PREPARING CHILDREN FOR SURGERY
THROUGH INTERACTIVE EDUCATION

by

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Table of Contents

Chapter One 7

Introduction and Overview of the Problem of Interest 7

Introduction 7

Background 7

Significance 9

Question Guiding Inquiry (PICO) 11

Population 12

Intervention 14

Comparison 15

Outcome 16

Conclusion 17

Chapter Two 18

Review of Literature and Evidence 18

Introduction 18

Methodology 18

Findings 19

Predictors of Preoperative Pediatric Anxiety 19

Consequences of Preoperative Pediatric Anxiety 21

Anxiety Reductions Interventions Overview 23

Pharmacologic Considerations 25

Nonpharmacologic Distraction Techniques 26
| Chapter Six | 58 |
| Evaluation and Outcomes of the Practice Change Initiative | 58 |
| Introduction | 58 |
| Project Objective and Evaluation | 58 |
| Considerations | 61 |
| Recommendations | 63 |
| Conclusion | 65 |

| Chapter Seven | 66 |
| Implications for Nursing Practice and Project Limitations | 66 |
| Introduction | 66 |
| Nursing Practice Implications | 66 |
| Project Limitations | 69 |
| Conclusion | 71 |

| Chapter Eight | 72 |
| Summary and Conclusion | 72 |
| Introduction | 72 |
| Summary | 72 |
| Conclusion | 75 |

| References | 77 |

| Appendixes | 86 |
| A: Capstone Project Organizational Model/Framework | 86 |
| B: PROP Program Advertising Flyer Version One | 87 |
| C: PROP Program Parent/Guardian Post-Class Survey | 88 |
D: Institutional Review Board (IRB) Approval Communication 89

E: PROP Program Advertising Flyer Version Two 90

F: PROP Program Children’s Scavenger Hunt/Map 91

G: PROP Program Parental Preoperative Instructions Handout 92

H: PROP Program Parent/Guardian Post-Class Likert Survey Results 93

I: PROP Program Parent/Guardian Post-Class Multiple Choice Survey Results 94
Chapter One: Introduction and Overview of the Problem of Interest

Children perceive the world differently than adults. Stressors associated with healthcare activities can potentially overwhelm the coping mechanisms of the pediatric patient. Specifically, preoperative pediatric anxiety remains a persistent clinical problem requiring proven and effective solutions. Beneficial solutions addressing the clinical problem of preoperative pediatric anxiety are discovered through the evidence-based practice process. Evidence-based practice was founded upon the principle of collecting and evaluating all available evidence relative to a defined clinical issue and implementing demonstrated interventions into clinical practice (Stevens, 2004). The Pediatric Readiness for Operative Procedures (PROP) program is an evidence-based practice change project developed as a means of addressing the clinical problem of preoperative pediatric anxiety. This program utilized pediatric specific preoperative educational materials and activities in order to reduce preoperative anxiety and improve surgical readiness for children.

The following chapter describes the background and significance of the identified clinical problem of preoperative pediatric anxiety. Further discussion outlines the motivating question of inquiry that sought identification of the most effective nonpharmacologic methods of preoperative anxiety reduction utilized in the pediatric patient. Refinement of the question of inquiry is also detailed, as the collective evidence recognized a specific intervention, namely a preoperative preparatory educational program, as helpful in ameliorating preoperative pediatric anxiety.

Background

Anxiety is defined as a “painful uneasiness of mind usually over an anticipated ill” or “abnormal apprehension and fear often accompanied by physiological signs (as sweating and
increased pulse), by doubt about the nature and reality of the threat itself, and by self-doubt” (Merriam-Webster’s Dictionary & Thesaurus, 2006, p. 46). Anxiety is delineated as either trait or state. Trait anxiety is the form of anxiety inherent to and ever-present within the individual, while state anxiety is the form of anxiety exhibited by the individual at a particular moment in time as a consequence of some provoking stimulus (Kain, Caldwell-Andrews, Krivutza, Weinberg, Gaal et al., 2004). State anxiety is the type of anxiety manifesting in patients preoperatively. Family separation, fear of pain and the unknown, and loss of control are recognized stressors contributing to preoperative pediatric anxiety (Brewer, Gleditsch, Syblik, Tietjens, & Vacik, 2006; Li & Lopez, 2008; Lynch, 1994; Ziegler & Prior, 1994).

When considering the preoperative preparation of children, Maclaren and Kain (2007) exhort “while we recognize that continued research in this area is important, it is equally important to acknowledge that research thus far provides us with criteria for evidence-based preparation” (p. 1019). Furthermore, Maclaren and Kain (2007) stress the “need to recognize our own biases toward the familiar, and evaluate whether we provide preparation because ‘this is what we have always done’ or because it is based on empirical data and has been supported as efficacious” (p. 1020). Therefore, true to evidence-based practice ideology, thorough evaluation of past and current clinical practices are required for the enhancement of future practice.

The specific problem of interest that initiated inquiry and further development of the evidence-based practice quality improvement program described below, sought identification of the most effective nonpharmacologic anxiety reduction techniques utilized in the preoperative preparation of children age 2 through 12. The literature indicated preoperative anxieties in children might be related to adverse emotional and psychological behaviors postoperatively (Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006; Kain, Wang, Mayes, Caramico, &
Hofstadter, 1999; McCann & Kain, 2001; Ziegler & Prior, 1994). Therefore, age-appropriate preoperative education leading to anxiety reduction should theoretically limit the suggested development of such adverse behaviors throughout the child’s postoperative course.

**Significance**

Children less than 15 years of age undergo approximately 2,159,000 surgeries annually in the United States (DeFrances, Lucas, Buie, & Golosinskiy, 2008). The reported incidence of preoperative anxiety in children is between 40 and 60% (Kain, Mayes, O’Connor, Cicchetti, 1996; Wollin, Plummer, Hawkins, & Materazzo, 2003). Anxieties in children arise due to their altered interpretation of healthcare surroundings. Anxiety manifestations are variable as children transition through different stages of physical, emotional, and psychological development. Parental separation and induction of anesthesia have been implicated as the most stressful periods for children to endure during their surgical experience (Kain, Caldwell-Andrews et al., 2007; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Mayes, O'Connor et al., 1996).

A child’s perception of their control in a given situation is a primary inciting event in the development of anxiety. Any loss of control, such as experienced during medical procedures, might potentially contribute to anxiety development. Preoperative anxiety in children contributes to a myriad of physical and psychological sequelae (Kain, Mayes et al., 2006; Kain et al., 1999; Kotiniemi, Ryhanen, & Moilanen, 1997; Li & Lopez, 2006; Stargatt et al., 2006).

The literature revealed the effects of preoperative pediatric anxiety as contributory to the manifestation of numerous postoperative psychological behavioral changes (Kain, Mayes et al., 2006; Kain et al., 1999; McCann & Kain, 2001; Ziegler & Prior, 1994). A linkage exists between children presenting with high levels of preoperative anxiety and the development of multiple postoperative negative behavioral changes up to 2 weeks after surgery (Kain et al., 1999).
Postoperative behavioral changes resulting from preoperative anxiety in children may manifest as feeding and sleeping problems, bedwetting, withdrawal and apathy (Kain, Mayes et al., 2006; McCann & Kain, 2001; Ziegler & Prior, 1994), nightmares, disobedient behaviors, separation anxiety, loss of temper, and fear of healthcare workers (Kain et al., 1999).

Likewise, as experiences shape memories, previous healthcare encounters may also contribute to heightened anxieties during subsequent healthcare encounters (Davidson et al., 2006; Kain & Caldwell-Andrews, 2005; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Mayes, O’Connor et al., 1996). Traditional anxiety reduction methods are invasive (e.g. intramuscular injections and oral medications) and can be significant multipliers to already existing preoperative anxiety in children. For that reason, nonpharmacologic alternatives of anxiety reduction may be a more viable option for pediatric preoperative preparation.

A nonpharmacologic approach to anxiety reduction in children includes education. Offering an age-appropriate educational program utilizing non-threatening methods has the potential to reduce preoperative anxiety in children. Children may more readily accept the desensitizing interventions encountered in “kid-friendly” preoperative preparatory programs. Specifically, preoperative preparatory programs that encompass informative tours, lecture, or interactive play have been shown effective in beneficially reducing preoperative anxiety in children (Brewer et al., 2006; Demarest, Hooke, & Erickson, 1984; Edwinson, Arnbjornsson, & Ekman, 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li, Lopez, & Lee, 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993).

Furthermore, therapeutic play interventions have not only been described in the literature as a powerful modality in the care of children, but have also been shown to positively influence parental anxiety (Child Life Council & Committee on Hospital Care, 2006; Demarest et al.,
Preparing Children

1984; Greenberg & Davis, 1996; Kotiniemi et al., 1997; Li & Lopez, 2008; Li et al., 2007; Ziegler & Prior, 1994). Adequate parental preparation alone may be sufficient to reduce anxiety in children (Ellerton & Merriam, 1994). Accordingly, preoperative preparation providing specific and appropriate information to prepare children and parents/guardians for surgery is warranted, as caregivers are frequently unfamiliar with the operative routine (Brewer et al., 2006; Edwinson et al., 1988; Ellerton & Merriam, 1994; Lynch, 1994; Rawlinson & Short, 2007).

Anxiety reduction accomplished through age-appropriate preoperative education will be beneficial to both children and parents/guardians as they prepare for surgery. Children will more readily cooperate with already familiar routines and parents/guardians will be better equipped to assist their child throughout the healthcare process. Moreover, such educational offerings might be helpful in reducing postoperative negative behaviors (Li & Lam, 2003). Improved ease of parent/guardian separation and improved induction of anesthesia are the desired endpoints resulting from successful reductions in preoperative pediatric anxiety.

*Question Guiding Inquiry (PICO)*

Evidence-based practice transforms patient care from practices historically governed by tradition towards those based upon thorough evaluation of all available evidence. The development and implementation of a preoperative pediatric preparatory program in response to the aforementioned clinical problem of interest follows the spirit of evidence-based practice. Melnyk and Fineout-Overholt (2005) suggest five steps to evidence-based practice. The evidence-based practice process begins with the creation of a clinical question of interest, followed by the search for and critical appraisal and integration of all relevant and available evidence, and ends with evaluations of clinical practice changes that were based upon the newly enacted intervention (Melnyk & Fineout-Overholt, 2005).
Preparing Children

The foreground questions necessary to begin an evidence-based inquiry are rooted in the acronym PICO, which stands for: patient population, intervention of interest, comparison intervention or status, and outcome (Melnyk & Fineout-Overholt, 2005). The original PICO question that guided inquiry into the identified clinical problem of preoperative pediatric anxiety was: What are the most effective nonpharmacologic anxiety reduction techniques to be utilized in the preoperative preparation of children age 2 through 12? The intended patient population was preoperative children age 2 through 12; the intervention of interest was nonpharmacologic anxiety reduction techniques; the comparison intervention or status were traditional pharmacologic anxiety reduction strategies; and the outcome was preoperative anxiety reduction.

Consequently, literature review findings prompted a refinement of the original PICO formatted question in order to more specifically define the direction of the identified evidence-based practice quality improvement program. The redesigned PICO asked: In children age 2 through 12, do parents/guardians perceive attendance at a preoperative preparatory informational session as helpful to improving their child’s and their own knowledge and familiarity of the events occurring during the perioperative period, resulting in increased readiness for surgery? The final patient population of interest included preoperative children age 2 through 12; the intervention of interest was a preoperative preparatory informational session for children and their parents/guardians; the comparison intervention or status was parent/guardian perceptions of their child’s readiness for surgery as a result of the intervention; and the desired outcome was improved preparation or readiness for surgery, with readiness defined as increased knowledge and familiarity of perioperative events and equipment.

Population. The original and current patient population for this practice change project included preoperative children age 2 through 12. Children perceive the world differently
throughout development. Anxieties arise as a result of immature interpretations of healthcare surroundings. The selection of this population was based upon historically accepted developmental theories of Erikson and Piaget (Wong, 1995) and the consistent representation of this particular age grouping in research literature. With respect to the psychologic developmental stages of children, as described by Erikson and Piaget, combined with inherent coping skills and potential anxieties, children age 2 through 12 possess the greatest potential to perceive and experience procedure related anxiety (Wong, 1995). As children advance through developmental stages and approach the upper limit of this age range, they progress from the preoperational to the concrete operational stage, overcoming elementary reasonings and pondering alternative views (Wong, 1995).

Respecting developmental milestones through individualized assessment is necessary in order to deliver age-appropriate pediatric care. Recognized variations in developmental abilities through multiple age groups of children, as well as their concomitant coping strategies and adaptations, must be considered when seeking to prepare this population for procedures (Kain, Mayes, O’Connor et al., 1996; Li & Lopez, 2006). Moreover, as experiences shape memories, previous healthcare encounters may contribute to heightened anxieties during subsequent healthcare encounters (Davidson et al., 2006; Kain & Caldwell-Andrews, 2005; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Mayes, O’Connor et al., 1996). Consequently, based upon the literature review, additional restrictions were placed upon the population of interest. Children within the described age range who had no previous surgical experiences were offered participation in the proposed intervention. The theoretical underpinnings of the childhood developmental theories by Erikson and Piaget, as well as research findings pertaining to the
occurrences of anxiety in children who have already had prior healthcare experiences, served as the basis for selection of this population.

*Intervention.* The initial and overall essence of the intervention of interest involved the employment of nonpharmacologic anxiety reduction techniques as a means of preoperative anxiety reduction. As pharmacologic measures are most often utilized to manage preoperative pediatric anxiety (McCann & Kain, 2001), the motivation behind this evidence-based practice initiative was to identify the most effective nonpharmacologic anxiety reduction techniques utilized for children in the preoperative setting. Nonpharmacologic anxiety reduction techniques were chosen because of their perceived benefit in a population possessing developmentally based fears and anxieties. Children may more readily cooperate with some form of nonpharmacologic anxiety reducer when compared to pharmacologic interventions because traditional pharmacologic approaches may be perceived as invasive and inherently a “procedure,” when the anxiety “reducer” arrives in the form of a drink or needle.

The literature supported the use of therapeutic play through a preoperative preparatory program as a means of preoperative pediatric anxiety reduction. Exposure to the surgical milieu and related items, as well as providing age-appropriate information, desensitizes children and reduces anxieties (Demarest et al., 1984). Prior experiences with the surgical environment, processes, and equipment cannot be underestimated as playing a significant role in effectively reducing anxiety and preparing a child for surgery (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Kain Caldwell-Andrews et al., 2007; Li & Lopez, 2008; Ziegler & Prior, 1994).

The intervention of interest was formally known as the Pediatric Readiness for Operative Procedures (PROP) program. The program was designed as a free one-hour preoperative
preparatory informational session for children and their parents/guardians. The program utilized pediatric specific educational materials (e.g. pamphlets, multimedia) and “hands-on” activities, coupled with a facility tour, in order to increase familiarization with the surgical environment, thereby improving readiness for the surgical experience and optimistically alleviating preoperative anxiety. While the basic premise of preoperative preparation programs involving therapeutic play can be established by anyone, the literature supported the use of multidisciplinary teams in their set-up and execution, particularly the role of nurses (Dreger & Tremback, 2006; Ellerton & Merriam, 1994; Li & Lopez, 2008; Murphy-Taylor, 1999) and child life specialists (Child Life Council & Committee on Hospital Care, 2006). Accordingly, this program employed the expertise of personnel from the departments of Anesthesia, Child Life, and Perioperative Nursing.

Comparison. The original comparison group was broadly defined as traditional pharmacologic strategies. The existence of preoperative anxiety in children has been duly noted in the literature (Kain, Mayes, O’Connor et al., 1996; Li & Lopez, 2006; Wollin et al., 2003; Ziegler & Prior, 1994). Accordingly, children experience anxiety when exposed to perceived threatening situations, as illustrated in the childhood developmental stages described by Piaget and Erikson (Wong, 1995; Ziegler & Prior, 1994). Methods of anxiety reduction, pharmacologic or nonpharmacologic, are generally employed to reduce preoperative anxiety in children. As a result, the bulk of literature represented evaluations comparing one technique versus another or a blended application of both techniques.

The anxiety management practices for children at the implementation site, a 400-bed acute care hospital in central Pennsylvania, involved the combined use of pharmacologic and nonpharmacologic methods because a pediatric-specific preparatory program did not exist.
Children at the implementation site were afforded the opportunity to watch a movie as they waited for their surgery. Children older than 1 year and less than 10 years, received oral Midazolam in order to reduce the anxiety associated with separation from parents/guardians.

Conceptually, the original PICO sought a strict comparison in anxiety levels between children receiving pharmacologic versus nonpharmacologic anxiety reduction modalities. Based upon information obtained through the comprehensive literature review and evaluation of the allowances and limitations within the governing body at the implementation site concerning research activities in children, the focus of the PICO guiding this initiative was further refined. As a result, the revised PICO comparison component was considered more as a status rather than a true comparison group. Thus, the comparison or status component sought to identify parental perceptions of their child’s demonstrated readiness for surgery as a result of the child’s participation in the preoperative preparatory program.

*Outcome.* The original outcome sought in this evidence-based practice program was anxiety reduction. As anxiety is a complex and multifaceted phenomena, absolute resolution may not be an achievable outcome through a purely nonpharmacologic anxiety reducing modality alone. However, a sufficient degree of anxiety reduction that eases parent/guardian separation and improves induction of anesthesia has generally been reported in the literature as a desired and successful endpoint when implementing either format of techniques. The ultimate goal and outcome of the PROP program was to decrease preoperative pediatric anxiety and improve readiness for surgery. Children were considered to attain an increased state of preoperative readiness secondary to an increased familiarization with and knowledge of perioperative events. Therefore, the increased readiness attained through this program would be contributory to fulfilling the preoperative anxiety reduction endpoints described previously.
Conclusion

The prevalence of preoperative anxiety in children is noteworthy and requires clinical action based upon sound evidence. Investigation into the relevant evidence required to initiate change in clinical care was accomplished after devising a focused question of interest based upon the acronym PICO. A comprehensive literature review guided by the initial PICO question of inquiry identified the most beneficial preoperative nonpharmacologic anxiety reduction methods utilized in children. Resultant data led to the revision of the PICO that provided the foundation for the development of a preoperative pediatric preparatory educational program known as the PROP program.
Chapter Two: Review of Literature and Evidence

Patient care is effectively guided by considerate reflection upon historical approaches to care as well as innovative research. The ideology espoused by evidence-based practice is one whereby all available evidence is critically evaluated and transformed into clinically relevant practice knowledge (Stevens, 2004). The development of best clinical practice is initiated through inquiry into the best available information, resulting in new care modalities being infused into clinical practice as practitioners attempt to embody a core understanding of evidence-based patient care. The management of preoperative anxiety in children poses a clinical problem which required an evidence-based solution. Hence, a comprehensive literature review was undertaken to seek the evidence necessary to answer the question: What are the most effective nonpharmacologic anxiety reduction techniques to be utilized in the preoperative preparation of children age 2 through 12?

Results of the comprehensive literature review identified relevant research information and provided general recommendations supporting implementation of the most clinically effective and pertinent nonpharmacologic preoperative anxiety reducing interventions in the care of children within the scope of evidence-based practice. The Pediatric Readiness for Operative Procedures (PROP) program, an informational preoperative preparatory program, was subsequently devised to assist children in managing the anxiety provoking nature of the surgery experience more effectively. The following evaluation of nursing, medical, and behavioral sciences literature elucidated reported pediatric preoperative anxiety management procedures and furthered the cache of evidence-based knowledge of perioperative pediatric care.

Methodology
Preoperative pediatric anxiety management techniques were identified through a comprehensive literature review that encompassed a search of multiple research databases including MEDLINE (OVID), CINAHL Plus with full text, PubMed, and Evidence Based Medicine Reviews (EBMR). Examples of keywords utilized to identify literature representative of the problem of interest included: adjustment, anesthesia, anxiety, anxiety management, behavior, child, child behavior, children, day surgery, family-centered, hospitalization, induction, inpatient, interventions, nonpharmacologic, outcomes, outpatient, patient education, pediatric, perioperative, pharmacologic, preoperative, preparation, pre-procedural, preschool, prevention, procedures, psychological response, recovery, stress, surgery, and surgical. Year restrictions were approximately 1996 through 2009, with some individual searches for historical references prior to 1996. All research studies were quantitative. The time frame for accessing databases occurred from January 2009 through June 2009.

Although contributory works were identified in nursing and related behavioral sciences literature, the bulk of research into preoperative pediatric anxiety was contained within Anesthesia literature. General themes were identified with respect to the applicability of the topic under investigation in order to thoroughly capture the overall representation of research findings. Individual literature was evaluated as to its relevancy with respect to currency, sample size, and relevant subjects within the framework of the PICO format. Evaluations of research study strengths and weakness particularly in controlling of samples, preventions of biases, as well as, conditional generalizability of study results were undertaken.

Findings

Predictors of Preoperative Pediatric Anxiety. The propensity for children to experience anxiety due to the surgical experience is substantial (Li & Lopez, 2006; Ziegler & Prior, 1994)
because nearly 2,159,000 children face surgery annually in the United States (DeFrances et al., 2008). Accordingly, researchers have acknowledged the very real nature of preoperative pediatric anxiety and have been investigating suitable anxiety reduction measures. Although children may inherently possess varying degrees of trait anxiety, modalities utilized to reduce preoperative anxiety are aimed at managing state anxiety, or that anxiety present at a defined moment in time resulting from a defined cause (Kain, Caldwell-Andrews, Krivutza, Weinberg, Gaal et al. 2004).

The anxiety experienced by children within the perioperative period progressively intensifies. Research indicated preoperative anxiety in children escalates as the child nears the moment of parental separation. Parental separation and induction of anesthesia have been implicated as the most stressful period for children to undergo in the surgical experience (Kain, Caldwell-Andrews et al., 2007; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Mayes, O’Connor et al., 1996; Varughese, Nick, Gunter, Wang, & Kurth, 2008). In a two-phase prospective study of 407 children, Vetter (1993) found a 23% chance of 2-year-olds and 12% chance of 3 to 6-year-old children to display behavioral problems on separation. Results were statistically significant (p = 0.0012) indicating decreased behavioral problems with increasing age (Vetter, 1993). A prospective observational cohort study of 832 children age 1 through 13 by Varughese, et al., (2008) also identified a greater degree of compliance in older children.

Numerous predictors of preoperative pediatric anxiety have been identified in the literature. Preoperative anxiety in children is at minimum influenced by, if not predicted by, a host of factors including child age and temperament, mother’s state anxiety (Kain & Caldwell-Andrews, 2005; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Mayes, O’Connor et al., 1996), previous healthcare experience (Davidson et al., 2006; Kain & Caldwell-Andrews, 2005; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Mayes, O’Connor et al., 1996; Varughese et
al., 2008), and longer wait time for surgery and negative previous healthcare experiences (Davidson et al., 2006; Wollin et al., 2003). Additional anxiety contributing factors include: the increased number of persons present during anesthesia induction, and a mother who does not practice religion (Wollin et al., 2003), parents who possess greater anxiety (Davidson et al., 2006; Dreger & Tremback, 2006; Greenberg & Davis, 1996; Kain & Caldwell-Andrews, 2005; Kain, Caldwell-Andrews, Maranets, Nelson, & Mayes, 2006; Kain, Mayes, Caramico, Silver et al., 1996; Kain, Caldwell-Andrews, & Wang, 2002; McCann & Kain, 2001), and children of families with separated parents (Kain & Caldwell-Andrews, 2005; Kain et al., 2002). Additionally, operative procedures longer than 30 minutes and more than 5 previous admissions to the hospital were found associated with preoperative child anxiety (Davidson et al., 2006).

A postulated interrelationship between parent anxiety and child anxiety has been indicated in the literature. Davidson et al. (2006) suggested the complex linkage of anxiety provoking factors within children to the influence of parental anxieties, thereby creating an exchange between the child and parent. Despite an impressive randomized sample of 1224 children, Davidson et al. (2006) was unable to demonstrate statistical significance between risk factors due to admitted incomplete data. Age and maturity were additional factors highlighted in the literature considered to shape preoperative pediatric anxiety. Multiple authors cited younger children as exhibiting greater anxiety at induction than older children, regardless of the child’s appearance of emotional control (Holm-Knudsen, Carlin, & McKenzie, 1998; Kain, Mayes, O’Connor et al., 1996; Vetter, 1993).

Consequences of Preoperative Pediatric Anxiety. Preoperative anxiety in children potentially contributes to the development of a myriad of physical and psychological sequelae (Kain, Mayes et al., 2006; Kain et al., 1999; Kotiniemi et al., 1997; Li & Lopez, 2006; Stargatt et
Fear of the unknown, coupled with a loss of control, contributes to the development of anxieties that manifest through behavioral and vital sign changes (Ziegler & Prior, 1994), particularly evident as increased heart rate and blood pressure (Li & Lopez, 2006). The psychological ramifications of preoperative anxiety were well described by researchers. Kain, et al. (199) identified associations between children presenting with high levels of preoperative anxiety and the development of multiple postoperative negative behavioral changes up to 2 weeks after surgery in a longitudinal study of 91 children age 1 through 7.

Research suggested preoperative anxiety in children might manifest as feeding and sleeping problems, bedwetting, withdrawal and apathy (Kain, Mayes et al., 2006; McCann & Kain, 2001; Ziegler & Prior, 1994), nightmares, disobedient behaviors, separation anxiety, loss of temper, and fear of healthcare workers (Kain et al., 1999). Further, postoperative behavioral problems can be related to lack of a preoperative preparation program, previous healthcare encounter, and being either withdrawn or parentally dependent (Vetter, 1993). Appropriately recognizing and intervening to reduce a child’s preoperative anxiety could subsequently be beneficial in reducing postoperative negative behaviors (Li & Lam, 2003).

The occurrence of preoperative anxiety in children has also been found as contributory to the development of increased pain and analgesia requirements, sleeping and eating problems, and common anxiety (Kain, Mayes et al., 2006). Kotiniemi, et al. (1997) followed 551 children for 1 month after surgery and found that in that time frame, 47% of children exhibited some form of significant behavioral problem noted with respect to the child’s age (p = 0.002). Preoperative and postoperative questionnaires were utilized in this prospective study revealing the occurrence of most behavioral problems on procedure day and decreasing throughout the month following surgery (Kotiniemi et al., 1997).
Stargatt et al. (2006) studied the impact of anxiety on postoperative behavior in 1027 children age 3 through 12, noting within 1 month, 16% still displayed some form of resulting negative behavioral change. Correspondingly, Kain, Caldwell-Andrews, Maranets, et al. (2004) retrospectively evaluated the correlation between preoperative anxiety and postoperative negative behavioral changes and emergence delirium. The propensity to exhibit postoperative behavioral changes in children were found in those of younger age, higher emotions and impulsivity, and less social, as well as having parents with greater anxiety levels (Kain, Caldwell-Andrews, Maranets et al., 2004). A noted drawback of this retrospective analysis was that the investigators failed to completely identify research formats of the source studies under review.

Extensive agreement amongst researchers thoroughly supported the premise that parental anxiety greatly impacts children (Bevan et al., 1990; Davidson et al., 2006; Kain, Caldwell-Andrews et al., 2006; Kain, Caldwell-Andrews, Maranets et al., 2004; Kain, Mayes, Caramico, Silver et al., 1996; Li, & Lam, 2003; Wollin et al., 2003). Therefore, preoperative interventions should be aimed at identifying and treating the phenomena of parental anxiety, thereby indirectly managing a child’s anxiety via appropriate preparation of parents (Kain, Caldwell-Andrews, Maranets et al., 2004; Lynch, 1994). A family-centered approach in the management of preoperative pediatric anxiety will yield beneficial results (Ellerton, & Merriam, 1994; Kain, Caldwell-Andrews et al. 2007).

Anxiety Reduction Interventions Overview. Preoperative pediatric anxiety management encompasses a wide variety of techniques requiring tailoring to each individual child, parent, and family unit. Anxiety reduction interventions are broadly grouped as pharmacologic or nonpharmacologic. Pharmacologic measures include the administration of various medications
often through invasive routes (e.g. intramuscular, intravenous, intranasal, oral, and rectal) in order to reduce the anxiety of the child and ease the separation of child from parent (Greenberg & Davis, 1996).

Since pharmacologic modalities are administered in the form of a needle or drink, children may resist and actually perceive these anxiety reducers as invasive, interpreting the medications as a “procedure.” Future research with respect to pharmacologic modalities must address not only the physical properties of medications, but should investigate less traumatic and invasive delivery means such as the transdermal route (McCann & Kain, 2001). Additionally, pharmacologic premedication measures can increase cost and delay recovery negatively impacting the economic aspect of patient care (Kain, Mayes, & Caramico, 1996).

Alternatively, nonpharmacologic anxiety reduction interventions utilize modalities whereby children retain a degree of independence, autonomy, and self control. The professional literature thoroughly supported the premise that psychological preparation is essential for children undergoing surgery (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Kain et al., 2002; Lynch, 1994). Nonpharmacologic anxiety reduction measures are well suited to ensure sufficient psychological surgical preparation.

Contrary to pharmacologic measures, nonpharmacologic measures are inherently “hands-on” for children (e.g. play-type interventions) and “hands-off” for healthcare workers, thus enhancing cooperation. Nonpharmacologic modalities described in the literature include preoperative family preparation programs (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993), distraction techniques such as music (Cooke, Chaboyer, Schluter, & Hiratos, 2005; Kain, Caldwell-Andrews, Krivutza,
Preparing Children

Weinberg, Gaal et al., 2004), bubbles (Sinha, Christopher, Fenn, & Reeves, 2006), video games (Patel et al., 2006; Sinha et al., 2006), books (Rawlinson & Short, 2007), clowns (Vagnoli, Caprilli, Robiglio, & Messeri, 2005), therapeutic play (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Edwinson et al., 1988), acupressure (Wang, Escalera, Lin, Maranets, & Kain, 2008; Wang, Gaal, Maranets, Caldwell-Andrews, & Kain, 2005), acupuncture (Wang, Maranets, Weinberg, Caldwell-Andrews, & Kain, 2004; Wang, Peloquin, & Kain, 2001), and parental presence during induction of anesthesia (Bevan et al., 1990; Davidson et al., 2006; Kain et al., 2006; Kain, Caldwell-Andrews, Krivutza, Weinberg, Wang et al., 2004; Kain, Mayes, Caramico, Silver et al., 1996; Li, & Lam, 2003; Wollin et al., 2003).

Pharmacologic Considerations. Although this literature review specifically sought to address nonpharmacologic methods of preoperative anxiety reduction in children, pharmacologic measures remain a mainstay treatment and their collaborative role in this issue required overview. Premedications are utilized the least in patients under 3 years and most in those less than 65 years (McCann & Kain, 2001). One of the most employed premedicant drugs is the short-acting benzodiazepine Midazolam (Marshall et al., 2000; McCann & Kain, 2001). Midazolam produces the clinical effects of anxiolysis and antegrade amnesia (Reves, Fragen, Vinik, & Greenblatt, 1985).

In the United States, 80% of children receive premedication orally, 8% intranasal, 6% intramuscular, and 3% rectal (McCann & Kain, 2001). Premedicated children are more cooperative during anesthesia induction (Kain, Mayes, Wang, Caramico, & Hofstadter, 1998). In a randomized controlled trial, Kain, et al. (1998) reported Midazolam as being more successful than parental presence for managing a child’s preoperative anxiety.
Although Midazolam has staked a claim in the general pharmacologic management of preoperative anxiety in children, it is not a panacea. Pharmacologic measures alone may be inadequate to effectively prepare children for surgery. In a cross sectional controlled study, Kain, MacLaren, et al. (2007) found that despite receiving preoperative Midazolam, 14.1% of children still displayed anxiety and reduced compliance during anesthetic induction. The diversity of underlying factors for the development of preoperative anxiety in children demands correspondingly varied anxiety treatment modalities and management interventions. Advocating a combined approach to the management of this complex issue was noted by Holm-Knudsen, et al. (1998), reflecting that, “a policy of optimizing nonpharmacologic approaches for minimizing induction distress, combined with selective premedication with oral Midazolam, can produce a low incidence of induction distress and adverse effects” (p. 391).

**Nonpharmacologic Distraction Techniques.** Nonpharmacologic measures vary in content, but remain similar in context. Most nonpharmacologic measures are minimally-invasive or non-invasive, and offer non-threatening approaches to reducing preoperative anxiety in children. Therapeutic play and modeling (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Edwinson et al., 1988), acupressure (Wang et al., 2008; Wang et al., 2005), acupuncture (Wang et al., 2004; Wang et al., 2001), and various distraction techniques including music (Cooke et al., 2005; Kain, Caldwell-Andrews, Krivutza, Weinberg, Gaal et al., 2004), books (Rawlinson & Short, 2007), bubbles (Sinha et al., 2006), video games (Patel et al., 2006; Sinha et al., 2006), videos (Lynch, 1994), clowns (Vagnoli et al., 2005), and parent interventions (Bevan et al., 1990; Davidson et al., 2006; Kain, Caldwell-Andrews et al., 2006; Kain, Caldwell-Andrews, Krivutza, Weinberg, Wang et al., 2004; Kain, Mayes, Caramico, Silver
et al., 1996; Li, & Lam, 2003; Wollin et al., 2003) have been reviewed as potential methods by which preoperative child anxiety can be minimized or alleviated.

Therapeutic play was well presented in the literature as a powerful modality in the care of children, particularly with respect to preoperative anxiety reduction (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Greenberg & Davis, 1996; Kotiniemi et al., 1997; Li & Lopez, 2008; Li et al., 2007; Ziegler & Prior, 1994). Simply offering a toy to a child has been shown to reduce anxiety levels (Golden et al., 2006). The primary benefit of therapeutic play is to enhance the child’s hospital routine and develop abilities through this activity with which to adapt to encountered stressors (Ziegler & Prior, 1994). One randomized controlled trial performed by Li and Lopez (2008) evaluated the use of therapeutic play in the preoperative preparation of children. Their evaluation of 203 children age 7 through 12 indicated this intervention reduced children’s anxiety greater than children who were not prepared in this manner. Li and Lopez (2008) commented that the use of therapeutic play was essential for re-establishing the child’s overall sense of self-control.

Just as the negative effects of anxiety can potentially transfer between parents and children (Bevan et al., 1990; Davidson et al., 2006; Kain, Caldwell-Andrews et al., 2006; Kain, Caldwell-Andrews, Maranets et al., 2004; Kain, Mayes, Caramico, Silver et al., 1996; Li, & Lam, 2003; Wollin et al., 2003), so too, the beneficial aspects of anxiety reducing interventions can transfer amongst parent and child (Ellerton & Merriam, 1994; Himes, Munyer, & Henly, 2003; Kain, Caldwell-Andrews, Maranets et al., 2004). Therapeutic play interventions were demonstrated to positively impact parents as well as children in the Li & Lopez (2008) trial mentioned previously. Demarest, et al. (1984) discovered through a randomized study of 24 children age 3 through 9, that exposure to the surgical milieu and related items and
accompanying information desensitized children and reduced their anxieties. Prior exposure to surgical environments, processes, and equipment cannot be underestimated as playing a significant role in effectively reducing anxiety and preparing a child for surgery (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Kain, Caldwell-Andrews et al., 2007; Li & Lopez, 2008; Ziegler & Prior, 1994). While the basic premise of preoperative preparation programs involving therapeutic play can be established by anyone, the literature supported the use of multidisciplinary teams in their set-up and execution, particularly the role of nurses (Dreger & Tremback, 2006; Ellerton & Merriam, 1994; Li & Lopez, 2008; Murphy-Taylor, 1999) and child life specialists (Child Life Council & Committee on Hospital Care, 2006).

Another aspect of nonpharmacologic preoperative anxiety reduction presented in professional literature was rooted in eastern medicine. Acupressure and acupuncture have been described as promising alternative therapies for anxiety reduction (Agarwal et al., 2005; Wang et al., 2008; Wang & Kain, 2001; Wang et al., 2004; and Wang et al., 2001). The only noted drawback specific to acupuncture versus acupressure was that children may resist this intervention secondary to the required use of needles to elicit an effect (Wang et al., 2008; Wang et al., 2004).

Most preliminary research related to acupressure and acupuncture has been performed in adults. Agarwal, et al. (2005) evaluated acupressure in 76 randomly assigned preoperative adult patients, finding a significant reduction in anxiety after the treatment which resolved within 30 minutes. In an adult randomized controlled trial of 55 persons by Wang and Kain (2001), anxiety reduction due to acupuncture initiated at the “relaxation” point on the ear began within 30 minutes after application. The needles placed at this point remained in place for 48 hours as the
study group resumed normal activities. This group reported significantly less anxiety ($p < 0.05$) for the duration of the treatment (48 hours), noting that the anti-anxiety effect began as early as 30 minutes after treatment initiation. Therefore, Wang and Kain (2001) strongly suggested further evaluation of this technique as a practical preoperative anxiety reducing measure.

In a follow-up investigation of acupuncture as a modality for anxiety reduction, Wang, et al. (2001) performed a blind, randomized controlled trial of 91 preoperative adult patients. The same “relaxation” point group received acupuncture and again the researchers demonstrated statistically significant ($p = 0.01$) decreased anxiety in the study group. A related inquiry by Wang, et al. (2004) evaluated if maternal anxiety reduction due to acupuncture would benefit children undergoing surgery. Their findings, resulting from a randomized double-blinded, sham-controlled trial of 67 mother and child combination, indicated that the mother’s anxiety was similar pre-induction, but significantly less post-induction of anesthesia.

Additionally, children of the mothers who had received preoperative acupuncture were less anxious and more cooperative during induction of anesthesia. This finding further demonstrated the interplay of anxiety between parents and children and holds great promise for a clinical approach contributing to the combined reduction of child and parent anxiety preoperatively. Wang, et al. (2004) concluded that parental acupuncture could therefore be of great benefit in reducing parental and child anxiety and in improving child compliance.

Acupressure is a non-invasive alternative anxiety reducing therapy showing promise. Wang, et al. (2005) evaluated the use of acupressure in 61 parents of children undergoing procedures. Using a blind, randomized sham-controlled trial, the researchers demonstrated statistically significant ($p = 0.03$) less anxiety in the parents, a finding consistent with previous investigations after receiving the acupressure treatment. As with acupuncture, research literature
describing the use of acupressure in pediatric populations was limited. However, a brief detailed
description of the success of pediatric acupressure in 2 studies is warranted. A randomized
controlled trial of 52 children age 8 through 17 undergoing anesthesia for endoscopic procedures
by Wang, et al. (2008) found a decrease in preoperative anxiety within 30 minutes after
application of acupressure to the Extra-1 acupoint preoperatively, which bore out to an 11%
difference between treatment and control group anxiety levels (Wang et al., 2008). Further study
evaluating the utility of acupressure and acupuncture in reducing preoperative anxiety in children
is warranted in order to fully elucidate the benefits of these techniques, as initial findings were
promising and the bulk of current research remains restricted to adult populations.

As previously cited, multiple nonpharmacologic distraction techniques utilized for
anxiety reduction in children exist including the use of music, coloring, reading books, blowing
bubbles, video games, and clowns. Distraction techniques are effective in reducing anxiety in
children because they redirect the child’s attention from the stressful stimuli towards more
pleasing stimuli (Sinha et al., 2006). In a randomized study of 240 children age 6 through 18,
Sinha, et al. (2006) sought to examine the effects of distraction techniques on children’s pain
perception. These researchers found such techniques did not benefit study participants with
respect to pain reduction, but did discover that anxiety was reduced. Sinha, et al. (2006)
supported the furtherance of this practice and proposed its potential benefit in other treatment
settings based on the limited training necessary to achieve a positive result.

Another distracter to decrease preoperative anxiety in children briefly mentioned in the
literature involved the use of clowns preoperatively and during anesthesia induction. Vagnoli, et
al. (2005) evaluated preoperative anxiety in 40 children age 5 through 12 in a randomized study
with respect to the degree with which clowns decreased anxiety. These researchers found clowns
to be a valuable component in the management and reduction of preoperative child anxiety. One caveat detailed by the investigators was that although hospital personnel felt this intervention was beneficial, it caused much interference in the operating room routine (Vagnoli et al., 2005).

Although weak in its representation throughout professional literature, music therapy was another distraction technique employed to reduce preoperative anxiety in children. Kain et al. (2004) evaluated the effects of music versus pharmacologic premedication in 123 children with respect to preoperative anxiety reduction. This randomized controlled trial revealed no differences in the anxiety level of children who had participated in music therapy with those who had not participated in music therapy (Kain, Caldwell-Andrews, Krivutza, Weinberg, Gaal et al., 2004). The postulated reason for this result by Kain, Caldwell-Andrews, Krivutza, Weinberg, Gaal, et al. (2004) was that the anxiety of waiting preoperatively was considered “soft” anxiety and the induction process, particularly the application of the breathing mask was “hard” anxiety, which could not be overcome by such a simple anxiety reducing measure as music.

Music administration as an anxiety reducing modality has demonstrated mixed benefits with respect to age. Anxiety perception in adults and children is influenced by cognitive and processing differences. A randomized controlled trial of 180 adults presented by Cooke, et al. (2005) indicated that potential age differences may impact the success of music therapy as a distraction technique. These researchers found music to be an effective preoperative anxiety reducer in adults, but advocated further investigation of this modality in other populations.

Caprilli, Anastasi, Grotto, Abeti, and Messeri (2007) investigated the use of music therapy in the reduction or prevention of anxiety in 108 children requiring venipuncture. Their results indicated that children who had interaction and participation with a live musician prior to blood tests, experienced reduced pain and distress due to the procedure (p = 0.048). The
orthopedic literature presented the results of a study by Liu, et al. (2007), showing that children exposed to music during casting procedures exhibited decreased heart rates which correlated to decreased levels of anxiety. In an evaluation of pediatric oncology patients undergoing cancer treatments, Kemper, Hamilton, McClean, and Lovato (2008) discovered that children displayed greater relaxation when exposed to music.

In related work, Kain, Wang, Mayes, Krivutza, and Teague (2001) investigated the creation of a low sensory stimulation environment within the operating room composed of soft music and dimmed lights. This intervention significantly (soft music p = 0.03, dimmed lights p = 0.003) reduced children’s anxiety upon entry of the operating room and on anesthesia induction. Therefore, Kain, et al. (2001) concluded that music and other environmental modifying interventions can contribute to anxiety reduction in children.

**Preoperative Preparatory Programs.** Parents are generally unfamiliar with the operative routine and are inadequate sources of preparatory information for their children. Therefore, preoperative preparation providing specific and appropriate information to prepare children for surgery is essential (Brewer et al., 2006; Edwinson et al., 1988; Ellerton & Merriam, 1994; Lynch, 1994; Rawlinson & Short, 2007). Preoperative preparatory programs encompassing tours, lecture, or interactive play have been shown to be effective in beneficially reducing preoperative anxiety in children (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993).

Thompson (1994) identified factors that potentially reduce a child’s preoperative anxiety, which may be integrated into the development of an effective preparatory program. In this study of 43 children age 8 through 12, utilizing an interview approach to data collection, found that
children who sought information were better equipped to manage their anxiety and thus reported less anxiety. Ironically, children who avoided information also reported less anxiety. Thompson (1994) noted that an all or nothing mentality with respect to preoperative educational preparation was best. Children who used a combined approach, some degree of information seeking coupled with a measure of information avoiding, actually experienced the greatest anxiety (Thompson, 1994).

Similarly, Kain, Mayes, and Caramico (1996) reported the amount of preoperative educational material presented can negatively affect the anxiety level of children within specific age ranges. Such findings support the concept that practitioners need to offer only the content and extent of information necessary to impact the child in a positive way (Kain, Mayes, & Caramico, 1996; Thompson, 1994). In a corresponding evaluation, Wollin, et al. (2003) was unable to establish statistical significance, but identified, in a study of 120 children age 5 through 12, that children with greater knowledge had less anxiety while those with less knowledge had greater anxiety. Accordingly, an overarching theme in the literature regarding child preparation for surgery involves adapting the presented information as specifically to the needs and level of comprehension of the individual child (Brewer et al., 2006; Kain, Mayes, & Caramico, 1996; Runeson, Martenson, & Enskar, 2007).

Practitioners must be aware that a child’s anxiety may continue once they have awakened from anesthesia. Hence, another potential benefit of preoperative preparation programs is the positive effect they may have on postoperative anxieties. Brewer, et al. (2006) identified as a result of a double-blinded, alternate-assignment intervention study of 142 children, that children were less anxious postoperatively when they had participated in a child life instructed preoperative preparation program and recommended all children would benefit from
preoperative preparation, not just children presenting with a perceived need. A randomized controlled trial of 408 children by Kain, Caldwell-Andrews, et al. (2007) corroborated this finding indicating that a preoperative preparation program decreased the potential postoperative negative behaviors, analgesia need, and increased speed of discharge as compared to those who did not participate.

Kain, Caldwell-Andrews, Maranets, et al. (2004) suggested the importance of preoperative preparatory programs in light of identifying parental anxiety as contributory to the child’s level of anxiety and related to postoperative negative behaviors. Therefore, appropriate education and preparation of not only the child patient, but the parent as well, can significantly impact patient care (Himes et al., 2003). Adequate parental preparation alone may contribute to anxiety reduction in children (Ellerton & Merriam, 1994).

A randomized controlled trial by Cassady, Wysocki, Miller, Cancel, and Izenberg (1999) recognized the use of a preoperative informational video as a useful modality for parental anxiety reduction. Research by McEwen, Moorthy, Quantock, Rose, and Kavanagh (2007) corroborated these findings and also advocated the use of a preoperative informational video for parents as a useful intervention for reducing parental anxiety. Further illustrating the benefits of preoperative education and preparation, a well-developed randomized controlled trial by Kain, Caldwell-Andrews, et al. (2007) identified that a preoperative preparatory program was as effective in reducing anxiety as Midazolam and displayed reduced behavioral changes postoperatively, requiring less analgesia and achieving earlier discharge. Edwinson, et al. (1988) suggested the idea that thorough patient preparation may decrease premedication requirements.

Despite extensive reports within the literature that preoperative preparation programs are beneficial (Brewer et al., 2006; Edwinson et al., 1988; Ellerton & Merriam, 1994; Lynch, 1994;
Preparing Children

Rawlinson & Short, 2007), some contend children would not uniformly profit from such a practice (Kain, Mayes, & Caramico, 1996; Rice, Glasper, Keeton, & Spargo, 2008). Specifically, intervention timing greatly influences the intended outcome of anxiety reduction. In a non-randomized study of 143 children undergoing outpatient surgery conducted by Kain, Mayes, and Caramico (1996), results indicated children older than 6 years showed reduced anxiety after participation in a preoperative preparation program approximately 5 to 7 days before surgery versus attending within 1 day prior. Children younger than 3 years and those who had been previously hospitalized were negatively impacted by program attendance. These researchers actually recommended children would be better served by avoiding any preparatory program if it was not accomplished within this time frame and according to these age groupings. Additionally, Rice, et al. (2008) were unable to identify any beneficial reductions in child anxiety beyond the waiting area as a result of attendance at a preoperative preparatory program. The researchers admitted many study limitations that may have impacted results including non-randomization of participants, non-standardized anesthesia induction techniques, and timing of the program (Rice et al., 2008).

**Parental Presence During Induction of Anesthesia (PPIA).** A final nonpharmacologic anxiety reducing strategy in children was parental presence during induction of anesthesia (PPIA). Parental presence involves a dynamic interplay between the parent and child. As evidenced previously, this interaction can either improve or worsen accompanying preoperative and induction anxiety (Bevan et al., 1990; Davidson et al., 2006; Kain, Caldwell-Andrews et al., 2006; Kain, Caldwell-Andrews, Krivutza, Weinberg, Wang et al., 2004; Kain, Mayes, Caramico, Silver et al., 1996; Li, & Lam, 2003; Wollin et al., 2003). Parents involved in a child’s anesthetic induction have indicated they feel they are playing a vital role in their child’s care (Himes et al.,
The interrelationship between child and parental anxiety was evidenced in a randomized controlled trial of 103 children age 2 through 8 by Kain, et al. (2000), with results indicating that PPIA may be of greater benefit for parents than their children.

Kain, et al. (2000) found parents to be less anxious as a result of being included in the induction process and with reportedly greater satisfaction. Additionally, Himes, et al. (2003) commented that parents involved in the induction process believed their presence to be valuable to not only their child, but themselves and to the healthcare team as well. Although PPIA has been shown to decrease child anxiety (Himes et al., 2003; Kain et al., 2000), and despite the benefit PPIA has yielded with respect to reducing child anxiety, PPIA has not always improved the compliance of the child throughout induction (Kain et al., 2000) or consistently reduced the child’s anxiety (Bevan et al., 1990; Kain, Caldwell-Andrews et al., 2006). Kain, Mayes, Caramico, Silver, et al. (1996) evaluated PPIA in 84 children age 1 through 6 during a randomized controlled trial finding PPIA to only be beneficial in children older than 4, otherwise, child anxiety increased as a result of parental presence.

The allowance of PPIA appears to be dependent on the parent’s anxiety more so than the child’s anxiety. Participating calm parents provide a benefit to anxious children by decreasing the child’s associated anxiety. Correspondingly, inclusion of anxious parents in anesthesia induction only serves to escalate an already calm child (Bevan et al., 1990; Kain, Caldwell-Andrews et al., 2006). Regardless of the stated benefits or drawbacks of PPIA, the reported routine use of this modality in the United States is variable. PPIA prevalence is greater in the northeast United States and is least in the south central United States, with the overall usage of PPIA and sedative premedications increasing since 1995 (Kain, Caldwell-Andrews, Krivutza, Weinberg, Wang, & Gaal et al., 2004).
Not only has PPIA been investigated with regards to its role in reducing preoperative and induction anxiety, but also its relative impact on postoperative behaviors. In the previously mentioned Kain, Mayes, Caramico, Silver, et al. (1996) study, the researchers discovered that PPIA was only beneficial in children older than 4 with an accompanying parent with low trait anxiety. Additionally, postoperative behavioral outcomes were similar between children who had PPIA to those children who did not have PPIA (Kain, Mayes, Caramico, Silver, et al., 1996). While the Kain, Mayes, Caramico, Silver, et al. (1996) study inferred that children older than 4 benefited from PPIA, a wider age range encompassing older children through age 10 or 12 may have yielded more information.

Contributory findings were presented in a similar study by Kain et al., (1998). These researchers identified the administration of premedication to be more effective than PPIA or no premedication plus no PPIA. Both research groups (Kain, Mayes, Caramico, Silver et al., 1996; Kain et al., 2000) supported the use of PPIA as an individualized treatment modality because it was not consistently effective. Additionally, Kain, et al., (2000) were unable to identify further anxiety reduction when PPIA and premedication were combined, thus postulating PPIA as an acceptable alternative to premedication alone.

Limitations

The preponderance of literature represented in the review was current, dating less than 15 years. A minimum number of older studies were utilized because they were historically cited works by multiple authors within the professional literature. Overall findings indicated that many currently employed nonpharmacologic measures utilized in the preoperative anxiety reduction of children appear effective. By and large, the importance of the topic was evidenced in its general representation throughout multiple disciplines including medicine, nursing, and psychology.
Alternative nonpharmacologic therapies such as acupressure and acupuncture, however, are just beginning to emerge in professional literature.

One expected limitation within this review was the reliance upon strictly quantitative research literature. Anxiety reduction interventions themselves are generally evaluated in the context of quantitative study, as this topic pertains to a defined clinical problem in medicine. Speculatively, the utilization of qualitative studies within the search for anxiety reduction strategies may prove beneficial in corroborating existing quantitative data. A potential drawback identified within the findings was that many nonpharmacologic modalities were not evaluated in isolation apart from pharmacologic means, and therefore, individual nonpharmacologic techniques may not necessarily be strictly employed or successful without concomitant pharmacologic modalities. Another potential shortcoming involved study formats. Although virtually all of the studies reviewed achieved Institutional Review Board (IRB) approval and clearly indicated strict adherence to ethical research practices, many employed small sample sizes and neglected randomization. With the inherent possibilities for confounding variables and bias to be introduced within the study process, most of which required observation, research findings must be interpreted with a high index of suspicion and uniform generalizability of results handled cautiously.

Predictors and contributing factors to the development of anxiety, as well as, patient responses to stressful situations remain varied, therefore appropriate anxiety treatment requires accurate preoperative detection and evaluation. The majority of studies analyzed in this literature review evaluated similar phenomena with similar instruments, yielding more reliable and consistent data with which to fuel evidence-based practice initiatives. Nevertheless, a “gold standard” for preoperative anxiety measurement does not exist, potentially hindering accurate
evaluation of this phenomenon throughout clinical research (Kain, Mayes, Caramico, Silver et al., 1996).

Conclusion

Evidence-based practice encompasses a thorough focused evaluation of research data with objectives of implementation and incorporation of new knowledge and techniques into clinical practice. Researchers have identified the existence of associations, rather than cause-effect relationships, between preoperative anxiety and inciting events (Davidson et al., 2006; Kain et al., 1999; Stargatt et al., 2006). Generally, predictors of preoperative anxiety in children are as varied as a child’s response to anxiety provoking phenomenon.

Appropriate care results when patients are successfully matched with effective anxiety reducing techniques. Current pharmacologic and nonpharmacologic anxiety reduction techniques in children were evaluated through a comprehensive literature review. Overall findings supported the beneficial aspects of both pharmacologic and nonpharmacologic anxiety reduction modalities for children in the preoperative setting (Holm-Knudsen et al., 1998). In accord with the initial question of inquiry, the literature identified numerous nonpharmacologic anxiety reduction techniques capable of being utilized in the preoperative preparation of children age 2 through 12.

Accordingly, with respect to weighing costs and benefits of initiating an evidence-based practice change in the clinical setting, further implementation of nonpharmacologic measures including acupressure, PPIA, and a preoperative preparation program with therapeutic play was conceivable. Furthermore, current data specifically outlined the valuable aspects of preoperative preparation programs for children and parents as a specific nonpharmacologic technique in the management of preoperative pediatric anxiety. Preoperative preparatory programs utilizing tours, lecture, or interactive play favorably reduce preoperative anxiety in children (Brewer et al., 2006;
Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993).

Consequently, such findings inspired the development and implementation of the PROP program. From inception, development of this evidence-based practice project was sensitive to the literature with regards to timing of the intervention (Kain, Mayes, & Caramico, 1996; Rice et al., 2008), use of age-specific information (Brewer et al., 2006; Kain, Mayes, & Caramico, 1996; Runeson et al., 2007; Thompson, 1994), and employment of educational methods which reinforced parental understanding (Ellerton & Merriam, 1994; Cassady et al., 1999; Himes et al., 2003; Kain, Caldwell-Andrews, Maranets et al., 2004; McEwen et al, 2007). Continued evaluation and further incorporation of the PROP program into clinical practice will prove advantageous to pediatric care.
Chapter Three: Organizational Model/Framework for Practice Change

Evidence-based practice, as outlined by Stevens (2004), is a cyclical process whereby research data is transformed into clinically relevant practice knowledge. Organizational models assist in the development and implementation of evidence-based processes into clinical practice. The utilization of education as an alternative to or partner with pharmacologic management of preoperative anxiety in the preparation of children for surgery was the impetus for the Pediatric Readiness for Operative Procedures (PROP) program. This program was an evidence-based practice quality improvement initiative which utilized pediatric-specific multimedia and “hands-on” therapeutic medical play to ready children for the perioperative experience. The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) served as a roadmap for the completion of this project (Appendix A).

_Iowa Model of Evidence-Based Practice to Promote Quality Care_

The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) was utilized for the development and implementation of this evidence-based practice quality improvement project. The Iowa Model of Evidence-Based Practice to Promote Quality Care “serves as a guide for nurses and other healthcare providers to use research findings for improvement of patient care” (Titler et al., 2001, p. 498). Successful implementation of evidence-based initiatives requires thorough collaboration from key personnel throughout an organization. The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) respects “how the infrastructure to support research use must involve every level of the organization” (Melnyk & Fineout-Overholt, 2005, p. 197). The following describes how the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) directed the creation and execution of the PROP program.
The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) is initiated by either problem-focused or knowledge-focused triggers that encourage “nurses to think critically about clinical and operational efficiency and effectiveness and thus to seek scientific knowledge for use in decision making” (Titler et al., 2001, p. 502). The identified clinical problem trigger in this instance was the presence and management of preoperative pediatric anxiety. Specifically, the clinical problem to be rectified involved isolating the most effective nonpharmacologic anxiety reducing techniques used in children age 2 through 12. The development of a team of “interdisciplinary stakeholders in the delivery of care” (Titler et al., 2001, p. 503) was required as the next step within the framework of the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001). The team concept promoted collaboration of personnel and success for the evidence-based project. The PROP program was by nature interdisciplinary, as it engaged the expertise of personnel from within the departments of Anesthesia, Child Life, and Perioperative Nursing.

The next consideration of the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) involved researching, reviewing, critiquing, and synthesizing pertinent research literature. Upon evaluation of data, the decision was cast as to whether or not adequate research was present to initiate and direct a practice change. The PROP program was based upon recommendations borne from the findings of a comprehensive literature review. A pilot project was subsequently devised as recommended by the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) secondary to resultant evidence. “Piloting a research-based change in clinical settings takes the intervention away from the controlled environment of a research study and puts it into an environment where the effects of extraneous variables influence the results” (Titler et al., 2001, p. 506). The Iowa Model of Evidence-Based
Practice to Promote Quality Care (Titler et al., 2001) then advised consideration of the results of the pilot program as a determinant to whether the change should be adopted into practice or if further research must be undertaken. Ultimately, the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) supports ongoing evaluation of data as “evaluation data lend support to the usefulness of the intervention in practice settings by demonstrating the ability of multiple care providers to use EBP and the reality of achieving expected outcomes” (Titler et al., 2001, p. 507).

**Conclusion**

The PROP program was a quality improvement initiative that involved the utilization of an informational session to provide comprehensive education to pediatric surgical patients and their families, yielding anxiety reduction and improved readiness for surgery. The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) was utilized as a guide for the development and completion of this program. True to this model, successful achievement of evidence-based practice initiatives require emphasis upon adherence to the interdisciplinary team concept and the accurate interpretation and ongoing evaluation of data.
Chapter Four: Project Design

Evidence-based practice is essential to the development of progressive clinical services and care initiatives. The Pediatric Readiness for Operative Procedures (PROP) program was an evidence-based practice quality improvement project designed to enhance the preoperative readiness and anxiety reduction of pediatric patients. Specifically, the program was driven by the question: In children age 2 through 12, do parents/guardians perceive attendance at a preoperative preparatory informational session as helpful to improving their child’s and their own knowledge and familiarity of the events occurring during the perioperative period resulting in increased readiness for surgery?

Practice Change Project Description

The PROP program involved the utilization of education as a nonpharmacologic approach to reduce preoperative pediatric anxiety. Specifically, the program was developed to provide age-appropriate educational materials and “hands-on” activities for children and parents/guardians outlining the events of the perioperative surgical experience in order to provide preoperative education and anxiety reduction, thereby improving readiness for surgery. Inclusion of parents in the preoperative education process was deemed a necessary component of this project as the literature endorsed the notion that parental anxiety greatly influences child anxiety (Bevan et al., 1990; Davidson et al., 2006; Kain, Caldwell-Andrews et al., 2006; Kain, Caldwell-Andrews, Maranets et al., 2004; Kain, Mayes, Caramico, Silver et al., 1996; Li, & Lam, 2003; Wollin et al., 2003).

Preoperative anxiety reducing interventions in children should address parental anxiety, thereby indirectly attending to the child’s anxiety through adequate parental preparation (Kain, Caldwell-Andrews, Maranets et al., 2004; Lynch, 1994). Parental preparation in itself is
advantageous as it can substantially yield positive influence on a child’s preoperative anxiety state (Ellerton & Merriam, 1994; Himes et al., 2003). A family-centered style of preoperative pediatric anxiety management will yield beneficial results (Ellerton, & Merriam, 1994; Kain, Caldwell-Andrews et al. 2007). Therefore, the design of the PROP program centered upon a recognized necessity to deal with the respective preoperative informational requirements of children and their parents/guardians.

The PROP program filled an existing gap in the preoperative care of children at the implementation site, a 400-bed acute care hospital in central Pennsylvania, where pediatric-specific preparatory programs were not routinely employed. The project plan included marketing the program to families during the child’s final clinic appointment with their surgeon. A flyer was utilized to publicize the program for a Saturday in September (Appendix B). The free program was designed to last approximately 1 hour employing multimedia, a tour of the preoperative and postoperative areas, and provision of opportunity for children and parents/guardians to “place hands” on some of the anesthesia equipment they would encounter on the day of surgery.

While the basic premise of preoperative preparation programs involving therapeutic play can be established by anyone, the literature supported the use of multidisciplinary teams in their set-up and execution, particularly the role of nurses (Dreger & Tremback, 2006; Ellerton & Merriam, 1994; Li & Lopez, 2008; Murphy-Taylor, 1999) and child life specialists (Child Life Council & Committee on Hospital Care, 2006). Accordingly, this program employed the expertise of personnel from the departments of Anesthesia, Child Life, and Perioperative Nursing at the implementation site. Interprofessional collaboration was accomplished through various meetings among the involved departmental personnel in order to discuss course content and
delivery of information. Child Life personnel were particularly instrumental in their contributions to the structure of this program with respect to the developmental considerations of the involved population.

The project plan included use of a parent/guardian survey distributed at the conclusion of the informational session for evaluation purposes (Appendix C). The survey was intended to elicit parent/guardian responses to questions evaluating the benefits of the informational session content and the program’s impact on their child’s readiness for surgery. The survey was rated at a Flesch-Kincaid reading grade level of 8 through Microsoft Word 2007 software. The survey consisted of 1 multiple choice question, 1 “yes”/”no” question, and seven 5-point Likert scale questions eliciting parent/guardian responses as to the helpful nature of each component of the program in readying their child for surgery. Survey data yielded important information as reported by parents/guardians outlining the effectiveness of the program objective, that being, increased readiness or preparedness of their child for surgery. Survey data ultimately provided guidance for future modifications of the program structure. The surveys were void of identifying and personal information and absent of links to personal data, thereby yielding no impact on current and future care.

*Risks and Benefits of Practice Change Project*

Potential risks and benefits identified with respect to the development and implementation of this educational program were considered. Speculatively, potential risks to project integrity resulting in the dissemination of inaccurate information could have occurred with respect to the content and/or context of information delivery. Therefore, the volunteer healthcare practitioners from Child Life and Perioperative Nursing who participated in the
program were chosen to ensure content accuracy and fulfillment of the educational needs of attendees.

The research literature suggested that some preoperative educational offerings may not always yield positive results. Despite extensive reports within the literature that preoperative preparation programs are beneficial (Brewer et al., 2006; Edwinson et al., 1988; Ellerton & Merriam, 1994; Lynch, 1994; Rawlinson & Short, 2007), some contend children would not uniformly profit from such a practice (Kain, Mayes, & Caramico, 1996; Rice et al., 2008). Specifically, intervention timing greatly influenced the intended outcome of anxiety reduction. Recommendations from the literature included avoiding any preparatory program in children who have experienced previous hospitalizations or in those unable to attend such a program within 1 week of surgery, especially in children younger than 3 years (Kain, Mayes, & Caramico, 1996).

Consequently, increased preoperative anxiety within certain populations remained a potential risk even after attendance at this informational session. The project respected the suggestions of the literature during program development with regard to timing of the intervention (Kain, Mayes, & Caramico, 1996; Rice et al., 2008), use of age-specific information (Brewer et al., 2006; Kain, Mayes, & Caramico, 1996; Runeson et al., 2007; Thompson, 1994), and employment of educational methods which reinforce parental understanding (Ellerton & Merriam, 1994; Cassady et al., 1999; Himes et al., 2003; Kain, Caldwell-Andrews, Maranets et al., 2004; McEwen et al., 2007). Exclusionary criteria and limitations (e.g. age 2 through 12, children with no previous surgical experiences) with respect to participant attendance as drawn from the literature were utilized in order to limit exposure of sensitive pediatric populations to anxiety provoking content (Davidson et al., 2006; Kain & Caldwell-Andrews, 2005; Kain,
As a means of rescue, Child Life personnel continued to be available on the day of surgery in order to offer additional support as needed to patients and families. Optimistically, the beneficial aspects of this program were evidenced as adequately prepared children and families resulting in a reduced amount of time staff members needed to perform education on the day of surgery, which theoretically decreased staffing requirements and expenses. Moreover, children who were adequately prepared for their surgical experience demonstrated smoother transitions from parental care to that of staff members, which added to parent satisfaction of the staff and facility.

**Conclusion**

The introduction of a preoperative educational session as preparation for pediatric patients undergoing surgery has empowered children and families. Acquaintance with surgical environment, routines, and equipment plays a significant role in effectively reducing anxiety and preparing a child for surgery (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Kain, Caldwell-Andrews et al., 2007; Li & Lopez, 2008; Ziegler & Prior, 1994). The PROP program was an evidence-based practice quality improvement program that utilized pediatric-specific educational materials and interactive “hands-on” therapeutic medical play to familiarize children with the events of the perioperative period.
Chapter Five: Implementation Procedures and Process

Preoperative pediatric anxiety was a fundamental clinical problem requiring a practical solution. Evidence-based practice is a philosophy of patient care that seeks consideration of all available science in order to administer the best interventions. Relevant literature has indicated the utilization of pediatric-specific preparatory programs encompassing tours, lecture, or interactive play as a means of successfully reducing preoperative anxiety in children (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993). An overarching theme in the literature regarding child preparation for surgery involves adapting preoperative information as specifically as possible to the needs and level of comprehension of the individual child (Brewer et al., 2006; Kain, Mayes, & Caramico, 1996; Runeson et al., 2007).

The Pediatric Readiness for Operative Procedures (PROP) program was designed as an evidence-based initiative with the goal of reducing preoperative pediatric anxiety and increasing a child’s readiness for surgery through activities providing familiarization with the equipment and events of the perioperative period. The implementation procedures and process for this program are highlighted in this chapter. Accordingly, details are discussed regarding an organizational assessment of the implementation site, and the barriers and challenges to implementation within that setting. Corresponding solutions for managing encountered adversities are also discussed.

Organizational Assessment and Change Readiness

An organizational assessment evaluating the climate for change within the implementation facility was a precursory step in the development and execution of an evidence-
based practice change project. The PROP program was developed based upon a recognized need for greater child preparation for surgery in a 400-bed acute care facility in central Pennsylvania. The number of pediatric surgeries performed within this facility were consistently increasing and attendant advancements in the perioperative management of children and their families were warranted.

Various aspects of an organization impact the change process. Two key change factors identified by Fernandez and Rainey (2006), leadership participation and resource adequacy, were assessed within this organization prior to embarking on this practice change initiative. Active leadership participation was noted at the implementation site as evidenced by the swift approval of and clearance for the project. Furthermore, additional commitments were freely offered by management personnel throughout multiple departments to aid in the development and implementation of the program. Active involvement and support of ancillary staff was also demonstrated through enthusiastic volunteerism and participation in the preparation and execution of the actual program. As “successful change usually requires sufficient resources to support the process” (Fernandez & Rainey, 2006, p. 172), resource adequacy was a second change factor sufficiently met as various facility resources were allocated at no charge for use in presenting the program.

Other issues relative to promoting change within an organization include vision communication, strategies necessary to overcome identified barriers, and adversity resolution tactics. “Individual professionals need to be informed, motivated and perhaps trained to incorporate the latest evidence into their daily work” (Grol & Wensing, 2004, p. S57). Vision communication required the development of a strategy that “serves as a road map for the organization, offering direction on how to arrive at the preferred end state, identifying obstacles,
and proposing measures for overcoming those obstacles” (Fernandez & Rainey, 2006, p. 169).

The vision for this practice change project and preoperative pediatric educational strategy was accomplished through email communications and personal meetings with key contributors (e.g. department heads of Anesthesia and Perioperative Nursing, and Child Life personnel) providing consistent reinforcement of the value in implementing this program for patients.

Project Course

A lack of formal preoperative education for children and families at the implementation site catalyzed the PROP program. A comprehensive review of medical, nursing, and social sciences literature supported the development of a preoperative preparatory educational program for children and their parents/guardians as a nonpharmacologic preoperative anxiety reduction strategy. The entire process from program inception and development through implementation took place over a 6-month course.

The foundation for the development of this preparatory program was established in May 2009. Various contacts were initiated with multiple department leaders in order to assess the feasibility of creating and implementing such a program, and to evaluate the dedication of the organization’s support for this project. Key leaders including the chief nurse anesthetist of the Anesthesiology department, the vice chair of the division of Anesthesiology, the director of Perioperative Nursing, and the surgical suite director were contacted. Support from Child Life personnel and Pre-surgery Anesthesia clinic personnel were also sought during this time of initial planning. Brainstorming for ideas related to program content, location, and staffing also occurred in this timeframe.

In June 2009, the full development of the class plan and content was undertaken. Multiple emails and meetings with the aforementioned key personnel contributed immensely to the
program’s development during this time. The Institutional Review Board (IRB) for the implementation site was consulted and the project was submitted for review. The goal of the IRB is to ensure the protection of human subjects during research activities. Institutional Review Board clearance was obtained, which allowed for formal advancement of the project (Appendix D).

July 2009 involved further consultation with the Anesthesia and Perioperative Nursing department leaders and Child Life team members for continued planning and program content development. Promotion for the program was considered during this time and contact was established with public relations. An advertising flyer for the program was approved for distribution by public relations personnel (Appendix B). The marketing plan involved distribution of these advertising flyers to a target population of children age 2 through 12 by surgical clinic secretaries at the time of surgery scheduling. The target clinic locations included pediatric general surgery and otolaryngology as these were the two largest pools of pediatric surgical candidates. The advertising took place over 6 weeks in August and September 2009. Program content was finalized to include a video of the operating room experience and a tour of the facility including the waiting area, preoperative and postoperative units, and a mock operating room.

The inaugural program took place Saturday September 12, 2009 at 0900. Unfortunately, no one attended the session. The remainder of September 2009 involved a review and revision of the initial steps of the program in order to identify a new direction and plan for a second attempt. The revised plan involved further advertising and a commitment by 2 pediatric surgeons to either personally invite patients to attend the session or ensure that the program flyer was included in pre-surgery information packets. The IRB granted approval to add a monetary incentive in order
to attract potential participants. Institutional Review Board approval to utilize an incentive was necessary in order to avoid jeopardizing the exempt status of the project. A re-designed flyer was distributed according to the same procedure and criteria as outlined previously (Appendix E). Advertising for the second class took place over a 4-week timeframe in September and October 2009.

Despite sufficient advertising to the prospective population, no surgical candidates registered for the second program. Consequently, within 3 days of the second program, volunteers were sought to fill the vacancies and act as a pilot group for evaluation of the program’s benefit and whether it should be offered a third time. The second program occurred Saturday October 10, 2009 at 0900 and was attended solely by the volunteers. The volunteer group was composed of 4 families made up of 5 parents and 5 children. Two female and 3 male children ranged in age from 2 through 6.

The program began with the session facilitators meeting and greeting attendees in the lobby of the children's hospital. The group next viewed the 15-minute video of the surgical experience. A question and answer session followed. After the video and question and answer period, the class was escorted on a walking tour of the areas families would encounter on the day of surgery. The tour component was accompanied by a scavenger hunt map that children would identify each stop of the tour (Appendix F). The tour proceeded to the waiting area and onto the preoperative surgery unit. In the preoperative unit, families were instructed about how their child would be prepared for the surgery and what they would see, feel, hear, and touch.

Next, families were ushered to a mock operating room. The mock operating room contained an anesthesia machine and equipment that the children would encounter on the day of their surgery. The usual pediatric anesthesia induction procedure was demonstrated with a simple
explanation on a doll. This portion of the tour was critical as it provided the children and families with an opportunity to touch the equipment. The “hands-on” component was a primary objective of the preparatory program as the literature supported therapeutic play and exposure to medical equipment as beneficial in reducing preoperative anxiety (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993).

The tour group was last ushered to the postoperative surgery unit to view the recovery area.

The program concluded with a final question and answer session. Coloring books describing commonly encountered surgical suite personnel and events were provided to the younger children and handouts that reinforced preoperative instructions were given to parents/guardians (Appendix G). The entire program lasted approximately 50 minutes. At the conclusion of the event, a survey was given to parents/guardians in order to ascertain their perceptions as to whether attendance at the preoperative preparatory informational session was helpful to improving their child’s knowledge and familiarity of the events occurring during the perioperative period, ultimately resulting in increased readiness for surgery and a reduction in preoperative anxiety (Appendix C). As advertised, a $10.00 department store gift card was given to parents for attending the program.

**Barriers and Challenges to Implementation**

Barriers and challenges may potentially stymie the momentum of change within an organization. Melnyk and Fineout-Overholt (2005) outlined such barriers to evidence-based practice initiatives including skepticism and misunderstandings about evidence-based practice, individual personalities, communication, and resources. Grol and Wensing (2004) have also described barriers to and incentives for achieving evidence-based practice in an organization.
including innovation, the individual, the patient, and social, organizational, economic, and political aspects.

The PROP program was motivated by a well known problem within healthcare, namely preoperative pediatric anxiety. This clinical problem has generally been addressed through pharmacologic means. Therefore, resistance to or skepticism regarding the value of changing currently accepted practice to a nonpharmacologic approach was possible. The skepticism and non-supportive personality barriers encountered in this project’s development were addressed with staff education and the provision of literature based evidence detailing support of this practice change initiative.

Ineffective communication was another barrier overcome through consistent pursuit of ensuring effective communication of the project and its objectives among the various disciplines involved in the program’s development. Lack of resources never materialized as a barrier to this project because the facility provided the physical locations and the multimedia equipment necessary for achievement of the project. Additionally, personnel resources were adequate as volunteers enthusiastically engaged themselves in aiding the project through unto successful completion. The patient/family unit itself was identified as a potential barrier because they may not attend if they were not compelled to believe the program would be beneficial to either themselves or their child. Therefore, through program advertisement, families were informed that participation in the program was important to their child’s welfare (Appendix E).

Adversity Contingency Plans

Adverse conditions were considered and contingency plans were identified early in project development. Three problems were identified as setting, lack of child and family participation, and poor conveyance of information (e.g. with respect to program advertisement...
and information delivery during the program itself). Apprehension regarding loss of setting and materials were met by ensuring reservations for all physical components of the program (e.g. setting, multimedia, etc.) and the securing of a secondary back-up location early in development.

Family participation was a second element of concern impacting the PROP program. All efforts were made to thoroughly advertise the informational session to the designated population. Despite sufficient advertising within the preoperative pediatric general surgery and otolaryngology clinics, attendance was nil at the inaugural session. The program was offered a second time 1 month later and again advertised in a manner similar to the first with the addition of greater involvement by various pediatric surgeons in the promotion of the program. As the implementation date of the second program neared, a contingency plan was initiated to ensure some element of participation. Volunteers were solicited so that the content of the class could be delivered in order to garner feedback as to how future sessions should be managed.

Information delivery was the third potential area where misfortune could have arisen. Assurance of accurate information was addressed by thorough review of program subject matter in order to guarantee factual integrity and consistency. At the conclusion of the program, handouts containing essential preoperative information were presented to parents/guardians and age-appropriate surgery-experience coloring books were given to participating children in order to guarantee reinforcement of factual material (Appendix G).

Conclusion

The development of an evidence-based practice project requires the concerted efforts of multiple personnel at multiple levels of leadership. The concept of the PROP program was well received by all leadership personnel at the implementation site from inception through completion. The embodiment of a change-oriented mindset by healthcare professionals was
essential for the successful implementation of this evidence-based practice project.

Identifications of barriers and appropriate solutions facilitating this practice change initiative were considered and managed effectively. The overall integrity of the implementation process and program was maintained through strict adherence to the ideals of evidence-based practice and seeking to provide the best quality of patient care.
Chapter Six: Evaluation and Outcomes of the Practice Change Initiative

Utilization of an evidence-based practice approach to patient care results in delivery of the best possible care. Preoperative pediatric anxiety was identified as a clinical problem necessitating an evidence-based solution. A thorough review of medical, nursing, and social sciences literature identified an evidence-based approach to this clinical issue through utilization of a preoperative pediatric preparatory educational program. The Pediatric Readiness for Operative Procedures (PROP) program employed age-appropriate information and “hands-on” learning in order to prepare and increase the readiness of children and their parents/guardians for the surgical experience. The program was initially trialed on September 12, 2009 and again on October 10, 2009. Evaluation of program effectiveness is detailed within this chapter.

Project Objective and Evaluation

The PROP program utilized age-appropriate educational materials and “hands-on” learning for children and parents/guardians as preparation for the surgical experience. The ultimate goal and outcome of the PROP program was to decrease preoperative pediatric anxiety and improve a child’s readiness for surgery. Children were considered to attain an increased state of preoperative readiness as a result of an increased familiarization with and knowledge of perioperative events and equipment. Therefore, the increased readiness attained through this program would be contributory to reducing preoperative anxiety. The program outcome was evaluated against the project’s driving question of inquiry that was to assess parent/guardian perceptions as to whether attendance at the preoperative preparatory informational session was helpful to improving their child’s and their own knowledge and familiarity of the events occurring during the perioperative period, ultimately resulting in increased readiness for surgery and anxiety reduction.
Preparing Children

The tool utilized to evaluate the program’s outcome was a parent/guardian survey (Appendix C). The survey included notation of the age of the child and evaluative questions eliciting parental responses regarding the helpful nature of each component of the program in preparing their child for the surgical experience. The survey consisted of seven 5-point Likert scale questions, 1 multiple choice question asking parents/guardians to describe how well the class prepared their child for surgery, and one pointed question about whether parents believed their child was better prepared for surgery after attending the class. Four volunteer families attended the program with 5 children ranging in age from 2 through 6 years.

The Likert scale portion of the post-class parent/guardian consisted of seven 5-point questions evaluating the helpfulness of the individual activities encountered within the program denoting 1 as “less helpful” and 5 as “more helpful” (Appendix H). A score of 3, being equally positioned between positive and negative responses was interpreted as an indication of indifference. Mean scores less than 3 indicated that the activity was perceived as less helpful to preparing children for surgery, while mean scores of 3.1 or greater were an indication that the activity was perceived as more helpful to preparing their child for the surgical experience. Therefore, any mean score of 3.1 or greater was interpreted as a positive response and considered to be a valuable activity in preparing their child for surgery.

The walking tour and “hands-on” activities were considered to introduce children to the most stressful aspects of the impending surgical experience and were scored by parents/guardians as the most helpful activities (mean score 4.3). Altogether, parents rated all aspects of the program as beneficial in helping their child become familiar with or ready for surgery, as noted by mean scores for all components exceeding 3.1 or greater. The drawbacks of the group of children evaluated through this program were twofold. Primarily, the participants
were volunteers who were not intentionally preparing for surgery. Being volunteers, both the parents and children were assumed to have had a lower baseline level of anxiety and possessed a lesser need for knowledge of the perioperative period, as they were not truly preparing for a real surgical experience. Accordingly, parent/guardian responses related to the evaluation questions were considered to require a similar degree of speculation on behalf of the parents as it would have required of true surgical candidates’ parents. Moreover, the number of participants was small. Therefore, outcomes should be interpreted with caution. Overall, parental reports that the program was essentially helpful to improving their child’s preparation for surgery were encouraging and reinforced current evidence that children may benefit from preoperative education as a surgical readiness enhancing strategy.

The multiple choice question section of the post-class parent/guardian survey asked parents to select a statement that best described how well they thought the class helped their child prepare for surgery (Appendix I). Four of 6 parents chose the statement indicating that they did not know if their child’s fears about the upcoming surgery had changed as a result of the class. The remaining 2 parents chose the statement indicating that their child was now less afraid of the upcoming surgery after participation in this informational class. Again, results must be interpreted in light of the fact that the class was composed strictly of volunteers who were not imminently preparing for surgery. Nonetheless, parent survey responses supported the notion that the activities provided through the PROP program were helpful in familiarizing and readying their child for surgery. However, the majority of parents ultimately remained undecided as to whether these activities actually reduced their child’s fears about an upcoming surgery.

One final question in the parent/guardian post-class survey asked if parents believed their child was better prepared for surgery after attending the class. Ironically, parents unanimously
answered “yes,” despite mixed responses regarding speculation of their child’s fears as a result of the class as noted in the multiple choice section of the survey. Parents were asked to qualify their answer with a statement as to why they responded “yes” or “no.” Two of the only 3 responses confirmed the benefit of the familiarizing activities of the PROP program. One parent indicated: “My child was able to see the environment and touch the equipment. I think it helps him to understand more.” Another response was “Observation is always more helpful.” A third parent responded “Questionable” despite responding affirmatively as to the beneficial nature of the program.

Considerations

The intended outcome of the PROP program was to increase a child’s readiness for surgery through familiarization with the experiences and equipment of the operating room environment. Based upon the literature, such familiarization should speculatively yield an associated reduction in preoperative anxiety. The evaluation of the effectiveness of clinical care interventions in a vulnerable population such as children can be problematic. Therefore, while the intention of this project was to provide preoperative anxiety reduction to children through education and therapeutic play and ultimately increase the child’s readiness for surgery, evaluations of parental perceptions of the program’s helpfulness was sought as the most reliable means of program appraisal. Accordingly, in designing the program, parental perceptions were considered to yield valuable insight into the positive and negative aspects of this child-focused educational endeavor and a mainstay of program evaluation design.

Despite the lack of attendance at the inaugural session and ultimate utilization of volunteers at the second session, the program outcome seemed to be achieved. Parents indicated the activities utilized in the PROP program were helpful to preparing their child for a future
surgery, but were unable to identify if their child’s fears/anxieties were correspondingly reduced as a result of participation in the event. Nonetheless, consideration must be given to the fact that the participants were essentially a pilot group of volunteers and may not have had the same degree of preoperative anxiety as actual children and families psychologically preparing for an eminent surgery.

Additional considerations related to lack of attendance by the target population were speculated to have resulted from multiple contributory and interrelated factors including patient/family motivation and perceptions, information access, setting, timing, and population. Patient perceptions may have impacted attendance as families may not have fully understood the benefits of attending such an educational program. Accordingly, the increased availability of and access to free and detailed information for patients via the internet may have caused families to consider physically “showing up” at the hospital in order to learn about their surgical experience as unnecessary. Retrospectively, advertising may also have been suboptimal, despite attempts to ensure the program was adequately offered to the target population.

The setting itself may have limited full participation because it was a large acute care hospital situated in a predominately rural area. Many children’s hospitals after which this program was patterned, exist in large metropolitan areas offering relatively close access for patients and families. Families served by this facility may reside many hours away. Speculatively, the service area was too great to entice patients living distances from the facility to return one extra time for a class that they may not have considered as necessary.

Furthermore, timing of the program, particularly time of day and day of week, may have had an impact upon attendance. The classes were offered from 0900-1000 on a Saturday. Hypothetically, children may have been involved in various sporting or school activities on this
day of the week or parents may have been unwilling to attend a class at such an early time of day. Moreover, the implementation site was extraordinarily busy even at late evening hours on weekdays, which precluded use of this timeframe for offering a session. Thought must also be given to the substantially large age group to whom the class was offered. Although the literature generally identified an age range of 2 through 12 in such preparatory program studies, perhaps 2 classes administered at separate times dividing the population in half (e.g. ages 2 through 6; 7 through 12) may have been more prudent.

**Recommendations**

The literature has indicated the use of preoperative education and exposure to the events surrounding the operative period as beneficial in reducing preoperative anxiety in children and readying them for surgery (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Kain, Caldwell-Andrews et al., 2007; Li & Lopez, 2008; Ziegler & Prior, 1994). Based upon the preceding considerations related to class attendance, the most effective means of meeting the preoperative educational needs of children and families may require a more immediate technological approach. A recommendation for future dissemination of such essential preoperative information to families through an alternative pathway rather than a traditional organized “classroom” or group setting includes media.

The development of a real-life video presenting the same elements of the PROP program would be conceivable, practical, and helpful to children and their families. Video delivery of information during the family’s waiting for the surgeon in their preoperative clinic visit would allow education and provide impetus for discussions with the surgeon regarding their upcoming surgery. The video must accurately highlight elements of the walking tour whereby all aspects of
the surgical suite from the waiting room through preoperative and postoperative units and the operating room are encountered.

An element of interaction with questions and answers, perhaps utilizing child interviews by healthcare personnel, should be included. Further, the video could conceivably be narrated by a child, thus enhancing the video’s ability to connect with the desired audience. Additionally, a version of the video should be made available via the internet if viewing in the surgical clinic proves difficult or time consuming. Overall, a system should exist whereby if families desire a personal operating room tour, they could obtain it the day of their clinic visit. Ideally, all efforts should be made to ensure that families are provided with complete information before they leave their final appointment with their surgeon.

As noted in the reviewed literature, therapeutic play and exposure to the surgical environment remain critical aspects of preoperative child preparation (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993). The opportunity must be present for children to touch anesthesia equipment during the video presentation. The development and provision of a surgery “toolkit” designed to include common anesthesia items that children and parents can physically touch should also be considered and offered with the video.

A final recommendation arising from the PROP program involves the development of a more specific tool for evaluating preoperative pediatric anxiety. A tool more directly capable of evaluating parental perceptions of their child’s perceived anxiety and/or readiness for medical procedures would be valuable in similar instances. The evaluation method would conceivably
identify a greater knowledge change if it were employed as a pre-test/post-test design in a similar educational offering.

Conclusion

The PROP program was developed as an evidence-based practice initiative seeking to enhance a child's readiness for surgery. Although the program was unattended by surgical candidates, volunteer participation has provided valuable information supplying impetus for a new direction utilizing video to convey needed preoperative information to children and their parents/guardians. The outcome of this endeavor ultimately contributes to the cache of evidence pertaining to the preoperative management of pediatric anxiety.
Chapter Seven: Implications for Nursing Practice and Project Limitations

The evidence-based practice process, accomplished through the concerted efforts of nurse researchers and clinicians, involves the evaluation of all available evidence and implementation of proven strategies into clinical practice ultimately enhancing patient care. Nursing practice is involved in a perpetual cycle of research, implementation, and evaluation as new modalities of treatment enhance patient care and invigorate nursing science. The mitigation of preoperative anxiety in the preparation of children for surgery was a clinical dilemma that required an evidence-based solution. An educational program based on the literature was developed for pediatric patients and their families. This chapter outlines the various nursing practice implications and limitations resulting from the development and implementation of an evidence-based practice patient education project known as the Pediatric Readiness for Operative Procedures (PROP) program.

Nursing Practice Implications

Preoperative pediatric anxiety is a persistent quandary in healthcare with a reported incidence between 40 and 60% (Kain, Mayes, O’Connor et al., 1996; Wollin et al., 2003). Moreover, the consequences of preoperative pediatric anxiety are numerous including postoperative behavioral changes manifesting as feeding and sleeping problems, bedwetting, withdrawal and apathy (Kain, Mayes et al., 2006; McCann & Kain, 2001; Ziegler & Prior, 1994), nightmares, disobedient behaviors, separation anxiety, loss of temper, and fear of healthcare workers (Kain et al., 1999). The corresponding management of preoperative pediatric anxiety is complex and consists of a variety of anxiety reduction techniques ranging from pharmacologic interventions to preoperative preparatory programs, parental presence during anesthesia induction, and a sundry of distraction alternatives. Regardless of method, employment of
preoperative pediatric anxiety reduction tactics falls within the purview of nursing. Therefore, the nursing discipline is obliged to its pediatric patients and families to act accordingly.

The PROP program addressed a well-documented clinical problem of preoperative pediatric anxiety. The PROP program provided essential and specific information to meet the educational needs of children with respect to the surgical experience and attempted to aid in preoperative anxiety reduction in this group. Specifically, the PROP program was an educational activity designed to enhance preoperative readiness and decrease anxiety in children age 2 through 12. The program utilized age-appropriate delivery of preoperative education coupled with a facility tour. Patient education and other empowering learning activities have historically been a responsibility of the nursing profession. Thus, the PROP program was fittingly designed and implemented via the talents of the nursing profession.

The PROP program was developed after noting the lack of formal preoperative pediatric education at the implementation site. Nursing implications related to the development and implementation of the PROP program include enhancements to nursing science, facilitating interdisciplinary collaboration, exempling a community-oriented health promotion activity through education, introducing children to the nursing profession, and improving quality of patient care. The nursing profession benefits from a progressive change-oriented perspective that seeks alternative methods to deliver nursing care and an ability to recognize opportunities to improve or change clinical practice.

Innovative approaches to patient care are both founded upon and further nursing science. Accordingly, the PROP program employed an interactive approach (e.g. multimedia, “hands-on” activities) to provide essential preoperative education to children and their families about their upcoming surgical experience. Nursing science facilitated the development of this patient
educational endeavor. Moreover, the results of this program contributed to the furtherance of
nursing science by highlighting what patients/families consider to be valuable with respect to
reinforcing preoperative nursing-based education. Dissemination of the details and results of the
PROP program via professional publication will contribute to general nursing knowledge of
preoperative pediatric anxiety management. Correspondingly, the results of the PROP program
will further the evidence related to pediatric/family preoperative preparation and serve as a guide
assisting other nursing professionals in the development and implementation of future pediatric
educational programs.

The PROP program was also a noteworthy example of how nursing facilitated
interdisciplinary collaboration through partnerships with other healthcare practitioners to achieve
a common end. The development and implementation of the PROP program required the
intimate collaboration of multiple parties including Anesthesia, Perioperative Nursing, and Child
Life to design and initiate this practice change project. Moreover, the project showcased the
innovation of patient education and the ability of nursing to act as an ambassador to both patients
and other disciplines.

Patient education activities remain a fundamental aspect of health promotion. As
previously noted, approximately 2,159,000 surgeries are performed annually in the United States
for children less than 15 years of age (DeFrances et al., 2008), with between 40 and 60% of
children experiencing preoperative anxiety (Kain, Mayes, O’Connor et al., 1996; Wollin et al.,
2003). The utilization of the PROP program contributed greatly to health maintenance and injury
prevention ideologies by supplying essential preoperative information for children and their
families in a population experiencing a great need. The education and familiarization provided
through the PROP program increased knowledge and empowered children and families.
Optimistically, a resultant reduction in stress and anxiety occurred, ultimately contributing to a healthier pediatric and family population.

Speculatively, the utilization of this program also provided opportunity to introduce children to the nursing profession and healthcare careers. Older children who participated in this activity might potentially be encouraged to choose a healthcare career path as a result of nonthreatening exposure to healthcare personnel and the healthcare environment. Overall, the development of the PROP program served as a model of evidence-based preventative nursing care in action and was a pattern that can be followed by nurses caring for children in various settings.

Finally, the quality of patient care improves only after various care interventions are devised, implemented, and evaluated in light of their benefit and utility. The completion of the PROP program has yielded insight into the effectiveness of health information delivery in the pediatric surgical population. The PROP program has contributed to the understanding that patients and families desire and seek information related to the surgery experience. In this instance, more patient education increases quality of care. While data obtained from parents regarding the benefits of the information contained within the program were encouraging, an alternative format for content delivery (e.g. media) of essential preoperative education should be considered in this patient population. Therefore, this nursing-based educational endeavor has been shown useful in guiding future practice and enhancing the quality of patient education activities.

Project Limitations

Although the concept of the PROP program and other patient education endeavors was noble, the project possessed some limitations in its current format. While the program was
thoroughly scrutinized in order to ensure accuracy and delivery of content, the possibility existed for inadequate conveyance or reception of information. The wide age range of participants (e.g. ages 2 through 12) lent itself to the possibility that some of the course material exceeded the comprehension of some participants. Nursing’s responsibility is to ensure accurate provision of information to patients in order to prevent or counter inappropriate and untrue information. Therefore, separate classes with smaller age groupings (e.g. ages 2 through 6; 7 through 12) might have allowed for more effective delivery of age-specific information.

Moreover, the utility of this format of preoperative educational program may have been a limitation. Technological advancements have contributed to an increased availability of health-related information via the internet. Patients and families have greater access to information and may be potentially better informed prior to healthcare encounters. Accordingly, the offering of a full-fledged informational session and tour may not be the optimum route of information delivery to the selected population as some patients may not desire to attend a formal class and tour of the operating facility.

Interdisciplinary collaboration was another aspect of the PROP program that was both helpful and yet, limiting. Although the staffing requirements for the actual program were minimal, the foundational development of the program required great effort and collaboration with multiple personnel at varying levels of influence and responsibility throughout the facility. The large number of personnel involved over the course of the program’s development caused occasional setbacks. Overall, interdisciplinary collaboration was essential for the success of this educational offering.

The participation of families was in itself a limitation to the project’s full potential. Despite sufficient, family-specific, and prolonged advertisement, both offerings of the PROP
program were not attended by true surgical candidates. Advertising modifications including addition of a monetary incentive and greater surgeon participation were unable to yield participation by surgical candidates in the second program. A contingency plan using volunteers was prospectively initiated prior to the second session in order to, at minimum, garner feedback regarding the utility and relevance of the program content and activities.

The inclusion of volunteers was the only deviation from the program’s initial intentions of educating preoperative children age 2 through 12 undergoing their first surgery. This divergence was justified based upon the principles of the underlying framework of the program, the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) (Appendix A). The Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) endorses the utilization of a pilot or trial of implementation in order to establish the value of the evidence-based initiative. Consequently, the use of volunteers enabled the implementation of the program in order to evaluate its effectiveness and determine if enough evidence existed to continue this evidence-based practice project.

**Conclusion**

The nursing profession strengthens as knowledge is gained and applied to clinical practice. The development of an evidence-based practice educational program known as the PROP program has served to further the capacity of nursing to inform its patients. The PROP program has served to enhance nursing science, facilitate interdisciplinary collaboration, champion a community-oriented health promotion activity via education, introduce children to the nursing profession, and improve overall quality of patient care. Careful attention to detail and introspection are essential to refining care and bringing best practice interventions into the clinical setting.
Chapter Eight: Summary and Conclusion

Patients benefit from reliable care practices based upon sound evidence. The nursing profession is specifically adept to employing an evidence-based practice approach in clinical patient care settings. Evidence-based practice is the transformation of best evidence into best practice to effect a change in the care of patients related to a specific clinical challenge. Preoperative pediatric anxiety is one such clinical challenge requiring an evidence-based solution. The Pediatric Readiness for Operative Procedures (PROP) program was an evidence-based practice educational program intended to reduce preoperative anxiety and improve surgical readiness for children and their parents, thus addressing the clinical challenge of effectively managing preoperative pediatric anxiety.

Summary

Children develop anxiety based upon their interpretations of surroundings. The surgical environment is a setting where unfamiliar sights and sounds potentially predispose children to anxiety development. Historically, pharmacologic means have been used to manage preoperative anxiety in children. Pharmacologic approaches to pediatric anxiety reduction may themselves be inherently threatening to children and only serve to escalate an already anxious state within the child. Nonpharmacologic anxiety reduction tactics in children are plausible alternatives that may provide comparable anxiety reduction in a manner perceived by children as less threatening.

Therefore, a clinical question was conceived based upon the assumption that children may more readily cooperate and benefit from a nonpharmacologic approach to preoperative anxiety reduction. The question of inquiry asked: What are the most effective nonpharmacologic anxiety reduction techniques to be utilized in the care of the preoperative pediatric patient age 2 through 12? A literature review was performed in order to isolate the best nonpharmacologic
anxiety reducing options employed in the preoperative clinical care of children. Findings of the literature review revealed the current utilization of three broad nonpharmacologic anxiety reduction strategies for children including preoperative preparation, parental presence during anesthesia induction, and distraction techniques.

An organizational assessment was performed in order to ascertain which of the identified nonpharmacologic solutions was most feasible at the proposed implementation site. Formal preoperative preparatory educational programs for children and their parents/guardians were lacking at the implementation site. Accordingly, the literature supported the use of a preoperative preparatory program as a beneficial nonpharmacologic anxiety reduction technique in children (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993). Therefore, the refined question of inquiry that more specifically directed the following evidence-based practice change project asked: In children age 2 through 12, do parents/guardians perceive attendance at a preoperative preparatory informational session as helpful to improving their child’s and their own knowledge and familiarity of the events occurring during the perioperative period, resulting in increased readiness for surgery?

Children may more readily accept the desensitizing interventions encountered in “kid-friendly” preoperative preparatory programs. Specifically, preoperative preparatory programs encompassing informative tours, lecture, or interactive play have been shown to be beneficial in reducing preoperative anxiety in children (Brewer et al., 2006; Demarest et al., 1984; Edwinson et al., 1988; Ellerton & Merriam, 1994; Greenberg & Davis, 1996; Kain, Caldwell-Andrews et al., 2007; Li et al., 2007; Lynch, 1994; Thompson, 1994; Vetter, 1993). Furthermore, therapeutic play interventions have been described in the literature as a powerful modality in the care of
children and have been shown to positively influence parental anxiety (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Greenberg & Davis, 1996; Kotiniemi et al., 1997; Li & Lopez, 2008; Li et al., 2007; Ziegler & Prior, 1994).

An informational session specifically designed to improve a child’s readiness for surgery and correspondingly reduce their preoperative anxiety was developed in order to address the identified need. The PROP program was constructed upon the evidence that children and their parents/guardians benefit greatly from familiarization strategies, noting that prior exposure to surgical environments, processes, and equipment effectively reduces anxiety and prepares children for surgery (Child Life Council & Committee on Hospital Care, 2006; Demarest et al., 1984; Kain, Caldwell-Andrews et al., 2007; Li & Lopez, 2008; Ziegler & Prior, 1994). The PROP program was developed and implemented over the course of 6 months under the guidance of the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001), placing attention upon the educational needs of the entire family. This family-centered approach was utilized in the design of this educational program, noting that parental anxiety and knowledge greatly influence the child’s anxiety levels (Bevan et al., 1990; Davidson et al., 2006; Kain, Caldwell-Andrews et al., 2006; Kain, Caldwell-Andrews, Maranets et al., 2004; Kain, Mayes, Caramico, Silver et al., 1996; Li, & Lam, 2003; Wollin et al., 2003). Adequate parental preparation alone may be sufficient to reduce anxiety in children (Ellerton & Merriam, 1994). Preoperative preparation providing specific and appropriate information to prepare children and parents/guardians for surgery is warranted, as caregivers are frequently unfamiliar with the operative routine (Brewer et al., 2006; Edwinson et al., 1988; Ellerton & Merriam, 1994; Lynch, 1994; Rawlinson & Short, 2007).
Preparing Children

The PROP program was developed with the interdisciplinary assistance of personnel within the departments of Anesthesia, Perioperative Nursing, and Child Life. The program utilized multimedia, print media, medical play, and a facility tour to empower the child patient and parents/guardians in order to enhance readiness for surgery and reduce preoperative anxiety. The PROP program was created as a pilot intervention and offered twice. The first class was not attended. The second class was more heavily advertised and yet was not attended by potential surgical candidates.

A contingency plan was enacted prior to the second session whereby volunteers were solicited to participate in order to obtain feedback as to the utility of future preoperative pediatric educational programs within the implementation site. Five children ranging in age from 2 through 6 participated. Altogether, parents rated all aspects of the program as beneficial in helping their child become familiar with or ready for surgery, as noted by mean scores for all components of the post-class Likert survey exceeding 3.1 or greater (Appendix H). Accordingly, parents unanimously agreed that they believed their child was better prepared for surgery after attending the class. Despite these responses, the majority of parents ultimately remained undecided as to whether these activities actually reduced their child’s fears about an upcoming surgery (Appendix I). Although parents may have been unsure as to the identifiable anxiety-reducing effects of the PROP program in their children, these findings support the premise and future utilization of preoperative pediatric education as a valuable modality capable of readying children for surgical experiences. However, alternative avenues for delivery of such preoperative pediatric educational content (e.g. media, internet) should be considered, as true surgical candidates failed to show interest in a formal educational program.

Conclusion
The creation and implementation of the PROP program strengthened the many diverse roles of the nursing profession including contributor to nursing science, ambassadorship towards other disciplines, and facilitating innovative patient education solutions. Program feedback substantiated the responsibility of the nursing profession in providing education that effectively empowers patients and families. Accordingly, interprofessional collaboration among various disciplines within the implementation facility bolstered nursing’s role as ambassador among healthcare professionals. Ultimately, the PROP program contributed to the cache of knowledge and evidence regarding the utility of a preoperative preparatory program as a nonpharmacologic approach in the management of preoperative pediatric anxiety ultimately furthering nursing science. As research and clinical practice support one another in a reciprocal relationship that ultimately enhances and refines patient care, this evidence-based practice project has further authenticated the utilization of preoperative interactive education in the preparation of children and their families for surgery as a worthwhile nursing endeavor.
References


Stevens, K. R. (2004). *ACE Star Model of EBP: Knowledge Transformation.* Academic Center for Evidence-Based Practice, UTHSCSA.


Appendix A: Capstone Project Organizational Model/Framework

The Iowa Model of Evidence-Based Practice to Promote Quality Care

- Problem-focused Triggers:
  1. Risk Management Data
  2. Process Improvement Data
  3. Internal/External Benchmarking Data
  4. Financial Data
  5. Identification of Clinics Problem

- Knowledge-focused Triggers:
  1. New Research or Other Literature
  2. National Agendas or Organizational Standards & Guidelines
  3. Philosophies of Care
  4. Questions from Institutional Standards Committee

Consider Other Triggers

Is this Topic a Priority for the Organization?

Yes

Form a Team

Assemble Relevant Research & Related Literature

Critique & Synthesize Research for Use in Practice

Yes

Is There a Sufficient Research Base?

No

Pilot the Change in Practice

1. Select Outcomes to Be Achieved
2. Gather Descriptive Data
3. Design Evidence-Based Practice (EBP) Guideline(s)
4. Implement EBP on Pilot Unit
5. Evaluate Process & Outcomes
6. Modify the Practice Guideline

Determine Which Types of Evidence:

1. Case Reports
2. Expert Opinion
3. Scientific Principles
4. Theory

Continue to Evaluate Quality of Care and New Knowledge

Is Change Appropriate for Adoption in Practice?

Yes

Institute the Change in Practice

No

Disseminate Results

Monitor and Analyze Structure, Process, and Outcome Data:

- Environment
- Staff
- Cost
- Patient and Family

Reference:

1998 Iowa Model of Evidence-Based Practice to Promote Quality Care reproduced with permission from Kim Jordan, Administrative Assistant, Center for Nursing Quality, Professional Development and Research Department of Nursing Services and Patient Care, University of Iowa Hospitals and Clinics, 200 Hawkins Drive, T100 GH Iowa City, IA 52242-1009 on July 24, 2009.
Pre-surgery Informational Class & Tour

What: Informational Class and Tour of In & Out Surgery Units

Who: Children Age 2-12, first-time having surgery & Parents/Guardians

Where: Meeting at the Turtle Fountain in the Children’s Hospital Lobby

When: Saturday September 12th 9am – 10am

Please Call if planning to attend
Appendix C: PROP Program Parent/Guardian Post-Class Survey

**Pediatric Readiness for Operative Procedures Post-Class Parental/Guardian Survey**

This survey is being used to gather information related to how well you believe this class has prepared your child for their upcoming surgery. Your responses will be reviewed in order to further refine future classes.

Child’s Age________

For each **Blue** statement, please circle the number which relates to how well those activities helped your child in becoming familiar with or ready for surgery?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Less Helpful</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>More Helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watching the video</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Touring the In &amp; Out waiting area</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Touring the In &amp; Out Pre and Post Operative Units</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Being able to touch the Anesthesia equipment</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Talking with Anesthesia personnel</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Talking with Child Life personnel</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Talking with Perioperative Nursing personnel</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Overall, do you believe your child was better prepared for surgery after attending this class?

YES       NO

If YES, why? If NO, Why not?

Please circle the answer which best describes how well you think this class has helped your child prepare for their surgery?

A. My child is now less afraid of the upcoming surgery  
B. My child is now more afraid of the upcoming surgery  
C. My child is as afraid of the upcoming surgery as he/she was before the class  
D. I do not know if my child’s fears about the upcoming surgery has changed as a result of the class
Appendix D: Institutional Review Board (IRB) Approval Communication

Chris -
Your protocol was reviewed on June 18, 2009 and it was determined that your research protocol meets the criteria for EXEMPTION as defined in the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects [(45 CFR 46.101(b)]. You may now begin your research.

The specific exemption category under 45 CFR 46.101(b) is:

4 Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and Geisinger IRB policy. Please be aware of the following policies and responsibilities for investigators:

1. Amendments You are responsible for reporting any amendments to your research protocol that may affect the determination of the exemption and may result in your research no longer being eligible for the exemption that has been granted.

2. Record Keeping You are responsible for maintaining a copy all research related records in a secure location in the event future verification is necessary, at a minimum these documents include: the research protocol, the claim of exemption application, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to subjects, or any other pertinent documents.

Please be sure to:

Use your research protocol number (listed above) on any documents or correspondence with the IRB concerning your research protocol.

Thank you
N

Nancy Moody, JD MA
Director
Human Research Protection Program
Geisinger Clinic
100 N. Academy Ave.
Danville, PA 17822-2603
(570) 271-5715
njmoody@geisinger.edu
Appendix E: PROP Program Advertising Flyer Version Two

Did you know...

• 40-60% of children experience preoperative anxiety

• Parental anxiety can contribute to a child’s anxiety

• Exposure to the surgical environment can reduce parent & child anxiety

We have a solution...

What: Hands-on activities & Tour of In & Out Surgery Units/OR

Where: Beginning at the Turtle Fountain in Children’s Hospital Lobby

Who: Children age 2-12 & Parents/Guardians

When: Saturday October 10th @ 9 am

Please Call if planning to attend

First 10 families who arrive that day will receive a $10.00 gift card
Follow the road through the hospital to find out where we are going next! As we journey along, enjoy the scavenger hunt. Search for the items listed in each room. Place a star sticker on the line after you have found the item. Let the adventure begin!
Appendix G: PROP Program Parental Preoperative Instructions Handout

Preoperative information for Children

Fasting guidelines:
~ No formula after midnight
~ Breastfeeding OK until 4 hours pre-surgery
~ Stop G-Tube or Nasogastric Tube feedings at midnight (Contact Primary Doctor for substitutes)
~ Do not chew gum or candy the morning of surgery

Additional information:
~ Bring a favorite toy / blanket / stuffed animal / binky to the hospital
~ Only parents and siblings allowed at bedside
~ No aspirin or aspirin like products one week prior to surgery (Some surgeries may require a greater time restriction, check with your surgeon)
~ You will receive a phone call the day before surgery with instructions regarding medications and other reminders and directions for your day of surgery visit
~ Children 12 months to 10 years will generally be offered an oral sedation syrup to drink prior to their surgery
~ Children weighing less than approximately 66 pounds will breathe sleepy gas to go to sleep
~ Children weighing more than 66 pounds will probably require an IV before they go to sleep (Numbing cream or cold spray are available to decrease pain from the IV)

**Please tell the preoperative nurse and anesthesia people about the child’s allergies (including food and Latex) and family problems with anesthesia**

**If your child has a fever and/or cold symptoms the night before their surgery, please call the hospital operator ( ) and ask for the In and Out surgery unit or the Operating Room to speak with a nurse**
Appendix H: PROP Program Parent/Guardian Post-Class Likert Survey Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Less Helpful</th>
<th>More Helpful</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watching the Video</td>
<td>16</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Touring the In &amp; Out Waiting Area</td>
<td>33</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Touring the In &amp; Out Pre and Post Operative Units</td>
<td>16</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>Being Able to Touch the Anesthesia Equipment</td>
<td>16</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>Talking with Anesthesia Personnel</td>
<td>16</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Talking with Child Life Personnel</td>
<td>16</td>
<td>66</td>
<td>16</td>
</tr>
<tr>
<td>Talking with Perioperative Nursing Personnel</td>
<td>16</td>
<td>66</td>
<td>16</td>
</tr>
</tbody>
</table>

*Note.* Data represents 6 parent responses evaluating how well each component of the PROP program helped their child become familiar with and/or ready for surgery.
## Appendix I: PROP Program Parent/Guardian Post-Class Multiple Choice Survey Results

<table>
<thead>
<tr>
<th>Question</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. My child is now less afraid of the upcoming surgery</td>
<td>33</td>
</tr>
<tr>
<td>B. My child is now more afraid of the upcoming surgery</td>
<td>0</td>
</tr>
<tr>
<td>C. My child is as afraid of the upcoming surgery</td>
<td>0</td>
</tr>
<tr>
<td>as he/she was before the class</td>
<td></td>
</tr>
<tr>
<td>D. I do not know if my child’s fears about the upcoming surgery</td>
<td>66</td>
</tr>
<tr>
<td>has changed as a result of the class</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data represents 6 parent responses evaluating how well the overall class had helped their child prepare for surgery.