Nursing and Allied Health (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), PubMed, and Google Scholar. A variety of combinations of the following key words guided the search: Preoperative anxiety, adolescents, preoperative teaching programs, posterior spinal fusion, nurses, patient education, and family education.

The goal of the review was to locate published clinical research related to the (a) occurrence of preoperative anxiety in the adolescent population, (b) coping skills used to manage this anxiety, (c) preoperative teaching programs, and (d) adolescents undergoing posterior spinal fusion. The inclusion criteria utilized were peer reviewed, medical or nursing journal articles published in English in full-text after the year 2005. The types of studies selected from the eighty-seven articles reviewed included prospective exploratory, investigative, qualitative, prospective cohort, observation qualitative, and prospective randomized studies, as well as

randomized controlled studies. The twelve articles chosen focused on preoperative anxiety in adolescents and clinical methods to alleviate it prior to surgery.

Results

Upon analysis of the twelve studies retrieved which focused on preoperative anxiety, teaching programs to reduce this anxiety, and specific information regarding adolescents facing surgery, three themes emerged: effectiveness, humor, and improvement. All themes related the development and implementation of formalized preoperative teaching programs with the goal of reducing preoperative anxiety patients.

Effectiveness

Five of the twelve studies reviewed evaluated the effectiveness of formalized preoperative teaching programs and the resulting decrease in preoperative anxiety. Teaching programs in these studies utilized a variety of educational formats: lecture in a classroom, interactive workshops, and one-on-one teaching sessions with preoperative patients. However, each provided some combination of the following educational information: preoperative procedures, fasting prior to surgery, risks of surgery and anesthesia, preoperative and surgical units, equipment, induction of anesthesia, venipuncture, surgical procedures, postoperative expectations, and pain management (Fincher, Shaw, & Ramelet, 2012; Fortier, Wong, Mayes, & Kain, 2011; Hilly, et al., 2015; Papanastassiou, Anderson, Barber, Conover, & Castellvi, 2011; Rhodes, et al., 2015). Only one of the studies did not show a significant decrease in preoperative anxiety levels for subjects participating in each preoperative teaching program. The researchers attributed this, in part, to the fact that for 35% of the subjects who participated in this particular study, the intervention did not fall within the recommended time frame (greater than 5-7 days

before surgery) for preoperative education (Fincher, et al., 2012). The remaining four studies did show a significant reduction in preoperative anxiety for the subjects who participated (Fortier, et al., 2011; Hilly, et al., 2015; Papanstassiou, et al., 2011; Rhodes, et al., 2015). The timing of the preoperative teaching program is a key component to its effectiveness.

Humor

Three of the twelve studies explored the use of humor in preoperative teaching to reduce anxiety for adolescents. The researchers in the three situations provided innovative methods of reducing fears through the use of costumes, silly actions, clowning, and comic books as a format for educational information (Berger, Wilson, Potts, & Polivka, 2014; Dionigi, Sangiori, & Flangini, 2013; Kassai, et al., 2016). The utilization of costumes for both staff and patients, silly songs, dancing, and clowns who parodied the routine teaching points provided by staff produced laughter. The opportunity for these patients to spend the immediate preoperative period laughing allowed the patients to release tension. The patients investigated in these studies demonstrated significantly decreased preoperative anxiety levels (Berger, et al., 2014; Dionigi, et al., 2013).

The third study utilized a unique intervention involving humor via an informational comic book. Findings demonstrated that 90% of subjects found the comic book useful and stated it reduced preoperative anxiety levels (Kassai, et al., 2016). The overwhelming percentage of subjects confirmed the comic book as a helpful intervention that captured the attention of adolescents. Such an accomplishment is extremely valuable in patient education.

Improvement

Overwhelmingly, the subjects were most interested in information related to pain (Fortier, et al., 2009). Two studies examined the reality of preoperative teaching provided by nurses based on data gathered from nurses on the front lines. The first of these studies revealed that the teaching points nurses thought should be included in preoperative teaching were not the actual information provided. Also noted in the study was that preoperative teaching was not be provided at all by some nurses due to time constraints, heavy patient loads, language barriers, lack of resources, and the belief that physicians were responsible for providing specific portions of preoperative teaching. The researchers concluded that the current preoperative teaching methods and available resources in the setting of this study should be evaluated and revised through assessment and planning to offer a more effective preoperative teaching program (Lee & Lee, 2012). The second study examined the language used by nurses in their preoperative teaching by identifying positive and negative statements. According to the results of this study, nurses overwhelmingly used negative statements in their teaching. For example, a negative statement focused on the patient is one that emphasized inability to eat the first few days after surgery due to a risk of vomiting. The same information presented in a positive statement focused on the patient returning to normal eating habits in a few days. This study provided fresh information encouraging nurses to be aware of language used in preoperative teaching and to take a thoughtful approach to speaking (Perry, Samuelsson, & Cyna, 2015).

The last study that addressed the theme of improvement provided evidence that parents/guardians recorded increased satisfaction scores when registered nurses and advance practice nurses provide preoperative teaching to their children. Results showed that the amount of time spent with families, the thoroughness of the teaching provided and respect experienced

contributed to their satisfaction with the teaching program (Delaney, Bayley, Olszwsky, & Gallagher, 2015).

Discussion

Reducing preoperative anxiety for adolescents facing spinal fusion surgery has significant implications for clinical practice and patient outcomes for this specific population. Preoperative anxiety occurs in at least 65% of children and adolescents facing a surgical procedure (Dreger & Tremback, 2006). Preoperative anxiety is known to increase postoperative pain, sleep disturbances, and maladaptive behaviors in the postoperative period. Further, preoperative anxiety is a difficult, uncomfortable, and exhausting state of being during what can be a period lasting for months, due to time required for preoperative evaluation and numbers of patients needing to be scheduled. An intervention that can decrease this anxiety and equip adolescents with the knowledge and skills to traverse this waiting period successfully is the goal of preoperative teaching. The incorporation of a preoperative teaching program to modify current practice can provide nurses with the resources needed to accomplish these goals.

The studies reviewed guide for the development of such preoperative interventions. Adolescents are eager to learn what to expect during surgery and recovery, are receptive to preoperative teaching programs, and they provide insight as to what information they need (Fortier, et al., 2009). Nurses revealed deficits that prevent them from providing quality preoperative teaching to patients and further studies suggested practice changes that nurses can implement to improve patient outcomes based on the language used in these interventions (Lee & Lee, 2012; Perry, et al., 2015).

The development and implementation of a comprehensive, formalized, preoperative teaching program that employs a multidisciplinary approach in order to provide optimal preparation for adolescents and families facing spinal fusion surgery is a quality recommendation to improve practice for this specific population. The evidence presented in this review confirms that a teaching program that answers the questions adolescents want to be answered can provide them with the knowledge and coping skills to manage their preoperative anxiety. Such a practice change could take the form of preoperative clinics in which adolescents facing surgery spend time with anesthesiologists, nurses, child life specialists, physical therapists, and nutritionists to gain an understanding of their treatment. Computer-aided learning could provide a captivating approach to preoperative teaching for this population.

Conclusion

The studies reviewed herein support such a practice implementation to reduce anxiety. Further, the evidence presented in this review concludes such an intervention can reduce anxiety for adolescents facing surgery, and, in turn, improve patient outcomes. Decreased anxiety during the preoperative period helps to reduce postoperative pain and maladaptive behaviors. An intervention that engages adolescents with humor, interesting formats utilizing current information technologies, and interactive programs has the potential to reform preoperative teaching. Such a program design can be implemented for multiple populations undergoing any surgical procedure. Those facing surgery, in a variety of healthcare settings, can benefit from this economic intervention and experience improved wellbeing.

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TABLE 1: Recommended Questions to Answer for Children/Adolescents Before Surgery
PAIN
• Will the operation hurt?
• Will there be pain? If so, how bad will it be?
• How long will I be in pain after the operation?
• Will I feel the pain?
• How is it going to feel?
Eating
• What am I allowed to eat before the operation? • After the operation?
• When will I eat after the operation?
Anesthesia
• Will I wake up in the middle of the surgery?
• When you are asleep will you feel it?
• Will I feel sick or drowsy after the operation?
• Will my Mom and Dad be there when I wake up?
Preoperative and Discharge Procedures
• Will the doctor tell me about the operation and what it will be like when I go home?

Fortier, et al., 2009.

Table 2 Summary of Studies Reviewed

Citation	Design & Methods	Number of Subjects	Results	Conclusion/Recommendations
Berger, et al. (2014)	Quasi-experimental design using a nonrandomized control group	n=13 children receiving standard of care during preoperative period with intervention in addition n=29 children in control group	Anxiety score average of intervention group upon beginning of intervention was 33.1. Control group average score was 56.6. Following complete intervention, average anxiety score of intervention group was 22.2. Control group average score was 52.0.	The intervention group experienced surgery on "Wacky Wednesdays (WW)." They were welcomed by staff dressed in colorful costumes. During preoperative intervention, they were visited by WW mother who brought a cart with costumes, inviting children to choose one to wear. Care providers also sang to the children, told stories, danced, and played games with them. The study used humor and distraction to decrease preoperative anxiety levels. The wacky environment they experienced upon arrival reduced their anxiety from the start. Continued humorous interactions produced laughter, allowing the children to release tension.
Delaney, et al. (2015)	Prospective, exploratory, comparative, and correlational descriptive design	n=542 parents or legal guardians of children participating in preoperative teaching visit with RN and/or NP	Overall satisfaction of parents/legal guardians with preoperative services was high. 76% rated experience excellent and 20% rated experience as very good	Findings demonstrated value of RN's and NP's in providing preoperative assessment and education in presurgical clinic setting in pediatric hospital
Dionigi, et al. (2013)	Randomized controlled trial	n=77 children	Intervention group showed less anxiety	The children experiencing clown intervention preoperatively were

		undergoing surgery Intervention group n=52 Control group n=25 (2:1 ratio)	after clown intervention explaining expectation for procedure prior to surgery Control group showed higher anxiety scores without the intervention	significantly less anxious and calmer than the children with no intervention. Conclusion was that clowning to explain procedures in surgery can be effective tool to decrease preoperative anxiety.
Fincher, et al. (2012)	Single-blind randomized controlled study	n=35 children undergoing standardized preoperative preparation n=32 in control group	No significant difference in child anxiety scores between groups. Majority of all children in study exhibited negative behaviors two weeks postoperatively. No significant difference in postoperative behavior between the two groups	Both groups experienced increased anxiety in preoperative period with a drop in anxiety levels 24 hours postoperatively. Overall anxiety scores in group undergoing preoperative preparation were lower than control group but no statistically significant. May be due to fact 35% of families participating in intervention did not participate during the predetermined time of preparation-due to unforeseen circumstances.
Fortier, et al. (2011)	Dismantling report of a randomized controlled trial	n=96 children who underwent surgery whose parents were educated with the ADVANCE preoperativ	Children whose parents were in the high adherence to the ADVANCE preoperative teaching program showed decreased	Closer parental adherence to the ADVANCE preoperative teaching program was associated with decreased levels of preoperative anxiety in the children who were subjects in the study

		e teaching program	preoperative anxiety.	
Fortier, et al. (2009)	Investigative, qualitative study	n=14 children aged 7-17 completing 40 item questionnaire assessing desired surgical information and measurement of anxiety level on day of surgery	Range of frequencies of response "I really want to know" was 14%-71.5%. Over 40% of subjects responded "I really want to know" to 25 of 40 items. Children were overwhelmingly interested in information pertaining to pain. The incidence of information avoidance was low. Less than 10% of children responded with "I don't want to know to 28 of 40 items.	Findings suggest that children are open to receiving comprehensive information about the surgical experience, therefore, such information should be made available preoperatively. Information most desired was regarding pain, anesthesia, and potential complications. Of note, the children with higher anxiety scores were most interested in receiving information, specifically regarding pain. These children were more likely to want to avoid information.
Hilly, et al. (2015)	Prospective cohort study	n=27 children in intervention group n=26 children in control group	Both preoperative anxiety and postoperative maladaptive behaviors were significantly decreased in the intervention group as compared to the control group.	The intervention of the preoperative preparation workshop for children and families consisting of description and explanation of the perioperative experience, including surgical unit, operating room, induction of anesthesia, and postoperative recovery period. Procedure such as venipuncture, anesthesia administration, urinary catheters, and pain management. Participation in

			However, there was no decrease in the incidence of emergence delirium in the intervention group.	the workshop resulted in decreased preoperative anxiety levels and reduced postoperative maladaptive behaviors.
Kassai, et al. (2016)	Multicenter, open-label, parallel-group randomized trial	n=54 children in intervention group n=57 children in control group randomized	Prior to intervention there was no significant difference in anxiety levels between the two groups. The intervention group anxiety score decreased from 32.09 to 30.07 after intervention and two assessments. Control group anxiety scores increased from 30.40 to 31.30 after two assessments.	Both groups received verbal information during pre-anesthesia visit regarding fasting, surgical procedures, hospitalization, risks, and pain management. In addition, the intervention group received written information in the form of a 20 page comic informational leaflet mailed to their homes. 90% of children in intervention group found comic leaflet useful and comforting and had lower anxiety scores than control group. Comic leaflet intervention was inexpensive. Authors concluded that information regarding surgery 18procedure and anesthesia provided in leaflet is worth implementing.
Lee & Lee. (2012)	Cross-sectional survey	n=86 nurses working in surgical ward in acute care public hospital	Oral explanation was most common method for delivery of preoperative information. Nurses in study rated details of anesthesia as most important	Discrepancies were noted between current practice of preoperative teaching and nurses' ideas of what preoperative teaching should actually offer patients. This compromised the effectiveness of preoperative teaching patients actually received. The researchers concluded that the current preoperative teaching methods and available resources in this setting

			teaching component, however, the major portion of the teaching they actually provided addressed preoperative preparation. The top issues affecting provision of preoperative teaching were: time constraints, language barrier, and surgery schedule. Satisfaction of nurses providing teaching was correlated significantly with their workload and professional training.	should be evaluated and revised through assessment and planning to offer a more effective, evidence based clinical practice in order to improve patient outcomes.
Papanastassiou, et at. (2011)	Retrospective analysis	n=77 patients facing spine surgery who attended preoperative teaching class n=78 patients in control group	96% of patients who attended preop classes were satisfied with their pain management while 83% in control group were satisfied. Overall satisfaction of the surgical experience of those who	The preoperative preparation classes demonstrated positive impact on patient satisfaction, especially regarding pain management. The researchers concluded that the preoperative intervention provided an efficient, viable, and inexpensive intervention that improved patient outcomes.

			participated in preop class was 91% while control group overall satisfaction was 85%.	
Perry, et al. (2015).	Prospective, observational, qualitative study	n=51 audio recordings of preoperative consultations between nurses, children and their parents	Two researchers reviewed transcripts of consultations and identified 130 positively and negatively worded teaching point used by nurses. Results revealed 40 teaching points were identified as positive and 90 as negative	The 40 (31%) positive teaching points included descriptions of return to normal routine: 14 consultations (28%) included eating and drinking, 9 (18%) included comfort, 9 (18%) included well-being. The 90 (69%) negative teaching points included 21 consultations (41%) addressed pain, 19 (37%) nausea/vomiting, and 9 (18%) agitation and irritability. 12 consultations (24%) contained only negative teaching points and 4 (8%) had only positive teaching points. Education of nurses providing preoperative teaching regarding language and awareness of effect of negative statements would be beneficial.
Rhodes, et al. (2015)	Prospective randomized study	n=26 subjects in intervention group n=39 subjects in control group. All subjects were patients undergoing posterior	All subjects demonstrated significantly higher state anxiety scores than trait anxiety scores at all intervals, indicating their general anxiety was less than anxiety each time measured	Both groups received teaching from surgeon regarding benefits, risks, and alternatives to PSF. Intervention group received preoperative education and orientation for scoliosis surgery. Intervention was standardized, including tour of all areas in which they would receive care and explanation of that care. PSF procedure was also explained and families were

		spine fusion (PSF)	throughout study. Only significant difference in state anxiety between the groups was higher anxiety scores in intervention group during postoperative period than control group.	encouraged to ask questions. Anxiety scores were measured in both groups at 4 intervals: at preoperative appointment, immediately preoperatively, postoperatively, and at discharge. Only significant difference in anxiety scores between the two groups was a higher state anxiety score for the intervention group during postoperative period compared to the control group. Authors stated the preoperative intervention may have sensitized patients to postoperative stressors. The state score addresses anxiety at the particular point in time while trait score addresses general feelings of anxiety. Authors concluded that structured preoperative teaching program can benefit adolescents undergoing PSF but improvements are needed to reduce anxiety of both groups during perioperative period.

Manuscript 2

Developing a Preoperative Teaching Program For Adolescents Facing Spinal Fusion Surgery

Anna Gayle Parke

Abstract

To provide quality patient care, nurses need to choose a model to guide care delivery. The Collaborative Patient Care Management Model provides the framework needed to improve the quality of care provided to adolescents facing spinal fusion surgery. Based on the model's tenants of process, quality, and cost while centered on the patient, a preoperative teaching program was designed and implemented. This intervention meets the needs of the target population of adolescents facing spinal fusion surgery by decreasing their anxiety and increasing their knowledge.

Introduction

Every nurse must decide how to best practice nursing. To do so requires an understanding of one's own values, ethics, priorities, and a chosen evidence-based nursing care model to guide interventions with patients and families. In the discipline of advanced practice nursing, the opportunity is often presented in which a nurse is charged with developing a design and implementation of an intervention to improve patient outcomes. To guide such a task, the nurse often makes a choice of nursing practice model. That decision is the basis for the impact of an intervention on patient outcomes. A nursing practice model reflects the nursing values that exemplify the culture of a healthcare organization. The fundamental goal of this model is to support the relationship between the nurse and the patient. The model provides the nurse with autonomy, independent decision-making, and empowerment to implement a care intervention. The model is a framework that guides the implementation of care within the value system of the nurse and the organization (Chamberlain, et al., 2013). Hopefully, the improvement of patient outcomes is the goal of every nurse. The following is an account of the discovery of a nursing care model that values the patient as the center of any care intervention. Using the framework of this model led to the development of an intervention plan to decrease preoperative anxiety and improve basic knowledge for adolescents facing spinal fusion surgery.

Components and Dynamics of the Model

The model chosen as the basis for this project was the Collaborative Patient Care Management Model (CPCMM), was developed at High Point Regional Health Systems, a 400-bed acute care hospital in High Point, North Carolina ("Innovative Care Models," 2008). CPCMM was developed when the hospital was searching for a way to balance patient care processes, cost and quality. The model provides multidisciplinary case management through the formation of practice teams, co-lead by RN patient care coordinators and physicians. These teams shaped the care for patient populations that are high volume, high risk, high cost, and disease-specific. ("Innovative Care Models,"2008).

As illustrated in Figure 1, the central focus of CPCMM is the patient. The components of care embodied by the model are care processes, quality, and cost. To make an impact on each of these components, CPCMM provides pivotal patient care coordinators, BSN or MSN prepared nurses, who lead multidisciplinary patient rounds, develop multidisciplinary care plans, coordinate individualized patient education, and are responsible for case management and discharge planning for their specific patient populations. The model demands an expanded nursing role for the patient care coordinators to serve as experts and mentors for the entire nursing staff caring for patients on their team, as well as guiding their team to define the standards of care, practice, and interventions for the patients in their respective patient populations. The cornerstone of the care delivered to patients in the CPCMM is nurse-initiated patient education promoting health maintenance ("Innovative Care Models," 2008).

The functional element of the CPCMM is the flexible multidisciplinary teams who guide the care of patients in their specific care populations. The members of these teams include, the

nurse and physician co-leaders; physical, occupational, and respiratory therapists, as appropriate; social workers; pastoral care providers; and any other allied health personnel contributing to patient care. The teams meet a minimum of six times per year to address issues of quality of patient care, patient outcomes, clinical procedures, standards of care, financial status, marketing strategies, and evidence-based research. The agenda for team meetings focuses on the model tenets of cost, quality, and process and how each impacts the patient. Meeting minutes are made available to all hospital employees via the internet. Each team's performance is evaluated based on outcomes, such as the decrease in patients' pain, anxiety level, and increased activity. When outcome goals are not met, intervention plans are developed. For example, the nurse's desired outcome for the patient might by improved compliance with desired health behaviors and the physical therapist's desired outcome might be the patient walking 500 feet continuously three times per day ("Innovative Care Models," 2008).

Since the implementation of the CPCMM at High Point Regional Health System, the average length of stay for patients has been reduced from 9.6 days in 1992 to 4.6 days in 2007. There has also been a noted improvement in patient safety and quality outcomes, as well as improved provider satisfaction and retention statistics. Satisfaction scores for employees working in the CPCMM within the hospital were at 92.3 percent in 2007, and there had been no turn over in the patient care coordinator positions in five years ("Innovative Care Models," 2008).

Theoretical and Evidence-based support for the Model

While the above evidence suggests that the implementation of the CPCMM within the specific health system in which it was developed will be successful, to be a viable model for nursing care that can be replicated, and the model must be validated. The following will examine

similar theories and evidence in the literature that support the Collaborative Patient Care Management Model as an effective approach to patient care.

In the research of Kimball and her colleagues to identify new and successful care delivery models, sponsored by the Robert Wood Johnson Foundation, the CPCMM was singled out among five highlighted models (Kimball, Cherner, Joynt, & O'Neil, 2007). The article authors were charged by the Robert Wood Johnson Foundation to identify five new care delivery models and identify common elements among them that contribute to their success. The models identified were: the 12-bed hospital model, the primary care team model, the collaborative patient care management model, the transition care model, and the hospital at home model. The components consistent with all five models are as follows:

- An advanced, expanded role of the RN from the conventional deliverer of care to that of primary care manager, coordinating patient care from admission to follow up post discharge
- Greater focus on the patient such that education is provided to empower the patient to accept responsibilities for care, resulting in improved compliance and recovery rates.
- Refining patient transitions through the use of improved assessment and teaching tools and managing care beyond the acute care setting to decrease fragmentation of care.
- Emphasis on measurable outcomes focused on clinical processes, quality, financial, safety, and satisfaction indicators to demonstrate viability and sustainability

(Kimball, Cherner, Joynt, & O'Neil, 2007).

The CPCMM component of care being coordinated by an expert nurse is supported by the evidence found in Courtenay and Carey's literature review of the impact of nurse-led patient management models of care (2008). The overall conclusion of this review of twenty-one relevant

publications is that patient education interventions, and use of a care protocol by nurse specialists can augment patient understanding of the condition and improve pain control (Courtenay & Carey, 2008). Another study of the impact of nurses coordinating interventions in patient care is noted in a quasi-experimental study looking at nurse-led multidisciplinary rounds that included assessment of the failure to remove urinary catheters promptly. If no need for continued catheterization was noted, the nurse coordinated the patient's care to include timely removal of the catheter. Data were collected twice during the nurse-led rounds and then after the model for such rounds was concluded. The pre (203 days per 1000 patients) and post (187 days per 1000 patients) intervention numbers of days of catheterization were significantly higher than the number of days patients remained catheterized during the coordination of catheterization care (162 days per 1000 patients). Therefore, the intervention led and coordinated by a nurse directly impacted the risk of urinary tract infection in catheterized patients (Courtenay & Carey, 2008; Fakih, et al., 2008.). Again, evidence supporting the CPCMM component of nurse driven care coordination in a multidisciplinary team setting is provided.

When the CPCMM is utilized by the nurse executive, it is important to hold the model up to the light of the Scope and Standards of Practice for the specialty. The model component calling for the nurse serving as a co-leader of the multidisciplinary care team and as a patient care coordinator shaping the care of patients in the specific population fulfills: Standard 5A: Coordination-"The nurse administrator coordinates the implementation and other associated processes. The nurse administrator: Provides leadership in the coordination of multidisciplinary healthcare resources for integrated delivery of care and services." (American Nurses Association, 2009). Standard 5B states: "Health Promotion, Health Teaching, and Education-The nurse administrator employs strategies to foster health promotion, health teaching, and the provision of

other educational services and resources….The nurse administrator: Contributes to the design, development, implementation, and evaluation of educational programs, including continuing education" (American Nurses Association, 2009). This standard is also addressed by the CPCMM component of developing individualized patient education. The Standards of Professional Performance of Standard 11-Collaboration, Standard 14-Resource Management, and Standard 15-Leadership share the focus of the CPCMM tenets of quality, cost and process. The design of the CPCMM is couched in the Scope and Standards of Practice for Nursing Administration by sharing the same values and principles of patient care and the leadership required to make these standards a reality in practice.

Application across Multiple Cultures

Regardless of the nursing care model an intervention is based upon, if the model and intervention are not culturally sensitive, both are useless when included in the plan of care for a patient who cannot hear, see, understand, carry out, or believe in the components of the intervention. All care models must make cultural competence a priority and cultural proficiency a goal. Not only is cultural competence an ethical issue each care provider must incorporate in the personal care paradigm, but the governing bodies of health care demand it of providers. In 2007, The Joint Commission introduced requirements providing for culturally appropriate care in the appropriate language for all patients ("Joint Commission on Accreditation Health Care Organizations," www.jointcommission.org, 2017). The American Nurses Association, American Academy of Nursing, the American Association of Colleges of Nursing, and the American Medical Association, among a multitude of other professional healthcare associations have issued statements promoting cultural competence and proposed standards to demand healthcare that is sensitive to all areas of cultural sensitivity (Engebretson, Mahoney, & Carlson, 2008).

Cultural competence, a fundamental issue throughout healthcare, is accomplished when each practitioner assures such sensitivity for all. With the implementation of a nursing care model, such sensitivity must be a priority. The very structure of the Collaborative Patient Care Management Model assures its application for all cultures because the patient is the center of the model. The care processes and standards of quality that comprise the model must be individualized to the needs, beliefs, customs, and values of each patient. The use of interpreters, patient education materials available in languages and formats of the patient population, and resources for care coordinators providing cultural information must be available.

The first step in assuring cultural sensitivity in the implementation of the CPCMM is to conduct a cultural assessment of the patient populations served by the care providers. Awareness of the customs, beliefs, and needs of all patients within a patient population is essential to cultural competence. The next step belongs to the leadership of the workplace. The required resources must be provided for care providers attain cultural competence (Rose, 2011). The CPCMM can be applied to all persons within a diverse patient population when cultural competence becomes a value for leadership and practitioners.

Proposed Intervention Based on Care Model

The system context in which the CPCMM will be utilized in practice is that of a small, specialty facility providing inpatient and outpatient services for children and adolescents with orthopaedic conditions. The population to be served by the model is adolescents, ages 10-18, facing spinal fusion surgery. The model provides the framework for the implementation of a nurse-driven preoperative protocol as a component of a teaching program consisting of a multidisciplinary team directing care for these adolescents. This Spine Fusion Surgery Care

Protocol (SFCP) is to be implemented to meet the goals of providing an excellent level of patient/family education, reduced preoperative anxiety and increased knowledge of spinal fusion surgery. By placing the patient at the center of its construct, the CPCMM will prioritize the components of the proposed spine program to meet the individualized needs of this population. According to the National Scoliosis Foundation, the prevalence of scoliosis in the United States is 2-3% of the population which is equivalent to 7 million people (2016). Further statistics indicate that 38,000 people in the United States undergo spinal fusion surgery each year. (National Scoliosis Foundation (NSF), 2016). While this is not a large patient population, it consists of adolescents and families who are frightened by the prospect of surgery and in need of all the excellence of care the SFCP, designed according to the standards of the CPCMM, provides.

The care intervention presented herein was developed for the patient population of adolescents facing spinal fusion surgery for the treatment of scoliosis. The nursing care model chosen to guide the care of this population is CPCMM. The goals of the CPCMM are summarized as follows:

- Focus on health prevention, awareness, management, and patient education through the lifespan
- Primary involvement of the patient and family in the planning and delivery of care
- Collaborative practice among a multidisciplinary team
- Improved outcomes in the areas of clinical processes, fiscal management, and patient satisfaction

("Innovative Care Models," 2008)

The nurse CC is the driving force of this multidisciplinary team approach with patient education at its center. Per design of the CPCMM, the patient is the center of care and the focus of the tenets of cost, quality, and process. These are the areas of priority of care for the model which is realized in the proposed intervention in this writing. The flow chart in Figure 2 illustrates the Spinal Fusion Care Protocol (SFCP).

The intervention that the CPCMM shapes for the scoliosis population treated at a small specialty hospital in central Kentucky that serves as the subject of this project is a preoperative care protocol. This protocol is a modification of the Care Pathway for Spinal Surgery (CAPSS) developed and in use at The Children's Hospital-Colorado in Aurora, CO (Miller, et al., 2010). This author had the fruitful opportunity to spend three days with the Spine Program Nursing Staff at The Children's Hospital-Colorado and observed CAPSS in action. Elise Benefield, BSN, RN provided a wealth of information on the development and implementation of their care protocol and was eager to collaborate and offer resources for the development of this care protocol.

Although CAPSS focuses on high-risk patients undergoing spinal fusion surgery and SPCP focuses on primarily healthy patients with adolescent idiopathic scoliosis, much can be learned from the CAPSS experience. The algorithm model presented in CAPSS offers a framework for this implementation. CAPSS formalizes the patient/family journey to spinal fusion surgery. The nurse-led multidisciplinary clinic concept for this program, while based on the CPCMM, is adapted from what this author observed in the Spine Clinic at The Children's Hospital in Aurora. Their efficiency and thoroughness with which care is provided in the CAPSS program offered an excellent standard of care this program emulates.

The SFCP begins with the commitment of the CC-the nurse serving in a new role that is the foundation of the CPCMM ("Innovative Care Models," 2008). This nurse is experienced in

the care of the patient population central to the intervention plan and holds a BSN, MSN, or DNP. The CC is responsible for the patient education plan individualized to each patient/family, the multidisciplinary plan of care, case management, and discharge planning for patients undergoing spinal fusion surgery. The CC also serves in an expert, mentor, and role model for nursing staff caring for these patients during hospitalization.

The goal of the SFCP is to provide a comprehensive, formalized, multidisciplinary preoperative care protocol that provides optimized preparation for patients and families facing spinal fusion surgery. The objectives of the protocol are:

- Decreased preoperative anxiety level
- Increased basic knowledge of scoliosis and spinal fusion surgery

The intervention begins when the family and surgeon decide that spinal fusion surgery is the next step in the patient's treatment plan. At this point, the CC meets with the family in the clinic and explains and initiates the SFCP and schedules the patient's appointment in the Spine Surgery Clinic. This clinic is held on the second, third and fourth Fridays of the month. This appointment is scheduled to take place within six weeks of the decision to proceed with spinal fusion surgery. At this appointment, the patient/family meets the multidisciplinary Spine Team consisting of the anesthesiologist, nurse CC, child life therapist, dietician, and medical technologist from the clinical laboratory. During the clinic visit, each of these team members has a scheduled time to interact with the family in the clinic room, sharing their specific piece of the patient's plan of care. Next, the CC provides the teaching portion of the SFCP, using a notebook and PowerPoint format. The visit is concluded with the CC summarizing the day with the family and answering any final questions. The family is informed of arrangements for any consults requested by the Anesthesiologist at this point. Such consults include: cardiology, pulmonology, sleep study, neurosurgery, and dermatology-if acne is present on patient's back. The presence of

acne increases the patient's risk of delayed infection due to Propionibacterium acnes, as the bacteria is a common skin organism and is associated with the occurrence of acne (Collins et al., 2008; Hahn, Zbinden, & Min, 2005; Perry & Lambert, 2006).

The protocol proceeds with the CC coordinating any needed consults and retrieval of medical records from outside facilities, obtaining consult reports and compiling the patient's information for review by the anesthesiologist. Next, the anesthesiologist and CC meet to review all results and determine the patient's next step in the protocol. For example, a cardiology referral is arranged for an abnormal electrocardiogram (EKG), a repeat test is arranged in for the patient in the local community for an abnormal blood test. The anesthesiologist gives clearance for the patient's surgery to be scheduled if no concerns are identified. The CC obtains date of surgery from the surgery scheduler when surgical clearance is obtained. When this date is received, the CC informs the family, via phone, and surgery becomes much more of a reality for them. During this phone call, the CC addresses the combination of relief and increased anxiety with the family. It helps to acknowledge that the family is pleased to receive a surgery date but also anxious because surgery is now soon.

The protocol progresses to the preoperative phone call made to the family by the CC four weeks before the patient's surgery date. During this call, the CC and family again discuss the patient's skin condition. If the family reports acne on the patient's back, they are assisted in obtaining dermatology consult to begin skin treatment. If no acne is reported, the preoperative phone call proceeds with a discussion of details of family's schedule for preoperative testing, housing arrangements, admission, surgery, homebound schooling, Family Medical Leave, patient's health status, and any other questions and concerns of the family.

Next, the family arrives the day before surgery for the preoperative work up of laboratory tests, x-rays, history and physical, informed consent and introductions to the inpatient, surgical

and post anesthesia care staff. Then, the family is off to surgery early the next morning. During this time, the CC makes rounds, visiting with the family while the patient is in surgery. These rounds continue until the patient is discharged. The CC then proceeds with the protocol with a follow up phone call to the family three days post discharge. The patient then returns to the Outpatient Clinic 2-3 weeks post discharge and meets with surgeon and CC for wound check and discussion regarding return to school. Forms are provided to outline needs and activity restrictions for the school staff. The protocol concludes with the second post discharge clinic visit with the surgeon and CC unless complications, such as wound infection, arise. The family is encouraged to call CC with any concerns and the patient is seen intermittently in the Outpatient clinic until the age of 21. At that time, they are transitioned into the adult healthcare system-with assistance from the social worker and CC.

Implementation and Evaluation Plan

Implementation of the SFCP begins when the Nurse Executive selects the Patient Care Coordinator. The CC begins by developing a presentation of the care protocol that is presented to the hospital board of governors, administration, and medical staff to obtain a commitment for support, funding, and participation. Once this major feat is accomplished, the CC proceeds with the recruitment of the SFCP team. In the case of the facility presented in this writing, the physician who serves as co-leader of the team is the anesthesiologist. The CC's first task is the recruitment of the multidisciplinary team members. Some justification of choice of disciplines for the team follows: The role of the dietician on the team is to guide this patient population to attain improved nutritional status preoperatively to support surgical site wound healing and weight management as determined necessary (Arnold & Barboul, 2006). The child life therapist contributes expertise in the area of managing anxiety. Research confirms that preoperative

anxiety contributes to postoperative pain, sleep disturbances, as well as increased nausea and vomiting (Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006; McCann & Kain, 2001).

The SFCP is evaluated based on its attainment of the objectives in the following manner:

- Objective 1- Guiding adolescent to a decreased anxiety level on the Numeric State Anxiety Scale with participation in the preoperative teaching intervention. The Numeric 0-10 State Anxiety Scale is used in the protocol due to its simplicity of use and its validity for measuring anxiety in children (Crandall, Lammers, Senders, Savedra, & Braun, 2007). Each family is instructed in the use of the scale at their Spinal Surgery Clinic appointment and provided with a laminated scale card (see Figure 2-3).
- Objective 2-Increasing the adolescent's basic knowledge of scoliosis and spinal fusion surgery. The patient completes a quiz composed of 10 true-false questions based on the subject matter covered in the preoperative teaching session.

The Preoperative Teaching Program Design

On the day that the patient, family, and pediatric orthopaedic surgeon decide to proceed with spinal fusion surgery, the SFCP is initiated. The CC meets with the family to introduce him or herself, explain the process of the work up, teaching, and scheduling of spinal fusion surgery. The primary outcome of this contact is the explanation of the Spinal Surgery Clinic and scheduling the adolescent's appointment in this clinic. The CC provides the family written information that explains expectations for the clinic visit and the CC's contact phone number.

The Spinal Surgery Clinic visit consists of an assessment by the anesthesiologist and a teaching session with child life specialist in which family views a slide presentation of an

individual experiencing each area of the hospital and type of care experienced in these areas while hospitalized for spine fusion surgery. Examples of these photographs include: check in area, inpatient nursing unit, patient room, radiology department, laboratory, graphic arts department, patient with spinal cord monitoring leads and wires in place, preoperative holding room, post anesthesia care unit, operating room and close observation room for first 12 hours of postoperative nursing care. Then the dietician consults with the adolescent and family to discuss optimizing nutrition to assist with postoperative recovery and wound healing. Next, blood and urine are collected for preoperative laboratory testing. An EKG and pulmonary function tests are obtained. The CC them conducts the teaching program.

The SFCP was modeled after the program used by the staff at The Children's Hospital-Colorado. The cornerstone of the teaching intervention is the notebook developed to provide each adolescent with information regarding expectations of the work up process for spinal fusion surgery, waiting period before surgery occurs, the day before surgery, the day of surgery, and the postoperative period. The notebook contents are comprised of two sections: general surgery information provided by the hospital and information specific to the spinal fusion surgery experience. This specific information is shared with the adolescent and family in the form of a PowerPoint presentation. The second section of the notebook contains copies of each slide included in the power point presentation. A detailed list of notebook contents is provided in the Appendix.

The goal of this teaching intervention is to provide the adolescent and family with information regarding scoliosis, spinal fusion surgery, preoperative anxiety, and coping skills to manage anxiety, and expectations for the hospitalization and surgery experience. Other teaching is provided regarding postoperative care, focusing on pain management, weaning off narcotics,

postoperative constipation, and activity limitations. The intervention concludes with a tour of the hospital and a stop by the laboratory toy room for a gift for a job well done.

Benefits for the Population and the Organization

The SFTP offers a multitude of benefits to both the children and families undergoing spinal fusion surgery, as well as the organization that implemented the program. The population receives an excellent standard of care by working with a multidisciplinary team from the beginning of their journey through recovery from surgery. Therapeutic relationships are formed upon which the children and families can depend for support and information. The CC serves as the point of contact for them and is available by phone as needed. This relationship provides some control for the families when they are turning the lives of their children over to others. Having input allows these families to maintain a connection with the healthcare professionals entrusted with the care of their children for the 5-8 month waiting period before surgery.

Meeting the outcomes of the protocol improve the care of this patient population in a comprehensive manner. By teaching the children and families the coping skills to manage their anxiety during their journey, they are empowered to improve their outcomes (Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006). The acne protocol focuses on a risk that can lead directly to surgical site infections (Hahn, Zbinden, & Min, 2005; Kain, et al., 2006). The nutrition component of the protocol also addresses the risk factors of obesity and improved nutritional status preoperatively for the population to decrease the risk of incisional infections (Arnold & Barboul, 2006; Pull ter Gunne, A.F., & Cohen, 2009). Maintaining communication with patients and families throughout the waiting period before surgery helps to identify and address issues that can lead to cancelation of surgery-a hugely disappointing and costly event. Finally, the culmination of benefits for this population is their satisfaction with a positive experience during a stressful period in their lives. That is quality care.

When an organization implements the SFCP there are resulting benefits. These benefits are expressed in the tenets of the model serving as the framework for this intervention-the Collaborative Patient Care Management model. The organization experiences improved outcomes of process, quality, and cost. The processes of care for patients undergoing spinal fusion surgery are formalized and more efficient, thereby meeting organizational care standards. Next, the families inform the organization of their belief in the quality of care they experience. Finally, the organization experiences cost efficiency with the low cost of the teaching intervention, decreased surgery cancelations, and measures to decrease postoperative infections, such as treating acne before surgery.

Anxiety is a disruptive reality for adolescents facing spinal fusion surgery. Participation by this population in a nurse-led preoperative teaching program can equip them with the tools required to manage this anxiety. Gaining knowledge of the surgical procedure, hospitalization experience, care participation required and coping skills can assist these patients to reach the goal of decreased preoperative anxiety. The development and implementation of such evidence-based interventions can improve outcomes for these adolescents.

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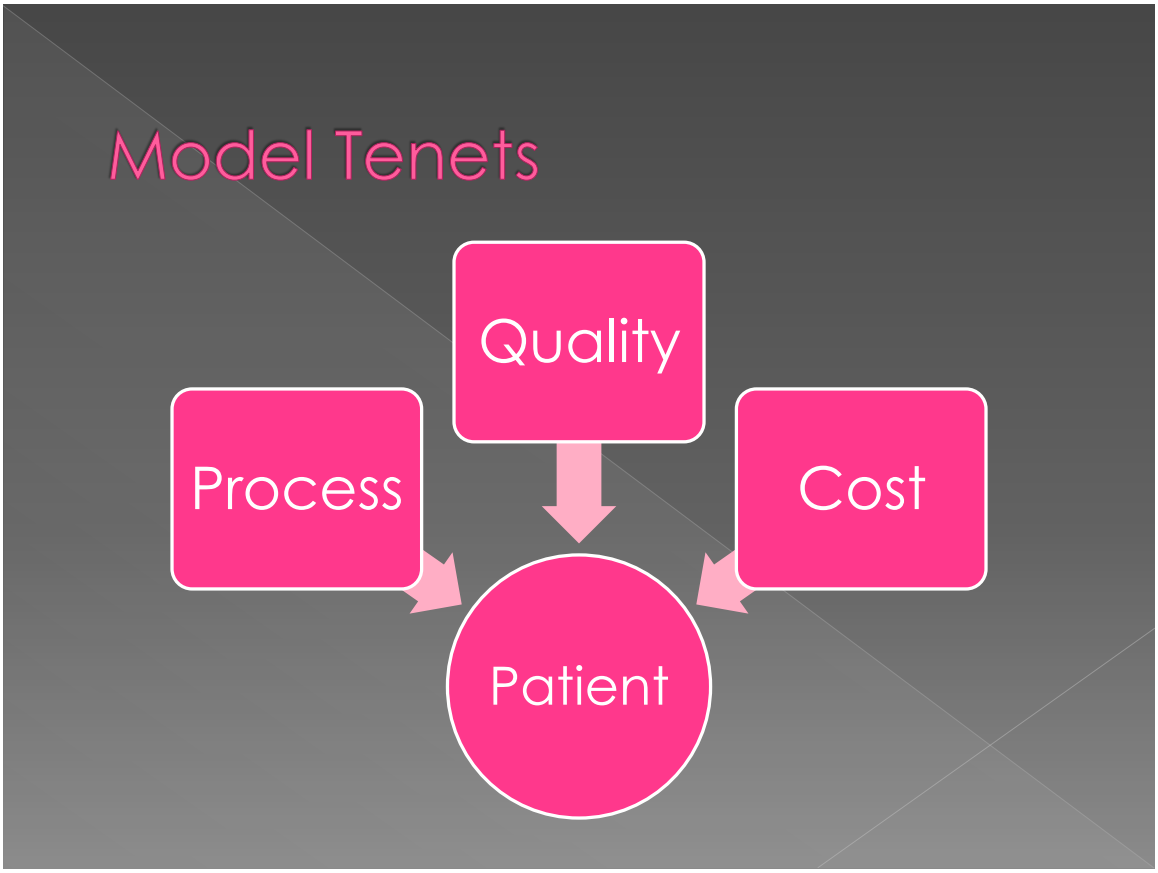

Figure 1 “Innovative Care Models,” 2008

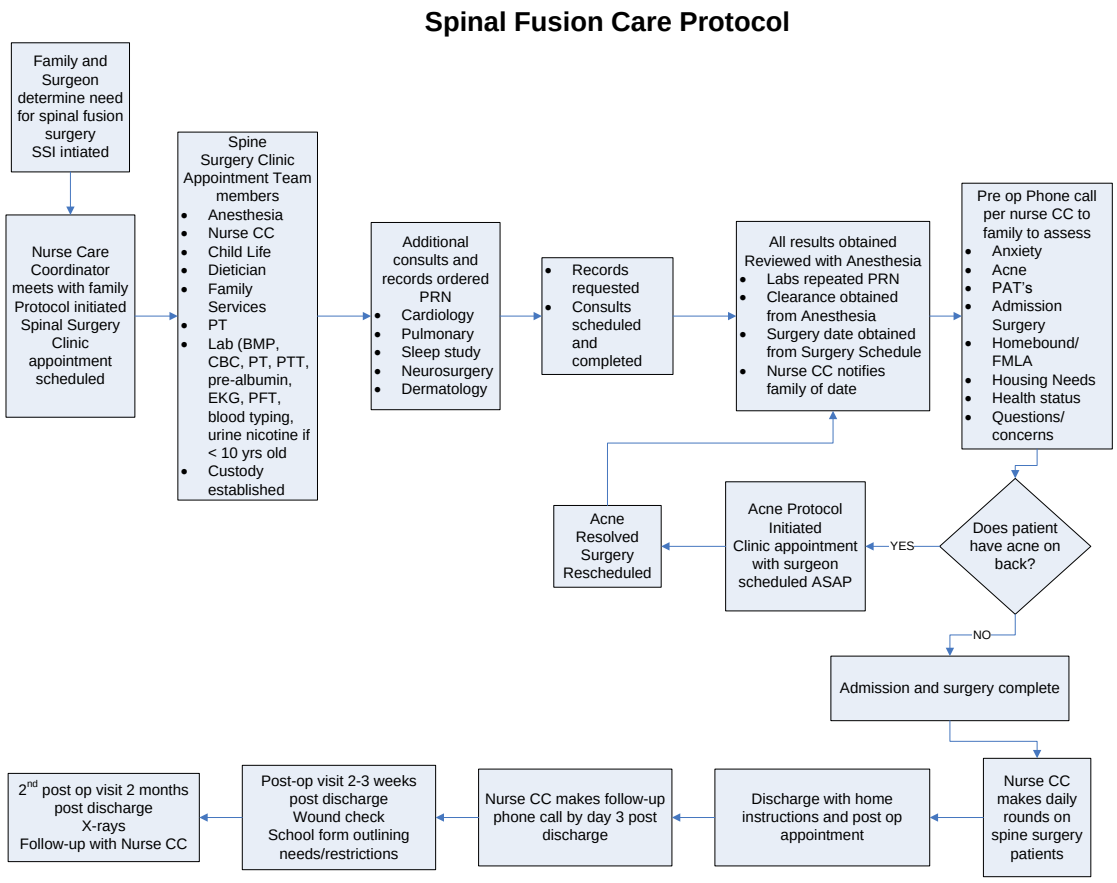

Figure 2 Spinal Fusion Care Protocol

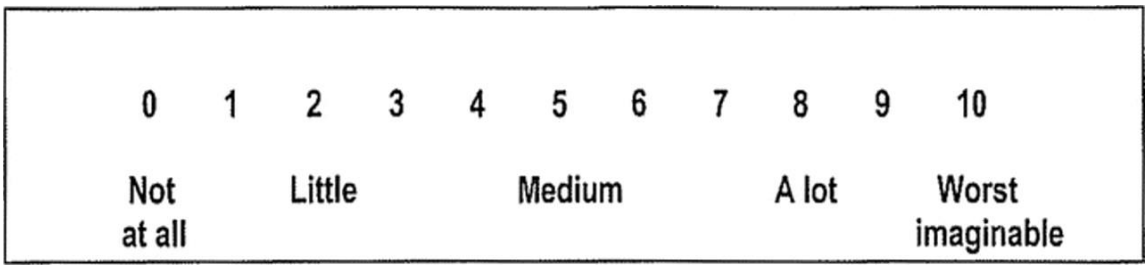

Figure 3 Numeric 0-10 State Anxiety Scale

Manuscript 3

An Examination of the Spinal Fusion Care Protocol:

A Pre-test/Post-test Analysis

Anna Gayle Parke

Abstract

Purpose: The purpose of this preoperative patient teaching intervention was to reduce preoperative anxiety and increase basic knowledge of adolescents facing spinal fusion surgery.

Setting: The teaching program was implemented in the outpatient clinic in a small pediatric orthopaedic hospital located in central Kentucky.

Population: The population for this study was a sample of 15 adolescents. 13 females, two males. Their ages ranged from 10-16 years of age with a mean age of 12.9 years, Of the 15 subjects, nine had undergone previous surgeries.

Inclusion criteria: Subjects were English speaking, 10-18 years of age and preparing to undergo spinal fusion surgery for idiopathic scoliosis. They were able to express understanding of the concept of anxiety and to determine their level of anxiety using a validated 0-10 scale.

Design & Methods: The study was a one-group pretest-posttest design. Demographic variables, age, gender, and previous surgical experience were captured upon enrollment. Before and after the teaching intervention and on the day before surgery, the subject's anxiety score and answers to 10 true/false questions regarding scoliosis and spinal fusion surgery were obtained. Subjects were also asked to complete questions capturing qualitative information regarding the program.

Results: Preoperative anxiety scores significantly decreased from a mean of 4.27 pre-training to a mean of 2.07 post-training as indicated by p value=0.001 and significantly different from pre-training mean of 4.27 to day before surgery mean 3.00 as seen in the p value=0.042. Basic knowledge of scoliosis and spinal fusion surgery did not significantly change over time as seem in the p value-0.337.

Conclusion: A decrease in preoperative anxiety was noted in adolescents participating in the spinal fusion preoperative teaching program.

Background

Scoliosis is an abnormal lateral curve in the vertebrae of the spine, which occurs in 2% to 3% of the population; this proportion equals approximately 7 million individuals in the United States (NSF, 2016). The degree of curvature, measured on a radiograph determines the degree of curvature. Scoliosis curves greater than 30 degrees occur in 0.2% to 0.3% of the population, which equals approximately 600,000 to 900,000 individuals (American Academy of Orthopaedic Surgeons, AAOS, 2010). Curves of lesser magnitude are equally distributed between females and males. However, females are eight times more likely to develop curves that require treatment (NSF, 2016).

Treatment for scoliosis is three-fold: observation, bracing, and surgical intervention with spinal fusion surgery. Observation is recommended in cases of curves less than 20 degrees. When the curve is in the 20-30 degree range and the young person is still growing, bracing is the recommended treatment. The goal is to stop the progression of the curve. When the curve progresses to 50 degrees or greater, spinal surgery is recommended. Curves of this magnitude have shown progression in adulthood. The primary goal of spinal fusion surgery is to stop curve progression and secondarily to provide as much correction of the curve as possible (AAOS, 2010; NSF, 2016). Annually, approximately 600,000 of adolescent office visits to primary care providers are for scoliosis. Further, each year, 30,000 children are treated with a scoliosis brace, and 38,000 have curves that progress to the point of requiring spinal fusion surgery (NSF, 2016)

The focus of this study was adolescents with scoliosis that has progressed to 50 degrees or greater who are facing spinal fusion surgery. The reality of major surgery is daunting for anyone. Adolescents are in the midst of a stage of growth and development that Keating

describes as unique due to the influence of technology and the complexity of the world in which they live (2007). He theorizes that the developmental task of this age group is to learn management of complexity and the key to gaining this ability is in the rapid growth of the prefrontal cortex (PFC) in their brains. The PFC influences other areas of the brain during this stage of development and changes are noted in behavioral, cognitive, social, and emotional functioning (Keating, 2007).

The reality of a pending surgical procedure creates anxiety for adolescents. Anxiety is defined as an undesirable emotional state due to anticipation of pain, fear of the unknown, loss of control and independence, past experience with pain, and separation from home, family, and friends (Crandall, Lammers, Senders, Savedra, & Braun, 2007; Eysenck, Derakshan, Santos, & Calvo, 2007; Lamontage, Hepworth, & Salisbury, 2001; Logan & Rose, 2004). The experience of anxiety is commonly described as worrying, but it can also produce physical symptoms such as increased heart rate, shortness of breath, and abdominal pain (Muris, 2007). Assessment of anxiety and measures to decrease its occurrence for adolescents facing spinal fusion surgery is important in order to prevent its potential complications. These can include increased postoperative pain, greater use of analgesics; sleep deprivation, occurrence of emergence delirium, and changes in behavior during the postoperative period, such as uncooperativeness and combativeness (Crandall, et al., 2007; Kain, et al., 2004; Kain, Mayes, Caldwell, Andrews, Karas, & McClain, 2006).

Providing cognitive-behavioral strategies for adolescents before surgery helps them to decrease their distress regarding surgery. Teaching coping techniques that improve their confidence in dealing with anxiety and enhancing their feeling of control over their situation (LaMontagne, Hepworth, Cohen, & Salisbury, 2003). One method of gaining these skills is

through preoperative teaching provided by health care providers in which they assess current coping skills and explain the procedure, discuss expectations for the experience and teach needed coping skills to help manage their anxiety (Dreger & Tremback, 2006; LaMontagne, et al., 2003) Investigators have found that the sources for preoperative information for adolescents were pamphlets, stories from friends and relatives, and television, rather than healthcare providers (Smith & Callery, 2005). Adolescents confirmed that they had little knowledge about hospitals or even their surgical procedure before admission (Smith & Callery, 2005).

Preoperative teaching programs are used in the pediatric setting to reduce preoperative anxiety. These programs, especially when they are family-centered in nature, have reduced anxiety levels, both preoperatively and postoperatively, decreased hospital length of stay, reduced postoperative delirium, and decreased analgesic-usage (Kain et al, 2007; Rice, Glasper, Keeton, & Spargo, 2008).

Description of the Practice Inquiry Project

A preoperative teaching program was developed at a small specialty hospital in central Kentucky by this investigator and implemented September 1, 2013. The purpose of the new program, termed Spinal Fusion Teaching Protocol (SFTP), was to present a comprehensive, formalized, multidisciplinary preoperative teaching program that provided optimized preparation for patients facing spinal fusion surgery and their families. A content outline is provided in the Appendix. One of the goals of the program was the reduction of anxiety by providing the adolescent with information about the plan of care, expectations for the time period from the teaching was provided through the first postoperative visit, and the development of coping skills to address preoperative anxiety. The second goal was the

increase of basic knowledge of scoliosis and spinal fusion surgery. The purpose of this study was to evaluate the patients participating in the preoperative teaching program for reduced levels of anxiety and increased basic knowledge of scoliosis and spinal fusion surgery. The preoperative teaching program took place in the outpatient department of a small specialty hospital in central Kentucky during the preoperative anesthesia clinic.

Objective

The objective of this study was to determine if participation in the SFCP program reduced anxiety levels and increased basic knowledge of scoliosis and spinal fusion surgery.

Methods

The study used a one-group pretest-posttest design. Upon enrollment, demographic variables, age, gender, and previous surgical experience were captured. Anxiety scores were obtained before and after participation in the SFCP during the anesthesia preoperative clinic visit and the day before surgery. Each subject also answered the same ten true/false questions related to knowledge of scoliosis and spinal fusion surgery at the same intervals. Subjects were also asked qualitative questions concerning the teaching program after the intervention, during a telephone call with subjects approximately one month after the teaching intervention, and on the day prior to surgery.

Measures

Demographic data to be collected include age, gender, and occurrence of previous surgeries. The Numeric State Anxiety Scale used in the study was evaluated for validity for its numeric 0-10 anxiety scale as compared to the state portion of the State-Trait Anxiety Inventory for Children (STAIC) with the use of a descriptive correlation research design

(Crandall et al., 2007). A score of "0" indicates no anxiety at all, "5" medium anxiety, and "10" indicates the worst anxiety ever experienced. The tool was tested in a preoperative clinic with 60 children, 7-13 years of age. Anxiety scores were obtained from each child pre and post education with both the 0-10 scale and the STAIC tool. A simple linear regression and Pearson correlation were used to evaluate the strength of the results. The pre-education evaluation of the two showed $p=0.0007$ and post-education evaluation showed $p<0.0001$. The correlations moderate with pre education with $r=0.424$ and post education with $r=0.639$. These results verified the validity of the numeric 0-10 anxiety self-report scale (Crandall et al., 2007; Fortier et al., 2010).

Procedure

Upon the patient and family arrival in the examination room, the primary investigator presented an explanation of the study and answered any questions. For those who chose to participate in the study, informed consents and assents was obtained and signed. Copies of the signed forms were provided to participants. Patient number, age, gender, and previous surgery experience were obtained to complete the Study Data Form. The Numeric State Anxiety Scale (Figure 3) was given to the subjects, its use explained, and the pretest result was obtained and recorded on the Study Data Form. Next, the Basic Knowledge test was administered to subjects. The subjects then participated in the Preoperative Spinal Fusion Teaching Program. Upon completion of the teaching session, the post-test anxiety score was collected and recorded on the Study Date Form. Lastly, the investigator administered the Basic Knowledge test. Also, upon the arrival of each subject the day before surgery, the anxiety score was obtained and the investigator again administered the Basic Knowledge test.

Data Analysis and Results

A repeated measures ANOVA was used to measure changes in the same variable over time. In this case, the variables examined measured were basic knowledge of scoliosis and spinal fusion surgery and level of anxiety at three time points (pre-training, post-training, day before surgery). This produced one p-value that indicated if there were changes over time. A p-value >0.05 indicated there was no change over time. The Bonferroni correction was used to ascertain where the significance occurred (between the pre-training, post-training and day before surgery).

Basic knowledge of scoliosis and spinal fusion surgery did not significantly change over time due to a p-value=0.82. However, preoperative anxiety did significantly change over time due to a p-value=0.001. Anxiety scores significantly decreased from a mean of 4.27(with a standard deviation of 2.15) pre-training to a mean of 2.07(with a standard deviation of 1.71) post training due to a p-value=0.001. Anxiety scores remained significantly different from pre-training from a mean of 4.27(SD=2.15) and the day before surgery mean of 3.00 (SD=1.73) due to a p-value=0.042. While the anxiety score did increase from post-training to the day before surgery, it was not a significant change due to a p-value=0.377.

As seen in Table 4, the subjects demonstrated significantly reduced preoperative anxiety scores following participation in the Preoperative Spinal Fusion Teaching program. While their preoperative anxiety scores did not show a continued decrease from the completion of the teaching program to the day before surgery per Table 3, these scores tended to remain below the first score obtained before the teaching program. The additional anxiety experienced on the day before surgery likely contributed to any increase in anxiety score. However, the goal of decreased preoperative anxiety for this population was met.

As seen in Table 5, the basic knowledge of scoliosis and posterior spinal fusion did not significantly increase after the teaching intervention. While the subjects were provided with valuable information during the intervention, their attention was not captured to a degree that they were able to express a significant increase in understanding of the concepts presented. The entire visit in which the intervention was a part lasted an average of 3 hours. The subjects' fatigue and loss of interest may have contributed to the scores on the test.

Discussion

The implementation of the SFCP impacted the Anesthesia Clinic in which it occurred and the workload of the CC responsible for the program. The SFCP took place in Anesthesia Clinic which occurred the second, third, and fourth Fridays of each month. With the addition of the SFCP, the time required to complete the appointment increased the time to complete the visit to 3-4 hours. Therefore, the scheduling format was modified. With only a Friday afternoon slot available for the program, only one patient preparing for spinal fusion surgery was scheduled. This scheduling restriction decreased the availability of openings in the clinic and potentially postponed scheduling of surgery date.

Further, the time required of the CC to implement the SFCP decreased her availability for other patient populations for which she was responsible. This issue resulted in the need to reorganize the overall distribution of patient populations among all the CC's. Nursing management in the facility recognized the acuity of the preoperative spinal fusion patients and accommodated their needs with this change.

First, the patients and families who participated in the program and the CC developed a therapeutic relationship that extended through the postoperative period. Families' questions were answered and worries calmed through many telephone calls. Issues such as postoperative pain and constipation were addressed after discharge via telephone as well. This relationship improved care and satisfaction for patients and families.

Another benefit noted was that of decreased cancelation of spinal fusion surgeries. On average, there were 2-3 fewer spinal fusion surgeries canceled annually in 2010-2016 as compared to those canceled prior to the implementation of the SFCP in 2009 (Shriners Hospital for Children-Lexington Surgical Log, 2009-2016). With the average hospital charges alone for spinal fusion surgery in 2008 of $81,960, this had a significant impact on the organization (Rajaee, Bae, Kanim, & Delmarter, 2012.).

The costs of the SFCP to the organization were the salary of the nurse care manager and supplies for the program. These supplies included three-ring binders, paper, a color copier, subject dividers, and plastic business card holders. As a current employee of the organization, no new hiring was required. In comparison to the savings of decreased surgery cancelations, the program is economically Sound.

Limitations

One limitation of this study was the small sample size. A larger sample would provide more data to support the findings provided herein or provide different findings. Another limitation was the difficulty holding the attention of adolescents throughout a lengthy encounter. The use of an interactive format, rather than the exclusive use of lecture, which required responses to questions throughout the program may be more engaging.

Implications for Practice

The implementation of the SFCP can decrease preoperative anxiety and potentially increase basic knowledge of procedures for a variety of patient populations. The possibility of including two or three patients and families in the teaching sessions, taking care to maintain privacy policies, can provide an interesting alternative to the current design. If a group chose to participate together, the possibility of sharing of concerns and questions could add another layer of education for all involved. Families might choose to maintain contact during the experience, resulting in a source of support for everyone.

Another practice possibility is the incorporation of a web-based, interactive format for patient teaching. Examples of such interaction include animation and videos formatted into the teaching material to provide interest for the participants. Also, the idea of the material including a video game that guides the patient through an adventure in which they gather pieces of teaching information. Other possibilities include inserting questions and detailed answers in the body of the program and allowing user discretion of the order of completing modules. The overwhelming benefit of such web based teaching is the ease of access and flexibility of utilization (Fox, 2010; Runger, Lecheler, Horn, Tews, & Schaefer, 2006).

Further Research

As noted earlier, subjects provided qualitative data that were not utilized in this study. This information provided the subjects' opinions regarding the helpfulness of notebook, discussion, and PowerPoint presentation. Also reported were the coping skills subjects utilized during the waiting period for surgery. Further exploration of this information can lead to improvements in the current SFCP.

Conclusion

Preoperative anxiety is a reality for anyone experiencing surgery. The study presented in this writing examined a teaching protocol implemented for adolescents facing spinal fusion surgery with the goal of reducing preoperative anxiety. The results of this study revealed that a formalized, comprehensive, multidisciplinary teaching protocol could statistically reduce preoperative anxiety for this population. Implications for future practice include the adaptation of this protocol to reduce preoperative anxiety for multiple patient populations.

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Table 1 Pre and Post Teaching Knowledge Scores and Pre, Post and Day before Surgery Anxiety Scores-Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Pre_Teaching_Score	15	4	6	10	8.00	.338	1.309	1.714	.000	.580	-1.077	1.121
Post_Teaching_Score	15	3	7	10	8.80	.262	1.014	1.029	-.019	.580	-1.346	1.121
Day_before_Surgery_Score	15	3	7	10	8.80	.279	1.082	1.171	-.328	.580	-1.126	1.121
Pre_Teaching_Anxiety_Score	15	8	1	9	4.27	.556	2.154	4.638	.543	.580	.175	1.121
Post_Teaching_Anxiety_Score	15	6	0	6	2.07	.441	1.710	2.924	1.167	.580	.974	1.121
Day_before_Surgery_Score	15	6	0	6	3.00	.447	1.732	3.000	.095	.580	-.766	1.121
Valid N (listwise)	15											

Table 2 ANOVA Test-Change in Knowledge Score Pre, Post, and Day before Surgery

(I) Knowledge		Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.800	.368	.142	-1.799	.199
	3	-.800	.327	.084	-1.688	.088
2	1	.800	.368	.142	-.199	1.799
	3	0.000	.293	1.000	-.796	.796
3	1	.800	.327	.084	-.088	1.688
	2	0.000	.293	1.000	-.796	.796

Table 3 ANOVA Test-Change in Anxiety Score Pre, Post, and Day before Surgery

(I) Anxiety		Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	2.200*	.470	.001	.923	3.477
	3	1.267*	.452	.042	.038	2.496
2	1	-2.200*	.470	.001	-3.477	-.923
	3	-.933	.573	.377	-2.490	.624
3	1	-1.267*	.452	.042	-2.496	-.038
	2	.933	.573	.377	-.624	2.490

Conclusion to Final DNP Project Report

This DNP final project developed from a job requirement for this author. A charge was issued by the medical staff of a small specialty hospital in central Kentucky to the care coordinator who managed the care of their patients who needed spinal fusion surgery for scoliosis. They requested a protocol that standardized the care for this population from initial surgical planning through recovery. A key component of this protocol was a preoperative teaching program that prepared these adolescents to successfully complete the plan of care required for spinal fusion surgery.

It soon became evident to the CC that, from the first contact with this population, they were experiencing significant anxiety due to the realization that they were facing spinal fusion surgery. Tears, questions, fear and lack of control were all displayed when CC met the adolescents. This issue of anxiety evolved into the primary focus of the SFCP.

The first step was to review the current evidence. The resulting integrative literature review, provided in Manuscript 1, revealed that preoperative anxiety occurs in at least 65% of children and adolescents facing a surgical procedure (Dreger &Tremback, 2006; Ahmed, et al., 2011), Further, three themes became obvious in the literature that organized the information. Five studies utilized a variety of standardized intervention program that provided extensive information explaining a comprehensive collection of teaching points regarding the surgical experience. Three studies described humor as a method to engage adolescents in order to reduce preoperative anxiety and emphasized the use of positive teaching points to guide adolescents to a less anxious outlook on the surgical experience. The remaining four studies introduced methods to improve current preoperative teaching programs in order to decrease preoperative anxiety. An

intervention that engages adolescents with humor, interesting formats utilizing current information technologies, and interactive programs have the potential to reform preoperative teaching. Such a program design can be implemented for multiple populations undergoing any surgical procedure and result in decreased preoperative anxiety.

Next, the identification of a nursing care model was made to use as a basis for the teaching program. The Collaborative Patient Care Management Model was chosen to guide the teaching program as presented in Manuscript 2. The model provided multidisciplinary case management through the formation of practice teams, co-lead by RN patient care coordinators and physicians. The components of the model included process, quality, and cost with the patient in the center of care development ("Innovative Care Models," 2008). With this foundation, the Spinal Fusion Care Protocol (SFCP) was born.

The cornerstone of the SFCP was the notebook developed to provide each adolescent with information regarding expectations of the work up process for spinal fusion surgery, waiting period before surgery occurs, the day before surgery, the day of surgery, and the postoperative period. The notebook contents were comprised of two sections: general surgery information provided by the hospital and information specific to the spinal fusion surgery experience. The adolescent and family received this information in the form of a PowerPoint presentation. This section of the notebook contained copies of each slide included in the power point presentation. The adolescents and their families participated in the SFCP during their appointment in the anesthesia preoperative clinic. A large part of the teaching program focused on coping skills that assist the adolescents in managing preoperative anxiety.

The teaching program also involved a multidisciplinary team providing information to the patients and families. These team members included the anesthesiologist, nurse care

coordinator, child life specialist, dietician, and laboratory technologist. The team worked together to provide the adolescent with the ability to achieve the program's goals of decreased preoperative anxiety and increased knowledge of scoliosis and spinal fusion surgery.

The final step in the process of implementation of the SFCP was the evaluation of the program and its outcomes. Manuscript 3 described in detail the study conducted on the SFCP in order to accomplish this evaluation. A one-group pretest-posttest design study was used to demonstrate that the SFCP significantly decreased the preoperative anxiety of 15 subjects. Therefore, the SFCP improved care for adolescents facing spinal fusion surgery.

September 1, 2009, a small specialty hospital in central Kentucky implemented the SFCP. This DNP project was a real time patient intervention that remains the standard of care for adolescents facing spinal fusion at this facility. The care coordinator who provided this report continues to facilitate this successful patient intervention, dedicated to decreased preoperative anxiety for the adolescents for whom she provides care.

Appendix

Spinal Fusion Surgery Protocol Notebook Contents

I. Cover Sheet with Contact Information for Hospital

II. Business Card Holder for Contact Information for Care Providers
   a. Care Coordinator
   b. Recreation Therapist
   c. Dietician

III. Title Page

IV. General Hospital Information
   a. Mission Statement
   b. CORE values
   c. Policy Information for Inpatients
   d. Maps
      i. Directions to Hospital
      ii. Interior of Hospital
   e. Lodging Options offering Discount
   f. Care Coordination Information Sheet
   g. Recreational Therapy Information Sheet
   h. Pain Management Information Sheet
   i. Scoliosis Resources

V. Before Surgery Information Sheet
   a. What Happens Next: review of lab results, obtaining surgery date, the teaching of coping skills to use during the waiting period before surgery (distraction, deep breathing, talking with family and friends, the process to contact nurse care coordinator for answers to questions.
   b. Acne: if develops at surgery site will be treated to reduce risk of infection of surgical incision
   c. Illness: if ill 7-10 days before surgery date, procedure may be postponed to avoid added risk

d. Preoperative Phone Call: from Admissions Coordinator nurse to assess current readiness current status of the patient, recent/current illness, and questions regarding the procedure.

VI. Day Before Surgery Information Sheet

a. Arrival Time
b. History and Physical
c. Visit with Anesthesiologist
d. Preoperative Testing
    i. Blood test
    ii. X-rays
    iii. Medical Photography and Videography
    iv. Spinal Cord Monitoring Baseline
e. Nursing Education
f. Overnight Accommodations
g. Break (Can leave hospital)
h. Return to Hospital Instructions
i. Preoperative Scrub
j. Good Night's Sleep

VII. Day of Surgery Information Sheet

a. Admission to Inpatient Unit
b. Preparation for Surgery
    i. Change into gown
    ii. Preoperative Medication
c. Move to Preoperative Holding Area with Family
d. Tell Parents "See You Later"
e. Move to Operating Room
f. Move to Post Anesthesia Care Unit
g. Move to Close Observation Room
h. Expectations for Postoperative Care
    i. Vital Signs
    ii. Turn, Cough, and Deep Breath

VIII. Recovery

a. Move to Hospital Room
b. Diet Progression
c. Walking
d. Bowel Movement

IX. Day of Discharge

a. Pain Medicine and Prescription
b. Escort to Car
c. Hydration/Nutrition
d. Risk of Constipation
e. Weaning off Pain Medication
f. Incision Care
g. Activity Restrictions
h. Contact Information for Concerns

X. Support Information Sheet for Parents/Guardians

XI. Copy of Power Point Slides

a. Summary of Preoperative Appointment
b. While You Wait
c. Anxiety
d. Coping with Anxiety
e. Distraction
f. Deep Breathing Exercises
g. As the Date Gets Closer
h. Day Before Surgery (3 slides)
i. Day of Surgery (2 slides)
j. Coping with the Wait for the Family
k. After Surgery (3 slides)
l. While You are in the Hospital (2 slides)
m. The Day You Go Home
n. As You Recover at Home
o. Activity Restrictions

p. Skin Care

q. Things to Remember

r. YOU DID IT!!