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Please submit questions, letters, comments or high quality photos to the editor via email.

ON THE COVER
Mitch Kraus, Michael Chelberg, and Bich Pham (NorthShore Class of '22) on a medical mission to Honduras.

IN THIS ISSUE

As required by section 6033(e) of the Internal Revenue Code, we are required to inform you that $58.13 (or 25%) of your state membership dues are allocated toward expenses incurred by the Illinois Association of Nurse Anesthetists for state lobbying activities. This amount is not deductible for federal income tax purposes. All IANA members are also members of the AANA.

Jeffrey Matson, PhD, CRNA

LETTER FROM THE EDITOR

I am excited to be taking over from Jennifer Greenwood, PhD, CRNA, as editor of the journal. She has worked hard over the past seven years to highlight the work our members have done to make Illinois and our profession stronger; I welcome the opportunity to do the same. Thankfully, she will continue her work as a member of our editorial panel, a wonderful group of individuals working hard to ensure this journal effectively supports the practice of nurse anesthesiology in Illinois.

For those who don't know me, I am a 2013 graduate of NorthShore University HealthSystem School of Nurse Anesthesia. I've worked clinically with Midwest Anesthesiologists, Ltd. at Advocate Christ Medical Center and South Suburban Hospital, Northwestern Medicine at Northwestern Memorial Hospital, and NorthShore University HealthSystem at their legacy hospitals. I received my PhD in nursing with an emphasis on educational psychology from the University of Illinois at Chicago. The driving force behind my professional career has been a fascination with how human beings learn and how that learning is applied to clinical practice.

The editorial panel looks forward to continuing our mission of promoting and supporting the profession of nurse anesthesiology in Illinois through the publication of quality information on research and practice. To this end, we will begin publishing the journal twice a year and, starting with the Spring '23 issue, begin offering free class A continuing education credits to the members of the IANA. We hope this will help the membership stay informed on topics that impact practice.

We will continue to use the journal as a forum for our IANA leadership to communicate our advocacy efforts at the state level. Our profession provides a critical service to the community, who are best served when our membership can practice at the top of their license. In this edition of the journal, we explore how a worldwide shortage of anesthesia providers limits access to essential surgical care around the world, yet many countries, to the detriment of their people, unnecessarily restrict qualified nurses from providing anesthesia care. Unfortunately, these historic trends play out across many US states today.

Strong professional organizations have historically prevented restrictions on nurses providing anesthesia care to their patients; therefore, we encourage every member to consider how they can contribute to the IANA, no matter how big or how small. Your contributions strengthen an organization that is dedicated to advancing, supporting, and protecting nurse anesthesiology, and humanity is best served when CRNAs are providing safe and effective anesthesia care to their patients. ■

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Interviewed by Maiko Yamashita, DNP, CRNA

Mohammad Deen- The Journey of a CRNA Dedicated to Medical Humanitarianism

As a child of two immigrant parents from Palestine, Mohammad Deen, CRNA, PHRN has paved his own path in life and his career. Growing up in a lower socioeconomic environment, his exposure to medicine was little, until a friend's father introduced him to the opportunity to be an Arabic interpreter at Rush University Medical Center. This opened the doors to the expansive world of medicine, where Mohammad became a paramedic, received his undergraduate degree at University of Illinois Chicago, became a flight nurse, and lastly earned his Masters in Science of Nursing at Samuel Merritt University in California. During his time as an interpreter, he participated in the care of an Egyptian charity case, which led him to re-evaluate everything from himself to the importance of giving to others. This ignited his passion in public health advocacy. He vividly remembers the patient, although having nothing to give, gave him biscuits out of her pocket. This act of giving spearheaded his drive to dedicate his career to medical mission work.

Mohammad's work in providing healthcare to underserved populations expands extensively across the world. When asked about the most pivotal moments in his work, he named two. The first took place in Kenya, where he spent a month volunteering in a clinic next to an orphanage. The highlight of this trip was seeing the faces of the children as he greeted them as Spiderman. The second memorable moment was rescuing a 1-month-old refugee out of the water in Turkey. Ironically, moments before, Mohammad pondered why he was there, but it all made sense when life came full circle, as a son of refugees was at the right place at the right time to rescue another refugee.

As a CRNA dedicated to medical mission work, Mohammad has 3 words of advice. First-- know when you want to go travel for philanthropic work, understand your capabilities, and importantly, understand why you want to go. Second-- research and listen to what's needed in the specific region and respect the religions and cultures. Lastly, build your skills to work with less, and relying only on what you have. ■

LEGISLATIVE UPDATE

The Michael Best Strategies and Sanborn Williams LLC Government Relations team is currently advocating on behalf of the Illinois Association of Nurse Anesthetists.

Building upon the momentum from passing the CRNA licensure extension legislation (HB 4922), the Government Relations team is looking forward to continuing that success into the 103rd General Assembly.

The Illinois General Assembly wrapped up Veto Session and are preparing for the Lame Duck session.

Important Dates

Lame Duck Session (Tentative):
January 4 – January 10, 2023

103rd General Assembly Inauguration: January 11, 2023

Here are the large legislative items we continue to monitor:

Reproductive Healthcare Working Group legislative package. This legislative proposal is still being worked on with stakeholders. We anticipate for something to be proposed by next year.

A legislative Resolution acknowledging the importance of nurse anesthetists to the healthcare community.

Legislation addressing healthcare workforce shortage.

Here is legislation we were monitoring that either passed, or stalled:

HB4922 Nurse Practice-CRNA Licensure (MOELLER A)

Amends the Nurse Practice Act. Provides that the Department of Financial and Professional Regulation may issue a certified registered nurse anesthetist license to an advanced practice registered nurse who does not have a graduate degree, applies for licensure before July 1, 2028 (instead of July 1, 2023), and submits the other required information to the Department.

Iana Position: Support

Status: Passed - Public Act 102-0786

SB321 Dental-Collaborative Agreement

Amends the Illinois Dental Practice Act. Provides that a licensed dentist must hold an appropriate permit in order to perform dentistry while a nurse anesthetist administers conscious sedation, deep sedation, or general anesthesia (rather than conscious sedation). Provides that a certified registered nurse anesthetist who provides anesthesia services in a dental office shall enter into a written collaborative agreement with the operating dentist performing the procedure. Provides that the agreement shall describe the working relationship of the nurse anesthetist and the operating dentist and shall authorize the categories of care, treatment, or procedures to be performed by the nurse anesthetist. Provides that the operating dentist shall approve the anesthesia plan prepared by the nurse anesthetist and shall remain physically present and be available on the premises during the delivery of anesthesia services for diagnosis, consultation, and treatment of emergency medical conditions. Provides that the nurse anesthetist may select, order, and administer medications, including controlled substances, and apply appropriate medical devices for delivery of anesthesia services under the anesthesia plan agreed with by the operating dentist. Provides that the holder of a faculty limited license may advertise his or her specialty degree as part of his or her ability to practice at a clinic or office affiliated with a dental school.

IANA Position: Oppose

Status: Re-referred to Senate Assignments – Did Not Pass this Session

HB4574 Dental-Collaborative Agreement

Amends the Illinois Dental Practice Act. Provides that a licensed dentist must hold an appropriate permit in order to perform dentistry while a nurse anesthetist administers conscious sedation, deep sedation, or general anesthesia (rather than conscious sedation). Provides that a certified registered nurse anesthetist who provides anesthesia services in a dental office shall enter into a written collaborative agreement with the operating dentist performing the procedure. Provides that the agreement shall describe the working relationship of the nurse anesthetist and the operating dentist and shall authorize the categories of care, treatment, or procedures to be performed by the nurse anesthetist. Provides that the operating dentist shall approve the anesthesia plan prepared by the nurse anesthetist and shall remain physically present and be available on the premises during the delivery of anesthesia services for diagnosis, consultation, and treatment of emergency medical conditions. Provides that the nurse anesthetist may select, order, and administer medications, including controlled substances, and apply appropriate medical devices for delivery of anesthesia services under the anesthesia plan agreed with by the operating dentist. Provides that the holder of a faculty limited license may advertise his or her specialty degree as part of his or her ability to practice at a clinic or office affiliated with a dental school.

IANA Position: Oppose

Status: Re-referred to Senate Assignments – Did Not Pass this Session

SB3491 Med Practice-Title & License

Amends the Medical Practice Act of 1987. Provides that a person who does not possess a valid license and uses the title Anesthesiologist or Dermatologist violates the Act.

IANA Position: Oppose

Status: Re-referred to Senate Assignments – Did Not Pass this Session

HB4269 Nurse Licensure Compact (GABEL R)

Amends the Nurse Practice Act. Ratifies and approves the Nurse Licensure Compact, which allows for the issuance of multistate licenses that allow nurses to practice in their home state and other compact states. Provides that the Compact does not supersede existing State labor laws. Provides that the State may not share with or disclose to the Interstate Commission of Nurse Licensure Compact Administrators or any other state any of the contents of a nationwide criminal history records check conducted for the purpose of multistate licensure under the Nurse Licensure Compact.

IANA Position: Support

Status: Re-referred to House Rules Committee – Did Not Pass this Session

SB3196 Radiation-Aprn-Fluoroscopy (FEIGENHOLTZ S)

Amends the Hospital Licensing Act. Provides that, notwithstanding any provision of the Act or the implementation of any rule of the Department of Public Health to the contrary, an advanced practice registered nurse licensed under the Nurse Practice Act practicing in a hospital, a hospital affiliate, or an ambulatory surgical treatment center may administer radiation to a human being through a fluoroscope pursuant to specified provisions of the Radiation Protection Act of 1990. Amends the Radiation Protection Act of 1990. Provides that an advanced practice registered nurse practicing in a hospital, a hospital affiliate, or an ambulatory surgical treatment center may intentionally administer radiation to a human being through a fluoroscope without acting under the supervision, prescription, or direction of specified licensed persons. Provides that provisions regarding accreditation of administrators of radiation do not apply to such advanced practiced registered nurses. Effective immediately.

IANA Position: Support

Status: Re-referred to Senate Assignments – Did Not Pass this Session

Kevin Stein, DNAP, APRN, CRNA

Southern Illinois University Edwardsville (SIUE) Fall 2022 Program Update

Greetings from the Southern Illinois University Edwardsville (SIUE) nurse anesthesia faculty and students!

The nurse anesthesia program at SIUE graduated 23 students in May. We are delighted to announce that the class of 2022 had a 100% first time pass rate on the National Certification Exam! We are very proud of the accomplishments of our graduates and are excited for them as they transition from student to practitioner. Their high level of training has resulted in the aggressive recruitment by area hospitals. All our recent graduates received multiple job offers and have settled into their new jobs. Over 90% of our May 2022 graduates have accepted a position within our network of clinical affiliates.

With golf season in full swing, the nurse anesthesia program hosted its inaugural Networking Night and Fundraiser at Top Golf in June. Program alumni, students, and clinical partners had the opportunity to connect with one another while showing off their golf game. The fundraiser sold out, with more than 150 people raising over $24,000 to go toward state-of-the-art equipment for the nurse anesthesia lab at SIUE.

SIUE recently increased enrollment to 32 students per cohort to align the needs of our communities and health systems with the high number of qualified applicants we receive each cycle. Our first cohort of 32 is scheduled to graduate in May 2023. We are happy to report we have continued to see a strong interest in our program across the region and the country, with over 160 applicants for our last cohort. We had nearly 70 candidates on campus in July to interview for our next cohort.

Four CRNA educators recently joined our team; Dr. Michelle Ertel, Mr. Tramon Hunnicutt, Dr. Beth McCoy, and Dr. Linda Sharpless. Two of our faculty members, Dr. Nick Collier and Dr. Jenna Tebbenkamp, obtained their doctorates this year. Nearly 90% of program faculty now hold a terminal degree.

SIUE continues to add clinical affiliate partners to provide rich clinical experiences for our nurse anesthesia students. Our program now provides a diverse clinical experience to our students at over 50 clinical facilities including hospitals, surgery centers, and office-based anesthesia locations.

Plans continue for the $10.5 million Health Science Building (HSB) on the

Pictured Above: A group of nursing supporters gather at the SIUE Nursing Anesthesia (NA) Networking Night and Fundraiser.

SIUE campus. Approximately 221,000 square feet, the HSB will facilitate more simulation training, research and growth in programs within nursing, pharmacy and related health science areas. It will be the largest building on the SIUE campus.

Dr. James Minor was appointed as the 10th chancellor of Southern Illinois University Edwardsville on March 1st. Dr. Minor has demonstrated a strong focus on student success throughout his career, especially as it relates to improving student access, opportunity, diversity, and achievement. He is an innovative leader who has the vision to maintain a positive trajectory for the entire SIUE community. Dr. Minor replaced Chancellor Pembrook who retired from a lifelong career in higher education. Chancellor Pembrook led SIUE through many triumphs and challenges during his 5 ½ year tenure, holding true to the University's mission of developing leaders who will "shape a changing world."

Dr. Judy Liesveld was named Dean of the SIUE School of Nursing (SON) and assumed her duties on July 1st. She arrives at SIUE after serving as Interim Associate Dean of Innovation and Community Outreach at the University of New Mexico. She brings a wealth of experience in the design and implementation of pipeline programming aimed to functionally increase clinical and academic partnerships. She has an extensive history in securing grant funding to support her work with underserved communities and populations. She replaces Dr. Mark Lauer, who served as the Interim Dean of the SON following the retirement of Dean Bernaix in June of 2021.

We would also like to recognize Dr. Andy Griffin retired this spring as well. Dr. Griffin was the Director of the Nurse Anesthesia Program before becoming the Assistant Dean of Graduate Programs. Under Dr. Griffin's leadership, the SIUE nurse anesthesia program enjoyed remarkable success. We are grateful for Dr. Griffin and his 20 years of service to the SON and the nurse anesthesia program.

Pictured Above: (L-R) Kevin Stein, CRNA, DNAP, chair of the School of Nursing's Department of Nurse Anesthesiology, SIUE alumnus, Frank Grasso, CRNA.

The passion, innovation, and enthusiasm of our program faculty, clinical coordinators, and alumni have positioned SIUE to be a national leader in nurse anesthesia education. Producing top notch practitioners through a diverse and high level educational experience is our top priority. Gifts made through the SIUE Foundation help meet the needs of the Nurse Anesthesia Program and provide our students with additional opportunities. We welcome the opportunity to discuss how your gift can impact our program and our students. Please contact Patricia McDonald at pmcdona@siue.edu for additional information.

Sincerely,

Kevin Stein, DNAP, CRNA, APRN

Chair, Department of Nurse Anesthesiology Director, Anesthesia DNP Specialization Southern Illinois University Edwardsville ■

Karen Kapanke DNP, CRNA

NorthShore University HealthSystem School of Nurse Anesthesia Program Update Fall 2022

The NorthShore University HealthSystem School of Anesthesia began 2022 with another medical mission trip to Honduras with One World Surgery. Since 2012, more than 60 NorthShore students have participated in the week long surgical brigades caring for underserved patients in Honduras. Program Director Dr. Karen Kapanke, DNP, CRNA, and former NorthShore Program Director Dr. Bernadette Roche EdD, CRNA, developed and maintain an ongoing continuing education program for Honduran anesthesia providers. Dr. Kapanke leads 3-4 brigades to Honduras each year, bringing clinical faculty and 3 senior Nurse Anesthesia Trainees on each trip.

In February during the AANA Assembly of Clinical and Didactic Educators, Dr. Kapanke, Assistant Program Director Dr. Julia Feczko, DNP, CRNA, faculty Dr. Katie Coletto, DNP, CRNA, Dr. Susan Krawczyk DNP, CRNA, Dr. Anne Sauri, DNP, CRNA and Dr. Jeff Matson, PhD, CRNA all met for a retreat that consisted of curriculum review, ongoing simulation integration into all anesthesia courses, admissions process, and strategic planning. All NorthShore faculty have had a busy and productive year. Dr. Feczko was named delegate to the AANA education committee. Dr. Coletto coordinated and implemented the use of NuringCAS to streamline admissions, thus creating a fully digital

Pictured Right: Mitch Kraus and Michael Chelberg (NorthShore Class of '22) checking an anesthesia machine in Honduras.

platform accessible beyond our immediate geographic area. Dr. Sauri, who teaches airway management at NorthShore, has integrated cricothyrotomy simulations using porcine tracheas into the airway curriculum. The experience has earned such positive feedback that she expanded the simulation and brought the workshop to this year's AANA Annual Congress. Dr. Jeff Matson publishes seasonal podcasts that cover issues such as test taking, IRB/grant writing, leadership, racism in healthcare, and clinical topics such as pharmacology. Additionally, he has integrated multimedia and team based learning to improve clinical outcomes.

Dr. Susan Krawczyk has greatly increased NorthShore's communication with our treasured alumni. During the August AANA Annual Congress in Chicago, Dr. Krawczyk organized a NorthShore Alumni event to gather and celebrate the careers and contributions former Program Director Dr. Pamela Schwartz DNP, CRNA, and Anesthesiology Instructor Dr. Veronica Drantz, PhD. Over 90 Alumni spanning 40 years were in attendance, including 3 former Program Directors!

August began with the acceptance of 25 applicants for the class of 2026. The 24 members of the Class of 2022 graduated on August 26th, and more than half of the class has already passed the NCE. Congratulations to NorthShore's newest Alumni!

25 members of the Class of 2025 matriculated in September. The Class of 2025 is will be the 100th graduating class, as NorthShore will mark its centennial anniversary in 2025. Plans are already underway to celebrate 100 years of leadership in outstanding Nurse Anesthesia education. ■

Pictured Left Above: Class of 2024 at NorthShore University HealthSystem School of Nurse Anesthesia receive their white coats prior to entering the ORs for their clinical rotations.

Pictured Center Left: Left to right - Meghan Falsey, Chona Santiago, Devin Ponder, and Cyniah McClurkin (NorthShore Class of '24).

Pictured Center Right: Left to right: Brighty Sullivan and Aeleah Mockler (NorthShore Class of '24).

Pictured Left Below: From left to right; Drs. Karen Kapanke, Anna Lebiedzinski, Becky Burkhart, Hedi Booth, and Julia Feczko, in Honduras on a medical mission.

Jeffrey W. Matson, PhD, CRNA | Amanda Gray, JD

A Narrative Literature Review of Potential Historic Factors that Impacted the Development of Nurse Anesthesia Practice in North America and Western Europe

"History is to be learned from, not repeated. Learn its lessons and build on its achievements so as to keep faith with all who have been a part of this challenging endeavor."

-Ira P. Gunn, CRNA

Abstract

There is a worldwide shortage of anesthesia providers limiting access to safe surgical care for billions of people. To address this shortage, there needs to be an increase in the number of anesthesia providers. However, several similar countries have different regulations, and sometimes bans, preventing nurses from providing anesthesia care. A narrative literature review of nurse anesthesia histories was conducted to identify topics that may have led to the modern differences in the regulation, or banning, of nurse anesthesia practice. A search of PubMed and Cumulative Index to Nursing & Allied Health Literature Complete led to the review of 24 articles for factors that potentially created this difference. The articles predominantly discuss the history of nurse anesthesia in North America and Western Europe and were authored by a variety of professions and published in several countries. Although factor identification was subjective and the review limited, each factor was discussed in 5 or more articles. These factors serve as a starting point for further research to better understand the historic development of nurse anesthesia practice and may inform strategies to increase access to surgical care worldwide.

Kewords: Nurse anesthesia, nurse anesthesiology, nurse anesthesiologist, history, global health, healthcare access

Introduction

A worldwide shortage of anesthesia providers limits access to essential surgical care for 5 billion people.[1] Wealthy countries face shortages of anesthesia providers,[2,3] but the shortages are worst in low and middle-income countries where nine out of ten people can't access safe surgical care.[1,4] Strategies to address these shortages should be informed by the history of nurse anesthesia practice.

Nurse anesthesia has developed in several countries with similar histories, wealth, and legal systems, but there is considerable variability in how each country has decided to regulate or ban the practice. Canada, Germany, Italy, the United Kingdom (UK), and Japan do not allow advanced practice nurse anesthesia providers to provide anesthesia services, whereas France and the United States (US) have a long history of allowing advanced practice nurses to provide anesthesia care.[5] This country-by-country variation can be seen in training requirements (Table 1) and scope of practice for nurses who administer anesthesia.[6] There does not appear to be a single factor, but rather a variety of factors influencing these disparities.

The purpose of this narrative review is to identify potential historical factors that have led to the constraining or banning of nurse anesthesia practice. A search of PubMed and Cumulative Index to Nursing & Allied Health Literature (CINAHL) Complete databases provided articles that clearly described war, gender roles, compensation, education, cultural/legal events, and professional relationships as factors that impacted the development, and restriction, of nurse anesthesia practice in Western Europe and North America. Understanding why high-income countries have restricted nurse anesthesia practice, despite national and global shortages of anesthesia providers, may have implications for expanding nurse anesthesia training around the globe.

Methods

A narrative literature review was conducted to identify potential factors that impacted the history of nurse anesthesia. The search phrase ("nurse anesthetist" OR "nurse anesthesia" OR "crna" OR "certified registered nurse anesthetist" OR "nurse anesthesiologist") AND ("history" or "histories") was used to search PubMed and CINAHL Complete databases for peer-reviewed publications in English. These articles were then reviewed by the primary author for mention of "nurse anesthesia" and "history" in a three-step process reviewing (a) title, (b) abstract, and (c) full article.

Results

As shown in figure 1, the search strategy resulted in (n = 244) articles for title review (PubMed n =115; CINAHL Complete =

129). Abstract reviews (n = 37) and full paper reviews (n=24) were conducted on papers that included potential factors that impacted the history of nurse anesthesia. Article authors included physician anesthesiologists, historians, nurses, nurse anesthesiologists, anesthesia assistants, and nurse anesthetists. Locations of publications include the United States (US), the United Kingdom (UK), European Union (broadly), Australia, Japan, and Canada. In total, there were 6 factors subjectively identified by the primary author (JM) in fully reviewed papers. War and gender roles were each discussed in 12 articles, compensation in 8, cultural/legal events in 6, education in 5, and 11 articles discussed professional relationships. Each factor was discussed in 5 or more articles (Table 2).

Discussion

The results of this review found 6 potential factors that have impacted the historic development of nurse anesthesia practice. War, gender roles, economics, cultural events and legal rulings, education, and professional relationships have impacted the legality of nurse anesthesia practice in North American and Western European countries, and to a lesser extent Japan and Australia. These factors are not comprehensive and were subjectively derived by one author reading histories of North America, Western Europe, Japan, and Australia. However, each factor was discussed in 5 or more articles and articles were authored by a variety of professions and published across a variety of countries.

War

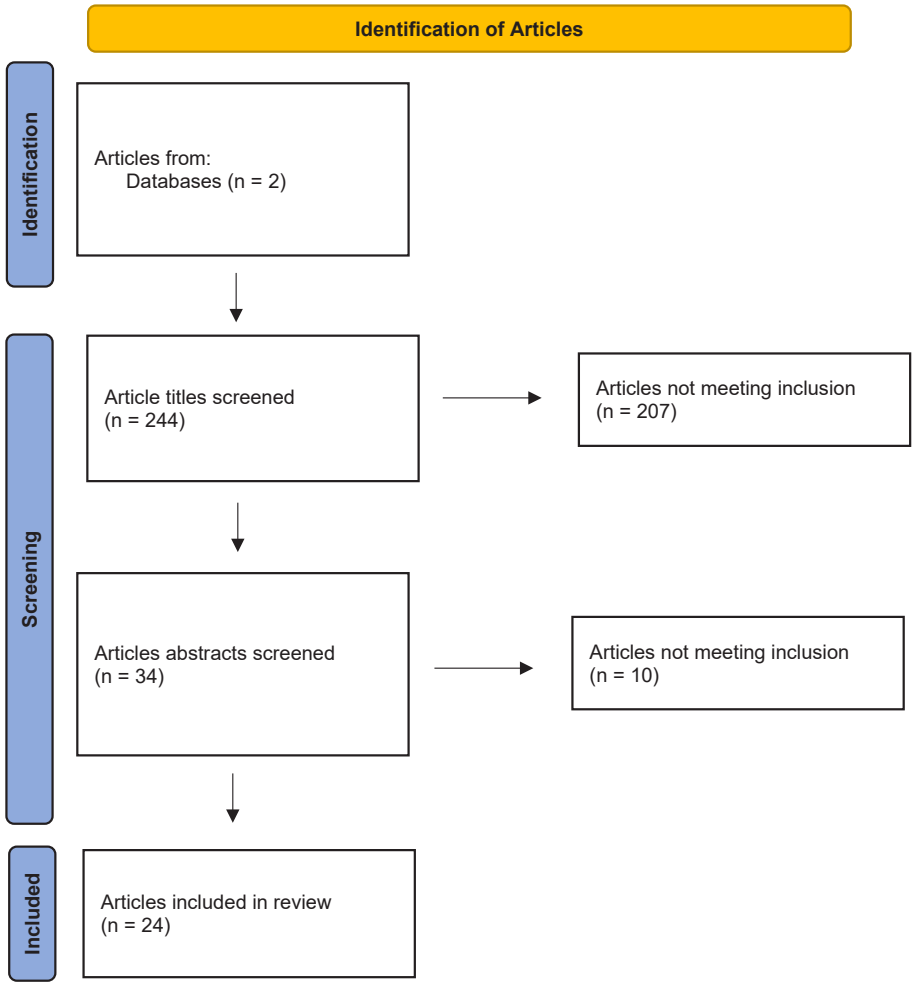
Governments loosened restrictions on nurse anesthesia providers during wartime due to an acute shortage of anesthesia providers, but during peacetime regulations varied. The Australian military trained

Table 1. Education of Nurse Anesthetists by Jurisdiction

Jurisdictions that Train Nurse Anesthetists	Description of Program and Requirements for admission.
Afghanistan[6]	Two-year nurse anesthesia training program. Applicants must have a general nurse education.
Cambodia[25]	Two-year program. Applications must have 2 years of experience as a nurse and pass an exam.
Cameroon[6]	Two-year nurse anesthesia training program. Applicants must have earned a diploma in nursing, practiced as a nurse for two years, and pass an entrance examination given by the Ministry of Health.
Democratic Republic of Congo (DRC)[6,25]	5-year training program that confers the nurse diploma scientific diploma.
Denmark[6,25]	Two-year nurse anesthesia training program. Applicants must be certified and have two years of training.
Dominica[6]	Training in anesthesia following completion of a nursing program.
France[6,25]	Two-year nurse anesthesia training program. To apply a nurse must have a bachelor's degree in nursing and two years of specialized nursing experience and passing of a two-hour written eligibility test and oral examination.
Ghana[25]	Nursing diploma (3 years), anesthesia diploma (2 years) and 5 years working experience.
Indonesia[25]	42-month program that includes basic nursing education, 12 credits of anesthesiology, and 6 months of clinical anesthesia practice.
Iran[6]	Two-year nurse anesthesia training program
Jamaica[25]	32-month program with 6 months of internship. Must be a registered nurse with 5-8 years' experience.
Martinique[6]	Two-year program. To apply must be a state-certified nurse for two years.
Norway[25]	Earn 120 European Credit Transfer Points (ECTP) in nurse anesthesia training.
Taiwan[25]	One-year training certification by hospital. To apply must be a diploma nurse.
Tunisia[6,25]	Additional training in an anesthesia concentration, approximately one-year, after a three-year generalist training as a nurse.
Turks and Caicos[6]	Must meet minimum standards which are developed and agreed to by the CARICOM (Caribbean Community) nations. These requirements may be amended from time to time. Minimum four years training in nursing.
Sweden[25]	Three-year training program. Applicants must have a professional degree and qualification as a registered nurse. https://ifna.site/country/sweden/
Switzerland[6,25]	24-month training program. Applicants must have a 4-year nursing diploma with 1 year experience.
United Kingdom[25]	Has anesthetic nurses that assist physician anesthesiologist. The program is 9 months and is competency based.
United States of America[6,25]	24-42-month anesthesia program. Applicants must have a baccalaureate or graduate degree in nursing or appropriate major, an unencumbered license as a registered nurse, and one year full time work experience in a critical care setting.

nurses during World War I (WWI) to provide anesthesia care, but ultimately forbid them to practice during either wartime or peacetime. The reasons for this restriction may have been due to a resistance to allowing women on the front lines.[7] The UK was less restrictive on nurse anesthetists. Nurses were trained and allowed to provide anesthesia during WWI and World War II (WWII), but ultimately banned from providing anesthesia once WWII was over.[8] The US has a long history of nurses providing anesthesia,[8] and following WWI and WWII nurses were allowed resume their practice of providing anesthesia during peacetime. Interestingly, the US military had similar restrictions on women on the front lines of battle as Australia but would allow the practice away from the front lines. It was not until the Vietnam War that men would be allowed to serve as nurses and provide anesthesia on the front lines.[9]

Figure 1. Identification of Articles



Gender Roles

Gender roles have historically caused restrictions on nurse anesthesia practice. The birth of modern anesthesia practice coincided with the Victorian era, which labeled men as fathers/physicians and women as mothers/nurses.[10,11] Higher education mirrored these values. Medical schools would not allow women to become physicians, and schools of nursing denied male applicants.[8-10] Victorian ideals dictated that men be the "breadwinners" of the family[10] and providing anesthesia provided lower compensation than other medical specialties of the time because it was not seen as a complex or technical task, especially in rural areas.[12] However, providing anesthesia paid better than most nursing positions at the time, incentivizing women (nurses) to take up the specialization. The differences in compensation may be a reason that the more rural US has fewer restrictions on nurse anesthesia practice than the more urban UK.[8,13] Although gender roles have evolved over time to be more equitable, historical differences in gender are still seen in nursing and medicine.[16,17]

Compensation

Competition for compensation has resulted in the restriction of nurse anesthesia practice and the creation of new types of anesthesia providers. The US government's generous payments for anesthesia services following WWII created an abundance of both physician and nurse anesthesia providers. However, several decades later, a series of billing changes reduced compensation for anesthesia services and allowed nurse anesthesia providers to bill directly for their services, creating tension between physicians and nurses. In the US, UK, and Canada, this led to the creation of anesthesiologist assistants, who provide anesthesia under the direct supervision of physician anesthesiologists with restrictions on practice and billing,[2,5,14] and, in the UK and Japan, perianesthesia nurses, can monitor ASA-PS I and II patients but can't administer medications or bill for services.[3,13] These modern providers are frequently paired in a 2:1 ratio and are directly supervised. Their introduction has not led to substantially ameliorated anesthesia provider shortages in the countries where they practice.[3,13]

Education

Education and authority to certify training has historically helped to legitimize anesthesia providers as specialists and has been used to defend nurse anesthesia

practice against restrictions. During the early 1900s, anesthesia was not seen as a medical specialty, but was seen as a nursing specialty. Nurse and physician anesthetists in France and the US were educated and certified together and, following certification, provided anesthesia services independently.[5,18,19] Later, physician anesthetists began physician-only training programs, while nurse anesthetists continued to be certified through specialty training programs.[5,15] Surgeons supported French nurse anesthetists in winning national certification in 1948. In a unique meeting, US nurse anesthetists almost gave the authority to certify nurse anesthesia providers to physician anesthesiologists.[8] During the meeting, the National Association of Nurse Anesthetists met with the American Board of Anesthesiology, a sub-board of the American Board of Surgery, to discuss certification of nurse anesthetists by the physician anesthetists' body. Membership on both sides ultimately decided to scuttle the deal. If physician anesthesiologists had taken responsibility for certifying nurse anesthetists, it would have restricted the practice of nurse anesthesia to a subordinate role and limited the number of independent anesthesia providers in the US.[20,21]

Cultural Events and Legal Decisions

Cultural events and legal decisions of the early twentieth century constrained nurse anesthesia practice while promoting physician anesthesia practice. William Morton, in 1845, publicly administered ether anesthesia for a tooth extraction in the US, and in the UK John Snow famously used chloroform to anesthetize Queen Victoria during labor.[8] Both events received positive and widespread news coverage promoting the image of the physician anesthetist. Conversely, nurse anesthetists suffered several legal setbacks in the early 1900s. In Sisters of St. Joseph v Fleming, the Canadian Supreme Court

Table 2. Articles Included for Full Literature Review

Author (Year), Country Published.	Title	Factors	Article Topic
Kane M, Smith AF (2004), UK.[2]	An American tale - professional conflicts in anaesthesia in the United States: Implications for the United Kingdom	War, Compensation	• Professional conflict in the US between nurse and physician anesthesia providers and the implications for how anesthesia is delivered in the UK.
Watson RD, Wright AJ (2006), USA.[10]	Anesthesia as women's work: The historic role of the female anesthetist	Gender Roles, Compensation	• The role of gender and compensation in the development of modern anesthesia practice. Specifically, why early anesthetists were majority female.
Bacon DR (1996), USA.[18]	A curious moment: The proposal to certify nurse anesthetists by the American Board of Anesthesiology	Education, Professional Relationships,	• A summary of events that lead to a meeting where physician anesthesiologists almost became the credentialing body for nurse anesthetists in the US.
Harris K (2013), Australia.[7]	'Giving the dope': Australian army nurse anaesthetists during World War I	War, Gender Roles, Professional Relationships	• An examination of why six Australian nurses, who were trained to provide anesthesia during World War I, were not allowed to practice anesthesia during and after the war.
Ide et. al. (2020), Japan.[3]	Introduction of evolving roles of perianestheisa Nurses	New Providers	• A review of the perianestheisa nurse role in Japan. Increasing need for anesthesia services in Japan has led to the creation of a new role for nurses to assist physician anesthesiologists with ASA-PS I and II patients.
Van Nest RL (2006a, 2006b), US.[23,24]	The life and trial of Dagmar Nelson – parts 1 and 2	Cultural/Legal event	• The trial of Dagmar Nelson, a nurse accused of practicing medicine when she administered general anesthesia, and its impact on modern nurse anesthesia practice.
Matsusaki T, Sakai T, (2011), Japan.[13]	The role of certified registered nurse anesthetists in the united states	New Providers, Professional Relationships	• The history of nurse and physician anesthesia practice in the US and the implications for the shortage of anesthesia providers in Japan.
McAuliffe MS, Henry B (1996), US.[26]	Countries where anesthesia is administered by nurses	New Providers	• A International Federation of Nurse Anesthetists (IFNA) descriptive survey reporting on the level of involvement of nurses in the administration of anesthesia world-wide.
McAuliffe MS, Henry B (2016), US.[27]	Nurse anesthesia worldwide: Practice, education, and regulation	New Providers	• A follow-up survey by the IFNA concluding that nurses are active in the provision of anesthesia services around the world, providing almost all the anesthesia services in some countries.
LaRocco SA (2015), US.[9]	Men as nurse anesthetists	Gender roles, War, Compensation	• The barriers that prevented men from entering the field of nurse anesthesia and factors that led men into the field of nurse anesthesia.
Wilkinson D (2007), UK.[14]	Non-physician anaestheisa in the UK: A history	Modern Provider	• The history of the introduction of the Anaesthesia Practitioner in the UK in the 1990's.
Fosburgh LC (1997), US.[29]	Nurse anesthesia and religious sisters: Sister Secundina Mindrup	Gender roles	• The role of religious women in the early administration of anesthesia with emphasis placed on Sister Secundina Mindrup.
Dunlop J, Boschma G, Jefferson R. (2009), Canada.[12]	Nursing and anaesthesia: Historical developments in Canada.	Gender roles, Cultural/Legal event, Professional Relationships.	• A history of nurses' providing anesthesia care in Canada with an emphasis on the court rulings that prevented the practice.
Ray WT, Desai SP (2016), US.[19]	The history of the nurse anesthesia profession	Gender roles, Professional Relationships, Compensation, War, Education, Cultural/Legal Events	• Tracing of the origins of the nurse anesthesia profession and short biographical summaries of some early influential nurse anesthetists in the US.
Radford M (2003), UK.[11]	Recovery nursing services: An evolution	Gender roles	• An history of recovery nurses in the UK.
Koch BE (2015), US.[22]	Surgeon-nurse anesthetist collaboration advanced surgery between 1889 and 1950	Professional Relationships	• A focused review of history on the importance of the relationship between surgeons and nurse anesthetists in the US.
Tenedios et al., 2018, EU.[5]	History of anaesthesia: Nurse anaesthesia practice in the G7 countries (Canada, France, Germany, Italy, Japan, the United Kingdom and the United States of America)	Professional Relationships, Compensation, War, Education	• A review of historical factors that influenced or prevented the development of the nurse anesthesia profession in countries of similar wealth.
Worth P (2004), US.[29]	The evolution of diversity in nursing and nurse anesthesia	Gender Roles	• The influence diverse nurses on the history of the nursing profession.
Gunn IP (1991), US.[15]	The history of nurse anesthesia education: Highlights and influences	Education, Professional Relationships, Economics, War, Gender Roles	• A tracing of the history of nurse anesthesia with an emphasis on education and professional relationships.
Garde JF (1996), US.[21]	The nurse anesthesia profession: A past, present, and future perspective	Professional Relationships, Gender Roles, Cultural/Legal Events, War, Compensation	• A history of nurse anesthesia in the US with an emphasis on the context of anesthesia practice in the middle 1990's.
Woollam CHM (2002), UK.[30]	The sister anaesthetists of Norwich	Gender Roles, War, Cultural/Legal Event	• The use of religious women to provide anesthesia in the UK when it was difficult to find anesthesia providers.
Vigil-Fowler M, Hillman S, Desai S (2019), Canada.[8]	Who controls the power over pain? A comparative history of nurse anaesthsia	Gender Roles, War, Professional Relationships, Compensation, Education, Cultural/Legal Events	• An in-depth look into the history of nurses' providing anesthesia in the US, UK, and Canada.

implied that hospitals are liable for actions of the nurses they employ. The ruling was not specific to anesthesia practice, but the implication was that the liability of nurse anesthesia fell to the hospitals and not the individual providers. The following year, in the ruling McFall v Victoria Hospital and Turner, a Canadian court found a nurse anesthetist partially responsible for the death of patient under anesthesia and that the hospital should have provided someone medically qualified.[12] It was not until 2009 that advanced nurses would be trained to provide anesthesia in Canada, and the emergence of nurse anesthetists in Canada was short lived. The program shut down in 2013 due to lack of interest.[5]

Professional Relationships

Strong surgeon advocacy helped persuade US judges that nurses had a role in the administration of anesthesia.[21,22] In 1916, the Ohio Attorney General ruled that only a registered physician could provide anesthesia, effectively eliminating the practice of nurse anesthesia in the US state. However, renowned surgeon Dr. George Crile advocated that nurses should be allowed to provide anesthesia. His support helped reverse the decision by the Attorney General. When the Kentucky Medical Society attempted to ban all physician members who practiced at hospitals where nurses administered anesthesia, it was surgeon Dr. Louis Frank who helped nurse anesthetists overturn the regulation.[21] In the case of Dagmar Nelson, a nurse charged with practicing medicine when she administered a general anesthetic, the defense argued that Dagmar Nelson was carrying out the surgeon's orders when she provided general anesthesia.[23,24] The court agreed, and its ruling has given nurses the legal framework to provide anesthesia, but only under the supervision of a physician. It would be 67 years before nurse anesthetists in the US would be able to practice without physician supervision.[16] The strong surgeon support that nurse anesthetists enjoyed in the US was clearly a factor in protecting their ability to practice anesthesia.[23]

Professional relationships have played a large role in protecting nurse anesthesia practice. Positive relationships with surgeons in the US and France ensured legal protections for nurse anesthetists. Similar relationships were not reported in Canada or the UK, countries that have banned or significantly restricted nurse anesthesia practice.[22] Surprisingly, generalist nursing organizations have historically hindered nurse anesthesia development. In Germany, the German Nurses' Association declared that anesthesia was better left to physicians, and in the UK the Nursing Board of the War Office would not authorize training of nurse anesthetists during WWII.[5,8] Both countries would cite this lack of support as reason for banning the practice of nurse anesthesia. Professional relationships appear to play a role in almost every facet of nurse anesthesia practice and have either helped restrict or promote nurse anesthesia practice in North America and Western Europe.

Conclusion

Nurses have a long history of providing safe anesthesia care;[2] however, nurse anesthesia practice varies widely in North America, Western Europe, Japan, and Australia. This review has identified factors that have shaped restrictions on modern nurse anesthesia practice, but it is only the beginning of understanding why countries restrict safe anesthesia providers despite national and global shortages. Future research should be targeted to identify how these factors could restrict nurse anesthesia practice in developing parts of the world. If low- and middle-income countries were to mirror high-income countries that have constrained nurse anesthesia practice, it would likely exacerbate the current worldwide anesthesia provider shortfalls and prevent patients from receiving surgical care. Professional organizations have the influence to determine how that need will, or will not, be met.

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Medical Cannabis: Knowledge, Beliefs and Attitudes of Certified Registered Nurse Anesthetists

Abstract

Background: The increase in the number of patients prescribed medical cannabis (MC) in the United States (US) poses a unique challenge for anesthesia providers. It is being prescribed for an increasing variety of conditions and has a documented impact on anesthesia care. However, anesthesia provider's current knowledge, attitudes, and beliefs, about MC have not been well described in the literature.

Purpose: This study aimed at filling that knowledge gap by surveying Certified Registered Nurse Anesthetists (CRNA) and Student Registered Nurse Anesthetists (SRNAs) in Illinois with an adapted survey measuring anesthesia providers' knowledge, attitudes, and beliefs, about MC. Results: The results of this survey provide evidence that a clear majority of survey respondents believe that (a) understanding MC is important for anesthesia practice, (b) anesthesia providers' MC knowledge is poor, and (c) formal training and education on MC is necessary for safe anesthesia practice.

Conclusions: More education on recreational and medical cannabis is needed and has provided a template to develop future educational interventions.

Keywords: Anesthetist, cannabis, cannabinoids, survey, education, knowledge, attitude, beliefs.

Introduction

Recreational and medical cannabis (MC) use in Illinois is increasing[1] and anesthesia providers will likely see more patients using cannabis, and cannabis related substances, in need of anesthesia care. There is evidence cannabis increases anesthesia requirements when placing an airway,[2] increases the dosage of Propofol for endoscopic procedures,[3] is increasingly used as a non-opioid analgesic for surgery,[4] is a treatment for chronic pain conditions,[5,6] and will reduce the dose of benzodiazepines and antidepressants in patients.[7] It's opioid sparing effects[8] have the potential to be incorporated into enhanced recovery after surgery (ERAS) protocols, but these results are contradicted by the finding that patient's taking MC and recreational cannabis reported higher pain scores before and after surgery,[9] making its use in ERAS protocols debatable. What is clear is that cannabis use is increasing and will impact anesthesia care. To safely care for these patients, clinicians need to be knowledgeable about cannabis and MC.

MC and recreational cannabis are similar in active chemical ingredients, but differ on where they come from and how they are obtained. MC is prepared by a pharmaceutical company and prescribed by a physician, presumably giving an expectation of consistency and stability. However, general practitioners have reported dissatisfaction in the availability of formal training programs to help providers prepare to discuss and prescribe MC.[10] Dosing of MC can be difficult and therapeutic cannabinoids take many forms. MC can be taken as a pill, eaten, smoked, vaped, and applied topically as an oil, which makes creating equivalencies in dosing a challenge for providers and researchers.[11] Although anesthesia providers are rarely the prescribers of MC, difficulties in prescribing may result in variability in MC dosing which will impact the effects MC has on anesthesia care. Prescribing clinicians require education on dosing, routes of administration, and side effects, to maximize the benefits and reduce risks of MC.[5] It may also be prescribed to patients who, under other circumstances, would never use cannabis products. For example, an otherwise sober elderly individual, taking MC, may require far larger than expected doses of anesthetics during an upper endoscopy leading. Despite a lack of training, healthcare providers are generally positive about MC as a treatment option, but believe they have knowledge deficits and are uncomfortable discussing MC with patients.[12-15] It is imperative that the knowledge, attitudes, and beliefs, of anesthesia providers regarding MC be quantified so that educational interventions can be developed to create scientific based training interventions so that providers can provide the safest care and give the most up-to-date information to their patients.

To date, no study has assessed the MC knowledge, beliefs and attitudes, of anesthesia providers. To fill that knowledge gap, this study examined Illinois CRNAs' and SRNAs' knowledge, beliefs and attitudes, regarding MC by surveying the Illinois Association of Nurse Anesthetists (IANA) using an adapted questionnaire that quantifies knowledge, attitudes, and beliefs, regarding MC. The results of this study will be used to create a framework for educational interventions to train anesthesia providers about MC.

Methods

The research team conducted a descriptive study using an adaptation of an existing survey on knowledge, beliefs, and attitudes, of MC5 that was distributed to the Illinois Association of Nurse Anesthetists (IANA) membership. The survey was adapted by the investigators after permission was obtained from the

copyright holder. The adapted survey underwent review by three outside content experts using the content validity process described by Lynn.[16] All content experts agreed that the new researcher-developed adaptation of the knowledge, beliefs, and attitudes, survey had content validity for nurse anesthesia practice.

Following IRB approval, the surveys were distributed by the IANA via email and participants were able to complete survey on computer, tablet, or phone, using Qualtrics® survey software. Data from the survey was analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were used to present data including percentages, mean and median.

Results

The study sample included 204 members of the IANA who were mainly between the ages of 20-39 (91, 44.8%), female (134, 66.3%), and had been practicing for 10-29 years (75, 36.9%) (Table 1).

Overwhelmingly, participants responded that they did not feel knowledgeable about the endocannabinoid system (152, 79.6%), felt that it is important to understand MC (142, 73.2%), did not feel knowledgeable about existing cannabinoid medications (153, 80.1%), and believed that it is important to understand existing cannabinoid medications (145, 74.4%) (Table 2). Additionally, participants were asked to select where they received their MC information. They responded that their primary source of MC information was news media (115, 55.8%), followed by medical journals (105, 51%), and other healthcare providers (89, 43.2%). More traditional education and training settings (continuing education, 81, 39.3%; lectures,

Table 1. Survey Respondent Demographic Information

Demographics of Respondents		No.	Percent
Age (years)	20-39	91	44.8
	40-59	77	37.9
	60+	35	17.3
Gender	Female	134	66.3
	Male	68	33.7
Years Practicing	SRNA	40	19.7
	0-9	61	30.0
	10-29	75	36.9
	30+	27	13.3

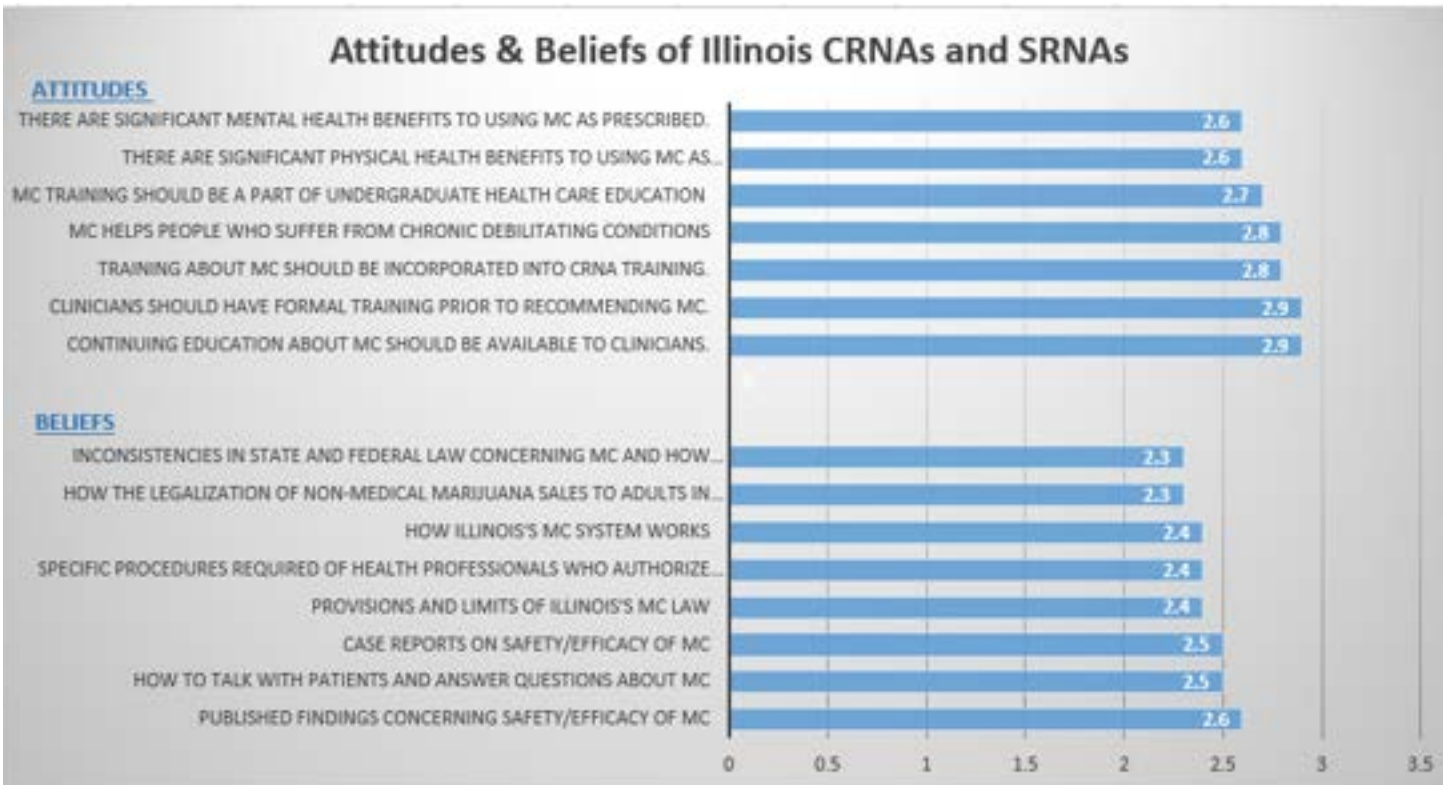

Table 2. How respondents ranked current knowledge and its importance.

Current state and relevance of MC knowledge		
Rating Category	**No.**	**Percent**
Do not feel knowledgeable about the endocannabinoid system	152	79.6
Feel it is important to understand of how MC works	142	73.2
Do not feel knowledgeable about existing cannabinoid medications	153	80.1
It is important to understand existing cannabinoid medications	145	74.4

A 0-10 ranking system was used. A 0-5 ranking indicated a negative response; 6-10 indicated a positive response. Abbreviations: MC, Medical Cannabis

Table 3: Sources of information.

Where CRNAs and SRNAs tend to get their information on MC		
Sources	**No.**	**Percent**
News media	115	55.8
Medical journals	105	51
Other healthcare providers	89	43.2
Continuing Medical education	81	39.3
Friends/family	77	37.4
Patients	63	30.6
Lectures	46	22.3
Training in Clinical Practice	26	12.6
Dispensary owners	15	7.3
Never obtained information on MC	8	3.9
Practice administrators	2	1
Legal counsel	1	0.5

Abbreviations: CNRA, Certified Registered Nurse Anesthetist; SRNA, Student Registered Nurse Anesthetist; MC Medical Cannabis

46, 22.3%) were ranked fourth and seventh, respectively (Table 3).

The clear majority of participants (>85%) replied that they were "somewhat" or "very interested" in learning about MC. The three main topics participants indicated they would like to learn about were published findings on MC (96.9%), case reports concerning safety and efficacy of MC (93.7%), and information on how to talk to patients about MC (89.6%). Participants reported that they were interested in education on Illinois's MC laws (89.6%) and policy questions, such as specific procedures required of health professionals who authorize patients to use MC (85%), how the legalization of non-medical marijuana sales to adults in Illinois will affect MC (86.5%), and how Illinois's MC system works (87.4%) (Table 4).

A majority of participants responded favorably to questions regarding the usefulness of MC as a tool for patient care. Most agreed that MC can have significant physical health benefits (66.3%) and significant mental health benefits (61.6%). When asked if MC can help people who suffer from chronic debilitating medical conditions, 80.6% of respondents agreed that it could. However, only 10.3% reported that they had suggested to a patient that they could benefit from MC (Table 5). The survey found that 88.6% of respondents had reported being asked at some point by a patient about MC as a treatment option.

Overwhelmingly, participants reported that continuing education about MC should be available to clinicians (91.5%) and that clinicians should have formal training about MC prior to recommending it to patients (91.4%). The majority felt that MC should be incorporated into CRNA training programs (84.6%) and undergraduate health care education curricula (75%).

Discussion

The results of this survey are evidence that anesthesia providers need more education regarding MC. Despite a majority believing that understanding MC was important to anesthesia practice, a clear majority of providers were not comfortable with their MC knowledge. These results are not surprising, and mirror other findings from healthcare providers. Primary care providers have reported that MC knowledge is important to their clinical practice and need help understanding MC treatment options.[5,13,14] Canadian healthcare providers

Table 4. Indication of whether or not respondents would be interested in learning about certain topics. Attitudes of CRNAs and SNRAs regarding training in various MC topics (Percent)					
Subject	**Not at all Interested (1)**	**Somewhat Interested (2)**	**Very Interested (3)**	**Mean**	**Median**
Published findings concerning safety/efficacy of MC	3.1	33.3	63.5	2.6	3
How to talk with patients and answer questions about MC	10.4	30.2	59.4	2.5	3
Case reports on safety/efficacy of MC	6.3	38.2	55.5	2.5	3
Provisions and limits of Illinois's MC law	10.4	38.9	50.8	2.4	3
Specific procedures required of health professionals who authorize patients to use MC	15	34.2	50.8	2.4	3
How Illinois's MC system works	12.6	39.3	48.2	2.4	2
How the legalization of non-medical marijuana sales to adults in Illinois will affect MC	13.5	40.1	46.4	2.3	2
Inconsistencies in state and federal law concerning MC and how they're being addressed	12	41.9	46.1	2.3	2

Abbreviations: CNRA, Certified Registered Nurse Anesthetist; SRNA, Student Registered Nurse Anesthetist; MC Medical Cannabis

Table 5. Indication of whether or not respondents felt MC is beneficial and if where education should take place.

Beliefs of CRNAs and SRNAs regarding MC use and education (Percent)					
Statements	**Disagree (1)**	**Neutral (2)**	**Agree (3)**	**Mean**	**Median**
Continuing education about MC should be available to clinicians.	1.1	7.4	91.5	2.9	3
Clinicians should have formal training prior to recommending MC.	2.2	6.5	91.4	2.9	3
Training about MC should be incorporated into CRNA training.	2.7	12.8	84.6	2.8	3
MC helps people who suffer from chronic debilitating conditions	1.6	17.8	80.6	2.8	3
MC training should be a part of undergraduate health care education	3.7	21.3	75	2.7	3
There are significant physical health benefits to using MC as prescribed.	4.7	28.9	66.3	2.6	3
There are significant mental health benefits to using MC as Prescribed.	6.3	32.1	61.6	2.6	3

Abbreviations: CNRA, Certified Registered Nurse Anesthetist; SRNA, Student Registered Nurse Anesthetist; MC Medical Cannabis

have called for training about MC to be included in clinical and educational settings[17] and Australian general medical providers felt that it was essential to be able to talk with patients about MC.10 Increasing prescriptions of MC will expose patients to cannabis that would never use this substance otherwise and variability in MC dosing can translate into anesthetic complications for patients.

One explanation is that anesthesia provider's comfort with their MC knowledge may be undermined by where they receive their information regarding MC. News media was rated as the most popular source of information regarding MC (55.8%), but the quality of news media reporting varies, and other more valid sources of information, such as scientific studies and lectures, were less frequently the sources of anesthesia provider's knowledge of MC. This problem could be corrected with high-quality research and educational interventions that educate and train anesthesia providers on MC and cannabis.

Generalizability of this study's conclusions is limited by a low-response rate (approximately 11%) and limiting the sampling frame to the IANA membership. Additionally, the survey did not collect data on potential confounding factors to MC knowledge such as practice setting or personal/family use of MC. However, this study was able to gather over two-hundred survey responses from CRNAs in Illinois and their responses clearly indicated on an adaptation of existing questionnaire. Future studies can correct these limitations through sampling all anesthesia providers on a national level.

The purpose of this study was to discover how knowledgeable CRNAs and SRNAs in Illinois were about MC, what their current beliefs were regarding MC, and what their current attitudes were regarding MC. Overall, this study found that CRNAs and SRNAs believe it is important to be knowledgeable about MC and to be able to talk with patients about it. However, anesthesia providers do not feel comfortable with their MC knowledge

and want more training in MC. It is the recommendation of this research team that educational interventions be developed to educate anesthesia providers on recreational and medical cannabis. Towards that end, an educational template was developed to be the first step in the development of such an intervention (Appendix A). Patients reporting cannabis use will be an increasing portion of the patient population and it is important for anesthetists to be knowledgeable and comfortable with the uses and effects of cannabis in order to keep our patients safe.

Conclusion

This survey found that CRNAs and SRNAs overwhelmingly believed it was important to be knowledgeable about MC and to be able to talk with patients about its use. Unfortunately, participants also overwhelmingly reported that they did not feel comfortable with their knowledge and would like more training in MC.

This study provides evidence that training in MC is important and needed. Education modules that synthesize current research and recommendations should be created for anesthetists to correct this deficiency. Patients using cannabis, whether medical or recreational, will continue to increase and it is important for anesthetists to be knowledgeable and comfortable with the uses and effects of cannabis to keep patients safe.

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Anesthetic Implication of Vaping: A Survey of Anesthesia Providers' Knowledge of Vaping and Intent to Utilize Vaping Knowledge into Practice.

Abstract

Background: Electronic cigarettes, also known as vapes, are a popular smoking cessation tool. Vapes increase the risk of cardiovascular and respiratory diseases. However, many anesthesia providers have not received formal training on the effects of vaping on anesthetic care.

Purpose: The purpose of this study is to determine the effectives of an educational intervention.

Method: An educational voice-over PowerPoint® was developed to educate anesthesia providers on the implications of vaping on anesthetic care and was tested using a pretest posttest design via online survey. Knowledge and future intent to utilize knowledge were measured using investigator developed exams.

Results: The exam content was found to be a valid (CVI = 1.0) and reliable (KR-20=0.54) measure of anesthesia provider vaping knowledge. The Wilcoxon-signed rank was significantly different between pre- and posttest scores ($z = -4.076$, $p = <0.01$) and all anesthesia providers agreed or strongly agreed that they would use the information presented in video in their practice.

Conclusions: The educational intervention may have increased anesthesia provider knowledge and was widely agreed to have information that can be utilized in anesthesia practice, but more research is needed.

Key Words: vape, electronic cigarette, anesthesia, education, knowledge

Introduction

A device advertised to promote smoking cessation is proving to have detrimental effects on health. This device goes by many different names, such as the electronic cigarette, e-cigarette, vape, Juul, or electronic nicotine delivery system (ENDS). A vape is a battery powered device that produces vapor by rapidly heating a liquid chemical formula containing a variety of ingredients.1 The user inhales the vaper, a term coined 'vaping', similarly to traditional cigarette 'smoking'.

Despite being advertised as safe or healthy, the Food and Drug Administration has reported that vape cartridges contain several substances known to be harmful to humans.[1-3] Users of electronic cigarettes are at an increased risk of developing a variety of diseases, particularly those of the cardiovascular and respiratory systems.[1-9] If present, these diseases may affect the course of an anesthetic, or the surgical outcome.[3] Furthermore, vaping contents induce physiological changes which can influence alterations in an anesthetic, such as: anesthetic pharmacokinetics and pharmacodynamics, oxygen delivery, airway management and hemodynamic management.[1-3]

Recent findings have demonstrated a significant knowledge gap exists amongst healthcare providers regarding preoperative vaping assessments and the clinical implications of vaping.[2,9] Given their increasing popularity, anesthetists will likely encounter greater numbers of patients who use vape products. Therefore, it is essential for anesthesia providers to have the knowledge and skills to properly assess patients for vaping use in order to adapt their anesthetic approach.

The purpose of this study was to determine the impact of an educational intervention, a voice-over PowerPoint® (VOPP), on anesthesia provider knowledge and their intent to utilize new clinical knowledge regarding the assessment, evaluation and anesthetic implications for patients who vape electronic cigarettes.

Methods

The educational intervention, VOPP, was developed using published literature from peer reviewed journals[1-9] and contained the following content: (1) physiological and health implications of vaping, (2) vaping assessment strategies, (3) anesthetic implications of vaping, and (4) general vaping information. A knowledge exam was developed to assess anesthesia provider knowledge of the impacts of vaping on anesthesia care. The VOPP and knowledge exams were reviewed by three practicing anesthesia providers, with no involvement in this project, and two authors (JM and KL) for clarity and relevance using an established content validity process.[10] Intent to incorporate the knowledge into practice was assessed with a 4-point Likert response.

SRNAs in clinical rotation and CRNAs at a suburban hospital system in Northern Illinois were sampled using recruitment emails. SRNAs not in clinical rotation and CRNAs not actively practicing were excluded from the sample. Those selected participated in a pretest-posttest experiment were given an email like to the knowledge exam, which they completed before viewing our VOPP intervention. Participants would watch the VOPP and complete the same knowledge exam with the intent to implement new knowledge into practice Likert question. Survey responses were collected using Qualtrics® and analyzed using Stata 17® statistical software to determine if there were pre- and posttest differences.

Results

The sample included 37 CRNA's and SRNA's, but 13 responses were excluded due to incomplete survey data (n=24). The majority of respondents reported practicing anesthesia for less than one year (83.33%)

and were SRNA's (79.17%). In addition, the majority of participants identified as being white (79.17%), female (66.67%) and were between the age of 30-39 years old (62.50%). In regard to the highest level of education, the majority of participants currently hold a bachelor's degree (62.5%), followed by a masters (20.83%) and doctorate (16.67%) (Table 1). The initial content validity index (S-CVI) measured at 0.93. The materials underwent a second review which found CVI = 1.00.

The mean knowledge score before viewing the education module was 5.75, while the mean score after viewing the education module was 8.58 (Figure 1). When comparing test scores, the majority of participants (45.83%) scored a 5/11 on the pretest, while the majority of participants (25.0%) scored an 8/11 on the post-test (Table 2). No participant received more than 8 questions correct on the pre-test, while 79% of participants on the post-test scored an 8 or greater. 4 participants (16.67%) scored a 100% on the post-test survey. One participant did score lower on the post-test than on the pre-test.

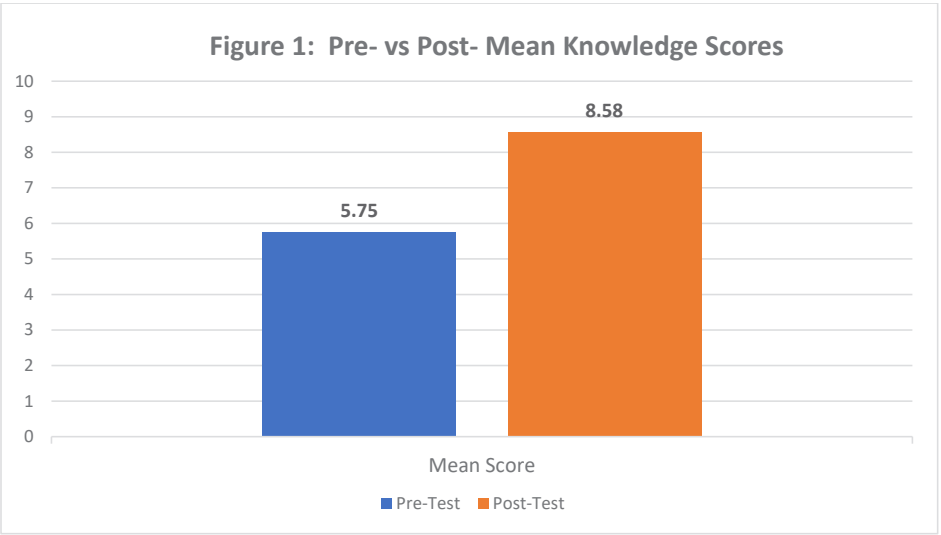
Data collected from survey responses did not meet assumptions of parametric statistical testing and non-parametric tests were used. Reliability of the knowledge exam was adequate (KR-20 = 0.54) and a Wilcoxon-signed rank test found that post-test scores were significantly higher than pre-test scores ($z = -4.076$, $p = <0.01$). All participants either strongly agreed or agreed that they were more likely to perform a preoperative vaping assessment and modify their anesthetic plan to incorporate vaping implications after watching the VOPP (Table 3). Additionally, 100% of participants either strongly agreed or agreed that patients who vape require changes in anesthetic plan. Lastly, 23 participants (95.8%) reported that they intend to incorporate new vaping knowledge into practice.

Discussion

The exam content was found to be a valid (CVI = 1.0) and reliable (KR-20=0.54) measure of anesthesia provider vaping knowledge. The Wilcoxon-signed

Table 1: Demographic Data

	Frequency (N=24)	Percent (%)
How many years have you been a practicing CRNA?		
<1 Year	20	83.33
1-2 Years	2	8.33
3-4 Years	0	0
5-6 Years	0	0
>6 Years	1	4.17
Prefer not to answer	1	4.17
What is your highest level of education attained?		
Associate's	0	0
Bachelor's	15	62.5
Master's	5	20.83
Doctorate	4	16.67
What is your current role?		
CRNA	5	20.83
SRNA	19	79.17
What is your ethnicity or race?		
Hispanic/Latino	3	12.5
Black/African American	0	0
Native American/ American Indian	0	0
Asian/Pacific Islander	1	4.17
White	19	79.17
Mixed Race	0	0
Prefer not to answer	1	4.17
What is your age group?		
20-29 Years	8	33.33
30-39 Years	15	62.50
40-49 Years	1	4.17
50-59 Years	0	0
>60 Years	0	0
What is your gender?		
Male	7	29.71
Female	16	66.67
Transgender/Non-Binary	0	0
Other	0	0
Prefer not to answer	1	4.17
What is your employment status?		
Full-time	16	66.67
Per-Diem	5	20.83
Retired	2	8.33
Prefer not to answer	1	4.17



rank was significantly different between pre- and posttest scores (z = -4.076, p = <0.01), evidence that the VOPP increased anesthesia provider knowledge. However, conclusions are limited due to the small sample size, unrepresentative sample, and a dropout of 13 providers from the study. Despite this, 100% of providers believed that the VOPP, developed from peer-reviewed information, contained information that can be incorporated into nurse anesthesia practice.

Conclusion

Patient vaping has consequences for the administration of anesthesia and educational interventions are needed to ensure that providers have the information they need to provide the highest level of anesthesia care. This study closely examined a VOPP educational intervention to address this shortfall, but more research is needed to ensure that efforts to educate anesthesia providers are effective.

Table 2: Pre- and Post-Test Scores

	Frequency (N=24)	Percent (%)
Pre-test scores: Total correct answers (11 total questions)		
4	1	4.17
5	11	45.83
6	7	29.17
7	3	12.50
8	2	8.33
Post-test scores: Total correct answers (11 total questions)		
3	1	4.17
5	1	4.17
6	1	4.17
7	2	8.33
8	6	25.0
9	4	16.67
10	5	20.83
11	4	16.67

Table 3: Future Intent to Utilize Vaping Knowledge

	Frequency (N=24)	Percent (%)
I am more likely to perform a preoperative vaping assessment in my clinical practice.		
Strongly agree	15	62.50
Agree	9	37.50
Disagree	0	0
Strongly disagree	0	0
I intend to modify my anesthetic plan to incorporate vaping implications.		
Strongly agree	13	54.7
Agree	11	45.83
Disagree	0	0
Strongly disagree	0	0
Patients who vape require changes in anesthetic plan.		
Strongly agree	14	58.33
Agree	10	41.67
Disagree	0	0
Strongly disagree	0	0
I **do not** intend to modify my anesthetic plan due to vaping because (select all that apply)		
I do not feel it is beneficial to my practice.	0	0
It is not routinely used or encouraged in my practice setting.	0	0
I feel there needs to be more research conducted before I change my practice	0	0
N/A: I intend to incorporate new knowledge	23	95.83
Other (Type in)	1	4.17
-Typed response:	"My level of knowledge for the implications of vaping needs to be reinforced to improve my confidence in making the right choices".	

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A Narrative Literature Review of Intrathecal and Epidural Dexmedetomidine for Obstetric Patients

Abstract

Dexmedetomidine may be a valuable replacement for neuraxial opioid adjuncts in the obstetric population. This novel technique warrants a thorough examination of existing research to ensure anesthesia providers are well-informed about its potential use. This narrative review of the literature on dexmedetomidine as a neuraxial adjunct in obstetric anesthesia found several studies comparing dexmedetomidine to opioids. Overall, studies reported dexmedetomidine potentiated the efficacy of neuraxial anesthesia, increased the onset of neuraxial block, and avoided common side effects of opioid adjuncts, such as shivering, pruritus, nausea, and vomiting. These conclusions are limited by publication bias, the subjectivity of narrative review methodology, and the quality of the journals publishing the studies. However, this narrative review found several promising findings in a broad range of published works that may lead to a better understanding of the use of neuraxial dexmedetomidine in obstetric anesthesia.

Keywords: obstetrics, neuraxial dexmedetomidine, intrathecal dexmedetomidine, epidural dexmedetomidine, opioid-free or opioid-sparing anesthesia

Introduction

Perioperative opioid use has been linked to increased opioid abuse and addiction, which has potentially fatal side effects.[1] Multimodal pain management utilizing opioid-free or opioid-sparing anesthesia techniques has improved surgical outcomes while reducing the potential risk for opioid addiction.[2] Neuraxial anesthesia frequently incorporates opioid adjuncts to improve intensity, onset, and duration of action. Unfortunately, opioid adjuncts may also cause pruritus, nausea, vomiting, urinary retention, and respiratory depression.[3] Dexmedetomidine, an alpha-2 agonist, is a novel adjunct that anesthesia providers can administer to enhance neuraxial anesthesia without the adverse side effects of opioids. This review aimed to analyze the literature comparing dexmedetomidine to opioids as a neuraxial adjunct in obstetrical populations.

Methods

Databases including EBSCO, MEDLINE, Cochrane, CINHAL, and Academic Search Complete were utilized to seek articles containing the keywords "spinal anesthesia intrathecal dexmedetomidine," "epidural anesthesia dexmedetomidine," "spinal," "epidural," "intrathecal," "neuraxial," "dexmedetomidine or Precedex," "obstetrics," "labor and delivery," "labor," and "cesarean." For all basic searches, the Boolean/Phrase search mode was utilized. Multiple keyword topics from the search history were chosen by selecting the Search with AND option. The first advanced search included the terms "spinal or intrathecal," "epidural," "dexmedetomidine or Precedex," and "obstetrics." The second advanced search contained "neuraxial," "dexmedetomidine or Precedex," and "obstetrics." A third advanced search involved the words "spinal or intrathecal," "epidural," "dexmedetomidine or Precedex," and "labor and delivery or labor." The final advanced search comprised "spinal or intrathecal," "epidural," "dexmedetomidine or Precedex," and "cesarean." Inclusion criteria for all queries incorporated a full-text filter and research published within the last ten years; articles not meeting these criteria were excluded from the review.

Results

The search yielded a total of 50 publications. Several studies that discussed the use of intravenous dexmedetomidine in obstetrical patients but did not involve spinal or epidural administration were excluded. After these criteria were applied, only 14 articles met the inclusion criteria (Table 1).

Studies examining intrathecal dexmedetomidine were more than half of the articles included for review. Topics encompassed dexmedetomidine as an adjunct to intrathecal bupivacaine or ropivacaine anesthesia for cesarean sections and combined-spinal epidural (CSE) labor analgesia for vaginal deliveries. All studies investigating intrathecal dexmedetomidine as an adjunct to spinal anesthesia concluded that dexmedetomidine prolonged the duration of sensory block. Four studies substantiated extended postoperative pain relief. Shivering was reduced in five double-blind, randomized controlled trials, with two concluding that an intrathecal dose of dexmedetomidine 5 mcg was optimal for reducing shivering. No studies found differences in neonatal outcomes when authors compared neuraxial dexmedetomidine to opioids.

Three studies investigated intrathecal dexmedetomidine as an adjunct with a CSE technique for labor analgesia. Two studies compared intrathecal dexmedetomidine to intrathecal fentanyl, and one compared intrathecal dexmedetomidine to intrathecal fentanyl, duramorph, and normal saline. Intrathecal dexmedetomidine was administered alone, with 2.5 mg of bupivacaine, or 2.5 mg of bupivacaine with 4 mg decadron, followed by epidural bupivacaine boluses as needed.

The review identified three randomized controlled trials examining epidural anesthesia and dexmedetomidine. Two investigated dexmedetomidine as a labor epidural infusion adjunct with ropivacaine; one sought to determine the optimal dose of dexmedetomidine in the epidural infusion. The third study analyzed post-cesarean analgesia with epidural dexmedetomidine and ropivacaine infusion compared to duramorph and ropivacaine infusion.

Discussion

Several studies reported benefits associated with intrathecal dexmedetomidine compared to opioids as an adjunct to neuraxial anesthesia in obstetrical populations. When added to intrathecal bupivacaine for cesarean section, dexmedetomidine sped block onset, prolonged duration of sensory block,[4,5] and reduced shivering.[6] When added to local anesthetic for epidural infusions, dexmedetomidine improved analgesia and sensory blockade without harmful side effects.[4,7] However, doses of dexmedetomidine as an epidural additive greater than 0.75 mcg/ml were correlated with increased motor block and decreased ability to push with contractions.[8] No studies found any differences in newborn outcomes when dexmedetomidine was used for maternal neuraxial anesthesia, and no traces were found in venous or arterial umbilical blood.[9]

Anesthesia providers should use caution when administering neuraxial dexmedetomidine. Utilizing the drug in this manner is not FDA-approved. Anesthesia providers must weigh risks versus benefits when considering the off-label use of any medication. The conclusions from the primarily Asian studies presented in this narrative literature review may not be generalizable to U.S. obstetric populations. There are differences in average height, weight, and comorbidities in Asian women. American women, on average, are taller, and 29% have prepregnancy body mass indexes ≥ 30 kg/m2.[10] Additionally, publication bias may have prevented disclosure of negative or non-statistically significant findings. Therefore, this narrative literature review does not provide specific practice recommendations but presents the available published literature on dexmedetomidine as an adjunct to neuraxial anesthesia in obstetrics. Studies conducted in patient populations that are representative of U.S. parturients are needed.

Table 1. Studies Included in Literature Review (DEX = dexmedetomidine)

Author (Year); Sample.	Study Purpose	Study Design	Principle Findings
Sun, Y., Xu, Y., & Wang, N. (2015); n=90.[5]	Compare outcomes of bupivacaine only, fentanyl + bupivacaine, or DEX + bupivacaine spinal for cesarean section.	Randomized trial One control and two experimental arms	• 2 ml 0.5% bupivacaine with 10 mcg intrathecal DEX resulted in longer sensory block compared to fentanyl + bupivacaine arm • DEX arm sensory block averaged 211.7 min, while fentanyl arm sensory block averaged 179 min (p< 0.003).
Li, X., Li, Y., Lv, X., Wang, X., & Lui, S. (2020); n=300.[9]	Determine the safety of intrathecal DEX vs. fentanyl vs. normal saline as adjuncts to bupivacaine spinal for cesarean section.	Double blind RCT One control and two experimental arms	• Significant (p < 0.05) difference in spinal duration: o DEX + bupivacaine arm average sensory block = 148.2 min. o Fentanyl + bupivacaine sensory block averaged 122 min. o NS + bupivacaine sensory block averaged 108.4 min. • No significant differences between newborn data in all groups: o pH (cord blood sample) o PaO_2 (cord blood sample) o $PaCO_2$ (cord blood sample) o APGAR scores
Qi, X., Chen, D., Li, G., Huang, X., Li, Y, Wang, X., & Li, Y. (2016); n=120.[11]	Compare intrathecal DEX + bupivacaine to duramorph + bupivacaine to plain bupivacaine spinal for cesarean section.	RCT One control and two experimental arms.	• Significantly (p < 0.05) longer block in DEX arm compared to duramorph arm o 10 mg (0.75%) bupivacaine + 5 mcg DEX arm had average sensory block of 253.1 min. o 10 mg (0.75%) bupivacaine + 100 mcg duramorph arm had average sensory block of 192.5 min. • Significantly more pruritis in the duramorph arm than the control and DEX arms (p < 0.001). No pruritis was reported in the DEX arm. • Significantly (p < 0.05) less shivering in the DEX group compared to the duramorph and control groups. • No difference in analgesic rescue time between morphine and DEX groups.
Modir, H., Yazdi, B., Shokrpour, M., Hesamamini, R., Modir, A., & Mohammadbeigi, A.(2020).[12]	Compare hemodynamics and block dynamics of different doses of intrathecal DEX (2.5 mcg, 5 mcg, and 7.5 mcg) with ropivacaine spinal for cesarean section.	Double blind RCT One control arm and three treatment arms	• Compared to 2.5 mcg and 5 mcg of DEX + ropivacaine spinal, 7.5 mcg of DEX arm had: o Lower heart rate and blood pressure (p < 0.05) o Lowest pain scores (p < 0.0001) o Shorter onset of sensory and motor block (p < 0.0001) o Resolution of block was longer.
He, L., Xu, J., Liu, S., Chen, Z., Li, X., & Zhu, R. (2017); n=90.[6]	Determine the effect of intrathecal DEX 2.5 mcg vs 5 mcg vs normal saline on shivering in bupivacaine spinal for cesarean section.	Double Blind RCT One control arm and two experimental arms	• 5 mcg DEX in bupivacaine spinal group had significantly less shivering than 2.5 mcg DEX and control groups, p < 0.01 and p < 0.005 respectively • No significant differences were discovered between mean arterial blood pressure or heart rate in any group.
Lui, L., Qian, J., Shen, B., Xiao, F., & Huaxiang, S. (2019); n=90.[13]	Determine if 5 mcg of intrathecal DEX increases the efficacy of bupivacaine spinal vs saline for cesarean section.	RCT with one control arm and one treatment arm	• Adding 5 mcg of DEX to bupivacaine spinal enhanced the efficacy of spinal bupivacaine by 24% in patients undergoing cesarean section with spinal anesthesia.
Nasseri, K., Ghadami, N., & Nouri, B. (2017); n=50.[14]	Determine if 5 mcg intrathecal DEX + bupivacaine reduces shivering vs intrathecal normal saline + bupivacaine in spinals for cesarean section.	Double-blind RCT One control arm and one treatment arm	• Incidence of shivering was significantly higher in the control group (p < 0.04). o Incidence of shivering with normal saline in bupivacaine was 52%. o Incidence of shivering with 5 mcg DEX was 24%. • Intensity of shivering in the DEX group was significantly lower (p < 0.04).
Cheng, Q., Bi, X., Zhang, W., Lu, Y., & Tian, H. (2019); n=160.[4]	Compare DEX to sufentanil as adjuncts in ropivacaine labor epidural analgesia continuous infusion.	RCT with four treatment arms: 1. 0.125% ropivacaine at 8ml/hr with 0.5 mcg/ml sufentanil 2. 0.08% ropivacaine at 8 ml/hr with 0.5 mcg/ml sufentanil 3. 0.125% ropivacaine at 8 ml/hr with DEX 0.5 mcg/ml 4. 0.08% ropivacaine 8 ml/hr with DEX 0.5 mcg/ml.	• Significantly (p = < 0.05) lower blood pressure and heart rate in sufentanil treatment arm 1 (0.125% ropivacaine at 8ml/hr with 0.5 mcg/ml sufentanil). • Significantly (p = < 0.05) fewer cases of urinary retention in DEX treatment arm 4 (0.08% ropivacaine 8 ml/hr with dexmedetomidine 0.5 mcg/ml).
Wangping, Z., & Ming, R. (2017); n=100.[8]	Determine the optimal dosage of DEX for labor epidural analgesia continuous infusion.	Pilot study with four treatment arms (0.25, 0.5, 0.75, and 1 mcg/mL DEX, in 0.1% ropivacaine)	• Analgesia and the density of sensory blockade increased with increasing dosage concentrations. • Once a dose of 0.75 mcg/ml or more was administered, motor block increased, negatively affecting the ability to push with contractions.
Mo, Y., & Qiu, S. (2017); n=80.[15]	Determine the post-cesarean analgesic effects of epidural infusions of DEX + ropivacaine vs duramorph + ropivacaine.	RCT with one control arm CSE was placed prior to Csection. Epidural infusions studied were started post Csection.	• Patients who received DEX + ropivacaine epidural infusion for post-csection pain had lower Visual Analog Scale reports at 6, 12, 24, and 48 hours in both a resting and coughing state (p < 0.05) but no significant difference in pain score at 2 hours post csection.

			• Significantly ($p < 0.05$) decreased nausea, vomiting, & pruritis, in DEX group.
Jain, N., Mathur, P., Soni, P., & Patodi, V. (2019); n=60.[16]	Compare duration & characteristics of labor analgesia between intrathecal DEX + bupivacaine vs intrathecal fentanyl + bupivacaine for CSE for labor epidural analgesia.	RCT with two treatment arms (2.5 mg 0.5% bupivacaine and 5 mcg DEX and 2.5 mg 0.5% bupivacaine and 25 mcg fentanyl.) 10 mL of 0.125% isobaric bupivacaine was given as top-up for rescue analgesia as needed.	• Significantly ($p < 0.0001$) longer duration of analgesia with DEX compared ~~to the~~ to fentanyl group. • Onset of analgesia was significantly ($p < 0.0001$) faster in DEX group compared to fentanyl group. • No significant difference in hemodynamics, side effects, or neonatal outcomes, between the groups.
Khaled, G. M., & Sabry, A. I. (2020); n=140.[17]	Assess the impact of adding intrathecal DEX, fentanyl, and morphine, to bupivacaine-dexamethasone for CSE for labour analgesia.	RCT with one control and three treatment arms Each arm received 2.5 mg of 0.5% bupivacaine and 4 mg of Decadron intrathecal and one of the following adjuncts: 1. 5 mcg DEX 2. 25 mcg fentanyl 3. 100 mcg morphine 4. 0.9% normal saline	• Dexmedetomidine had the longest duration of analgesia at 199 min versus 183.7 min with morphine and 171 min with fentanyl (p=0.001). • Dexmedetomidine had the shortest analgesic onset for pain relief and highest sensory level at 2.8 min, compared to 4 min with morphine ($p < 0.003$) and 2.9 min with fentanyl ($p < 0.001$). • A greater density of sensory block was found with DEX in contrast to other treatment arms and control. • There were no significant differences between newborn & maternal outcomes. • Highest sedation scores were recorded in the DEX group.
Dilesh, P. K., Eapen, S., Kiran, S., & Chopra, V. (2014); n=112.[18]	Compare maternal and neonatal outcomes along with the duration and quality of analgesia of intrathecal DEX vs IT fentanyl in CSE labor analgesia.	RCT with two arms. Each participant received an intrathecal dose of either 10 mcg DEX or 20 mcg fentanyl. 10 mL of 0.125% bupivacaine was given epidurally for top-up bolus when VAS score rose above 3.	• Significantly ($p < 0.001$) longer duration of analgesia in the DEX group (160 min) than the fentanyl group (124 min). • Significant ($p < 0.001$) less pruritis in the fentanyl group (74% vs. 0%). • VAS scores at peak analgesia were lower in fentanyl group; however, all women achieved VAS scores of <3 and were satisfied with analgesia in the DEX group.
Xia, F., Chang, X., Zhang, Y., Wang, L., & Xiao, F. (2018); n=90.[19]	Determine if DEX can reduce the ED95 of spinal bupivacaine for cesarean section.	RCT with one control arm (saline) and one treatment arm (DEX 5 mcg) were added to varying doses of intrathecal bupivacaine.	• Significantly ($p < 0.05$) longer duration of sensory blockade in the DEX group (110 min) vs control (67 min). • The addition of 5 mcg intrathecal DEX led to a 31% reduction in the ED95 of hyperbaric bupivacaine.

Conclusion

Dexmedetomidine is a promising replacement for opioids as an adjunct to neuraxial anesthesia for obstetric patients. Although limited, this review summarizes the available literature on dexmedetomidine's potential utility in obstetric neuraxial anesthesia. More research is needed before anesthesia providers can reach definitive conclusions regarding neuraxial dexmedetomidine's safety and efficacy in obstetrics.

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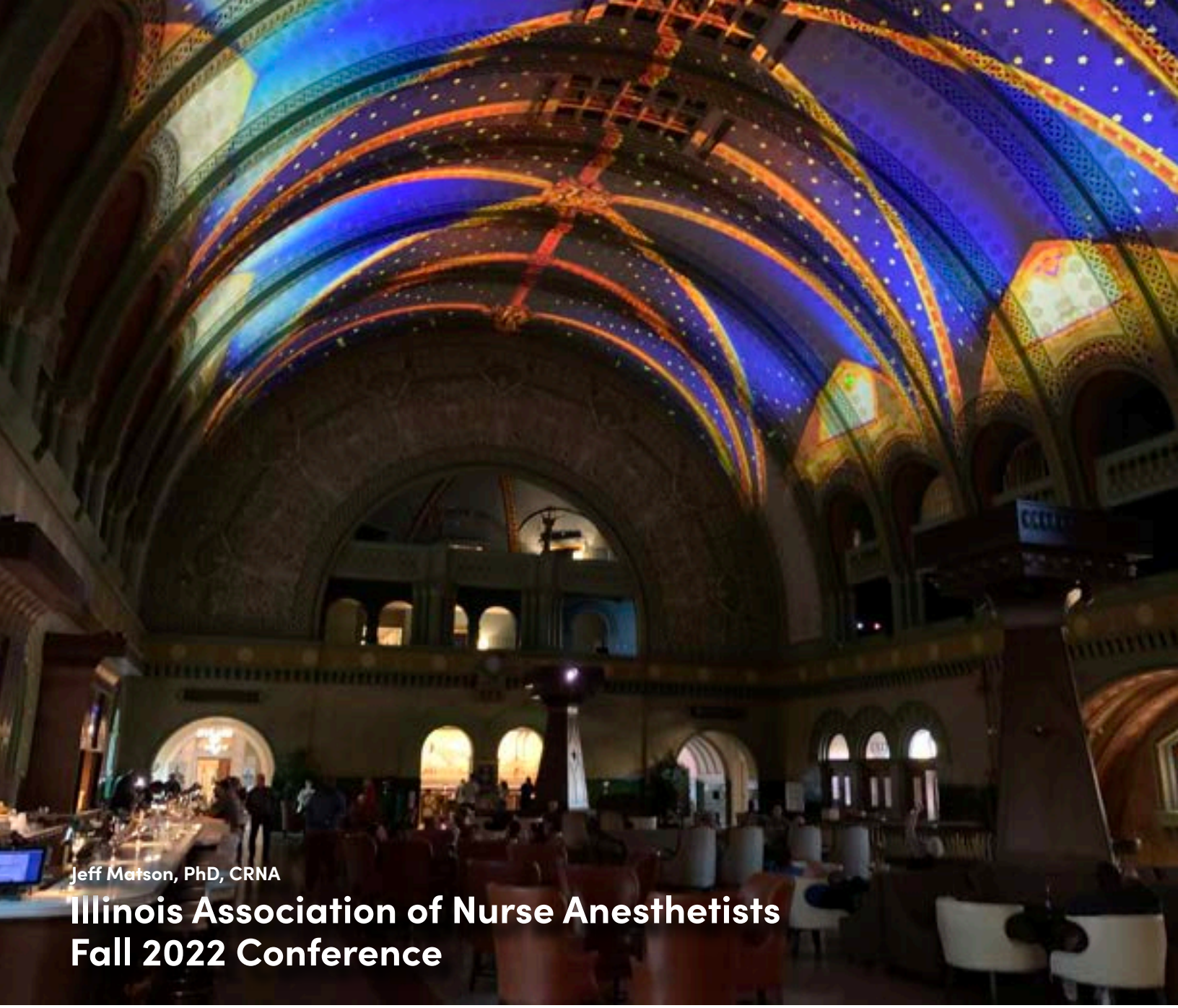

Jeff Matson, PhD, CRNA

Illinois Association of Nurse Anesthetists Fall 2022 Conference

Pictured Above: TBD

The IANA '22 Fall Conference was held at the St. Louis Union Station Hotel in St. Louis, Missouri. The smell the toasted ravioli, or T-Ravs as St. Louisans lovingly call them, greeted IANA members as they walked into the historic hotel, which up until 1978 was a train station that could see 100,000 passengers move through in a single day. Celebrities, including President Harry Truman, Joe DiMaggio, and Joan Crawford, all could be found traveling and taking pictures at the station during its heyday. During the conference, for those lucky enough to walk through the Grand Hall at 5 pm on Friday night, there was a laser light show projected onto the historic 65-foot vaulted ceilings. But the real event was the hard work put in by presenters to give the attendees a fun and educational experience to help us best care for our patients.

Pain and regional anesthesia were highlighted in several of the lectures at the conference. Reed Halterman, DNP, CRNA, double lectured on pain and radiographic interpretation. His straightforward

presentation allowed anyone to understand the basic mechanisms underlying pain transmission and how to easily approach chest x-ray interpretation – airway, breathing, cardiac, diaphragm, and everything else. Sarah Tweedy, DNP, CRNA, ARNP, taught providers how to select medications and dosages to relieve pain in our patients, and Rebecca Collier, DNP, CRNA, advocated for using dexmedetomidine in neuraxial anesthesia for obstetric patients. Blaire Ferguson, DNP, CRNA, reviewed truncal blocks that can provide superior analgesia to our patients – declaring that a bad quadratus lumborum block (QLB) is a great transversus abdominis plain (TAP) block. These blocks help reduce opioid exposure to our patients and prevent the substance use disorders that Suzie Newell DNP, CRNA, FAANA, expanded upon in her Sunday lecture and in her book that she just published.

Refreshing topics that emphasized provider wellness and professional growth included a talk by Julia Feczko, DNP, CRNA, that helped listeners identify their sage and saboteur influences to combat provider burnout by giving us real world examples of the little angels and devils we have on our shoulders, and how they influence our wellbeing. Mentorship of students and providers to promote professional growth were topics discussed by Lisa Bennett, DNP, MS, APRN-CRNA; Cassie Starrett, BS, RN; and Katrina Harlan, BSN, RN. They reminded us that we are all in some stage of professional growth and that finding people to support us can be an invaluable tool for ourselves and the profession. Jacob Bonnema, BSN, RN, CCRN, discussed the environmental impact of our anesthesia gasses, and if you want to know more, I recommend that you listen to the anesthesia guidebook podcast number 90 and take his survey.

Pharmacology, infection control, and pediatrics, were all highlighted in the Saturday and Sunday sessions, with Courtney Janiec, BSN, RN, presenting on PPE selection and Cole Dill, DNP, CRNA, presenting on neuromuscular blocking and reversal agents. The audience was reminded that aerosolization of respiratory diseases will forever be part of anesthesia practice and, although sugammadex has

Pictured Above: TBD

Pictured Above: TBD

changed how we reverse our paralysis, we can't forget neostigmine. The conference featured several presentations on issues relevant to pediatric anesthesia. Leah Park, DNP, CRNA, outlined the reasoning for ketogenic diet in pediatric patients with certain types of seizure disorders and how to effectively manage these patients inside and outside the OR, and Tracey Rooney, DNP, CRNA, reviewed the anesthetic consideration for pediatric obesity.

The IANA PAC hosted a bowling fundraiser on Saturday night at Flamingo Bowl where attendees were treated to pizza and T-Ravs for their support. Families and friends had a great time competing against each other, but it is safe to say no anesthesia providers are switching their career paths to professional bowlers. This author, sadly, did not even break 100.

The IANA Fall '22 conference was a great time for colleagues to come together and move our profession forward. Thank you to all the generous contributions from our members and exhibitors. We can't wait to see you in the Spring! ■

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