

2017

Pediatric Emergence Delirium in the Postoperative Setting

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Walden University

College of Health Sciences

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Jennifer Snell

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2017

Abstract

Pediatric Emergence Delirium in the Postoperative Setting

by

Jennifer M. Snell

MSN, Walden University, 2012

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2017

Abstract

Emergence delirium (ED), also known as emergence agitation, is a postoperative condition characterized by aberrant cognitive and psychomotor behaviors following general anesthesia. The incidence of ED is 3 to 8 times higher in children 5 years of age or less. There is no standard of nursing practice for managing ED symptoms in the pediatric surgical population. The purpose of this quality improvement project was to address a gap in knowledge needed to inform clinical decision-making when managing ED in the postoperative setting. Using an educational presentation for post anesthesia care unit (PACU) nurses, this project introduced the use of non-pharmacological interventions to mitigate symptoms of ED in the pediatric population as inspired by The Green Star Initiative, an Army program at Fort Carson. The project aim was to describe the effectiveness of ED-specific interventions from the nursing perspective. Using tenets of the Iowa model, this quality improvement project included a needs assessment survey, PowerPoint presentation, parent education leaflet, ED cheat sheet, and a post-intervention survey. Applying the context, input, process, product model for evaluation, this project increased knowledge of ED-specific interventions used by nurses that demonstrates a change in clinical decision-making. PACU nurses rated the interventions 43% effective on pediatric patients. This project addressed the gap in practice by providing structured education on ED, inspiring the use of ED-specific interventions, and promoting readiness to care for the pediatric surgical population. Outcomes add to the nursing literature by introducing ED-specific interventions to manage pediatric ED in facilities nationwide. A social implication of this project is to improve the care of pediatric surgical patients.

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Acknowledgments

So much time and effort has been put forth to accomplish this professional journey, and I could not have done it without the support of my wonderful husband and two children. Thank you for your love, encouragement, and support through my most challenging times. Thank you to the amazing PACU staff at Memorial Hospital, a part of University of Colorado Health (UCHealth), for your willingness to participate in this doctoral project. Thank you to my preceptor, Mrs. Cortney Lupo, Perioperative Educator, for your guidance and direction in creating this project. Thank you to Naomi Hooper for creating the cartoon character for the parent education leaflet. Thank you to Dr. Cathleen Colleran-Santos and all of the faculty at Walden University who have provided the insight and feedback I needed to make this project a success.

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Section 1: Nature of the Project

Introduction

The postanesthesia care unit (PACU) is a critical care environment in which a nurse's ability to quickly identify a problem and intervene is crucial. PACU nurses are required to be autonomous, responsible, and accountable for patient care under high-risk conditions (Simmons, 2010). In this environment, nurses develop a unique skill set and draw upon knowledge and expertise to influence nursing actions when faced with complex postoperative issues (Crosson, 2015). Pediatric patients are a vulnerable population who benefit from evidence-based interventions to improve safety, outcomes, and quality of care. Nurses caring for surgical pediatric patients must maintain knowledge within their specialty to meet the complex needs of children who may require a different approach to care. PACU nurses provide care to people at all stages of life; therefore, age-specific considerations are incorporated into interventions to provide better care (American Society of PeriAnesthesia Nurses [ASPA], 2014).

Pediatric ED is a topic of interest due to the increased use of short-acting volatile anesthetic agents for this patient population (Bajwa, Costi, & Cyna, 2010). ED as it is described in the literature has numerous risk factors associated with inhalation and intravenous (IV) anesthetics leading to many adverse outcomes (McLott, Jurecic, Hemphill, & Dunn, 2013). Many studies have addressed the causes of ED, yet the etiology remains poorly understood (Hudek, 2009; Wong & Bailey, 2015). The incidence of ED has been correlated to rapid emergence, young age (5 years or less), and postoperative pain (Hudek, 2009). Studies indicated a strong correlation between the

occurrence of ED and oral, otorhinolaryngological, and ophthalmological procedures (Reduque & Verghese, 2012). Physiologic factors (hypoxia, urinary retention, and hypoglycemia) and psychological factors (abuse, neglect, anxiety, and behavioral disorders) are also contributors of ED (Wilson, 2014). Preoperative anxiety is common in approximately 60% of children of preschool age (Yuen, 2010).

Preoperative and postoperative behavioral disturbances are common in children (Beringer, Segar, Pearson, Greampet, & Kilpatrick, 2014). The period from surgical prep to induction of anesthesia is known to be the most stressful period for children (Yuen, 2010). A child with ED is in a disassociated state of consciousness, irritable, uncooperative, incoherent, inconsolable, moaning, kicking, arms flailing, or thrashing around in bed (Stamper, Hawks, Taicher, Bonta, & Brandon, 2014). ED symptoms also include hallucinations, restlessness, anxiousness, hypersensitivity to external stimuli, and combativeness (Munk, Holst Andersen, & Gogenur, 2013). Children experiencing ED will often display nonpurposeful movements (eyes averted, staring, or closed) and may not recognize family members (Malarbi, Stargatt, Howard, & Davidson, 2011; Wong & Bailey, 2015). ED is a complex phenomenon that may be self-limiting and requires intervention (Locatelli et al., 2013). The onset is typically within the first 15 to 30 minutes after surgery (Reduque & Verghese, 2012).

Parental involvement is a crucial component of managing ED. PACU nurses caring for pediatric patients must consider the quality of the experience for the parent or guardian. Managing ED in the pediatric population places undue strain on PACU nurses as well as potentially decreasing parental satisfaction with patient care (Yuen, 2010).

Therefore, parents should be informed that ED can occur and what interventions will be implemented. It is imperative that parents understand that normal comforting measures may not work in a pediatric patient with ED. Parents who are unaware that ED and negative behaviors are common after anesthesia become distressed and anxious. As a quality improvement measure, a product of this project will be a simplified explanation and expectations of ED in the form of a leaflet to be given to parents prior to surgery (see Appendix D).

Current research supports pharmacological interventions in the management of ED. In contrast, this quality improvement project will introduce non-pharmacological interventions that allow children to wake up on their own and ease them out of ED (Munk et al., 2013). In an educational forum, this project will help PACU nurses realize their strengths, use self-knowledge to care for children, and increase their awareness of ED. New approaches to practice may be met with resistance, but with strong evidence, changes in practice are valuable when the desired outcomes are optimized.

Problem Statement

The use of an ED educational presentation will guide PACU nurses to use non-pharmacological interventions to mitigate symptoms of ED in the pediatric population. In selecting this topic, I considered the priority and magnitude of the problem as well as its contribution to improving care (see Doody & Doody, 2011). ED in the pediatric population is a complex condition with multiple contributing factors. There is a need for nursing education on ED causes, prevention, and interventions. This project can add to current practice by introducing non-pharmacological interventions to manage pediatric

ED. The selected practicum site is a Level II trauma center that performs an average of 50 elective and emergency surgeries daily. From this specific workload, the PACU nurses will recover an average of 20 pediatric patients daily. Due to the current pediatric surgical volume, the probability of patients experiencing ED is high.

Despite the fact that ED is not a new phenomenon and PACU nurses have cared for pediatric patients with this condition for decades, I discovered during this project that many PACU nurses have not specifically heard of ED. At this practicum site, no type of formal education has been provided regarding which interventions are most appropriate. The PACU nurses have self-taught knowledge on the causes, prevention, and treatment of ED. PACU nurses will benefit from evidence-based education on how to care for patients with ED using best practices.

This quality improvement project was inspired by a program known as the Green Star Initiative developed at a local military hospital. The Green Star Initiative is a program that is used to screen patients (children and adults) for risk factors that contribute to ED. Once patients are identified during the preadmission process, a green star is stamped on their armbands. Subsequently, the multidisciplinary team of health care providers caring for that patient is prepared for the possibility of adverse behaviors. If the patient displays signs or symptoms of ED on arrival to PACU, the curtains are closed and a flyer with a green star is attached to the curtain. ED-specific interventions are then implemented and documented. The Green Star Initiative is used for all patients (pediatrics and adults). This doctoral project provided the opportunity to introduce the

concepts of a program that is in the process of being proven effective to a local civilian hospital.

Purpose

Any patient emerging from anesthesia can experience ED, but it is more often seen in pediatric patients, geriatrics, and combat veterans (Munk et al., 2013). Negative behavior can be seen during induction of anesthesia, during recovery, and following discharge to home (Beringer et al., 2014). Children pose an increased risk for self-injury, injury to the surgical site, or accidental removal of IV catheters or drains (Locatelli et al., 2013; Reduque & Verghese, 2012). Children in the PACU setting may be exposed to recurrent noxious stimuli, persistent symptoms (i.e., nausea and pain), and/or distressing procedures (i.e., IV removal) (Chorney, Tan, Martin, Fortier, & Kain, 2012). Researchers observed that noxious stimuli create an excitatory phase in the unconscious patient resulting in ED (McLott et al., 2013). Children spend more time in the postoperative recovery area compared to other medical settings (Chorney et al., 2012).

Outcomes of ED in the pediatric population can be detrimental to nursing practice and health care organizations. Outcomes of ED contribute to increased health care costs, morbidity, and over utilization of human resources (Hudek, 2009). Current management of ED often requires extra pharmaceuticals to alleviate symptoms and an increased number of staff to care for the patient (Hudek, 2009). Increased health care costs ensue if the patient injures him or herself and requires surgical repair of the injury (Hudek, 2009). Patients who experience ED without adequate intervention require extended time in PACU.

This quality improvement project was expected to improve patient safety, parental satisfaction, and awareness of ED as a condition. The practice-focused questions guiding this project were as follows: Will the introduction of an education program for nurses and parents improve practice of RNs and improve parental satisfaction? Will a standardized protocol in the management of ED improve the quality of care of the pediatric surgical patient? What is the nurse's perspective of the effectiveness of the ED-specific interventions?

This project holds significance for the field of nursing practice because of the national interest in providing evidence-based, cost-effective, accountable care (White & Dudley-Brown, 2012). The system of care delivery is continuously evolving, and patients' needs vary widely across populations (White & Dudley-Brown, 2012). Health care professionals at the bedside are faced with the demand for increasingly complex modern health care (Zaccagnini & White, 2011). New issues continue to emerge, and methods for improvement are more challenging (White & Dudley-Brown, 2012). As long as anesthetics are used for pediatric surgical procedures, ED will remain an issue in practice. This project will facilitate positive social change by standardizing the care of pediatric patients experiencing delirium. This project will also provide practice guidelines tailored to the affected population to bring about change in patterns of care and changes in policies, procedures, and protocols for this potentially dangerous response to anesthetics (see Dahmani et al., 2010; White & Dudley-Brown, 2012).

Nature of the Doctoral Project

Consistent with the American Association of Colleges of Nursing (AACN, 2006) doctoral standards, this project was an evidence-based and quality improvement study intended to improve practice and institutional processes to manage and alleviate ED. This project will facilitate improvements in the clinical environment that are patient centered (see Zaccagnini & White, 2011). Pediatric patients deserve evidence-based interventions that improve safety, outcomes, and quality of care in the PACU setting. For this project, recommendations for change in practice were based on identifiable benefits and risks to the patients (Doody & Doody, 2011). I identified current evidence used in practice to integrate the viewpoints of the practitioner, the patient, the health care team, and the organization (see Kowal, 2010).

The primary participants were PACU nurses who care for the pediatric population at the practicum site. Project-directed surveys were the method of data collection (see Zaccagnini & White, 2011). Surveys were prepared with careful consideration of the information sought (see Appendix A and B). Participation was voluntary and anonymous. Approval from the PACU nurse manager, evidence-based practice committee, and the chief nursing officer was obtained. The context, input, process, product (CIPP) model was used for program evaluation.

Prior to developing the educational presentation, I administered a needs-assessment survey to determine what was known about the topic. This assessment helped me tailor the educational content to the target audience. The PowerPoint presentation was designed to educate and guide PACU nurses through the complex health and

situational transitions of ED (AACN, 2006). The education presentations were offered at multiple staff meetings and at a retention class entitled Mold & Hold (See Appendix C). During the implementation phase, nurses used the ED-specific interventions. Every time a nurse used any of the interventions for a pediatric patient, she or he submitted a short survey addressing the effectiveness of the interventions. The implementation of interventions was measured over 30 days to maximize exposure to a variety of pediatric surgeries.

Although nurses have dealt with ED in patients of all ages for decades, there still exists a noticeable knowledge deficit in the identification, causes, prevention, and management of ED. ASPAN (2014) guidelines indicate that PACU nurses should choose pharmacological and non-pharmacological interventions based on an understanding of developmental, physical, and psychosocial needs of the child. In alignment with ASPAN guidelines, this quality improvement project introduced non-pharmacological interventions identified from studies on ED. The purpose of this doctoral project was to encourage PACU nurses to use those non-pharmacological interventions to mitigate symptoms of ED, and to explore the nurse's perspective of the usefulness of the interventions. Because PACU nurses will be the primary users, they can provide a firsthand perspective on the effectiveness of the interventions on a case-by-case basis.

Significance

Planning for change involves laying the foundation for new approaches to practice, introducing the project idea, and gaining stakeholder buy in. Stakeholders often expect tangible results. Therefore, quality improvement initiatives that are safe, timely,

effective, efficient, equitable, and patient centered generally gain recognition (Zaccagnini & White, 2011). The identified stakeholders for this project were the pediatric surgical patients and parents, PACU nurses, organizational leaders, anesthesia providers, surgeons, and the quality improvement and evidence-based practice committee. Stakeholders have varying degrees of involvement and provide a direct perspective of the project work and aims (White & Dudley-Brown, 2012).

The significance of this project was twofold. Improving nurses' knowledge and competence in managing ED in the pediatric surgical population may increase the safety of children and the quality of care for children and their families. As a means to promote quality improvement and improve patient outcomes, this project included simple interventions to handle ED by stepping outside the norm to improve professional behavior, commitment to the patient, and responsibility of safe practice (see Gallegos & Sortedahl, 2015). Outcomes of this project added to the nursing literature by introducing specific nursing interventions to manage pediatric ED, not only in this facility, but also in facilities nationwide. A social implication of this project was to improve the care of pediatric surgical patients across the United States each year. This project provides a platform for further research on the nursing interventions used to manage ED while recognizing the specialized care nurses give in the PACU setting.

Summary

ED is a problem of growing concern due to the higher incidence within the pediatric population (Stamper et al., 2014). Outcomes of ED in the pediatric population are detrimental to nursing practice and health care organizations. Understanding ED as a

condition can help nurses choose interventions that minimize adverse behavioral changes (Beringer et al., 2014). In alignment with ASPAN guidelines, this doctoral project was intended to guide PACU nurses to use non-pharmacological interventions to mitigate symptoms of ED, and to explore the nurse's perspective of the usefulness of the interventions. In the next section, I describe the background and context of this doctoral project and explain how I addressed a gap in current practice.

Section 2: Background and Context

Introduction

Pediatric nurses recognize that hospitalization precipitates negative effects on the psychological, emotional, and physical well-being of children (Amin, Oragui, Khan, & Puri, 2010). The surgical experience is distressful for anyone at any age. However, this experience for children may lead to adverse behavior changes during induction of anesthesia, emergence from anesthesia, or in the PACU (Beringer et al., 2014). Although this condition can be momentary and generally resolves spontaneously, ED causes psychological and emotional stress for the patient, patient's family, nurses, and anesthesia providers (Bajwa et al., 2010). ED is a topic of interest due to the increased use of short-acting volatiles such as sevoflurane and desflurane as anesthetic agents for pediatric patients (Bajwa et al., 2010). Even though ED can occur with different types of anesthetic techniques, it has been found to be 4 times more common when inhaled anesthetics are used (Yu, Chai, Sun, & Yao, 2010).

Through an educational presentation in this quality improvement project, I introduced non-pharmacological interventions to help nurses ease patients out of ED

(Munk et al., 2013). Allowing children to wake up on their own, decreasing noise and lighting, one nurse speaking at a time in a soft nonthreatening voice, and bringing a parent or guardian to the bedside are methods to reduce ED symptoms (Reduque & Verghese, 2012). This section provides an overview of the background and context of ED in the postoperative setting in addition to a description of the concepts, models, and theories that provided the framework for this doctoral project.

Concepts, Models, and Theories

ASPAN (2014) provides the specialty of peri-anesthesia nursing with evidence-based resources that integrate the knowledge, skills, and behaviors needed to maintain consistent standards of care. ASPAN is dedicated to augmenting peri-anesthesia nursing along the care continuum. ASPAN guidelines are appropriate for the individual nurse, manager, and/or educator in any peri-anesthesia setting. PACU nurses “demonstrate the ability to perform a thorough pain assessment and to measure, plan, implement, and evaluate appropriate pain and comfort management in the infant, child, and adolescent” (ASPAN, 2014, p. 301). ASPAN guidelines also require PACU nurses to choose pharmacological and non-pharmacological interventions while understanding the developmental, physical, and psychosocial needs of the child. In alignment with ASPAN guidelines, this project introduced concepts that enhance the differentiation and treatment of ED.

Many standardized and practice models are available to guide improvements in quality care and outcomes (Kowal, 2010). For this project, I selected an evidence-based practice (EBP) model that emphasizes organizational culture and change. The Iowa

model has been found to be one of the most appropriate guides for implementing practice change in nursing (Kowal, 2010). This model provides direction for the development of EBP in clinical settings and facilitates the identification of problem-focused issues (Doody & Doody, 2011; Grove, Burns, & Gray, 2013).

Practical application of the Iowa model involves seven steps: selecting a topic, forming a team, retrieving evidence, grading the evidence, developing an EBP standard, implementing the EBP, and evaluating the EBP (Doody & Doody, 2011). The theoretical underpinning of the Iowa model is effective knowledge exchange, which results in mutual learning through the process of planning, producing, disseminating, and applying existing evidence to practice (White & Dudley-Brown, 2012). Tenets of the Iowa model were used to develop the educational tools for nurses and parents of the pediatric surgical patient (see Appendix C, D, and E).

Relevance to Nursing Practice

Care of the surgical patient has changed dramatically over the years (ASPAN, 2014). Peri-anesthesia nursing is a dynamic specialty that encompasses a myriad of invasive and noninvasive procedures requiring the use of anesthetics (ASPAN, 2014). The care peri-anesthesia nurses give at the bedside is specialized and remarkable. Changes in practice are a driving force to maintain and update competencies to ensure safe patient care (ASPAN, 2014). Most of what is known about ED comes from studying children (Wilson, 2014). This project highlighted the importance of the recognition and treatment of ED as it occurs.

There has been an increased interest in the topic of ED in children over the last decade due to the use of newer short-acting volatile anesthetic agents for pediatric patients (Bajwa et al., 2010). Evidence suggests contributing factors that increase the risk for ED are anesthetic agents, preoperative medications, pain, patient age, preoperative anxiety, and the type of surgical procedure (Reduque & Verghese, 2012). Psychological factors such as PTSD, anxiety, and traumatic brain injury (TBI) are also associated with ED (Wilson, 2014).

Researchers observed that noxious stimuli create an excitatory phase in the unconscious patient resulting in ED (McLott et al., 2013). Because hearing is the first sense to return upon awakening, auditory stimulation during emergence from anesthesia may activate a heightened response to fear and may be responsible for inappropriate responses to auditory stimuli (McLott et al., 2013). Additionally, the fight-or-flight response may also occur when the sense of smell and tactile stimulation return during emergence resulting in aggression and agitation (McLott et al., 2013). Reactive aggression, also referred to as impulsive aggression, is the reaction to a perceived threat or perception of danger (McLott et al., 2013).

Pediatric ED is a postoperative condition characterized by aberrant cognitive and psychomotor behaviors (Stamper et al., 2014). ED symptoms include hallucinations, restlessness, anxiousness, hypersensitivity to external stimuli, and combativeness (Munk et al., 2013). A child with ED is irritable, uncooperative, incoherent, inconsolable, moaning, kicking, or thrashing around in bed (Stamper et al., 2014). Children often display nonpurposeful movements (eyes averted, staring, or closed) and may not

recognize family members (Malarbi et al., 2011; Wong & Bailey, 2015). This short-lived behavioral disturbance causes distress to patients, parents, and staff (Bajwa et al., 2010).

Current research supports pharmacological interventions in the management of ED for children and adults (Redeque & Verghese, 2012; Wilson, 2014).

Benzodiazepines, analgesics, opioids, and other analgesic adjuvants are common pharmacological interventions to alleviate ED (Wilson, 2014). Some providers co-administer propofol, midazolam, or fentanyl as a prophylactic measure (Redeque & Verghese, 2010). Propofol, a general anesthetic with rapid pharmacokinetic properties, is often administered at the end of the procedure to increase sedation and delay emergence (Redeque & Verghese, 2010). Midazolam, a benzodiazepine, is often administered as a preoperative medication to reduce anxiety in children (Yuen, 2010). Wilson (2014) reported that 65% of providers often choose a benzodiazepine to treat ED. However, 27% of those providers believe that benzodiazepines contribute to ED, which contradicts the rationale for use (Wilson, 2014). Studies have shown mixed results regarding whether midazolam prevents or precipitates ED (Bajwa et al., 2010; Redeque & Verghese, 2012; Yuen, 2010). Fentanyl, an opioid analgesic, is often administered intranasally or intravenously during the procedure (Redeque & Verghese, 2010). These preventive measures increase sedation; therefore, providers must consider the risks versus benefits against prolonging emergence or prolonging PACU stay (Redeque & Verghese, 2010).

The broader problem in nursing is that there is no standard of nursing practice for ED. Nurses are given standard PACU orders from the anesthesia provider. Nurses use ASPAN (2014) guidelines and pediatric competencies to maintain knowledge within their

specialty to incorporate age-specific considerations. ED is difficult to identify and manage in children, and nurses do not realize that some of the simplest interventions can improve the circumstances and some actions can make the symptoms worse. PACU nurses have acquired self-taught knowledge on the causes, prevention, and treatment of ED. Most nurses have not received any formal education on the topic. ASPAN (2014) guidelines indicate the upkeep of pediatric competencies; this project will broaden nurses' knowledge base and introduce concepts of a local program that will improve the identification and management of ED in the pediatric population.

Local Background and Context

Memorial Hospital, a part of University of Colorado Health (UCHealth), is the leading hospital in Colorado Springs capable of providing general and specialized medical care across the lifespan. Memorial Hospital is a Level II trauma center that accommodates an average of 50 to 70 elective and emergency surgeries daily and approximately 200 to 300 pediatric surgeries monthly. Due to the current pediatric surgical volume, there is a moderate to high probability of patients experiencing ED. This facility has a designated pediatric PACU separate from adult patients with supplementary equipment suitable for children (see Clarke, 2010). The pediatric PACU is a child friendly environment with adequate space for parents to join their child after surgery. All PACU staff are required by UC Health to be trained and qualified in the recovery of pediatric patients in addition to mandatory pediatric advanced life support (PALS) certification every two years. The staff of the pediatric PACU manages surgical services including general surgery, orthopedics, gastroenterology, otorhinolaryngology,

and interventional radiology. Some trauma and cardiac cases are performed at this facility, but these patients are recovered in the pediatric intensive care unit (PICU). With over a century of practice, this practicum site serves a diverse population in the Pikes Peak region and surrounding military communities.

Over a 5-year period, Sheila Carroll, RN, noticed a rise in the incidence of ED in the surgical population at the military treatment facility (MTF) at Fort Carson, which provides a myriad of surgical procedures for active duty, retirees, and their dependents. Over the last decade, ED in the combat veteran has become an area of interest in the anesthetic literature (Wilson, 2014). Using her knowledge and expertise, Carroll began changing her approach to care for patients experiencing ED. Her passion and dedication led her to create the Green Star Initiative. The Green Star Initiative is an evidence-based program that is used to screen patients for risk factors that contribute to ED. Once a patient is identified, a green star is stamped on his or her armband, and everyone who cares for that patient is prepared for the possibility of adverse behaviors. If the patient displays signs or symptoms of ED on arrival to PACU, the curtains are closed and a flyer with a green star is attached to the curtain. ED-specific interventions are then implemented and documented. This program has been implemented at this local MTF over the last year and a half. Although data have been collected, findings have not been published.

The Green Star Initiative is gaining recognition throughout the U.S. Army. The PACU staff at this military hospital has cared for over 1,000 patients experiencing ED, and an estimated 45-50% of the patients who received ED-specific interventions reported

a better recovery and did not require pharmacological intervention (Personal communication S. Carroll RN, April 2016). This program was initially intended for the combat veteran experiencing ED. However, it has become common practice to use the same interventions with all patients experiencing ED.

Role of the DNP Student

As an employee of the local military treatment facility, I have been involved in the development and implementation of the Green Star Initiative since its inception. I have witnessed the effectiveness of the ED-specific interventions for a diverse group of patients. According to the American Association of Colleges of Nursing (AACN, 2006), a DNP-prepared practitioner is proficient in quality improvement strategies and has the ability organize care to address emerging practice problems. DNP practitioners are visionaries and are unafraid of questioning current practice (Zaccagnini & White, 2011). Scholarly nursing practice incorporates knowledge application to solve a problem, translation of research into practice, and the dissemination of new knowledge (AACN, 2006).

This DNP project allowed me to demonstrate advanced levels of clinical judgment and analytical skills to guide nurses through complex health and situational transitions (see AACN, 2006). DNP students are future nursing leaders driven by professional experience and the desire to develop and utilize research from and for the practice setting (Smith, 2013). A DNP investigates challenges and curiosities to understand, inform, influence, and change professional practice (Smith, 2013). DNP students as aspiring leaders perceive a need for action and take action (Gilliam &

Siriwardena, 2014). This project allowed me to reach out to a broader population of PACU nurses who are managing ED on the front lines of peri-anesthesia care. Many factors influence the care that pediatric patients receive, especially when a child is experiencing ED. PACU nurses must be able to respond appropriately putting all emotions aside. The role of the DNP student is dynamic allowing me to increase awareness of an ongoing practice problem and build confidence in managing the condition in the PACU setting.

Limitations and Assumptions

This project required a change in mind-set with a dedication to implementing ED-specific interventions. For some nurses seeing is believing, and others may not feel change is needed. A major limitation of this project was that the information collected was related to the PACU nurses at the practicum site. Whether ED-specific interventions are perceived to be effective depends solely on the nurse implementing them. Another limitation is that the educational presentation was offered to all PACU staff, but it was not mandatory. Therefore, some PACU nurses, in addition to any PACU staff hired after the presentation, did not receive the education to guide them in using the ED-specific interventions appropriately.

PACU nurses may view this projected change as dispensable. Care of a pediatric patient with ED requires patience and may require support of additional staff. When there is a change in standards of care, there is also a change in the culture of the unit. This project was developed based on the assumption that ED-specific interventions are effective for the pediatric population. Another assumption was that the PACU nurses

would be as passionate as I am and would embrace the use of ED-specific interventions. Assumptions of this project may have short-term and long-term implications. Long-term implications include no change in patient satisfaction, cost of care, quality of care, and patient safety. Short-term implications include pediatric patients experiencing ED may continue to spend more time in PACU and require an increase in resources.

Summary

Professional values and behaviors were at the core of this project. Upon implementation of the project, PACU nurses will be able to make informed decisions for any patient experiencing ED. Care of the surgical patient has changed dramatically over the years (ASPAN, 2014). ED is a momentary behavioral disturbance that causes distress to patients, parents, and staff and compromises safety (Bajwa et al., 2010). Identifying and managing ED in children is difficult. Nurses do not realize that some of the simplest interventions can improve the circumstances, and some actions can make the symptoms worse. This project highlighted the importance of the recognition and treatment of ED as it occurs. In the next section, I describe the collection and analysis of current evidence. Most of what is known about ED comes from studying children (Wilson, 2014).

Section 3: Collection and Analysis of Evidence

Introduction

Change in the health care environment is an integral part of improving patient outcomes (Hyrkäs & Harvey, 2010). Once the clinical problem has been identified, the next step is to find the best available evidence (Hain & Kear, 2015). Quality care and patient safety are a driving force of practice change (Hain & Kear, 2015). Historically,

translating research findings into routine practice has taken years to accomplish (White & Dudley-Brown, 2012). For organizations, failure to use knowledge and evidence is costly, harmful, and inefficient and results in ineffective care (White & Dudley-Brown, 2012).

There is a national interest in providing evidence-based, cost-effective, accountable care (White & Dudley-Brown, 2012). Nurses in a specialty setting must be progressive to capture the complexity of issues and find balance between individual and social responsibilities (McCurry, Revell, & Roy, 2009). Although new approaches to practice may be met with resistance, providing strong evidence validates needed changes. The result is invaluable when the desired outcomes are optimized.

Practice-Focused Questions

Preoperative and postoperative behavioral disturbances are common in children (Beringer et al., 2014). ED is considered an adverse response to anesthetic agents, but the exact etiology is unknown (Wong & Bailey, 2015). For children, this condition is both disturbing and dangerous (Stamper et al., 2014). A child with ED is in a disassociated state of consciousness, irritable, uncooperative, incoherent, inconsolable, disoriented, moaning, and kicking with arms flailing or thrashing around in bed (Stamper et al., 2014). ED is difficult to identify and manage in children, and nurses do not realize that some of the simplest interventions can improve the patient condition and some actions can make the symptoms worse. The literature indicated possible triggers and causes related to ED. However, no studies addressed how nonpharmacological interventions used to alleviate symptoms of ED can produce positive outcomes.

The practice-focused questions guiding this project were as follows: Will the introduction of an education program for nurses and parents improve practice of RNs and improve parental satisfaction? Will a standardized protocol in the management of ED improve the quality of care of the pediatric surgical patient? What is the nurse's perspective of the effectiveness of the ED-specific interventions?

Current research supports pharmacological interventions in the management of ED for children and adults (Redeque & Verghese, 2012; Wilson, 2014). The decision to treat ED with additional medication depends on the severity and duration of symptoms (Raghavendran, 2011). Studies showed that ED is self-limiting, resolving spontaneously with no intervention at all (Raghavendran, 2011). ED is also patient specific with patients exhibiting different symptoms. With a firm understanding that the condition is not permanent, nurses must be patient and provide a calm reassuring environment (Raghavendran, 2011). Although caring for the pediatric surgical patient is often a complex process, studies showed that solutions do not have to be complex (Raghavendran, 2011). This project was intended to help PACU nurses realize the strength of basic nursing interventions, thereby reuniting personal and professional values.

Sources of Evidence

Evidence for quality improvement initiatives may be categorized as research or nonresearch (Hain & Kear, 2015). The sources of evidence for the current doctoral project were primary and secondary sources including original research articles, systematic reviews, and randomized controlled trials (RCTs) (see White & Dudley-

Brown, 2012). This evidence was collected using the following databases: Cochrane Database of Systematic Reviews, Cumulative Index to Nursing & Allied Health Literature (CINAHL), MEDLINE with Full Text, ProQuest Nursing & Allied Health Source, PubMed, and Ovid Nursing Journals Full Text. Key terms used were *emergence delirium, emergence agitation, pediatric anesthesia, anesthesia complications, pediatric surgery, behavioral disorders, and pediatric pain control*.

The literature search included articles published in the last 20 years. Due to the insufficient evidence on the effects of non-pharmacological interventions, a comparison of current pharmacological and non-pharmacological practices will be conducted. The non-pharmacological interventions specific to this project have not been directly studied but have been consistent implications in the results of studies on ED. In the literature review, I explain how ED-specific interventions align with the symptoms of ED to demonstrate how the non-pharmacological interventions can mitigate symptoms.

Published Outcomes and Research (Literature Review)

ED is a well-documented phenomenon with a renewed interest in the literature (Scott & Gold, 2006). Despite the increasing number of publications appearing in the anesthetic literature, there is no simple or validated definition of ED for use in the peri-anesthesia setting (Beringer, Greenwood, & Kilpatrick, 2013). Numerous attempts to define ED, validate assessment tools, distinguish potential risk factors, and identify acute management have piqued the interest of peri-anesthesia researchers (Scott & Gold, 2006). ED as it is described in the literature has numerous risk factors associated with inhalation and intravenous anesthetics leading to many adverse outcomes (McLott et al., 2013).

Even though ED can occur with different types of anesthetic techniques, it has been found to be 4 times more common when inhaled anesthetics are used (Yu et al., 2010). Any patient emerging from anesthesia can experience ED, but it is more often seen in pediatric patients, geriatrics, and more recently the combat veteran (Munk et al., 2013).

ED in the pediatric population is a complex phenomenon. The current literature indicated it is multifactorial because no single factor has emerged as the primary cause (Wong & Bailey, 2015). ED in children is represented by but not limited to the following symptoms: a disassociated state of consciousness, hallucinations, irritability, uncooperativeness, incoherence, inconsolability, disorientation, and unresponsiveness to familiarity (Malarbi et al., 2011; Stamper et al., 2014; Wong & Bailey, 2015). ED is environment specific, and the onset is typically within the first 15 to 30 minutes after surgery (Reduque & Verghese, 2012). This short-lived behavioral disturbance causes distress to patients, parents, and staff (Bajwa et al., 2010).

The incidence of ED has been correlated to rapid emergence, young age (5 years or less), and postoperative pain (Hudek, 2009). Studies also showed a strong correlation between the occurrence of ED and oral, otorhinolaryngological, and ophthalmological procedures (Reduque & Verghese, 2012). Physiologic factors (hypoxia, urinary retention, and hypoglycemia) and psychological factors (abuse, neglect, anxiety, and behavioral disorders) are also associated with ED (Wilson, 2014). Preoperative anxiety is common in approximately 60% of children of preschool age (Yuen, 2010). The period from surgical prep to induction of anesthesia is known to be the most stressful period for children (Yuen, 2010).

Characteristics of ED in the pediatric population are potentially detrimental to nursing practice and health care organizations. Effects of ED include increased health care costs, morbidity, and overutilization of human resources (Hudek, 2009). Current management of ED often requires extra pharmaceuticals to alleviate symptoms and an increased number of staff members to care for the patient (Hudek, 2009). Increased health care costs ensue if the patient injures him or herself and requires surgical repair of the injury (Hudek, 2009). Patients who experience ED often require extended time in PACU (Hudek, 2009).

ED often resolves spontaneously without intervention other than supportive care (Hudek, 2009). Nursing management of ED starts with the basics: maintaining airway, breathing, and circulation (Hudek, 2009). When a patient begins to display symptoms of ED, nurses should first search for an underlying cause. Frequent assessment of the patient's cognitive status and level of consciousness is necessary in identifying ED (Hudek, 2009). Physicians, nurses, and anesthesia providers must work together in the identification and management of ED (Hudek, 2009).

ED causes psychological, emotional, and physical distress for the patient and family members (Raghavendran, 2011). Studies suggested that reuniting with the parent(s) is the best and most effective intervention (Raghavendran, 2011). Appropriate interventions and parental teaching can prepare parents for the possibility of ED symptoms. Pediatric patients often do not have the psychological maturity necessary to understand surgical procedures, which induces fear and may lead to a negative effect during postoperative care and recovery (Adams, 2011). Children depend on parents or

caregivers for support and guidance in coping with unfamiliar and stressful situations (Scrimin, Haynes, Alto, Bornstein, & Axia, 2009). The ability for parents to support their child can be compromised by their own vulnerability and emotional involvement (Scrimin et al., 2009). Parents automatically want to help calm a child experiencing ED. Parents have expressed feelings of helplessness and anxiety when normal comforting measures are unsuccessful. Parents have described the paranoia and the inability to recognize familiar objects or people as unusual and uncustomary for the child (Raghavendran, 2011). In this phase, communication is imperative, and parental involvement is a crucial component of managing ED (Raghavendran, 2011).

Researchers have attempted to describe why the contributing factors are associated with ED (McLott et al., 2013). McLott et al. (2013) postulated that a sense of suffocation upon emergence from anesthesia is responsible for agitation and aggressive behaviors. Because hearing is the first of the senses to return upon awakening, auditory stimulation during emergence from anesthesia may activate a heightened response to fear and may be responsible for inappropriate responses to auditory stimuli (McLott et al., 2013). Reactive aggression, also referred to as impulsive aggression, is the reaction to a perceived threat or danger (McLott et al., 2013). The fight-or-flight response may also occur when the sense of smell and tactile stimulation return during emergence resulting in aggression and agitation (McLott et al., 2013).

Physical aggression is associated with many adverse outcomes such as self-extubation, accidental removal of intravenous catheters or drains, and injury to the surgical site (Reduque & Verghese, 2012; McLott et al., 2013; Locatelli et al., 2013).

Children in the PACU setting are often exposed to recurrent noxious stimuli, persistent symptoms (i.e., nausea and pain), and/or distressing procedures (i.e., IV removal) (Chorney et al., 2012). Therefore, children spend more time in the postoperative recovery area than in any other medical setting (Chorney et al., 2012). This unfamiliarity with the PACU precipitates anxiety and distressed behaviors (Chorney et al., 2012).

Many studies focused on pharmacological interventions to deter and alleviate ED symptoms. Other researchers reviewed the behaviors of ED and attempted to validate or compare behavioral scales to assess ED (Bajwa et al., 2010). The incidence of ED in the pediatric population is influenced by anesthetic technique (Beringer et al., 2014). Anesthetic agents continue to be developed to target appropriate receptors to obtain the desired effect (Dahmani et al., 2010). Many studies have shown a direct correlation between the use of vapor-based inhalation agents and the incidence of ED (Chandler et al., 2012). Sevoflurane, the most commonly used agent for induction and maintenance of anesthesia in pediatric patients less than five years of age, is associated with the highest incidence of ED (Chandler et al., 2012). Studies that have addressed the effectiveness of different agents in addition to sevoflurane to prevent or mitigate ED have shown mixed results (Chandler et al., 2012). Preoperative medications such as midazolam (Versed), a benzodiazepine used to help reduce anxiety prior to the procedure, may contribute to increased wake times in PACU (Stamper et al., 2014).

Some surgical procedures require deeper sedation than others. However, there is a noted increase of ED following short surgical procedures and noninvasive procedures requiring the use of anesthetics (Dahmani, Delivet, & Hilly, 2014). Studies indicated that

this incidence is related to the rapid washout of inhalation agents, which does not allow full absorption and peak effect of analgesics (Mohkamkar et al., 2014). Studies have also indicated pain and rapid emergence as causes of ED (Reduque & Verghese, 2012). Some anesthesia providers choose to use a premedication or analgesic adjuvant to delay emergence and reduce postoperative pain (Reduque & Verghese, 2012). PACU nurses must be familiar with the anesthetic agents used by the anesthesia providers to assess the need for intervention.

Despite decades of research on ED, this phenomenon still leaves researchers with many unanswered questions. My review of the literature supported the quality improvement project in several ways. Knowing the causative factors allows providers to respond appropriately to ED. McLott et al. (2013) suggested implementing interventions to decrease stimulation during emergence from anesthesia or designating quiet time during emergence. Wong and Bailey (2015) recommended a calm, quiet environment while ensuring patient safety, eliminating physical discomforts, and reassuring the patient and parent(s). Raghavendran (2011) explained that children experiencing ED are upset by environmental stimuli; therefore, reuniting children with parents and providing a quiet, darkened recovery area is optimal. Due to the physical nature of ED symptoms, it may be necessary to use holding as a form of physical restraint and engaging more than one caregiver to protect the child from injury (Raghavendran, 2011).

Hudek (2009) explained that certain therapies may become irritants (i.e., blood pressure cuffs, oxygen mask, or pulse oximeter probe). Allowing the child to regain some control over his or her recovery may reduce agitation (Hudek, 2009). For example,

the child may be allowed to choose between an arm and a leg for the blood pressure cuff. Clarke (2010) offered a holistic approach to perioperative care such as reducing noise or loud conversations at the bedside and encouraging parents to be with the child during recovery to minimize emotional trauma. Lastly, Amin et al. (2010) described the importance of parental involvement to address psychological, social, and cultural needs of children. Well-structured preoperative preparation reduces fear and anxiety, which improves compliance with treatment and results in a higher satisfaction rate (Amin et al., 2010).

Evidence Generated for the Doctoral Project

PACU nurses provide specialized care for pediatric surgical patients to ensure their needs are met and important issues are addressed (Gallegos & Sortedahl, 2015). PACU nurses have the responsibility of ethical decision-making for children and families; which includes prompt recognition and treatment of ED (Gallegos & Sortedahl, 2015). The primary participants were PACU nurses that care for the pediatric surgical population at the practicum site. Surveys were the primary method of data collection. Post intervention surveys were prepared with consideration of the information needed for evaluation (See Appendix B). The PACU manager and team lead suggested the use of a survey appropriate for all pediatric recoveries whether or not they experience ED. The survey became a part of the PACU staff routine. All data collection was anonymous and did not include any personal identifiable information. PACU nurses used the ED-specific interventions and gave feedback on the effectiveness of the interventions on a case-by-case basis.

Analysis and Synthesis

A strong evaluation plan with clear outcomes is imperative to demonstrate efficacy of programs and practice changes (Zaccagnini & White, 2011). Evaluation strategies scrutinize a projects implementation, effectiveness, and credibility (Hodges & Videto, 2011). Project evaluation also provides accountability, and validates the purpose of the projected change (Zaccagnini & White, 2011). Using a systematic approach to evaluation allowed me to gain a deeper understanding of my project and identify strengths and weaknesses (Frye & Hemmer, 2012). Organizational leaders and stakeholders want to see the project activities produce practice changes for the population involved (Zaccagnini & White, 2011).

Evaluation for quality improvement projects is broader compared to research protocols (Zaccagnini & White, 2011). Quality improvement projects are designed to measure change in a population or practice not to make a project reproducible (Zaccagnini & White, 2011). Program evaluation is a key component of program success. There are various methods for evaluation, and the method chosen represents the type of program being implemented. Components of program evaluations often include formative and summative formats. I chose the CIPP model for evaluation using formative and summative methods.

Context Evaluation

The context evaluation consisted of observation and assessment. Interactions between PACU nurses, patients, and parents or caregivers were observed. The context evaluation, for the educational forum, included reviewing the literature and performing a

needs assessment to identify what was already known about the topic. The needs assessment survey was a formative evaluation using a Likert scale (See Appendix A). The survey was given to PACU nurses to obtain important information that was used to develop the educational content. The intent was not to simplify the topic but address knowledge deficits and introduce new concepts.

Input Evaluation

The input evaluation consisted of engaging leadership, stakeholders, and the evidence-based practice committee for buy in on the project idea. This part of the evaluation included a financial analysis and determining the program budget. This project was not cost accumulating. The costs incurred were for the supplies used to create the educational tools. The interventions did not produce any costs.

Process Evaluation

The process evaluation was performed after the education was provided and nurses began using the ED-specific interventions. This part of the evaluation included a summative method to evaluate the effectiveness of the ED-specific interventions. The post-intervention survey was designed to capture the PACU nurses perspective on the use of the ED-specific interventions. The process evaluation also validated assumptions and limitations of this project.

Product Evaluation

The product evaluation allowed me to scrutinize the finished product and identify areas for improvement. The information collected in preceding levels of evaluation

helped me determine if my mission, vision, objectives, and goals of this project were achieved. Lastly, the product evaluation allowed me to identify unintended outcomes.

Summary

A strong evaluation plan with clear outcomes is imperative to demonstrate efficacy of programs and practice changes (Zaccagnini & White, 2011). Evaluation provides accountability and clarity of a program (Zaccagnini & White, 2011). Organizational leaders and stakeholders want to see the quality improvement project produce practice changes for the population involved (Zaccagnini & White, 2011). Well-structured preoperative preparation reduces fear and anxiety, which improves compliance with treatment and results in a higher satisfaction rate (Amin, Oragui, Khan, & Puri, 2010). A profound understanding of ED, causative factors, and appropriate interventions can change the care of pediatric patients nationwide.

Section 4: Findings and Recommendations

Introduction

ED in the peri-anesthesia setting has received widespread recognition since its identification in the 1960s (Mohkamkar et al., 2014). ED is 3 to 8 times more likely to occur in children, which justifies the need for age-appropriate interventions (Stamper et al., 2014). ED is a state of mental confusion represented by agitation, hyper-excitability, restlessness, and the inability to reason (Stamper et al., 2014). ED symptoms increase emotional and psychological stress for the patient and family members (Raghavendran, 2011). To promote quality improvement and improve patient outcomes, I developed this project to introduce a change in nursing practice by using non-pharmacological

interventions to manage ED in the pediatric surgical population. Stepping outside the norm emphasizes changes to patient care to improve commitment to the patient, safe practice, and professional behavior (Gallegos & Sortedahl, 2015).

Despite the fact that ED is not a new phenomenon, I discovered that many PACU nurses have not heard of ED. The selected practicum site is a Level II trauma center that performs an average of 50 elective and emergency surgeries daily. From this workload, PACU nurses will recover an average of 20 pediatric surgical patients daily. At this practicum site, no type of formal education had been provided on what interventions are most appropriate. This project included an educational presentation for PACU nurses on the use of non-pharmacological interventions to mitigate symptoms of ED in the pediatric population. In alignment with ASPAN (2014) guidelines, this project also introduced concepts to enhance the differentiation and treatment of ED.

Surveys were the primary method of data collection. Surveys were prepared with careful consideration of the information needed to determine program success. Approval from the Walden Institutional Review Board (0185420), PACU manager, chief nursing officer, and evidence-based practice committee was obtained. In this section, I describe the findings, implications, and recommendations of this project. I also identify strengths and limitations in the project design.

Findings and Implications

The period from surgical prep to induction of anesthesia is known to be the most stressful period for children (Yuen, 2010). Although ED often resolves spontaneously without intervention other than supportive care (Hudek, 2009), this momentary

behavioral disturbance causes distress to patients, parents, and staff and compromises safety (Bajwa et al., 2010). Pediatric patients often do not have the psychological maturity to understand surgical procedures, which induces fear and may lead to a negative effect during postoperative care and recovery (Adams, 2011).

This project encouraged a change in mind-set and dedication to using the ED-specific interventions introduced in the educational presentation. Many factors influence the care that pediatric patients receive, especially when they are experiencing ED. PACU nurses must be able to respond appropriately putting all emotions aside. A total of 216 surveys were collected over a 30-day period. Participants reported that 195 (90.2%) of pediatric patients did not experience ED. The reason for this percentage was unclear due to the lack of details on the child's age, surgical procedure, or type of anesthesia used. This result was unexpected considering the amount of ED seen by PACU nurses at the practicum site. Out of the 216 surveys, participants reported that 21 (9.8%) pediatric patients experienced ED. Participants used ED-specific interventions on 19 (90%) of pediatric patients experiencing ED. Participants rated the interventions 43% effective and 57% ineffective (see Appendix B).

When there is an expected change in standards of care, there is also an expected change in the culture of the unit. However, this cultural change was beyond the scope of this project. The results of the survey left unanswered questions. Project results could not be used to demonstrate change in patient satisfaction, cost, quality, and patient safety. In addition, results did not indicate whether pediatric patients experiencing ED would continue to spend more time in PACU and require an increase in resources. Finally, it

was not clear why the interventions were effective for only 43% of the patients experiencing ED. One implication of the project findings is that the effectiveness of the interventions are influenced by multiple factors such as preexisting behavioral issues, anesthetic used, surgical procedure, age of the child, parental involvement, and nursing approach. There remains the potential for the ED-specific interventions to change the care of pediatric surgical patients across the United States. A larger study with more specific measurements may demonstrate the worthiness of ED-specific interventions.

The project aim was to describe the effectiveness of ED-specific interventions from the nursing perspective. The post-intervention survey was used to collect data on ED-specific interventions used by nurses. Specific interventions used by PACU nurses for this project were parental presence, calm voice, cuddling, dim lights, quiet atmosphere, low stimuli, and reassuring techniques (see Appendix E). Results demonstrated the thoughtfulness of nurses when choosing ED-specific interventions. The results also demonstrate an increased awareness of ED in the pediatric PACU. McLott et al. (2013) suggested implementing interventions to decrease stimulation during emergence from anesthesia or designating quiet time during emergence. Wong and Bailey (2015) recommended a calm, quiet environment while ensuring patient safety, eliminating physical discomforts, and reassuring the patient and parent(s). Raghavendran (2011) explained that children experiencing ED are upset by environmental stimuli; therefore, reuniting children with parents and providing a quiet, darkened recovery area is optimal. Due to the physical nature of ED symptoms, it may be necessary to use holding

as a form of physical restraint and engaging more than one caregiver to protect the child from injury (Raghavendran, 2011).

Recommendations

Although the scope of this project was limited by several factors, the use of ED-specific interventions in the pediatric PACU has great potential. One area that is of greatest importance is parental education and involvement. Unfortunately, the parental education leaflet was not used or approved during the allotted time of the study (see Appendix D). Parental involvement is a crucial component of managing ED. Parents must be informed that ED can occur prior to the child's procedure. Parents should also understand that normal comforting measures might not work in a pediatric patient with ED (Scrimin et al., 2009; Raghavendran, 2011). Parents may become distressed and anxious if they are unaware that ED and negative behaviors are common after anesthesia (Scrimin et al., 2009).

Well-structured preoperative preparation reduces fear and anxiety, which improves compliance with treatment and results in a higher satisfaction rate (Adams, 2011; Amin et al., 2010). Appendix D can be used as a preoperative educational tool by physician offices and surgery centers. ED occurs in patients of all ages, and interventions that alleviate symptoms of ED can change the approach to care in the peri-anesthesia setting. This project as an educational tool is a preliminary effort to address the gap in practice at the selected practicum site. This project identified the need for structured education on ED. The PowerPoint presentation designed for this project will continue to be used at the practicum site for new hires and nurses new to the peri-anesthesia setting.

Continuing education or annual competency training can address knowledge deficits and promote readiness to care for the pediatric surgical population.

Strengths and Limitations of the Project

A major limitation of this project was that the data collected were restricted to the PACU nurses at the practicum site. Whether the ED-specific interventions were perceived to be effective depended solely on the nurses implementing them. This may explain the perceived lack of effectiveness of the interventions. Another limitation was that the education presentation was offered to all PACU staff, but it was not mandatory. Some PACU nurses, in addition to new PACU staff, did not receive the education to guide them in using the ED-specific interventions appropriately. The project design was partially a limitation because of the magnitude of the practice problem. Several approaches could have been used to mitigate this limitation, but the project focus was consistent throughout the practicum experience.

A major strength of this project was the increased exposure of ED in the community. Presentations on the topic for peri-anesthesia nurses continue to be offered. The educational tools created for this project can be modified for the target audience. Facilities may use this project as a template for staff education and/or parental education. Although this project may not have yielded intended results, it is a platform for future research focusing on the nurse's perspective on pediatric ED.

Section 5: Dissemination Plan

Maximum exposure on the topic of ED in the pediatric surgical population is a long-term goal. The dissemination plan for this project includes publishing an article in a

nursing journal. Additionally, this project may be presented at local and regional conferences as an oral or poster presentation. This quality improvement project was inspired by a program known as the Green Star Initiative developed at a local Army hospital. The Green Star Initiative continues to gain recognition. There are various opportunities to share the results of this project and use the educational tools. Tenets of this project may be used to write standard operating procedures. The parent educational leaflet may be incorporated into the preadmission process for pediatric surgical patients. Articles have been written in the *Army Times* on the Green Star Initiative, and this project may be presented at nursing grand rounds.

Analysis of Self

This DNP journey allowed me to grow personally and professionally. This project helped me realize the possibilities of future projects. As a nursing supervisor and educator, I will be more effective at the bedside by implementing evidence-based practice in a variety of areas. This project prepared me to create an educational program for staff nurses by presenting relevant topics during staff meetings. In collaboration with the creator of the Green Star Initiative, I may lead a larger study on ED including combat veterans at Army facilities. The plan is to apply for the Army Network Campaign Plan (ANCP) research seed grant and assist the evidence-based practice committee in presenting the Green Star Initiative to legislators.

I am an instructor for basic life support (BLS), advanced cardiac life support (ACLS), and pediatric advanced life support (PALS). I am the current PALS program director for the military training network. My personal goals include opening an

American Heart Association training site for health care providers in rural Colorado, joining the American Society of PeriAnesthesia Nurses (ASPAN), and becoming a board certified post anesthesia nurse (CPAN) and board certified medical surgical nurse (RN-BC).

Summary

Although the precise mechanism behind ED remains a mystery, there has been progress in the knowledge of human physiology, neuroscience, and pharmacology that allows anesthesia and peri-anesthesia providers to alleviate reactions to anesthetics (Wilson, 2014). Peri-anesthesia nursing remains a dynamic specialty, and care of the surgical patient has changed dramatically (ASPAN, 2014). Changes in practice are a driving force to maintain and update competencies to ensure safe patient care (ASPAN, 2014). In alignment with ASPAN guidelines, this quality improvement project introduced non-pharmacological interventions derived from implications of studies on ED. This project recommended changes in practice based on identifiable benefits and risks to the patients (see Doody & Doody, 2011). Pediatric patients deserve evidence-based interventions that improve safety, outcomes, and quality of care in the PACU setting.

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Appendix A: Needs Assessment Survey and Results

NEEDS ASSESSMENT SURVEY	TOTAL # OF SURVEYS = 44
Statements	Answers in %
I have heard about emergence delirium but I do not know much about it.	Strongly agree – 9% Agree – 14% Neutral – 2.2% Disagree – 30% Strongly Disagree – 23%
I can differentiate between symptoms of emergence delirium and other behavioral disturbances in pediatric patients.	Strongly agree – 16% Agree – 36% Neutral – 16% Disagree – 7% Strongly Disagree – 2%
I use pharmacological interventions to manage emergence delirium in pediatric patients.	Strongly agree – 16% Agree – 41% Neutral – 11% Disagree – 5% Strongly Disagree – 5%
If I learned about non-pharmacological interventions to manage emergence delirium, I would use them.	Strongly agree – 41% Agree – 25% Neutral – 9% Disagree – 2.2% Strongly Disagree – 0%
Parents need to be involved as soon as signs of emergence delirium are identified.	Strongly agree – 9% Agree – 23% Neutral – 18% Disagree – 16% Strongly Disagree – 11%
Inhaled anesthetics are the primary contributor of emergence delirium.	Strongly agree – 7% Agree – 39% Neutral – 16% Disagree – 14% Strongly Disagree – 0%
Emergence delirium cannot be prevented.	Strongly agree – 0% Agree – 2.2% Neutral – 36% Disagree – 34% Strongly Disagree – 5%
Pain does not cause emergence delirium.	Strongly agree – 5% Agree – 23% Neutral – 16% Disagree – 32% Strongly Disagree – 2.2%
I think we handle emergence delirium in pediatric patients efficiently and we do not need to change anything.	Strongly agree – 2.2% Agree – 2.2% Neutral – 25% Disagree – 34% Strongly Disagree – 14%
Name two things you would like to know about emergence delirium.	Identified themes: Alternate methods to handle ED besides IV meds. Does pre-medication make delirium worse? Causes and Preventions of ED. Risk Factors. Physiologic mechanism. Parent education in pre-op. Anesthetic technique.

Appendix B: Post intervention Survey and Results

POST INTERVENTION SURVEY	TOTAL # OF SURVEYS = 216
<p style="text-align: center;">Questions</p> <p>Did the pediatric surgical patient experience emergence delirium? <input type="checkbox"/> Yes or <input type="checkbox"/> No</p> <p>If NO STOP the questionnaire.</p> <p>If YES please answer the following questions.</p> <p>Did you use a pharmacological intervention to reduce symptoms of ED? <input type="checkbox"/> Yes or <input type="checkbox"/> No</p> <p>Did you implement ED specific interventions? <input type="checkbox"/> Yes or <input type="checkbox"/> No If Yes, name two:</p> <p>Were the ED specific interventions effective? <input type="checkbox"/> Yes or <input type="checkbox"/> No</p> <p>Was the parent(s) informed of ED prior to arrival in PACU? <input type="checkbox"/> Yes or <input type="checkbox"/> No</p>	<p style="text-align: center;">Answers in %</p> <p style="text-align: center;">90.2% of Surveys Answered <u>NO</u></p> <p style="text-align: center;">9.8% of 216 patients experienced Emergence Delirium</p> <p style="text-align: center;">Out of 21 <u>YES</u> surveys</p> <p>76% of nurses used a pharmacological intervention and 24% did not use a pharmacological intervention.</p> <p>90% of nurses used the ED specific interventions and 10% of nurses did not.</p> <p>43% Interventions effective 57% Interventions ineffective</p> <p>52% of parents were informed 48% of parents were not informed</p>

Appendix C: PowerPoint Outline

Pediatric Emergence Delirium: Creating a World of Confusion in the Post-Operative Setting

OBJECTIVES:

Define Emergence Delirium

Identify Contributing Factors

Identify patients at risk

Identify ED specific interventions

EMERGENCE DELIRIUM:

Adverse reaction to anesthetics

Disassociated state of consciousness

Demonstrated by hallucinations, restlessness, combativeness

Children are inconsolable, moaning, kicking, or thrashing about in bed.

INCIDENCE AND RISK FACTORS:

3-8 times more common in children ages 5yrs or less

Rapid Emergence

Use of inhaled anesthetics

Surgical procedures involving the face, neck, nose or mouth

Physiologic and psychological contributors

CHILDHOOD TRAUMA:

Child abuse, maltreatment, problematic familial issues

Adoption

Physical, behavioral, and mental health disturbances

NURSING CARE:

Assess cognitive status and level of consciousness

Rule out physiologic disturbances

Reorient frequently and provide reassurance

Provide a safe environment

INTERVENTIONS:

Allow the child to wake up on his or her own

Only one person speaking at a time

Decrease Stimuli (lower noise and lighting, close curtains)

Bring parent/guardian to bedside

Treat pain

QUESTIONS FROM THE PACU: Q&A

Does Versed (midazolam) make it worse?

What are the benefits of Diprivan (propofol)?

How do you stop the screaming?

If a child went down 'crazy' he/she will wake up crazy, is this true?

CONCLUSION:

PACU nurses must consider developmental differences and medical history

Some of the simplest of interventions can help a patient ease out of ED

Managing ED takes patience

Improving the care of pediatric patients by stepping outside the norm improves professional behavior, commitment to the patient, and responsibility of safe practice.

HELLO MY NAME IS ED



WHO IS ED?

WHAT DOES ED DO?

HOW DOES ED MAKE YOUR CHILD FEEL?

PARENTS WE NEED YOUR HELP

Appendix E: ED Cheat Sheet

**EMERGENCE DELIRIUM?
HAVE YOU TRIED THESE INTERVENTIONS?****Allow the child to wake up on his or her own****Bring parent or guardian to bedside****Decrease noise and lighting****One person speaking at a time****Treat pain****Rule out physiologic disturbances****Reorient frequently and provide reassurance****Provide items of comfort i.e. blanket, teddy
bear, pacifier****ALWAYS PROVIDE A SAFE ENVIRONMENT**