

8-23-2021

An Educational Intervention to Promote a Shift in Attitude in Using Dexmedetomidine to Prevent Pediatric Emergence Delirium

Rose Pauldyne Richemond
rrich012@fiu.edu

Follow this and additional works at: <https://digitalcommons.fiu.edu/cnhs-studentprojects>

Recommended Citation

Richemond, Rose Pauldyne, "An Educational Intervention to Promote a Shift in Attitude in Using
Dexmedetomidine to Prevent Pediatric Emergence Delirium" (2021). *Nicole Wertheim College of Nursing
Student Projects*. 16.

<https://digitalcommons.fiu.edu/cnhs-studentprojects/16>

This work is brought to you for free and open access by the Nicole Wertheim College of Nursing and Health
Sciences at FIU Digital Commons. It has been accepted for inclusion in Nicole Wertheim College of Nursing
Student Projects by an authorized administrator of FIU Digital Commons. For more information, please contact
dcc@fiu.edu.

An Educational Intervention to Promote a Shift in Attitude in Using Dexmedetomidine to
Prevent Pediatric Emergence Delirium

A DNP Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

In partial fulfillment of the requirements
For the Degree of Nursing Practice

By

Rose P. Richemond, MSN, APRN, CRNA

Supervised By

Romulo M. Cuy, MD, FAAP

Ann Miller, DNP, CRNA, APRN

Jorge Valdes, DNP, CRNA, APRN

Approval Acknowledged:
Date:

DNP Program Director

Table of Contents

ABSTRACT.....	4-5
I. INTRODUCTION.....	6-19
Problem Statement.....	6-8
Background.....	8-15
Scope and Consequence.....	15-16
Consequence of Problem.....	16-17
Proposal Solution.....	17-19
II. SUMMARY OF LITERATURE.....	19-34
III. PURPOSE	35-37
PICO Question.....	35
PICO Clinical Question.....	35-36
Objectives.....	36-37
IV. DEFINITION OF TERMS.....	37-38
V. THEORETICAL FRAMEWORK.....	38-39
VI. METHODOLOGY.....	39-43
VII. RESULTS.....	44-48
VIII. DISCUSSION.....	48-49

IX. CONCLUSION.....49-50

X. REFERENCES.....51-53

XI. APPENDICES.....54-62

Appendix A.....54-56

Appendix B.....57

Appendix C.....58

Appendix D.....59

Appendix E.....60

Appendix F.....61

Appendix G.....62

Abstract

Background: Emergence delirium (ED) is a common occurrence following anesthesia, especially after the use of inhaled anesthetics such as sevoflurane, desflurane, and isoflurane in children. ED is characterized by a state of mental confusion, agitation, and restlessness frequently observed in preschool age children. Its incidence ranges from 10-80%. Its etiology, associated risks, prevention, and management are still unclear. Despite the transient nature of this syndrome, it may produce psychological distress in the child, the parents, and the caregivers.

Objective: The aim of the study is to promote a shift in the attitude and perception in anesthesia providers to encourage the use of dexmedetomidine to prevent the occurrence of emergence delirium.

Methods: A literature review was conducted, multiple studies related to the use of dexmedetomidine in comparison to other pharmacological adjuvants previously used in preventing the occurrence of emergence delirium were analyzed. Additional studies were also found to support the use of an educational intervention to promote a change in attitude and perceptions of healthcare professionals towards new practices. A pre-implementation survey assessed the providers' initial knowledge, attitudes regarding dexmedetomidine. This step was followed by a virtual educational intervention and a post-implementation survey.

Results: Significant differences were found in using dexmedetomidine. Reducing ED, in addition to provide analgesic and sedative effect without respiratory depression makes it favorable over pharmacological agents used previously.

Conclusion: Dexmedetomidine shows promising results in preventing emergence delirium when compared to other agents previously used to treat ED. Further studies regarding right dosage and timing of administration to prevent emergence delay are needed.

Introduction

Problem Identification/ Problem Statement

Emergence delirium (ED) is a common occurrence in the pediatric population (Hock, 2019). Emergence delirium is the psychomotor agitation and delirium typically takes place within forty-five minutes following emergence from anesthesia (Urits et al., 2020). The presentation of ED may vary among patients. The common core clinical features associated with ED consists of general non-purposeful resistive movements such as pulling, kicking, flailing, disorientation, non-responsiveness, lack of awareness of surroundings, and lack of eye contact. Additionally crying, inconsolability, confusion and motor agitation are other clinical presentations that have been listed under ED. (Urits et al., 2020). ED is self-limited, lasting about five to fifteen minutes. It often resolves spontaneously without any pharmacological intervention (Vlajkovic & Sindjelic, 2007). Various meta-analyses have evaluated the etiology and methods for prevention of ED. They have pointed out many gaps between current evidence and clinical practice. Presently Emergence delirium remains a common problem in children in post anesthesia care unit (PACU) with a frequency that equaled to the widespread use of sevoflurane into pediatric anesthesia care. Its diagnosis, pain management, validity scales, and treatment continue to be a stumbling block for anesthesia providers.

The incorrect diagnosis of ED in PACU may cause serious sequelae. The presence of physiological derangements such as hypothermia, hypoxia, hyperthermia, and hypoglycemia must be investigated and ruled out before the diagnosis of ED can be entertained (Vlajkovic & Sindjelic, 2007).

Postoperative pain has been listed as one of the most confounding variables in assessing a child's comportment upon anesthesia emergence because of the overlapping clinical manifestation with ED. Even though surgery has not been reported to trigger ED, many studies have reported a very large occurrence of ED especially after adenotonsillectomy. Clearly, the emergence in distress of any child after anesthesia and surgery could be in pain. It is of extreme importance to ensure the adequacy of analgesia with proper examination and appropriate treatment. Several studies have suggested that preemptive analgesic administration has successfully decreased the incidence of ED. Due to the brevity of certain procedures, inadequate pain relief could be the contributing factor to ED since peak analgesic effects may not be reached until the patient is fully awake (Vlajkovic & Sindjelic, 2007). It is imperative pain is treated before a diagnosis of ED can be confirmed to avoid the presence of pain being misconstrued as emergence delirium. (Lerman, 2020).

Several descriptive scales like the Cravero scale, the Watcha scale, and the Paediatric Anaesthesia Emergence Delirium (PAED) have been used to quantify the severity of ED. PAED scale is one of the most popular one used claiming a sensitivity of 64% and a specificity of 86% (Nair & Wolf, 2018). PAED has been validated to measure ED in the postoperative period. Unfortunately, a consensus has not yet been reached. In the evaluation of ED with PAED after anesthesia, values greater than 10 or 12 were found to be consistent with ED. However, in pediatric intensive care unit (PICU), a score greater than 8 predicts emergence delirium.

The literature in regard to postoperative delirium remains confusing in part because many studies utilized nonvalidated, unproven scales for the pediatric population whose pain was not

treated satisfactorily, excluding the cause of the behavior imputable to pain, delirium or both (Cote, 2019).

Unknown to many anesthesia providers, dexmedetomidine can reduce the sympathetic nervous activity and strengthen the parasympathetic activities to enhance the effect of major anesthetics (Wang et al., 2017). The choice of proper and safe anesthetic agent for patients scheduled to undergo surgery is of extreme importance. The stimulation of the autonomic nervous system during laryngoscopy, intubation, and surgical stimulation may result in many complications. These physiologic stressors can elevate catecholamines and lead to augmented hemodynamic response and adverse events (Kovac, 2018). Dexmedetomidine is unique with its analgesic, sedative, antinausea, and chills prevention. As an adjunct to anesthesia, dexmedetomidine may help increase patient safety, improve arousability, decrease hemodynamic changes, and minimize potential side effects like respiratory depression (Kovac, 2018).

Background

Emergence delirium is not a new occurrence in clinical practice. This post-surgical phenomenon was first identified in 1960 by Eckenhoff and his colleagues. Approximately 14,000 patients were studied. From this sample, 5.3% of the participants experienced some unusual post-operative behavioral disturbances which they have named excitement. It was noted children experienced postanesthesia agitation more often than adults, 12% -13% vs 5.3%. Eckenhoff and colleagues were the first to report the signs of hyperexcitation in patients emerging from cyclopropane, ether, or ketamine anesthesia, especially when used for circumcision, thyroidectomy, and tonsillectomy. The gradual discontinuation of the anesthetics mentioned above was observed with the introduction of the newer anesthetic gas called halothane

(Vlajkovic & Sindjelic, 2007). Halothane was the predominant anesthetic in the market for children for decades. Eventually, the use of halothane was discouraged due to the high incidence of hepatotoxicity. Fortunately, with the realization of postoperative pain management in children and the increase use of analgesics, the frequency of Emergence delirium was attenuated. However, with the launching of the newer, short-acting, volatile anesthetics desflurane and sevoflurane, a resurgence in ED was notable (Vlajkovic & Sindjelic, 2007). The three most common inhaled agents used today are desflurane, isoflurane, and sevoflurane. All of them have been linked to ED, especially sevoflurane. Fortunately, the multiple studies that have been conducted on dexmedetomidine, the highly selective alpha-2 agonist has proven to be a breakthrough in mitigating Emergence delirium (Nair & Wolf, 2018).

Since the landmark study conducted by Eckenhoff, research on this syndrome has been fixated largely on risk factors, etiology, and management (Urits et al., 2020). Despite these efforts, a consensus on an evidence-based management has not yet been established (Viswanath et al., 2015). To date, the management of ED has remained purely anecdotal where the providers rely entirely on judgement and clinical experience. According to Viswanath et al. (2015) the inability to establish a standardized treatment regimen is due in part to the complexity of currently available pharmacological agents. Several pharmacologic measures have been found to be efficacious in reducing the overall risk in the development of ED in pediatric patients postoperatively (Urits et al., 2020). Sedatives, hypnotics, anxiolytics including benzodiazepines & alpha-2 agonists, and opioids have been advocated due to their abilities to modulate ED frequency and severity. According to the literature, these classes of pharmacological adjuvants above have been found to reduce the occurrence of ED to varying degree over the years. A lower

incidence of ED and postoperative pain has been also reported with the use of total intravenous anesthesia (TIVA).

Pharmacological Interventions

Inhaled anesthetics

The most effective preventive measure for the elimination of ED is the avoidance of the potent inhalation anesthetics used to maintain anesthesia (Lerman, 2020). Some anesthesia providers have justified the use of total intravenous anesthetics (TIVA) in general in children for the maintenance of anesthesia based this causative factor (Lerman, 2020). Anesthetic gases also known as inhaled anesthetics like nitrous oxide, isoflurane, halothane, sevoflurane, and desflurane are given as primary therapy for sedation preoperatively and as adjunctive anesthesia maintenance to intravenous anesthetic medications like propofol and midazolam in the preoperative period. Sevoflurane is one of the inhalation anesthetic agent that has shown a high incidence of agitation in patients, especially in children (Lerman, 2020).

TIVA is a general anesthesia technique where a combination of agents is given solely by the intravenous route in the absence of all inhalational agents including nitrous oxide. To reduce the use of volatile anesthetics, the use of total intravenous anesthesia (TIVA) technique has been proposed. This method includes the continuous infusion of individual or the combination of short acting drugs like propofol, benzodiazepines, opioids, and alpha2 agonists to provide anesthesia in the absence of volatile agents. Administration of TIVA has been revealed to be superior to inhaled anesthetics in the prevention of emergence delirium (Cote, 2019). Intravenous drug administration has become very popular alternative to inhalational anesthesia. However, the complete elimination of inhalational agents is not feasible in kids because the use of inhalational

gases is most popular method used for pediatric anesthesia induction. The rapid introduction of these inhaled anesthetics into the pulmonary circulation favor their use over the circuitous route of venous circulation. The rapid therapeutic effect permits efficient induction and discontinuation of sedation brought on by these agents, supplying proper amnesia, anesthesia, and a quicker recovery period postoperatively as compared to intravenous medications (Clar et al., 2013).

Benzodiazepines

Midazolam. Midazolam is a short acting benzodiazepine that is utilized commonly for the control of anxiety preoperatively and intraoperatively in addition to prophylactic management for ED. Benzodiazepines work by activating the GABA(A) receptor complex and enhancement of GABA-mediated chloride currents causing hyperpolarization of neurons resulting in reduction of excitability (Pardo & Miller, 2018). A decrease in ED has been seen when midazolam is given twenty to thirty minutes following inhaled anesthetic gases. A dose of 0.03mg/kg administered intraoperatively before the end of surgery has shown reduction in ED without retarding the emergence period. Despite its similar efficacy to dexmedetomidine in reducing ED, it lacks the analgesic property seen in dexmedetomidine (Urits et al., 2020).

Sedatives Hypnotics

Propofol. Propofol is a non-barbiturate used for the induction of anesthesia. Its mechanism of action occurs through the potentiation of the chloride current mediated within the γ -aminobutyric acid type A (GABA A) receptor complex (Pardo & Miller, 2018). In addition of its use as a single anesthetic, propofol has shown to possess prophylactic properties in decreasing the incidence of ED when administered jointly with inhaled anesthetic agents. Multiple studies

have reported that a 1mg/kg bolus at the end of sevoflurane resulted in a decrease in ED. However recent studies have questioned the efficacy of the 1mg/kg bolus. A small delay has been noticeable in the recovery period without any increase in hospitalization during the transition period from propofol to the end of anesthesia with sevoflurane (Urits et al., 2020).

Opioids

A meta-analysis of the prophylactic effect of several mu-opioids agonists comprising sufentanil, alfentanil, remifentanil, and fentanyl has been analyzed as reported by Urits et al., 2020. The pharmacological effects of opioids result from the activation of opioid receptors. Three main types exist, mu opioid receptor (MOR), delta opioid receptor (DOR), and kappa opioid receptor (KOR). MOR is the primary target of most analgesic opioids used clinically (Kaserer et al., 2020). Data pooled from 19 randomized trials indicated that these opioids substantially reduced ED when administered prophylactically. Fentanyl has greatest reduction among all (Urits et al., 2020).

Alpha 2 agonists

Clonidine. Clonidine is an alpha 2 adrenergic agonist commonly utilized in pediatric practice of anesthesia as a premedicant, as an adjunct to anesthesia and analgesic agents to reduce ED, stress response related to tracheal intubation and surgery. Clonidine has also been used to supplement regional blockade and to reduce postoperative shivering (Cote, 2019). Clonidine has been found to exhibit a superior response on sedation upon induction, reduction in emergence agitation, and increase effect in early postoperative analgesia in comparison to midazolam (Viswanath et al., 2015).

Dexmedetomidine. Dexmedetomidine is an alpha 2 adrenergic receptor agonist located in major organs, blood vessels, and including the central, autonomic, and peripheral nervous system. It binds at the locus coeruleus and results in natural sleep. The possible hypothesis that excitation of the locus coeruleus as the possible mechanism of ED, studies continue to demonstrate the efficacy of dexmedetomidine in reducing ED in children (Cho et al., 2020). Far from the other sedatives, dexmedetomidine does not cause respiratory depression (Urits et al., 2020). Dexmedetomidine possesses an eight times higher affinity for the alpha2 adrenergic receptor than clonidine and it is well known for its sedative, anxiolytic, and analgesic properties (Makkar et al., 2016). In addition to its acceptable safety margin, its preference in managing ED is supported by its secondary benefits in improving symptomatic coverage. According to Viswanath et al., 2015, Ali and Abdellatif conducted a study in 2013, perioperative treatment of 0.3mg/kg of dexmedetomidine was found to be more effective than 1mg/kg of propofol in reducing the incidence and severity of ED in children that have undergone adenotonsillectomy. In the same study, dexmedetomidine was found to reduce the occurrence of nausea, chills, restlessness, and vomiting significantly (Viswanath, 2015). When compared to propofol, postoperative pain, extubation, and emergence time without extending the length of stay in the post anesthesia care unit (PACU) was found to be decreased as well. Recent research on dexmedetomidine has shown promising results in preventing ED.

Dexmedetomidine is clinically effective in perioperative and in providing reasonable sedation in intensive care units (ICU) settings. It reduces opioids requirements. Hemodynamically, its changes are modest and predictable. It minimizes postoperative shivering. Patients are more alert and responsive (Kovac, 2018). Dexmedetomidine is not without its limitations, proper dosing and the right timing to prevent delayed emergence are known factors

that are under investigations necessitating future research (Hoch, 2019). Hypotension, bradycardia, asystole, and cardiac arrest are among the side effects and adverse events that have been reported (Kovac, 2018).

Non-pharmacological Interventions

A higher incidence of ED has been seen in children who experience preoperative anxiety in comparison to patients who do not. Based on this credence, it is believed that reducing preoperative anxiety will likely lower the occurrence of ED. Multiple non-pharmacologic interventions have come about to decrease the incidence of ED since anxiety is a common issue in the perioperative state. Non-pharmacologic interventions such as parental presence during anesthesia induction, preoperative visiting operation room (PVOR), video distraction during mask anesthesia induction, and tablet-based interactive distraction (TBID) are multiple strategies that have been successful in reducing preoperative anxiety, emergence delirium, and discharge time (Urits et al., 2020).

Pathophysiology

The pathophysiology of emergence delirium is still inconclusive. It is believed to be the cause of an underlying physiological disturbance which may be secondary to general medical conditions, iatrogenic causes such as extended or excessive use of sedatives, and or substance intoxication or withdrawal (Malas et al., 2017). Researchers have not been able to elucidate the mechanism of emergence delirium in children. Excitation of the locus coeruleus has been speculated as one of the possible mechanisms of ED (Cho et al., 2020). Malas et al. (2017) reported that, “delirium is the clinical manifestations of disturbances in the homeostatic milieu of the brain as the final common pathway of multiple processes resulting in acute global central

nervous system (CNS) failure” (p.65). Urits et al., 2020, also reported certain genetic predispositions have been theorized as causative factors of ED in the adult population, mainly through elevated of interleukin-6 and apolipoprotein E e4, however the same claim cannot be stated for the pediatric population.

Risk Factors

Numerous risks factors have been attributed to the occurrence of ED. Some of the risk factors include patient’s age, anesthetic technique, surgical procedure, surgery related factors such as pain, preoperative anxiety, and various adjunct medications. Younger children are more likely to exhibit altered behavior upon emergence from anesthesia. ED occurs more often in school aged boys from 3 to 5 years with sevoflurane than halothane. The psychological immaturity of preschool children combined with rapid emergence in an unfamiliar environment have been speculated as the main cause of ED (Vlajkovic & Sindjelic, 2007). Intense preoperative anxiety in parents and children have been linked to an increase manifestation of restless behavior in the recovery period. Adjunct medications such as benzodiazepines, anticholinergics, droperidol, barbiturates, opioids, and metoclopramide have not been proven to be the underlying cause of ED, however they have been suggested as possible contributors to behavioral disturbances postoperatively (Vlajkovic & Sindjelic, 2007). Tonsils, thyroid, eyes, and middle ear surgeries have been the surgical interventions mostly associated with incidence of postoperative restlessness and delirium.

Scope of the problem

Approximately 4 million children around the world undergo general anesthesia yearly. Pediatric emergence delirium is a major problem in children in the post anesthesia period. The

incidence of ED ranges from 10 to 80% of the 450,000 children in the United States undergo surgical interventions annually. Even though emergence agitation happens in adults, the incidence appears to be 3 to 8 times greater in children (Viswanath et al., 2015). When examining the incidence of ED from a study conducted in 2006 in Belgrade, Serbia, ED ranges from 10-50%, as high as 80% (Vlajkovic & Sindjelic, 2007). ED is most common and more widely recognized in preschool age children, especially males younger than six years old.

Consequences of the problem

ED is not without its sequelae. The potential risk for self-harm, delayed post-anesthesia care unit (PACU) times, and postoperative maladaptive behaviors such as bed wetting, sleep disturbances, temper tantrums, loneliness, and attention seeking attitude are of great significance to clinicians and hospitals (Urits et al., 2020). Restless behaviors on emergence have resulted in discomfort to the child which has made both the parents and caregivers unhappy with the quality of recovery after anesthesia administration (Vlajkovic & Sindjelic, 2007). Self-injury, surgical site damage, increasing costs for extra nursing care can be multiple sources of financial strain to the healthcare system (Cho et al., 2020). Even though the severity of agitation may vary, additional nursing care, treatment with sedatives and analgesics may retard the discharge process from the hospital, long-term consequences have not been recorded (Vlajkovic & Sindjelic, 2007). According to Lerman 2020, once the episode of ED has been resolved either spontaneously or by an intervention, recrudescence has not been documented. Although ED is transient, there is potential for psychological distress to the parents, the child, the care givers as well as increased requirement for staffing and cost associated with phenomenon (Hoch, 2019). A major limitation reported in the prevention and treatment of ED lies in the economic expenses

related to the various pharmacological interventions and anesthetic methods. In an evaluation conducted where recovery from anesthesia, postoperative nausea and vomiting, and discharge time were compared with the use of TIVA and inhalational anesthetic, the costs tabulated for TIVA were significantly higher due to drug price, materials and set up. Besides the lack of knowledge in anesthesia providers on the most efficacious drug in the market to combat ED, costs of materials and drugs play a significant role in delivery the proper treatment to ensure quality care delivery.

Proposal solution

The multiple pharmacodynamic properties of dexmedetomidine have denoted its usefulness in the prevention of ED. Its properties as a sympatholytic, analgesic, anxiolytic, sedative, antisialogogue, and volatile agent-sparing properties are notable evidence in promoting its support as a preventive agent for ED (Manning et al., 2020). The frequency of emergence delirium has been greatly reduced using drugs activating alpha₂ adrenoceptors. The locus coeruleus (LC) is known as one of the principal targets of some alpha₂ receptor agonists, like dexmedetomidine. High percentage of sevoflurane has shown to induce an inward current in LC neurons in a robust manner, consequently, leading to an increase in the firing frequency in the absence of tetrodotoxin which is essential in the transmission of action potential. The prophylactic administration of dexmedetomidine blocks this augmentation in firing frequency with sevoflurane (Yasui, 2007). Sevoflurane, the most frequently used anesthetic gas in pediatric anesthesia has led to an increase of PACU emergence agitation. During the past few years, dexmedetomidine has been used reportedly in the pediatric population as a sedation in ICU, as a premedication, as an adjunct to inhaled anesthetic agent, and assuredly as a prophylaxis and

treatment after general anesthesia for emergence agitation. Due to the relationship of preoperative and operative factors that have been associated with ED, it is of ultimate significance to anesthesia providers to modify anesthesia techniques to reduce or avoid exposure to inhaled anesthetic agents or to add pharmacological agents to mitigate the ED. A variety of drugs categories have been used to prevent ED. Sedatives, hypnotics, anxiolytics including benzodiazepines & alpha-2 agonists, and opioids have been advocated due to their abilities to modulate ED frequency and severity. According to the literature, these classes of pharmacological adjuvants have been found to reduce the occurrence of ED over the years. However, dexmedetomidine, an alpha agonist has recently received notable attention in reducing emergence delirium in children (Nair & Wolf, 2018). Dexmedetomidine has been found to attenuate postoperative emergence and agitation in pediatrics following sevoflurane anesthesia. Considerable progress has been made in the field of neuroscience of anesthesia and new pharmacological agents, however, the mystery regarding the exact mechanism of ED is still elusive. ED's diagnosis has been mistaken for pain and vice versa. Several drugs have been used to treat ED. However, alpha 2 agonists and propofol as a single dose or as TIVA has been the evidence base for the best treatment according to Wolf & Nair, 2018. Emergence delirium after general anesthesia has been reported to decrease after a single dose of dexmedetomidine of .3mcg/kg IV on induction (Kovac, 2018). Due to the intrinsic analgesic and sedative properties associated with dexmedetomidine, it is considered the most appropriate prophylactic medication to prevent ED by multiple studies (Urits, et al., 2020). Due to the multiple properties possessed by dexmedetomidine and efficacy reported by multiple studies in comparison to other existing pharmacological agents, it is imperative that a standard of care be materialized on the basis of supporting evidence available to minimize the frequency of emergence delirium in the near

future. According to Urits et al. (2020) due to the high incidence and the occurrence of this disheartening clinical syndrome to both the parents and the children, attempts should be made to administer medications that have been proven to help prevent ED.

Summary of the Literature

The literature review search below confirms the promising results of dexmedetomidine in the prevention of ED. Physicians, nurses, and staff should all be familiar with the basic pathophysiology of delirium, diagnostic and management approaches specific to each institution. The ultimate goal is proper screening and interventions in order to activate the next steps to evaluate and manage accordingly (Malas et al, 2017). To promote the use of dexmedetomidine in current practice, educational interventions are indispensable. Educational interventions geared towards anesthesia providers will close the gaps that exist. Educational interventions will increase knowledge and awareness of practitioners to act prophylactically in the intraoperative period to reduce the occurrence of ED with the administration of dexmedetomidine.

Search strategy

Multiple databases were utilized to search the literature, including Cumulative Index to Nursing & Allied Health Literature (CINAHL), Cochrane Database, Medline, and Pubmed from 2007 to 2020 to guide this research. Boolean terms AND and OR, and a variety of searched terms such as pediatric, emergence agitation, delirium, general anesthesia, anesthetic gases, dexmedetomidine, anesthetic adjuncts, educational intervention, and anesthesia providers were utilized to search the different engines. Inclusion criteria include Systematic Reviews, Primary Research Studies, and Meta-Analysis published in English in peer reviewed journals addressing the PICO question. Of the articles retrieved, a total of 237 studies originating globally including studies from Australia,

Tehran, and China were appraised. After scanning the articles for relevance to the PICO question formulated to conduct the research, a total 9 articles fit the criteria for the research project.

Selected Articles

The literature provides substantial evidence describing the benefits of dexmedetomidine in the reduction of emergence delirium. Given the negative impact of emergence delirium on families, patients, and the hospital staff, it is imperative anesthesia providers incorporate the intraoperative use of dexmedetomidine to reduce the negative sequelae experienced by patients with ED (Nair & Wolf, 2018).

Manning et al (2020) believes that emergence delirium has a high incidence and a slew of untoward effects in the pediatric population. Manning stresses the investigation of pharmacological measures to mitigate this phenomenon is of extreme importance to the anesthesia provider. Dexmedetomidine, the highly effective alpha₂ agonist drug has been proven to be very effective in the prevention of ED, however, multiple barriers such as side effects, delayed emergence, and dosing could be the cause of the underutilization of the drug. The review consisted of 5 randomized controlled trials (RCTs) and 2 meta-analyses. The sources were of level I and level II evidence originating from India, Greece, Korea, and China. The participants ranged from age 1 to 15 years old according to the American Society of Anesthesiologists (ASA) physical status from 1 to 3. General anesthesia was maintained with sevoflurane, desflurane with or without nitrous oxide. A PRISMA Diagram of literature search Examining Dexmedetomidine Dosing to prevent ED was utilized. The PAED (Pediatric Anesthesia Emergence Delirium (PAED) score, the Watcha scale, and the 5-point scale were

used to conduct the study. Evidence demonstrated boluses of dexmedetomidine between .5 to 2mcg/kg reliably decrease ED. However, a dose greater than 0.5mcg/kg remains unclear whether it has in decreasing ED. Administration of dexmedetomidine has been proven to reduce the requirement for inhalational agent. Future studies are recommended to investigate the preferred time for dexmedetomidine administration to expedite emergence, reduce the use volatile agent and its antisialogogue property reported as a secondary outcome from dexmedetomidine administration.

Makkar et al (2016) conducted a study comparing a single dose administration of dexmedetomidine with propofol for the prevention of emergence delirium after desflurane anesthesia in children. A sample size of 100 patients was collected. Randomly dexmedetomidine, propofol, and saline were administered to the participants. The children were between 2 and 8 years old with an American Society of Anesthesiologists physical status of I or II scheduled for an infraumbilical surgery under general anesthesia with a single shot caudal block. The presence of developmental delay, neurological disease, recent administration of sedatives or analgesics, allergy to the study drugs and previous exposure to general anesthesia were the exclusion criteria. The PAED scale was used, and a score of 10 or more indicated the presence of emergence delirium. The student t-test was used to analyze normally distributed data and the chi-square test or Fisher's exact test was used for categorical data. Emergence delirium occurred in 9.4% in the dexmedetomidine group, 13.9% in the propofol group, and 40.6% in the saline group (Makkar et al., 2015). According to the reported result, the dexmedetomidine group surpasses the other two groups in reducing ED. However, an increase in sedation was seen was noticeable in the dexmedetomidine and propofol groups. Also, the wake-up time from anesthesia and transfer from the post-anesthesia care unit were more prolonged in the propofol and

dexmedetomidine group than the saline group. Sedation occurred in 62.5% of children 10 minutes after transfer to the recovery area, 44.4% in the propofol group, and 12.5% in the saline group. The reduction of ED is notable significantly in the dexmedetomidine group; however, a greater incidence of sedation is seen in the recovery area.

Hauber et al (2015) examined the study conducted from Children's Hospital of Pittsburgh, Pennsylvania. A total of 400 patients from age 4 to 10 years old underwent a randomized trial to compare the occurrence of ED after tonsillectomy with or without adenoidectomy, with or without myringotomy, and/or tympanostomy tube insertion. Five minutes after a standardized anesthetic regimen was given, a dexmedetomidine bolus was given to one group and saline was given to the other group. A baseline measurement of vital signs was recorded immediately before the administration of the drug and every minute thereafter for five minutes. In PACU, emergence agitation was assessed using PAED scale, vital signs, postoperative opioid use and complications were noted. Emergence delirium occurrence was significantly lower in the dexmedetomidine group compared to the saline group. Hauber et al demonstrated rapid intravenous bolus of dexmedetomidine in children reduce the incidence of emergence delirium. Some hemodynamic changes have been seen, however none required interventions. Dexmedetomidine is an effective drug in the prevention of emergence delirium. This study could have been more robust, unfortunately many important aspects have been omitted. Future recommendations were not advised. A PRISMA graph was not included. The incidence in the dexmedetomidine was at 36% and 66% in the saline group. The dexmedetomidine group reduced the incidence of ED and the postoperative opioid administration as compared to the saline group.

Despite the reported effectiveness of prophylactic dexmedetomidine in the prevention of emergence agitation induced by sevoflurane, a degree of controversy still exists. Sun & Guo (2014) conducted a meta-analysis of 15 randomized controlled trials to evaluate the efficacy of dexmedetomidine on the occurrence of emergence agitation related to sevoflurane. The authors carried out a comprehensive literature search to compare dexmedetomidine with placebo in reducing the incidence of sevoflurane induced emergence agitation in children. A total of 518 patients received dexmedetomidine and 413 received a placebo. The studies included studies effectuated in China, United States, Egypt, Turkey, Japan, and India. The investigators concluded dexmedetomidine was efficacious in the reduction of sevoflurane induced ED in comparison to the placebo.

Cho et al (2020) conducted a randomized controlled trial to compare the single minimum dose administration of dexmedetomidine and midazolam for prevention of emergence delirium in children. A total 70 children from age 24 months to 12 years participated in this study. A group of patients received 0.03mg/kg of midazolam and 0.3mcg/kg of dexmedetomidine were administered to the other group 5 minutes before surgery ended. A four-point agitation scale and PAED scale were used to assess emergence delirium. A flowchart demonstrating the enrollment, allocation and analysis of the facts and a baseline table delineating baseline characteristic, operation time, and anesthesia time of the patients were presented in the article. According to the authors, the incidence of ED from the midazolam group was reported at 31.3% and 26.5% in the dexmedetomidine group. Overall, both medications have been found to be equally effective in the prevention of ED. However, dexmedetomidine has shown significant analgesic effect compared to midazolam.

Wang et al. (2017) conducted a network of meta-analysis using ancillary drugs preventing emergence agitation with sevoflurane for pediatric anesthesia. The drugs included ketamine, propofol, dexmedetomidine, clonidine, midazolam, fentanyl, remifentanyl, and sufentanyl. These authors reveal that dexmedetomidine was among the most effective adjuvants in decreasing emergence agitation in sevoflurane induced anesthesia. Sixty-seven articles were extracted for the data out of the 1301 studies originally retrieved. A 95% of confidence interval (CI) was documented. Cochran's Q and Higgins' I² quantified the degree of heterogeneity. The surface under the cumulative ranking curve (SUCRA) values clearly indicates that dexmedetomidine had the highest value in the ranking scheme supporting its effectiveness in comparison to the other adjuvants. The authors' analysis suggests dexmedetomidine is potentially preferable to the other adjuvants.

According to Mafinejad et al. 2013, medical professionals must sustain and advance their competence to practice regarding organization, society and patients changing needs. As a result, effective learning will lead to personal and professional development. The change in attitudes and perceptions in healthcare professionals towards a new practice is not an easy task. Multiple educational methods have been proven to be effective in changing the behaviors of ingrained practices in many providers. The literature search was very limited in finding articles to support the specific use of an educational intervention to promote a change in attitude and perception of anesthesia providers towards the standard utilization of dexmedetomidine to reduce the occurrence of emergence delirium. However, the literature has an abundance of literature demonstrating countless methods that have been used in the medical practice to promote and sustain professional sustenance and enrichment. Health belief models, good clinical practice

guidelines, study guides, pre and post educational questionnaire and webinars have been utilized to promote learning and change in attitude and perception.

Goel et al conducted a cross-sectional descriptive study among healthcare professionals in India consisted of 80 doctors, 20 dentists, and 20 nurses at a Tertiary Health Care and Teaching Institute. The aim was to assess the level of awareness and perception of the healthcare professionals toward Good clinical practice (GCP) guidelines and subsequent change after a day training session on GPC guidelines. A self-administered questionnaire framed in English consisted of three parts, demographic, role of participant as a healthcare provider, and the last part included a descriptive set of questions seeking in depth knowledge of healthcare professionals about GCP guidelines. The two-tailed Z-Test was used to measure changes in the awareness and perception of GCP guidelines among healthcare providers between pre- and post-intervention and to assess the impact of effectiveness of educational intervention among providers. In conclusion, the authors demonstrated an educational intervention can increase the knowledge and awareness about principles and techniques of clinical research among healthcare providers.

In a quasi-experimental study at the military university of Tehran, to determine the effects of education patterns of dietary consumption was undertaken by Tavakoli et al in 2016. A total of 242 medical students comprised the sample group. The control group consisted of 107 participants and 135 in the interventional group. A self-administered questionnaire comprised six categories: perceived benefits, knowledge, perceived barriers, perceived threats, self-efficacy, and behavior. After the health belief model educational intervention on knowledge, attitude, and behavior in medical students, the efficacy was notable. The mean pre-intervention knowledge

score was 6.76, perceived threats 2.93, perceived benefits 7.28, perceived barriers 5.44, self-efficacy 4.28 and behavior 8.84. The post-intervention scores were as followed: knowledge 8.3, perceived threats 3.29, perceived benefits 7.71, perceived barriers 5.9, self-efficacy 4.6, and behavior 9.45. The significant improvement in all the categories echoed the significance of a pre- and post- educational intervention.

Study guides are effective tools in improving self-directed learning skills in medical students. They can make a major contribution to self-directed learning. Assumptions have been made that study guide are able to improve ability to assimilate and synthesize medical information and strengthen self- learning skills. A quasi-experimental study conducted by Mafinejad et.al, 2014 was composed of 46 undergraduate medical students in their fourth academic year at Iran University of Medical sciences. The control group comprised 22 students and the interventional group of 24 students. Both groups took part in a diagnostic test administered before and at the end of the course. Study guides were provided to the intervention group. The control group was only involved in the conventional training program. The mean scores for the control and the intervention group were 6.18 and 6.13. In the post-test the mean scores were significantly higher 9.25 and 12. In regard to students' perception, most students demonstrated a positive attitude toward the guides and agreed they played a role in promoting self-learning skills. Despite the effectiveness validated by the study guides among medical students, such strategy has not been mentioned as an effective tool among healthcare professionals, studies are needed among medical providers to confirm such efficacy.

Continuing professional development (CPD) programmes traditionally have been viewed as important strategies to stay current in the field of dentistry in Australia according to Parashos,

2007. However, limited information was available to verify the translation of these programs into clinical practice. A study was undertaken to investigate and report on the factors included in the translation of learned concepts among dentists into clinical practice in Victoria. The participants were surveyed utilizing a pre-CPD, a post-CPD, and 3 months following the program. It was found the use of the time series questionnaires were effective tools in the translation of concepts learned in CPD programmes in clinical practice. The overall response rate was 94% for pre-CPD and post-CPD questionnaires and 77% for the three months delayed. The uptake of learned concepts was found to be facilitated by CPD programmes. While these programmes positively impact clinical practice, it has been suggested the use of traditional methods such as lectures and hands on format should not be shunned as they may promote effective learning in other disciplines.

AUTHOR/ JOURNAL / YEAR	TYPE/ DESIGN/ FOCUS OR PURPOSE OF STUDY	POPULATION /DEMOGRAP HICS/ INCL/EXCL CRITERIA	METHODS/ INTERVENT- ION PROCEDURES	MEASURE- MENTS	RESULTS/ CONCLUSION	DISCUSSION / LIMITAT- IONS
<p>Cho, E.A., Cha, Y.B., Shim, J.G., Ahn, J.H., Lee, S.H., Ryu, K.H. (2020)</p> <p>Comparison of single minimum dose administration of dexmedetomidine and midazolam for prevention of emergence delirium in children: a randomized controlled trial. <i>Journal of Anesthesia</i>, 34, 59-65.</p> <p>https://doi.org/10.1007/s00540-019-02705-</p>	<p>Randomized controlled trial conducted to compare the efficacy of minimal dosage of midazolam versus dexmedetomidine to prevent ED in children undergoing tonsillectomy</p>	<p>24 months to 12 years scheduled for elective tonsillectomy under general anesthesia with ASA class I or II</p>	<p>Principles of Declaration of Helsinki Subjects received 0.03mg/kg of midazolam in 10ml of normal saline or dexmedetomidine 0.3mcg/kg in 10ml of saline</p>	<p>T test, Mann-Whitney U test, Pearson's X2 test Fisher's exact test, Statistical Package for the Social Sciences (SPSS) v 20.0 software were used</p>	<p>Dexmedetomidine and midazolam at single minimum dose showed equal effectiveness to prevent ED in children</p>	<p>Absence of control group</p> <p>Significant difference in pain score noted between both groups: Analgesic effect of both agents should have been taken into consideration</p> <p>Strength: Comparing incidence and severity of ED using smallest dose of dexmedetomidine and midazolam that would not delay anesthesia recovery</p>

AUTHOR/ JOURNAL YEAR	TYPE DESIGN FOCUS OR PURPOSE OF STUDY	POPULATION /DEMOGRA- PHICS INC/EXC CRITERIA	METHODS INTERVEN- TIONS PROCEDURES	MEASURE- MENTS VARIABLES	RESULTS CONCLUS-IONS	DISCUS- SIONS LIMIT- ATIONS
Hauber, J.A., Davis, P.J., Bendel, L.P., Martyn, S.V., Evans, M.C., Cladis, F.P., Cunningham, S., Lang, R.S., Campbell, N.F., Tuchman, J.B., Young, M.C., (2015) Dexmedetomidin e as a rapid bolus for the treatment and prophylactic prevention of emergence agitation in Anesthetized children. Journal of Anesthesia & Analgesia, 121(5), 1308- 1315	Double-blind, randomized study	100 patients age 4 to 10	After standardized anesthetic regimen, 5 minutes before end of surgery patients in group dex received a rapid IV bolus 0.5mcg and saline group received equivalent of saline volume	Emergence delirium assessed in post anesthesia care using the Pediatric Anesthesia Emergence Delirium (PAED) scale	Incidence of emergence delirium significantly lower in dexmedetomidi ne group compared to saline group	None overtly stated in the study

AUTHOR/ JOURNAL/ YEAR	TYPE/ DESIGN/ FOCUS OR PURPOSE OF STUDY	POPULATION /DEMOGRA- PHICS INC/EXCL CRITERIA	METHODS INTERVEN- TIONS PROCED-URES	MEASURE- MENTS	RESULTS CONCLUSIONS	DISCUS- SIONS LIMIT- ATIONS
<p>Makkar, J.K, Batia, N., Bala. I., Dwivedi, D., Singh, P.M, (2016). A comparison of single dose dexmedetomidine with propofol for the prevention of emergence delirium after desflurane anaesthesia</p>	<p>Randomized control trial to compare characteristics in 100 patients receiving dexmedetomi- dine, propofol or saline undergoing infra- umbilical surgery</p>	<p>100 children age 2 to 8 of ASA I or II</p> <p>EXCL CRITERIA: Developme ntal delay, neurological disease, recent ingestion of sedatives or analgesics, any known allergy to propofol or dexmedeto midine or previous general anesthesia</p>	<p>After anesthesia induction & caudal block Five minutes before end of surgery, each group received set dose of dexmedetomi dine, propofol, and saline.</p>	<p>PAED scale used to measure emergence delirium post extubation Face, legs, activity, cry & consolability (FLACC) scale used to evaluate pain</p>	<p>ED at 9.4% in Dexmedetomid ine group, 13.9% in propofol group, & 40.6% in control group</p>	<p>Limitation: discharge time was not recorded</p>

AUTHOR/ JOURNAL/ YEAR	TYPE/ DESIGN/ FOCUS OR PURPOSE OF STUDY	POPULATION /DEMOGRA- PHICS INC/EXCL CRITERIA	METHODS INTERVEN- TIONS PROCED-URES	MEASURE- MENTS	RESULTS CONCLUSIONS	DISCUS- SIONS LIMIT- ATIONS
Manning, A.N, Bezzo, L.K, Hobson, J.K. Zoeller, J.E. Brown, A.C. Henderson, K.J (2019) Dexmedetomidin e dosing to prevent pediatric delirium	5 RCTs S 2 systematic reviews Measures to prevent untowards effects of ED	Age:1-15 ASA status 1-3	PAED score WATCHA scale 5-point scale	Odd Ratio (OR) & Confidence Interval (CI)	Maximizing the benefits of dexmedeto- midine depends on dosage and timing of administration	Future studies to quantify its contri- bution in reducing volatile agent & investigate its possible antinausea property.

AUTHOR/ JOURNAL/ YEAR	TYPE/ DESIGN/ FOCUS OR PURPOSE OF STUDY	POPULATION / DEMOGRA- PHICS INC/EXCL CRITERIA	METHODS INTERVEN- TIONS PROCED-URES	MEASURE- MENTS	RESULTS CONCLUS-IONS	DISCUS- SIONS LIMIT- ATIONS
Wang, X., Deng, Q., Liu, B., Yu, X., (2017) Preventing emergence agitation using ancillary drugs with sevoflurane for pediatric anesthesia: a network analysis	Meta- Analysis Analyzing effective-ness of other adjuvants in reducing EA Average 4.7 years, 60.30% males	67 RCTs INC: primary research topic, major anesthetic used in each group was sevoflurane, each study group received at least one adjuvant or placebo, outcome of EA assessed in each study	Study flow/Selectio n diagram, OR, CI, Degree of heterogeneity	Surface under cumulative ranking curve (SUCRA)	Dexmedeto- midine preferable over other adjuvants	Adjuvants like remifenta- nil & sufentanil had small sample size Uncontrol- led factors like dosage, ethnicity may influence EA

AUTHOR/ JOURNAL/ YEAR	TYPE/ DESIGN/ FOCUS OR PURPOSE OF STUDY	POPULATION/ DEMOGRA- PHICS INC/EXCL CRITERIA	METHODS INTERVEN- TIONS PROCED-URES	MEASURE- MENTS	RESULTS CONCLUS- IONS	DISCUS- SIONS LIMIT- ATIONS
Sun, L., Guo, R., Dexmedetomi- dine for prevent- ing sevoflurane- related emergence agitation in children: a meta- analysis of randomized controlled trials	Meta- analysis of RCTs to evaluate effective- ness of dexmedetomi dine on EA related to sevoflurane use	Infants & children 15 RCTs, 518 received Dexmedetom i-dine, 413 received placebo	Systematic review & meta- analysis conducted to quality report of meta-analyses recommendatio ns	Cochrane collaborati on tool to assess bias in randomized trials	Dexmedeto mi-dine possesses a prophylactic effect in averting sevoflurane induced EA	Number of patients limited 2 trials designed with low risk bias. 13 were of moderate risk bias Safety in terms of cardiovascul ar effects were not studied
Goel, D., Walia, R., Sharma, P., Kaur, H., Agnihotri,P./ Perspectives in Clinical Research/ 2017	Assess level of awareness, and perception of the healthcare providers toward GCP and subsequent change in these after a day's training session on GCP guidelines	120 healthcare providers including medical doctors, dentists, and nurses	Self- administered questionnaire divided in 3 parts completed before and after undergoing a day training program in GCP guidelines	Two-tailed Z-test used to evaluate impact of effectivene ss of educational interventio ns on healthcare professiona ls	A day's training program on GCP guidelines was found to increase positive attitudes towards various aspects of clinical trials	Inclination towards clinical research was found to increase after a day of educational training program

AUTHOR/ JOURNAL/ YEAR	TYPE/ DESIGN/ FOCUS OR PURPOSE OF STUDY	POPULATION/ DEMOGRA- PHICS INC/EXCL CRITERIA	METHODS INTERVEN- TIONS PROCED-URES	MEASURE- MENTS	RESULTS CONCLUS- IONS	DISCUS- SIONS LIMIT- ATIONS
Tavakoli, H.R., Dini-Talatappeh, H., Rahmati- Najarkilaei, F., Fesharaki,M.G. Iran Red Crescent Med Journal/2016	Quasi- experimental study Study's purpose sought to determine the effects of education on patterns of dietary consumption	242 medical students from Military University of Tehran ranging from 18 -32 years/ Current University students/Mai med & Disabled	Self- administered questionnaire including six different categories	Cronbach alpha coefficient to validate internal consistency /3-point Likert scale	Significant improvement in experimental group's mean knowledge, HBM structures, and behavior scores indicates positive effect of intervention	Subjects were young military students not from military Units. Weakness: convenience sample consisted only of military students.
Parashos, P./ Australian Dental Journal/2007	Aim: to investigate and report on the factors involved in translating learned concepts in clinical practice among dentists using CPD programmes	Participants ranges between 11- 20 dentists	Participants used three questionnaires over 3-time frames, pre- CPD, post- CPD, three months after the program in 6 CPD courses		Programs were found to be effective in facilitating uptake of new technologies taught in courses. Overall response rate in pre- CPD & post-CPD 94%, 74 % delayed response	Unequal participants in different courses/Not all the CPD programmes covered exactly the same material

Purpose

Various pharmacological agents have been recognized as being effective in the prevention and treatment of ED. However, a standardized treatment has not yet been established. ED has been causing very real distress to the child, the parents, and the staff in the postoperative period. Dexmedetomidine has recently received significant attention in reducing ED due its multiple pharmacological properties. Consistently, dexmedetomidine has shown decrease in the occurrence of ED and agitation in the pediatric population when it is utilized as an adjunct to volatile anesthetics. Additionally, a decrease in nausea, vomiting, and pain have been noted postoperatively (Urits et al., 2020). In an effort to decrease emergence delirium in the pediatric population, our primary goal at the end of the project is to change the attitude, perception, and intraoperative practices of the anesthesia providers at Nicklaus Children's Hospital through educational interventions on the efficacy of dexmedetomidine in the prevention of emergence delirium. At Nicklaus Children's Hospital not all the twenty-two full-time anesthesia providers are avid supporters of dexmedetomidine use to prevent emergence delirium. An educational intervention is believed to be the catalyzer in bringing a change in the way certain providers have been practicing over the years.

PICO Question

Will the anesthesia providers at Nicklaus Children's Hospital experience a shift in attitudes and perceptions after an educational intervention on the efficacy of dexmedetomidine during general anesthesia to alleviate emergence delirium in pediatric population from ages 2 to 15 years old?

PICO Clinical Question

Population = Anesthesia providers at Nicklaus Children's Hospital

Intervention= An educational intervention on the efficacy of dexmedetomidine to prevent emergence delirium in the pediatric population

Comparison= Pre and post survey on the perceptions, attention, and preoperative practices among pediatric anesthesia providers

Outcome= Change in attitude, perceptions and preoperative practices (O).

Various pharmacological agents have been recognized as being effective in the prevention and treatment of ED. However, a standardized treatment has not yet been established. ED has been causing very real distress to the child, the parents, and the staff in the postoperative period. Dexmedetomidine has recently received significant attention in reducing ED due its multiple pharmacological properties. Consistently, dexmedetomidine has shown decrease in the occurrence of ED and agitation in the pediatric population when it is utilized as an adjunct to volatile anesthetics. Additionally, a decrease in nausea, vomiting, and pain have been noted postoperatively (Urits et al., 2020). In order to improve patient outcomes and parental satisfaction, the objective of the DNP project is to increase the knowledge of the anesthesia providers at NCH to promote the use of dexmedetomidine to minimize the occurrence of ED.

Objectives

I. At the conclusion of the DNP project, 15-20% of the anesthesia providers at Nicklaus Children's Hospital will score at least 80% on the post questionnaire dexmedetomidine survey after attending the scheduled educational sessions.

II. At the conclusion of the DNP project, there will be a baseline increase of 15-20% of the anesthesia providers showing a change in attitude and perception to incorporate

dexmedetomidine in their practice to reduce ED over the other adjuvant medications previously used.

Definitions of terms

Emergence delirium: is a dissociated state of consciousness in which children are inconsolable, irritable, uncompromising, and or uncooperative (Cote, 2019).

Emergence agitation: an umbrella of signs and symptoms including delirium, postoperative pain and behavior disorders (Cote, 2019).

Pediatrics: the medical specialty concerned with prevention, diagnosis, treatment, and diseases in children (Porta & Last, 2018).

General anesthesia: A reversible state of unconsciousness induced artificially for the purpose of performing procedures or surgery. It may be divided into induction, maintenance, and emergence stages (Shorthouse, 2017).

Anesthetic gases: also known as inhaled anesthetics, administered as primary therapy for preoperative sedation and adjunctive anesthesia maintenance to intravenous anesthetic agents in the perioperative setting (Clar et al., 2020).

Dexmedetomidine: a selective alpha₂ agonist has several pharmacodynamic properties including anxiolytic, analgesic, and antisialagogue (Manning et al., 2020).

Teaching strategies: also known as instructional strategies, are methods instructors use to deliver course material in ways that keep students engaged and practicing different skills sets (Kathy, 2020).

Perception: the process or result of becoming aware of objects, relationships, and events by means of the senses, which includes such activities as recognizing, observing, and discriminating. These activities enable organisms to organize and interpret the stimuli received into meaningful knowledge and to act in a coordinated manner.

Attitude: a relatively enduring and general evaluation of an object, person, group, issue, or concept on a dimension ranging from negative to positive. Attitudes provide summary evaluations of target objects and are often assumed to be derived from specific beliefs, emotions, and past behaviors associated with those objects.

Theoretical Framework

Continuous professional development relies heavily on the relationship between performance and an educational process aimed at ameliorating knowledge and skill. In 1990, psychologist George Miller proposed a framework to assess clinical competence known as the Miller's pyramid. It is one of the mostly used framework in the assessment of skills. It ranks clinical competence in the workplace and educational settings. This pyramid consists of a series of levels of achievement starting with knowledge and ending with routine clinical application. As a framework, it differentiates knowledge at the lower levels and action at the upper levels. This conceptual framework maintains the only way to know whether learners have achieved what they were supposed to learn is only by assessing them in clinical setting where they expect to deliver. This rationale truly underpins the conceptual framework of the assessment of any project in the workplace (Carley, 2015).

The four levels of the Miller's pyramid include the followings: 1) Knows 2) Knows how 3) Shows how 4) Does. The first component: **Know** involves the gathering of facts. The **Knows**

How encompasses interpretation and application of the facts. **Shows** has to do with demonstration of learning. **Does** is the performance integration into practice, observable through daily patient care. The four levels are further divided into two categories: cognition and behavior. Knows and Knows How fall under cognition where knowledge about the facts have been acquired. Shows and Does fall under behavior. Once knowledge is acquired in the first two steps, the manifestation of this knowledge is noticeable in the last two steps. The application of the knowledge will be exhibited in the provider's behavior by practicing what has been thought (Carley, 2015).

This theoretical framework will be used to guide the DNP project. First, facts will be gathered about dexmedetomidine to assess providers' knowledge. Second, educational sessions will be provided to enhance learning about the dexmedetomidine. The behavioral responses of the staff in the last two steps will be assessed through verbalization of the information and their reported use of the medication to combat emergence delirium in clinical setting.

Methodology

Settings and Participants

The DNP quality improvement project was launched at Nicklaus Children's Hospital. The anesthesia team at Nicklaus Children's Hospital is comprised of anesthesiologists, nurse anesthetists, and anesthesia assistants which is further subdivided into the cardiac and the general anesthesia providers. In total, 27 providers made up the team. This convenient sample was well qualified for the improvement project since the common goal of the team is to deliver excellent anesthesia care through evidence-based practice. By acquiring a better understanding on the

efficacy of dexmedetomidine in mitigating ED through the educational intervention, a change in attitude and perception was attainable.

Recruitment

The population targeted for the Quality Improvement project were the anesthesia providers at Nicklaus Children's Hospital. Of the 27 expected participants, 17 providers took part in the project including anesthesiologists, Certified Registered Nurse Anesthetists, and anesthesia assistants. The informational letter was used as the consent form to allow the anesthesia providers to take part in the project since it contained all the details required for a participant. The participants were not obliged to submit any other consents. Accepting to do the surveys and watch the PowerPoint educational session is considered a voluntary consent for participation.

Protection of Human Subjects

The data collection was anonymous. The only demographics questions included in the surveys were about gender, age, and title. After the surveys were created in Qualtrics and published. The presurvey link, the PowerPoint educational presentation link, and the postsurvey link were sent via WhatsApp to the clinical preceptor who later emailed them to the participants to avoid any bridge in anonymity

Data Collection

The only instruments utilized for the project were the pre-questionnaire survey, the voice over power point presentation and post-questionnaire survey. A pre and post surveys were created. Each survey consisted of 13 questions. The first three questions addressed demographics: age, gender, and age. The next five were dedicated to assessing the providers'

knowledge about dexmedetomidine. Finally, the last five were directed towards the comfortability and the likelihood of the providers in using dexmedetomidine. The surveys were typed into the Qualtrics system, which generated the links needed for project and later published. The links for the surveys and the power point educational session were sent to the clinical preceptor who later forwarded them to the participants.

Description of approach and project procedures

The quality improvement project took about three weeks to be completed by the participants. The pre and post questionnaire survey questions were typed on Qualtrics to create the links needed for the surveys. Afterwards the presurvey link, the power point educational session link, and the post survey links were sent via WhatsApp to the clinical preceptor which were then forwarded to the participants via email. The pretest questionnaire assessed the provider's general knowledge about dexmedetomidine and their current attitude towards introducing dexmedetomidine in their practice. A pre-recorded power point voice over format about dexmedetomidine mechanism of action, pharmacological properties, dose range, clinical uses especially in mitigation of emergence delirium in pediatrics, and potential side effects was presented to the participants. The same set of questions utilized for the pretest survey was used as the post-test to evaluate the providers knowledge acquisition on dexmedetomidine and change in attitude after the educational session. The attitude questions for the surveys were self-generated based on the objectives listed of the quality improvement project. Over the three weeks allotted for the completion of the project, seventeen anesthesia providers responded.

Data Analysis & Results

The data collected from the pre and post questionnaire surveys are stored in the Qualtrics system. The scores for both surveys have been analyzed. Knowledge and attitude scores have been examined separately.

In the pretest twenty-five participants attempted the survey. Only 17 anesthesia providers completed it. Out of the 17 participants ten were males and seven were females. The providers included five anesthesiologists, five certified nurse anesthetists and seven anesthesia assistants. For the age range three providers were between 20-30 years old, nine between 31-40 years old, two between 41-50 years old, and three between 51-60 years old. None of the participants were above 60 years old.

In the post survey sixteen participants completed the questions. Ten were males and six were females. The providers included five anesthesiologists, five certified nurse anesthetists and six anesthesia assistants. For the age range, three ranged between 20-30 years old, eight between 31-40 years old, two between 41-50 years old, and three among 51-60 years old. None of the participants were above 60 years old.

In the pretest survey, the data clearly shows that the participants' knowledge about dexmedetomidine was limited. The answers to the knowledge questions about dexmedetomidine were as follows: # 1 -100%, # 2 - 30%, # 3 87.5 %, #4 - 62.5%, and # 5-75%. For the attitude questions in the pretest the answers were as follows: #6- 68.75%, #7 -56.25%, #8- 75%, #9 - 62.5%, # 10- 81.25%. After the educational session, the answers were as follows for the knowledge section: 1- 100%, 2 – 100%, 3 – 100%, 4 – 81.25% and # 5 – 81.25%. Overall, the increase in knowledge has increased by. The questions about attitude were as follows: #6-50%,

#7-81.25, #8-87.5%, #9-75%, #10- 87.50%. In the pre survey the test score average was 78.31%.

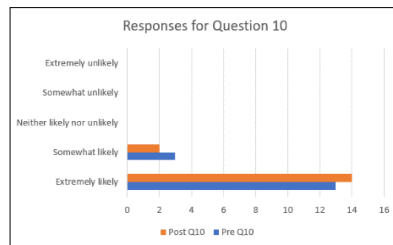
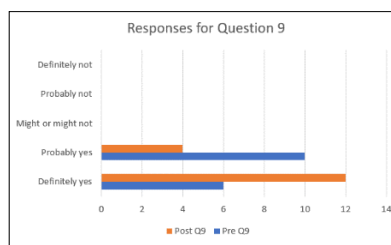
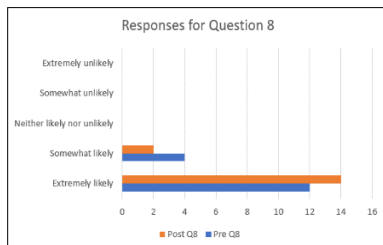
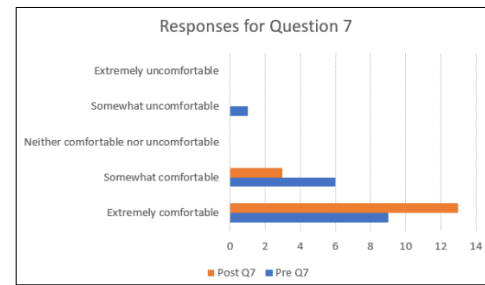
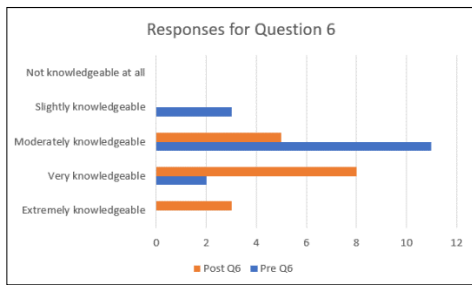
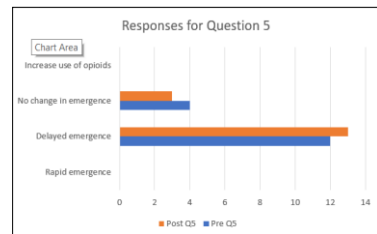
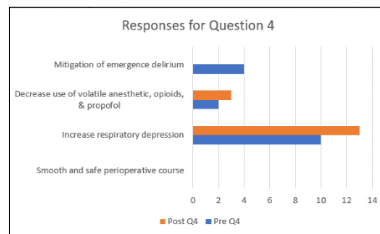
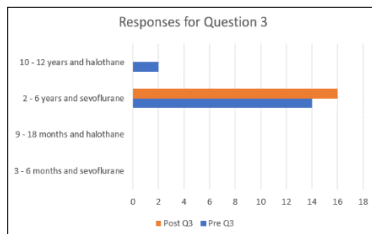
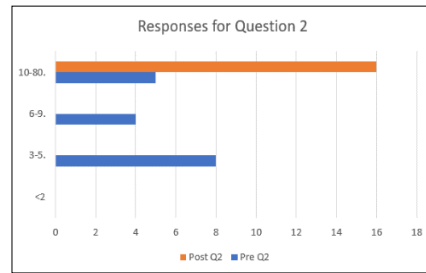
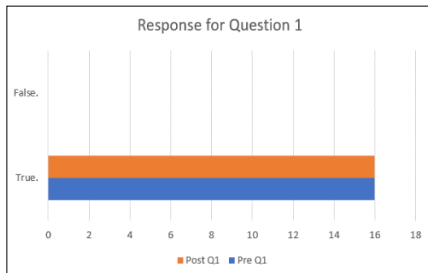
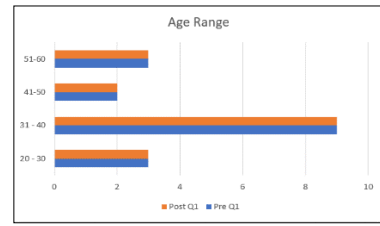
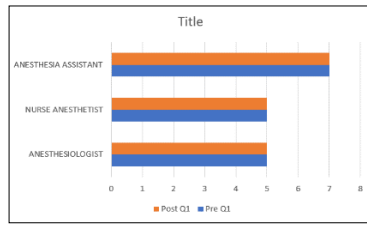
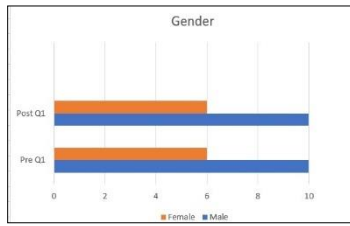
A certain reluctance was notable in the use of dexmedetomidine seeing the results of the pre survey. The answers were as follows: 68.75%, 56.25 %, 75%, 62.5%, and 81.25%. After the educational session, the answers were tabulated as such: 50%, 81.25%, 87.5%, 75%, and 87.5%.

The average presurvey score in the knowledge section was 78.31%, after the educational intervention, the average score was noted to be 92.50%. Similarly, the pre-survey score for the attitude section was 68.75%. After the PowerPoint presentation the score went up to 76.25%. Indubitably, the educational intervention has played a pivotal role in the improving provider's knowledge about dexmedetomidine and promoted a change in attitude by showing an interest in incorporating its use in their practice.

Data Analysis		
PRE AND POST TEST RESULTS		
Knowledge	Pre	Post
1.T/F	100%	100%
2	a.	0%
	b.	47.06%
	c.	23.53%
	d.	29.41%
3	a.	0%
	b.	0%
	c.	87.5%
	d.	12.5%
4	a.	0%
	b.	62.5%
	c.	12.5%
	d.	25%
5	a.	0%
	b.	75%
	c.	25%
	d.	0%
Attitude		
6	a.	12.5%
	b.	68.75%
	c.	18.75%
	d.	0%
	e.	0%
7	a.	56.25%
	b.	37.5%

	c.	0%	0%
	d.	6.25	0%
	e.	0%	0%
8	a.	87.5%	75%
	b.	12.5%	25%
	c.	0%	0%
	d.	0%	0%
	e.	0%	%
9	a.	37.5%	75%
	b.	62.5%	25%
	c.	0%	0%
	d.	0%	0%
	e.	0%	0%
10	a.	81.25%	87.50%
	b.	18.75%	12.50%
	c.	0%	0%
	d.	0%	0%
	e.	0%	0%

Pre-Survey and Post-Survey Results after PowerPoint Educational Session



Mean and Standard Deviation of Pre and Post Survey Test Scores by Subscale (n = 16)

Demographics Questions	Mean		Standard Deviation	
	Pre	Post	Pre	Post
Gender	1.41	1.38	0.49	0.48
Title	5.12	2.06	0.83	0.83
Age Range	2.29	2.31	0.96	0.98
Knowledge Questions				
#1	1	1	0	0
#2	2.82	4.0	0.86	0
#3	3.13	3	0.33	0
#4	2.63	2.19	0.86	0.39
#5	2.25	2.19	0.43	0.39
Attitude Questions				
#1	2.06	2.13	0.56	0.70
#2	1.56	1.19	0.79	0.39
#3	1.25	1.13	0.43	0.33
#4	1.63	1.25	0.48	0.43
#5	1.19	1.13	0.39	0.33

Limitations

The anesthesia team at Nicklaus Children's Hospital is made up of less than 30 providers. Additionally, the number of males outweighs the female providers. A bigger, more diverse sample size would have probably generated more convincing results. The amount of time allotted for the completion of the project might have been a factor as well. Out of the 27 providers, only 17 completed the project. The addition of a few more weeks could have permitted more providers to take part in the project. Due to the current pandemic, the use social platforms to minimize human contact to decrease propagation of the virus may have appeared less attractive to the participants. In person delivery of the PowerPoint presentation could have sparked more interest for some providers.

Discussion of the results with implications to advanced nursing practice

The delivery of the educational presentation has proven to be effective as demonstrated by the pre and post test results. The QI project demonstrated a increase in the knowledge of dexmedetomidine in the treatment of emergence delirium, and a change in attitude and perception towards the implementation of dexmedetomidine in the providers anesthesia regimen. This knowledge acquisition has certainly trumped the deeply rooted practice with the previously used pharmacological agents. Being aware of all its pharmacological benefits in comparison to the other anesthetic adjuvants, the providers are expected to show more interest in incorporating dexmedetomidine into their anesthetic recipe. The literature review confirms pediatric emergence delirium is a real problem continuing to affect a large percentage of children in the early recovery stage of anesthesia after the use of volatile anesthetic agents, especially sevoflurane. Multiple pharmacological agents such as benzodiazepines, opioids, propofol, and

dexmedetomidine have been proven to reduce and even prevent the incidence of ED but dexmedetomidine has been noted to be the most efficacious based on the RCTs, meta-analyses, and primary research that have been conducted Makkar et al (2016). The sedative, analgesic, and anxiolytic properties of dexmedetomidine have made it more favorable over the other agents mentioned earlier, Manning et al (2020). Indubitably dexmedetomidine will continue to be used in combatting ED, however various educational interventions to encourage a change in attitude and perceptions in the providers are imperative in the implementation of its use in any facility including Nicklaus Children's Hospital (NCH) where many providers do not include it in the anesthetic regimen. It is imperative for healthcare practitioners such as anesthesia providers to have the essential knowledge and expertise to act on the recommended standards of care. Additional educational programs towards dexmedetomidine at NCH providers can eventually bring forth more knowledge acquisition and incorporation of its daily use in their practice. The analysis of the data of the quality improvement project has determined that knowledge acquisition and a change in attitude towards the use of a new drug is indeed possible.

Conclusion

Emergence delirium is a real problem continuing to affect a large percentage of children in the early recovery stage of anesthesia after the use of volatile anesthetic agents especially sevoflurane. Its cause remains unknown. Diagnosing ED is not simple. Providers have difficulty differentiating it from pain as the administration of opioids have been successful in eliminating ED. Due to these unsolved mysteries, a definite cure cannot be established. Its occurrence has a significant impact on the mortality, morbidity, and healthcare utilization including patient, family, and provider distress. The early recognition and appropriate management of this

condition will assuredly reduce cost and ameliorate outcomes through prevention, early identification, and rapid, multidisciplinary evaluation and management (Malas, et al 2017). The sedative, analgesic, and anxiolytic properties of dexmedetomidine have made it more favorable over the other agents mentioned earlier. Indubitably dexmedetomidine will continue to be used in combatting ED. Nevertheless, further research is needed to find the appropriate dose, the most favorable administration time, the potential antinausea property, and many other possible benefits mentioned in the literature. This quality improvement project has demonstrated the use of an educational intervention is efficient in increasing a provider's knowledge and promote a change in attitude.

References

1. Carley, S. (2015). Educational theories you must know. Miller's pyramid. Retrieved from: <https://www.stemlynsblog.org/better-learning/educational-theories-you-must-know-st-emlyns/educational-theories-you-must-know-millers-pyramid-st-emlyns/>
2. Clar, D.T., Patel, S., Richards, J.R. (2013). Anesthetic gases. State Pearls Publishing.
3. Cho, E.A., Cha, Y.B., Shim, J.G., Ahn, J.H., Lee, S.H., & Ryu, K.H. (2020). Comparison of single minimum dose administration of dexmedetomidine and midazolam for prevention of emergence delirium in children: a randomized controlled trial. *Journal of Anaesthesia*, 34, 59-65. <https://doi.org/10.1007/s00540-019-02705-6>
4. Cote, C. J., Lerman, J., & Anderson, B.J. (2019). *Cote and Lerman's a practice of anesthesia for infants and children* (sixth edition.). Elsevier.
5. Goel, D., Walia, R., Sharma, P., Kaur, H., & Agnihotri, P. (2017). Impact of educational intervention on knowledge, attitude, and awareness of good clinical practice among health care providers. *Perspectives in Clinical Research*, 8(2), 90-94. <https://doi-org.ezproxy.fiu.edu/10.41103/2229-3485.203045>
6. Hauber, J.A., Davis, P.J., Laima, P., Martyn, S.V., McCarthy, D.L., Evans, M.C., Cladis, F.P., Cunningham, S., Lang, R.S., Campbell, Neal, F., Tuchman, J.B., Young M.C. (2016). Dexmedetomidine as a rapid bolus for treatment and prophylactic prevention of emergence agitation in anesthetized children. *Survey of Anesthesiology*, 60 (4), 1-2.
Hoch, K. (2019). Current evidence-based practice for pediatric emergence agitation. *American Association of Nurse Anesthetists Journal*, 87 (6), 495-499.
7. Hoch, K. (2019). Current evidence-based practice for pediatric emergence agitation. *American Association of Nurse Anesthetists Journal*, 87 (6), 495-499.
8. Kaserer, T., Steinacher, T., Kainhofer, R., Filippo, E., Sonja, S., & Birgit, W. (2020). Identification and characterization of plant-derived alkaloids, corydine and corydaline, as novel mu opioid receptor agonists. *Scientific Reports*, 10 (1) 1-12. <https://doi.org/10.1038/s41598-020-70493-1>
9. Kovac, A.L. (2018). Using dexmedetomidine in your clinical practice. *Current Reviews for Nurse Anesthetists*, 41 (15), 177-192.
10. Lerman, J. (2020). Controversies in pediatric anesthesia. *Current Reviews for Nurse Anesthetists*, 43 (8), 89-104.
11. Mafinejad, M.K., Aghili, R., Emani, Z., Malek, M., Baradaran, H., Taghavinja, M. &

- Khamseh, M. E. (2014). Study guides: effective tools to improve self-directed learning skills of medical students. *Acta Medica Iranica*, 52(10).
12. Makkar, J.K., Bhatia, N., Bala, I., Dwivedi, D., & Singh, P.M. (2016). A comparison of single dose dexmedetomidine with propofol for the prevention of emergence delirium after desflurane anaesthesia in children. *Anaesthesia* 71, 50-57.
13. Malas, N., Brahmabhatt, K., McDermott, C., Smith, A., Ortiz-Aguayo, R., Turkel, S. (2017). Pediatric delirium: Evaluation, management, and special considerations. *Complex Medical Psychiatry Journal*, 19 (65), 1-14.
14. Manning, A.N., Bezzo, L.K., Hobson, J.K., Zoeller, J.E., Brown, C.A., Henderson, K.J. (2020). Dexmedetomidine dosing to prevent pediatric emergence delirium. *American Association of Nurse Anesthetists Journal*, 88 (5), 359-363.
15. Nair, S., & Wolf, A. (2017). Emergence delirium after paediatric anaesthesia: New strategies in avoidance and treatment. *British Journal of Anaesthesia Education*, 18(1), 30-33
<https://doi-org.ezproxy.fiu.edu/10.1016/j.bjae.2017.001>
16. Pardo, M.C., & Miller, R.D. (2018). *Basics of Anesthesia*. (seventh edition.). Elsevier.
17. Porta, M., & Last, J.M. (2018). *Oxford dictionary of public health* (2nd ed.). Oxford University Press
18. Shorthouse, J. (2017). *Oxford dictionary of anaesthesia* (2nd ed.). Oxford University Press.
19. Sun, L., & Guo, R., (2014). Dexmedetomidine for preventing sevoflurane-related emergence agitation in children: a meta-analysis of randomized controlled trials. *Acta Anaesthesiologica Scandinavica*, 58 (6), 642.
<https://doiorg.ezproxy.fiu.edu/10.1111/aas.12292>
20. Tavakoli, H.R., Dini-Talatappeh, H., Rahmati-Najarkolaei, F., & Fesharaki, M.G. (2014). Efficacy of HBM-based dietary education intervention on knowledge, attitude, and behavior in medical students. *Iranian Red Crescent Medical Journal*, 18(11). <https://doi-org.ezproxy.fiu.edu/10.5812/ircmj.23584>
21. Urits, I., Peck, J., Giacomazzi, S., Patel, R., J., & Schwartz, R. (2020). Emergence Delirium in Perioperative Pediatric Care: A review of Current Evidence and New Directions. *Advances in Therapy*, 5, 1897. <https://doi-org.ezproxy.fiu.edu/10.1007/s12325-020-01317-x>
22. Viswanath, O., Kerner, B., Jean, Y.K., Soto, R., Rosen, G. (2015). Emergence delirium: a narrative review. *Journal of Anesthesiology & Clinical Science*, 4 (2), 1-8.

23. Vlajkovic, G.P., Sindjelic, R.P. (2007). Emergence Delirium in Children: Many Questions, Few Answers. *Anesthesia & Analgesia*, 104(1), 84-91.

Wang, X., Deng, Q., Liu, B., Yu, Xiangdi (2017). Preventing emergence agitation using ancillary drugs with sevoflurane for pediatric anesthesia: a network meta-analysis. *Mol Neurobiol*, 54, 7312-7326

APPENDIX A

QI Project PowerPoint Presentation

The Utilization of Educational Intervention to Increase Knowledge & Promote Change in Attitude in Anesthesia Providers





Rose Richardson, CRNA, APRN
De Jonge A. Añales DNP, CRNA, APRN
De Ann Miller, DNP, CRNA, APRN



1


Emergence Delirium (ED)

Emergence delirium is an altered state of consciousness where the child demonstrates a disturbed interaction with the environment characterized by agitated behavior, disorientation, and inconsolability usually within the first 10-30 minutes in the post anesthesia unit lasting about 20 minutes.




2

CHARACTERISTICS OF ED



Agitation Behaviors

- Crying
- Screaming
- Flailing
- Inconsolable, physical restraint, last drug contact




3

Emergence Delirium (ED)

Background

ED was first identified in 1960 by Eckenhoff and his colleagues.



Approximately 14,000 patients were studied. From this sample, 5.3% of the participants experienced some unusual post-operative behavioral disturbances which they have named excitement.



4

Significance of ED



- Difficult experience for family, patient, and provider
- Reduction in patient satisfaction scores
- In open postanesthesia care unit (PACU) environments, effects of ED may affect surrounding patients
- Increase in length of stay → increase cost to institution



5

RISK FACTORS

- Male gender
- Head Emergence
- Presence of water aspirator
- Premedication
- Male gender
- Age 0-30, 30-40
- Head surgery
- Poor quality of anesthesia and/or analgesia
- Patients: emergence anxiety, parental anxiety
- Free siblings
- Poor excitability
- Poor social adaptability





6

Emergence Delirium (ED)

Incidence

Estimate: 10-80% based on published evidence.




7

Significance of ED (cont)

• POSTOPERATIVE MALADAPTIVE BEHAVIORS

- SLEEP DISTURBANCES
- BED WETTING
- TEMPER TANTRUMS
- ATTENTION SEEKING
- ONLINE'S



8

Medications That Have Been Used To Prevent ED


- SEDATIVES/HYPNOTICS
- BENZODIAZEPINES
- ALPHA 2 AGONISTS
- OPIOIDS



9

Literature Findings

- Recent meta analysis consisting of 20 RCTs totaling 1364 patients undergoing various surgical procedures (including tonsillectomies, off-sites procedures, abdominal, and genital operations) found that dexmedetomidine decrease the incidence of emergence delirium compared to placebo.
- Same meta analysis concluded that reduction of emergence delirium with dexmedetomidine may be due to its analgesic properties as well.



10


QI Project Goals

- At the conclusion of QI project, 15-20% of the anesthesia providers will score about 80% on the post questionnaire dexmedetomidine survey after attending the scheduled educational sessions.
- At the conclusion of the QI project, there will be a baseline increase of 15-20% of the anesthesia providers showing a change in attitude and be open to incorporate dexmedetomidine in their practice to reduce ED over the other adjuvant medications previously used.




13

Effectiveness of Educational Intervention




Assessment	Pre-Survey Score	Post-Survey Score
Knowledge Assessment	~65	~85
Attitude Assessment	~60	~75



16

Future Studies


- Quantify contribution of dexmedetomidine to MAC level to assist anesthesiologists to appropriately reduce the volatile agent, assist in a more expeditious emergence time and decreased side effects.
- Further investigation into reducing PONV which is a desirable outcome
- As the opiate free anesthesia trend continues, studies to evaluate optimal amount of dexmedetomidine to reliably provides pain relief in opioid absence and reduce ED are needed.



11

Quality Improvement Project Components

- Location: Pediatric Facility
- Participants: 17 Anesthesia Providers
- Method: Educational Intervention
 - Knowledge Assessment Change Assessment: Pre/Post Survey
 - Post-Test Performance Assessment
 - Knowledge & Attitude Change Assessment: Post-Test Survey



14

Summary

CHANGE IS NOT EASY BUT IT IS POSSIBLE

Quality Improvement Project Result


- Addressed problem: Knowledge & Attitude Change indicated by analysis scores before & after educational intervention. Results:
 - Increased scores in knowledge & change in attitude, as evidenced by pre and post survey results.
 - Highlighted positive impact & effectiveness of educational intervention in enhancing knowledge & attitude change.
- This QI addresses future of educational interventions & serves as foundation for future QI implementation of educational strategies that address an evidence based, targeted solution to increase ED in pediatric patients postoperatively.
- Educational providers are prepared to play a critical role in the transformation of care delivery that is holistic and patient-centered.



17

QI Objectives

Inform practitioners of ED prevalence in Pediatrics
ED as an active problem in post anesthesia period
Detrimental Effects of ED on Patients, Family & Healthcare Systems
Opportunity for improvement achievable through proper treatment; current Evidence based practice on Use of Dexmedetomidine to mitigate ED
Ongoing staff education is crucial to decrease ED occurrence




12

Quality Improvement Project RESULTS

Data Analysis show an increase in knowledge and attitude following educational intervention

- Pre-survey Average Score: Knowledge: 78.31% Attitude: 68.75%
- Post-Survey Average Score: Knowledge: 92.5 Attitude: 76.25%



15

Potential Benefits of QI Project Implementation

- Improve Treatment Adherence
- Improve Outcomes
- Improve Healthcare Satisfaction
- Reduce Healthcare Costs



18

References

- 1. ...
- 2. ...
- 3. ...
- 4. ...
- 5. ...
- 6. ...
- 7. ...
- 8. ...
- 9. ...
- 10. ...
- 11. ...
- 12. ...
- 13. ...
- 14. ...
- 15. ...
- 16. ...
- 17. ...
- 18. ...
- 19. ...
- 20. ...
- 21. ...
- 22. ...
- 23. ...
- 24. ...
- 25. ...
- 26. ...
- 27. ...
- 28. ...
- 29. ...
- 30. ...
- 31. ...
- 32. ...
- 33. ...
- 34. ...
- 35. ...
- 36. ...
- 37. ...
- 38. ...
- 39. ...
- 40. ...
- 41. ...
- 42. ...
- 43. ...
- 44. ...
- 45. ...
- 46. ...
- 47. ...
- 48. ...
- 49. ...
- 50. ...
- 51. ...
- 52. ...
- 53. ...
- 54. ...
- 55. ...
- 56. ...
- 57. ...
- 58. ...
- 59. ...
- 60. ...
- 61. ...
- 62. ...
- 63. ...
- 64. ...
- 65. ...
- 66. ...
- 67. ...
- 68. ...
- 69. ...
- 70. ...
- 71. ...
- 72. ...
- 73. ...
- 74. ...
- 75. ...
- 76. ...
- 77. ...
- 78. ...
- 79. ...
- 80. ...
- 81. ...
- 82. ...
- 83. ...
- 84. ...
- 85. ...
- 86. ...
- 87. ...
- 88. ...
- 89. ...
- 90. ...
- 91. ...
- 92. ...
- 93. ...
- 94. ...
- 95. ...
- 96. ...
- 97. ...
- 98. ...
- 99. ...
- 100. ...

FIU Florida International University
College of Nursing & Health Sciences

19

References

- 1. ...
- 2. ...
- 3. ...
- 4. ...
- 5. ...
- 6. ...
- 7. ...
- 8. ...
- 9. ...
- 10. ...
- 11. ...
- 12. ...
- 13. ...
- 14. ...
- 15. ...
- 16. ...
- 17. ...
- 18. ...
- 19. ...
- 20. ...
- 21. ...
- 22. ...
- 23. ...
- 24. ...
- 25. ...
- 26. ...
- 27. ...
- 28. ...
- 29. ...
- 30. ...
- 31. ...
- 32. ...
- 33. ...
- 34. ...
- 35. ...
- 36. ...
- 37. ...
- 38. ...
- 39. ...
- 40. ...
- 41. ...
- 42. ...
- 43. ...
- 44. ...
- 45. ...
- 46. ...
- 47. ...
- 48. ...
- 49. ...
- 50. ...
- 51. ...
- 52. ...
- 53. ...
- 54. ...
- 55. ...
- 56. ...
- 57. ...
- 58. ...
- 59. ...
- 60. ...
- 61. ...
- 62. ...
- 63. ...
- 64. ...
- 65. ...
- 66. ...
- 67. ...
- 68. ...
- 69. ...
- 70. ...
- 71. ...
- 72. ...
- 73. ...
- 74. ...
- 75. ...
- 76. ...
- 77. ...
- 78. ...
- 79. ...
- 80. ...
- 81. ...
- 82. ...
- 83. ...
- 84. ...
- 85. ...
- 86. ...
- 87. ...
- 88. ...
- 89. ...
- 90. ...
- 91. ...
- 92. ...
- 93. ...
- 94. ...
- 95. ...
- 96. ...
- 97. ...
- 98. ...
- 99. ...
- 100. ...

FIU Florida International University
College of Nursing & Health Sciences

20

Thank You!

FIU Florida International University
College of Nursing & Health Sciences

21

APPENDIX B

Informational Letter

Dear potential participants,

My name is Rose Richemond. I'm a doctoral student at Florida International University Nursing Program. As an anesthesia provider at Nicklaus Children's Hospital, kindly I'm requesting your participation in a quality improvement project titled: Will anesthesia providers experience a shift in attitude and perception after an educational session on the use of dexmedetomidine to prevent Emergence delirium after general anesthesia?

The principal investigator of this project is Dr. Mechell Duran, a faculty member at Florida International university and me as a co-investigator.

The study will be completed using the Zoom platform to minimize contact as occasioned by our current pandemic. The study involves completing a pretest questionnaire, an educational presentation on dexmedetomidine, and a post-test questionnaire. The questionnaire consists of basic demographic, a knowledge session on dexmedetomidine, and attitude & perception shift towards the use of dexmedetomidine to mitigate Emergence delirium. The project is expected to last no more than 60 minutes in its entirety.

Your participation is completely voluntary. You may withdraw at any time. The study is anonymous, your name and other identifying details will not be required.

Your participation in this project will be of great importance to help combat Emergence delirium by promoting the use dexmedetomidine. The information collected in this survey will be kept confidential. Apart from Dr Duran and I, no one will have access to the questionnaires' responses. Besides an improvement in knowledge on dexmedetomidine, and a better approach to patient care in mitigating Emergence delirium after inhaled anesthetics, there are no foreseeable risks.

Thank you in advance for your time and participation

In the event you may have any questions throughout the process, please feel free to contact me at 305-458-1580 or Dr. Mechell Duran at 786-547-9933. If you would like to talk with someone about your rights of being a research subject in this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu. I will provide you with a copy of this page for your records.

Sincerely,

Rose Richemond

Appendix C

Recruitment Flyer

EMERGENCE DELIRIUM

THE CHAMPION ON THE MARKET



Dexmedetomidine
*Why should I make it a Part
 of
 My anaesthetic Practice ?*

Do you want your pediatric patients to emerge smoothly after inhaled anesthetic?

Well, it's time for a shift in attitude

- | | |
|---|--|
| What must I do? | Take part in the upcoming educational session |
| How long is the educational session? | No more than 60 minutes |
| Qualification? | Be an anesthesia provider |
| Where? | Via Zoom |

For additional information please contact

Dr Mechell Duran

Rose Richemond

Florida International University
Nicole Wertheim College of Nursing

Principal Investigator

Co-investigator

Phone: 786-547-9933

Phone: 305-458-1580

Email: meadavi@fiu.edu

Email: rrech012@fiu.edu

Appendix D

Pre-Test Questionnaire on Emergence Delirium & Dexmedetomidine use in clinical practice

Please circle one answer for each question

Demographics

1. Gender: a) male b) female
2. Title: a) Anesthesiologist b) Nurse Anesthetist c) Anesthesia Assistant
3. Age range: a) 20 -30 b) 31- 40 c) 41 – 50 d) 51 – 60 e) 61 & above

Knowledge

1. Emergence delirium is defined as an altered state of consciousness in which the child has a disturbed interaction with the environment; manifested as disorientation, agitated behavior and inconsolability in the immediate post-anesthesia period. T or F
2. The frequency of Emergence delirium is estimated at ----- percent based on published evidence:
 - a) <2
 - b) 3-5
 - c) 6-9
 - d) 10 -80
3. Emergence delirium in pediatric anesthesia occurs more commonly in young children of age---- and those anesthetized with -----
 - a) 3-6 months and sevoflurane
 - b) 9-18 months and halothane
 - c) 2-6 years and sevoflurane
 - d) 10 -12 years and halothane
4. When dexmedetomidine is used as an adjunct to anesthesia, the following benefits are noticeable except:
 - a) Smooth and safe perioperative course
 - b) Increase respiratory depression
 - c) decrease use of volatile anesthetic, opioids, & propofol,
 - d) mitigation emergence delirium
5. Administration of dexmedetomidine at the end of surgery may result in:
 - a) rapid emergence
 - b) delayed emergence
 - c) no change in emergence
 - d) increase use of opioids

Attitude

6. How knowledgeable are you about the use of dexmedetomidine in the treatment of Emergence delirium?
 - a) Very knowledgeable
 - b) Moderately knowledgeable
 - c) Slightly knowledgeable
7. How comfortable are you using dexmedetomidine currently in your practice?
 - a) Extremely comfortable
 - b) Somewhat comfortable
 - c) Neither comfortable or uncomfortable
 - d) Somewhat uncomfortable
 - e) Extremely uncomfortable
8. Will an educational intervention motivate you to embrace the current approach in the treatment Emergence delirium?
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely
9. Do you think Dexmedetomidine is superior to the other pharmacological agents previously used to treat ED?
 - a) Definitely yes
 - b) Probably yes
 - c) Might or might not
 - d) Probably not
 - e) Definitely not
10. How likely are you to encourage the use of dexmedetomidine to your peers?
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely

Appendix E

Post-Test Questionnaire on Emergence Delirium & Dexmedetomidine use in clinical practice

Please circle one answer for each question

Demographics

1. Gender: a) male b) female
2. Title: a) Anesthesiologist b) Nurse Anesthetist c) Anesthesia Assistant
3. Age range: a) 20 -30 b) 31- 40 c) 41 – 50 d) 51 – 60 e) 61 & above

Knowledge

1. Emergence delirium is defined as an altered state of consciousness in which the child has a disturbed interaction with the environment; manifested as disorientation, agitated behavior and inconsolability in the immediate post-anesthesia period. T or F
2. The frequency of Emergence delirium is estimated at ----- percent based on published evidence:
a) <2 b) 3-5 c) 6-9 d) 10 -80
3. Emergence delirium in pediatric anesthesia occurs more commonly in young children of age---- and those anesthetized with -----
a) 3-6 months and sevoflurane b) 9-18 months and halothane
c) 2-6 years and sevoflurane d) 10 -12 years and halothane
4. When dexmedetomidine is used as an adjunct to anesthesia, the following benefits are noticeable except:
a) Smooth and safe perioperative course b) Increase respiratory depression
c) decrease use of volatile anesthetic, opioids, & propofol, d) mitigation emergence delirium
5. Administration of dexmedetomidine at the end of surgery may result in:
a) rapid emergence b) delayed emergence c) no change in emergence d) increase use of opioids

Attitude

6. How knowledgeable are you about the use of dexmedetomidine in the treatment of Emergence delirium?
a) Extremely knowledgeable b) Very knowledgeable c) Moderately knowledgeable
d) Slightly knowledgeable e) Not knowledgeable at all
7. After the educational session how comfortable will you be using dexmedetomidine in your practice?
a) Extremely comfortable b) Somewhat comfortable c) Neither comfortable or uncomfortable d) Somewhat uncomfortable e) Extremely uncomfortable
8. Has the educational intervention motivate you to embrace the current approach in the treatment Emergence delirium?
a) Extremely likely b) Somewhat likely c) Neither likely nor unlikely
d) Somewhat unlikely e) Extremely unlikely
9. Do you think Dexmedetomidine is superior to the other pharmacological agents previously used to treat ED?
a) Definitely yes b) Probably yes c) Might or might not
d) Probably not e) Definitely not
10. After the educational session how likely are you to encourage the use of dexmedetomidine to your peers?
a) Extremely likely b) Somewhat likely c) Neither likely nor unlikely
d) Somewhat unlikely e) Extremely unlikely

Appendix F

IRB Approval Letter



**Office of Research Integrity
Research Compliance, MARC 414**

MEMORANDUM**To:** Dr. Mechell Duran**CC:** Rose Richemond**From:** Maria Melendez-Vargas, MIBA, IRB Coordinator

A handwritten signature in black ink, appearing to be the initials "MV" or similar, written in a cursive style.

Date: March 31, 2021

Protocol Title: “Will anesthesia providers experience a shift in attitude and perception after an educational intervention on the use of dexmedetomidine to prevent emergence delirium.”

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-21-0106 **IRB Exemption Date:** 03/31/21 **TOPAZ**
Reference #: 110110

As a requirement of IRB Exemption, you are required to:

- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

MMV/em

Appendix G



3/15/21

Dear Ms. Richemond,

This letter is to confirm review and approval of your Quality Improvement project, "An Educational Intervention to Decrease the Prevalence of Emergence Delirium in the Pediatric Population: A Quality Improvement Initiative " by the Nursing Research and Evidence-Based Practice Council at Nicklaus Children's Hospital. We support completion of this quality improvement educational initiative at Nicklaus, and request that prior to any work beginning you share your IRB decision letter with us. The goals of this project align with those of our organization, and we welcome the opportunity to support this project at Nicklaus Children's Hospital.

Sincerely,

Danielle Sarik, PhD, APRN-PC, RN

Danielle Sarik PhD, APRN, CPNP-PC
Research Nurse Scientist
Nicklaus Children's Hospital
(786) 624-2314