

Certified Registered Nurse Anesthetist vs. Anesthesiologist Assistant:

A Comprehensive Review of Similarities and Differences

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Abstract

Two types of non-physician anesthesia providers, Anesthesiologist Assistants (AAs) and Certified Registered Nurse Anesthetists (CRNAs), participate in anesthesia practice. While these two providers may share similarities in job descriptions and are considered interchangeable in some settings, the clinical background, academic requirements, and scope of practice between the two are different. A PowerPoint presentation describing the similarities and differences that exist among CRNAs and AAs was prepared and presented to a convenience sample of 24 senior Student Registered Nurse Anesthetists (SRNAs) enrolled at Adventist University of Health Sciences. The goal of this project was to increase the knowledge of SRNAs regarding the similarities and differences among CRNAs and AAs. A pre and post test was administered and scores were analyzed using SPSS. Results revealed a significant increase ($p = < .001$) in the SRNAs' knowledge following the PowerPoint presentation. Thus, the researchers concluded more education regarding the similarities and differences of CRNAs and AAs may be helpful among nurse anesthesia students. Understanding and respecting the differences between these two similar, yet different professions is a step in providing patients with safe and accessible anesthesia care.

Table of Contents

Abstract	2
Introduction	4
Problem	5
Literature Review	7
Educational Pathways	7
Scope of Practice	9
Government Policies	11
Contribution and Dissemination	15
Project Aim	15
Research Methodology	16
Timeline	17
Data Collection	18
Evaluation	18
Results and Findings	19
Limitations and Conclusions	19
References	22
Appendix A	26
Appendix B	28
Appendix C	30
Appendix D	31
Appendix E	37

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A Comprehensive Review of Similarities and Differences

Two types of non-physician anesthesia providers, Certified Registered Nurse Anesthetists (CRNAs) and Anesthesiologist Assistants (AAs), participate in anesthesia practice in the United States. In some areas, CRNAs and AAs can be found working at the same hospital and hired by the same employer. However, while these two providers share some similarities, distinct differences in educational pathways, scope of practice, and government policies distinguish each profession.

In the United States, nurses have been providing anesthesia care for over 150 years. Beginning in the late 1800s, they provided anesthesia care to wounded military personnel during the Civil War. In 1909, the first nurse anesthesia training program opened at St. Vincent's Hospital in Portland, Oregon. Today, CRNAs continue to serve as the main anesthesia providers to men and women in the U.S. military and are the primary anesthesia providers to nearly all rural hospitals in the U.S. In 1956, the CRNA credential was established (American Association of Nurse Anesthetists [AANA], 2017b). Currently, there are about 47,500 CRNAs in the U.S. (National Board of Certification and Recertification for Nurse Anesthetists [NBCRNA], 2016). CRNAs are licensed, advanced practice registered nurses (APRNs) who have an acute care background in nursing. Additionally, all new CRNAs since 2000 have obtained a Master's or Doctorate degree from an accredited Nurse Anesthesia Program. In the United States, CRNAs can provide anesthesia under the supervision of any physician in every practice setting where anesthesia is being delivered including dentist offices, ambulatory surgical centers, plastic surgery centers, and pain management clinics. Furthermore, CRNAs have been granted authority in 17 states to practice independently without physician supervision (AANA, 2017b).

In the late 1960s, anesthesiologists designed and developed another type of non-physician anesthesia provider. The concept of the anesthesiologist assistant was established due to the continued shortages of anesthesia personnel and increasing demands of surgical services throughout the country at that time. In 1969, Emory University started accepting students into the first AA training program. Today, there are about 2,000 AAs in the U.S. (American Academy of Anesthesiologist Assistants [AAAA], 2017b). Unlike CRNAs, AAs are healthcare professionals with a master's degree from an accredited AA program who are trained to work specifically under the direction of a licensed anesthesiologist as a part of the Anesthesia Care Team (ACT) (AAAA, 2016c). According to varying state regulations, an AA may be licensed or practice under the license of an anesthesiologist by delegative authority. Thus, the anesthesiologist is able to delegate tasks to the AA, yet the anesthesiologist remains responsible for the safety of each patient. AAs may work in any healthcare setting where they are supervised by an anesthesiologist; therefore, AAs are primarily found in the hospital arena.

Problem

With increasing efforts to decrease the cost of healthcare combined with a shortage of anesthesia providers, mid-level providers are utilized more frequently than ever before (Greenwood & Biddle, 2015; Hogan, Seifert, Moore, & Simonson, 2010). This has presented a problem as non-physician anesthesia providers compete for employment opportunities with comparable job descriptions, yet hold different clinical backgrounds, program requirements, and scopes of practice. In some settings, CRNAs and AAs are more commonly referred to as interchangeable, leaving many healthcare providers unaware of the distinct differences between the two professions (American Society of Anesthesiologists [ASA], 2013).

Although these differences are evident, the American Society of Anesthesiologists (2012) issued a statement declaring that upon thorough review, they concluded the two specialties are considered equivalent as anesthesia providers. Additionally, the Academy of Anesthesiologist Assistants (2016c) states that the “scope of clinical practice for AAs is identical to that of nurse anesthetists” while working as a part of the ACT (p. 1). These statements and many others have led to confusion and raised numerous questions among healthcare providers and those who employ them such as, are CRNAs and AAs really that similar? What are the differences between the two professions, and are those differences important? For example, one may argue that CRNAs are more qualified as entry-level providers due to previous critical care clinical experience as licensed Registered Nurses (RN), while others may not consider this to be of value, as both providers complete specialized training in anesthesia throughout their academic programs.

In an effort to increase the current understanding and knowledge about CRNAs and AAs among a small group of healthcare providers, a PowerPoint presentation was developed and presented to one cohort of SRNAs that described the similarities and differences that distinguish both provider types into two unique professions. Two questions helped to guide the researchers in a comprehensive review of literature. First, how have the educational pathways, scope of practice, and government policies (C) impacted CRNAs and AAs (P) in their respective professions (O)? Second, in a group of SRNAs (P), how does a 60 minute (T) educational presentation (I) comparing the similarities and differences of CRNAs and AAs (C) affect their knowledge of each profession (O)?

Literature Review

Educational Pathways

Admission Requirements

Requirements for admission into each of these programs are different. In the United States, there are currently 12 accredited programs for AAs that can be found in nine different states: Florida, Georgia, Ohio, Texas, Indiana, Missouri, Connecticut, Colorado, Wisconsin, as well as Washington D.C. (AAAA, 2016a). Applicants must have a bachelor's degree with completion of pre-medical prerequisites that have an emphasis in science and math. Though prior medical experience is preferred, it is not required for admission into an AA program. To be eligible for admission, applicants must earn appropriate scores per institutional requirements on the Medical College Admissions Test (MCAT) or Graduate Record Exam (GRE) (Commission on Accreditation of Allied Health Education Programs [CAAHEP], 2016).

In comparison, there are 120 accredited nurse anesthesia programs located in 38 states throughout the U.S. (Council on Accreditation of Nurse Anesthesia Educational Programs [COA], 2017). In contrast to anesthesiologist assistant applicants, students who are granted acceptance into a nurse anesthesia program are currently licensed and practicing as registered nurses (RN). Applicants are required to have a Bachelor's of Science in Nursing (BSN) or a Bachelor's of Science (BS) in a related field along with an Associate's Degree in Nursing (ADN). Additionally, an applicant must have a current, unencumbered nursing license and at least one year of work experience as a RN in a critical care setting with certifications in Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS), and Pediatric Advanced Life Support (PALS) (COA, 2016). Applicants granted acceptance have an average of 3.4 years of critical care nursing experience prior to entrance into the program (National Board of

Certification and Recertification for Nurse Anesthetists [NBCRNA], 2013). According to the Standards for Accreditation of Nurse Anesthesia Programs (2016), critical care experience develops the applicant's "critical decision making and psychomotor skills, competency in patient assessment, and the ability to use and interpret advanced monitoring techniques" (pp. 29-30).

Graduation Requirements

Once granted acceptance into an accredited program, CRNA and AA students must successfully complete the program didactic requirements and complete the minimum required cases prior to graduation. For students enrolled in an AA program, a total of 600 cases with at least 2,000 clinical hours must be achieved. Specialty case requirements for both AAs and CRNAs include multiple aspects of anesthesia care for geriatric, pediatric, obstetric, cardiac, and trauma patients (CAAHEP, 2016; COA, 2016). Identical to that of AAs' educational programs, students in CRNA programs are mandated to obtain a minimum of 600 cases and 2,000 clinical hours (COA, 2016).

Investigating the methods of anesthesia set forth by the accrediting entities, various differences in numbers of requirements can be noticed. For example, due to recent legislative rulings, attention was brought to the section of regional anesthesia. AA program requirements stipulate that a minimum of 40 regional techniques be logged. This section was titled as "management/administration" leaving no distinct specification requiring students to actually perform or initiate administration of regional techniques (CAAHEP, 2016). When this requirement is compared to the requisite set forth for students in the CRNA programs, a difference can be noticed. Regional techniques are divided into "actual administration" and "management" in which nurse anesthesia students must actually administer a minimum of 35 regional techniques while also managing at least 35 techniques (COA, 2016).

Another difference between the two curriculums is that the length of AA programs varies from 24-28 months post bachelor's degree, while the CRNA curriculums vary from 24-36 months post bachelor's degree. The reason for such a discrepancy between the duration for the two types programs is because more than half of CRNA programs are now offering, and even requiring, doctorate level degrees. In June 2007, the AANA Board of Directors positioned themselves in support of doctoral education for nurse anesthesia practice entry by 2025 (AANA, 2017a). The COA has enforced a doctorate level degree for all students admitted to a nurse anesthesia program as of January 1, 2022, and many CRNA programs are adapting to this future by offering doctoral education (Malina & Izlar, 2014). According to the COA (2017), 62 of the 120 CRNA programs offer a Doctor of Nursing Practice (DNP) or Doctor of Nurse Anesthesia Practice (DNAP) degree.

Scope of Practice

Through the research done for this article, it was found that both professions are trained to be able to perform and manage many of the same tasks. Both AAs and CRNAs can insert and maintain invasive lines, and both groups administer induction agents, narcotics, and anesthetic gases. They can both establish an airway, give ventilator support, use ASA standard monitors and appropriately interpret and treat results, and perform as a leader during the use of ACLS/PALS/BLS (AAAA, 2017a; AANA, 2013).

AAs are required to practice under direct supervision of an anesthesiologist, and the first step in providing anesthesia care cannot be accomplished without the anesthesiologist's presence. In Florida, AAs "may assist an anesthesiologist in developing and implementing an anesthesia care plan for a patient" (Condition of Participation: Anesthesia services, 2016, p. 2). Direct supervision of AAs works well when functioning as part of the anesthesia care team

(ACT), where, in some instances, the supervising anesthesiologist may oversee up to four AAs at once. The precise level of supervision is dictated by each jurisdiction and can involve merely having the anesthesiologist present in the facility, formulating the anesthetic plan with the anesthesiologist, or it can involve requiring the anesthesiologist to be physically present in the room during certain phases of the plan (Amburgey, Fordham, Payne, & Trebelhorn, 2007).

The scope of practice for CRNAs makes it possible for them to formulate a complete anesthetic plan. CRNAs “are advanced practice registered nurses (APRNs) licensed as independent practitioners”; thus, CRNAs have the capability to work independently (AANA, 2013, para 1). According to the AANA (2013), CRNAs can perform initial anesthesia consults, perform a complete history and physical, obtain informed consent, develop a plan of care for administering drugs, and insert invasive lines and monitoring. They perform as leaders during resuscitation measures in the healthcare facility, administer pain management services, utilize ultrasound and other diagnostic technologies, obtain and interpret laboratory results, and discharge from the post-anesthesia care unit (AANA, 2013). CRNAs can function independent of anesthesiologists, or as members of the ACT, depending on the locations in which they choose to practice.

Prescriptive Authority

On April 14, 2016, Florida HB 423-ARNP/PA Controlled Substance Prescribing was signed into law. This legislation awarded ARNPs and physician assistants (PA) the authority to prescribe controlled substances under preexisting protocol and supervision requirements. While some limitations do exist, as of January 1, 2017, CRNAs have the authority to prescribe a seven-day supply of controlled substances such as narcotics. In addition to the standard continuing education (CE) requirements needed for license renewal, CRNAs must apply for a Drug

Enforcement Administration (DEA) number and complete three hours of CE with a focus on controlled substance prescribing every two years.

Unlike CRNAs, AAs do not have prescriptive authority and are unable to prescribe medications or controlled substances under their scope of practice. According to sections 458.3475 (3)5-6, Florida Statutes, an AA may “administer” medications under the direct supervision of a medical doctor of anesthesiology. Additionally, section 458.3475 (3)(a)12(e), Florida Statutes, states that AAs “may not prescribe, order, or compound any controlled substance” (2016).

Government Policies

Credentialing/Licensure

Each profession has a credentialing body that provides a national certification process after passing an examination. AAs are credentialed by the National Commission for Certification of Anesthesiologist Assistants in collaboration with National Board of Medical Examiners (AAAA, 2017b). The CRNA is certified by the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA) and licensed as an RN by the state Board of Nursing (COA, 2017). CRNAs also apply for an APRN license through the Board of Nursing of the state(s) in which they practice.

The recertification process happens biennially for AAs, and they are required to submit 40 CE hours over that two-year period. Every six years, the AA must take the Continued Demonstration of Qualifications Examination (CDQ), which is set by the National Board of Medical Examiners (AAAA, 2017b).

CRNAs have a different recertification process. The NBCRNA initiated a revised system in 2016, known as the Continued Professional Certification program (CPC), through which

CRNAs now recertify (AANA, 2017c). CRNAs must provide proof of CE credits every four years, unlike every two years for AAs (AANA, 2017c). To be eligible for recertification, 60 class-A CEs and 40 class-B CEs must be submitted (AANA, 2017c). This equates to 50 CE credits every two years, compared to the 40 CMEs mandated for AAs. Similar to AAs, CRNAs will be required to take the CPC Examination beginning in 2032/2033, but this examination will only be taken every eight years (AANA, 2017c). The first recertification examination will begin in 2024, but with minimal passing requirements to be effective in 2032/2033 (AANA, 2017c). Additional recertification requirements include taking core modules every four years and maintaining a current RN and/or APRN license, dependent upon each state's requirements, every two years (AANA, 2017c).

CRNAs function as independent practitioners who are practicing under their own license. They can also collaborate with other members of the healthcare team to provide the best means of care for their patients (AANA, 2013). AAs do not function independently, but rather, under the supervision of an anesthesiologist, and the anesthesiologist is liable for the AA's performance (FLA. STAT. § 458.3475, 2016).

Federal vs State Level

AAs are currently licensed to work under the supervision of an anesthesiologist in 14 states: New Mexico, Colorado, Oklahoma, Missouri, Wisconsin, Indiana, Ohio, Kentucky, Alabama, Georgia, Florida, South Carolina, North Carolina, and Vermont, as well as Washington D.C. (AAAA, 2016b). In Texas and Michigan, AAs have delegatory authority to practice (AAAA, 2016b). Delegatory authority is governed by each state's Board of Medicine and essentially allows the legal use of AAs to work under physicians who have been granted authority to assign such tasks (AAAA, 2016c). Ultimately, the delegating anesthesiologist is

responsible to the patient and must verify that the AA is qualified to practice such tasks (AAAA, 2016c). However, AAs are able to practice at any Veterans Affairs facility throughout the United States (AAAA, 2016b).

CRNAs are licensed to work in all 50 states, including Puerto Rico, when working under the supervision of a physician. The Centers for Medicare and Medicaid services (CMS) mandates that for a healthcare center to participate in the Medicare program, CRNAs must work “under the supervision of the operating practitioner or of an anesthesiologist” (Conditions of Participation: Anesthesia services, 2007, para 6). However, there is no federal regulation that stipulates the specialty of the supervising physician. There is a state exemption allowed for the CMS requirement, and there are 17 states that have opted out of this regulation: Iowa, Nebraska, Idaho, Minnesota, New Hampshire, New Mexico, Kansas, North Dakota, Washington, Alaska, Oregon, Montana, South Dakota, Wisconsin, California, Colorado, and Kentucky (AANA, 2017b). Thus, these 17 states have no requirement for any physician supervision of CRNAs.

Florida

In the state of Florida, both AAs and CRNAs coexist. CRNAs must work under the supervision of a physician while practicing under the individual CRNA’s APRN license, whereas AAs are granted licensure to work only under direct supervision of an anesthesiologist (FLA. STAT. § 458.3475, 2016).

There was a recent issue petitioned in the state of Florida regarding the right for AAs to actually “perform” regional anesthesia. This Declaratory Statement argued that the supervising anesthesiologist would remain immediately available, but not necessarily in the same operating room, while the epidural or spinal was administered by the AA (Florida Association of Nurse Anesthetists [FANA], 2017a). This statement was similar to another petition filed in 2015

regarding AAs' ability to perform epidurals, yet this petition was denied by the 2015 Board of Medicine. In section 458.3475 (3)7, Florida Statutes, the wording of "perform" and "assist" can be found in the same subsection, which may be responsible for the misinterpretation of the law (2016). In November 2017, the Board of Medicine issued a final Declaratory Statement which concluded that AAs may perform epidural and spinal procedures only while the supervising anesthesiologist remains in the same room while the procedure is being performed. Additionally, the anesthesiologist must personally interview the patient and prescribe the medication to be administered (FANA, 2017b).

Another area of debate was settled in 2016 by the Florida Agency for Health Care Administration (AHCA) when they determined that AAs could not "perform STAT laboratory tests on patients under anesthesia" (FANA, 2016, para 1). In the Florida Statutes, AAs are not listed as personnel "who may perform alternate-site clinical laboratory testing" (FANA, 2016, para 5). If immediate laboratory tests would need to be collected while undergoing anesthesia, the AA would need to defer to the supervising anesthesiologist to comply with the AHCA ruling.

Synthesis

In summary, while CRNAs and AAs do share some similarities, important differences exist that distinguish these non-physician anesthesia providers into two unique professions. Primary aspects about CRNAs that are different from AAs include a critical care background, scope of practice and the right to work independently, prescriptive authority, and the right to work anywhere in the U.S. These differences between CRNAs and AAs are important not only for healthcare providers to understand, but also for those who employ non-physician anesthesia providers. After learning about the roles, background, education, and governing regulations controlling the right to practice for AAs and CRNAs, perhaps the strengths of each profession

can be analyzed to better utilize AAs and CRNAs in the workforce. Are these two similar professions as interchangeable as once thought? Understanding and respecting the differences between these two professions are essential to provide patients with safe and accessible anesthesia care.

Contribution and Dissemination

This scholarly project was completed in order to assess if a better understanding of the similarities and differences of CRNAs and AAs was needed among a small group of healthcare providers. Participants of this study were senior students that were enrolled in the Nurse Anesthesia Program at Adventist University of Health Sciences (ADU) and had a baseline of knowledge of CRNA program admission requirements and program requirements. However, the researchers anticipated that a better understanding of scope of practice, government policies, and the anesthesiologist assistant was needed. A PowerPoint presentation (see Appendix D) describing the similarities and differences in educational pathways, scope of practice, and government policies between AAs and CRNAs was developed and presented. This scholarly project was disseminated to the ADU community via a poster presentation on April 9, 2018.

Project Aim

The aim of this project was to increase the knowledge of 24 SRNAs enrolled in the Nurse Anesthesia Program at Adventist University of Health Sciences about the similarities and differences that exist between CRNAs and AAs. The PowerPoint presentation was presented during the Fall Trimester of 2017. A quantitative approach was utilized to measure the goals of this study. Scores from pre and post tests completed by the SRNAs immediately prior to and again immediately following the PowerPoint presentation were compared and analyzed (see Appendix C).

Research Methodology

The researchers hypothesized that there was lack of knowledge and understanding of the similarities and differences that exist among CRNAs and AAs. Therefore, a PowerPoint presentation was developed and presented to a convenience sample of 24 senior SRNAs enrolled in the Nurse Anesthesia program at Adventist University of Health Sciences in Orlando, Florida. It described the similarities and differences of CRNAs and AAs including admission requirements, program requirements, and scope of practice. The presentation took place in the Fall Trimester of 2017 at Adventist University of Health Sciences during the MSNA 641: Professional Issues in Nurse Anesthesia course on November 10, 2017. Students were completing their sixth trimester of the seven-trimester academic program. In order to be included in the study, participants must have been currently enrolled as full-time students in the Nurse Anesthesia Program and expected to graduate in April 2018. Prior to the presentation, participants were asked to sign a voluntary informed consent form that confirmed they were willing to take part in the proposed teaching project.

A quantitative single group pre and post test design was used to determine the effectiveness of the proposed teaching project. The pre and post tests were identical. Pre and post tests were pre-filled with an identification number in the upper right-hand corner and were simultaneously distributed among the students by the researchers. To preserve anonymity, students were asked not to write their names or any identifying data on the pre or post test. Pre tests were completed by the students and collected by the researchers immediately prior to the PowerPoint presentation. Post tests were presented in an envelope, and students were instructed not to open the envelope until the presentation had been completed. Upon completion of the

presentation, students were instructed to open the envelope and complete the post test. All post tests were collected by the researchers.

The completed tests were stored in a locked and secure location to which only the researchers had access. All electronic information and data collected was confidential and stored on two password-protected, personal computers each owned and operated by the researchers. Access to these files was only available to the researchers after successful entry of a personal password. At the completion of this project, all paperwork was shredded and discarded appropriately, and all files pertaining to this project was deleted from the two computers used to store the project information.

Timeline

Completion of this scholarly project took place over three consecutive academic trimesters. Beginning the Summer Trimester of 2017, a topic was established, a comprehensive literature review was completed, and a proposal for the scholarly project was submitted for review. Next, voluntary consent forms and pre and post tests were assembled and Adventist University SRC/IRB application forms were completed. While awaiting approval from the IRB, a PowerPoint presentation was developed.

Project implementation took place as a teaching project during the Fall Trimester of 2017 on November 10, 2017. Post-implementation data collection was gathered immediately after the presentation of material. The results of this data were reviewed and analyzed. A scholarly paper was finalized, and a formal poster was created to present the findings. This scholarly project was disseminated via a poster presentation on April 9, 2018.

Data Collection

A quantitative pre and post test assessment, developed by the researchers, was utilized as an evaluation tool to determine the success of this teaching project. There were 24 participants in total. Prior to the presentation, participants were asked to sign a voluntary informed consent form that confirmed they were willing to take part in the proposed teaching project. A 12-question, multiple choice pre test was distributed by the researchers to evaluate the SRNAs' pre-existing knowledge of the similarities and differences among CRNAs and AAs. Each pre test was completed by the participants and collected by the researchers prior to the start of the prepared teaching presentation.

Immediately following the presentation, an identical multiple choice questionnaire was administered in the form of a post test to the SRNAs to assess the level of knowledge gained. Pre and post tests were pre-filled with an identification number in the upper right-hand corner of the questionnaire. This separation allowed the researchers to determine the overall level of learning established by the group of SRNAs, as well as individual responses to specific questions on the questionnaire. The results were also used to identify which parts of the presentation were most effective and which were less sufficient. A total of two exchanges with participants in one setting of about 60 minutes occurred, and 48 assessments, consisting of 24 pre tests and 24 post tests, were collected and analyzed.

Evaluation

The pre and post test assessments were analyzed to evaluate if the presentation was successful in increasing the knowledge of the SRNAs about the similarities and differences among CRNAs and AAs. A database of the pre and post test results was created using an Excel spreadsheet and sent to the Adventist University Research Department's statistician, Roy

Lukman, PhD, who assisted with the statistical analysis portion of this project. The Statistical Package for Social Sciences (SPSS) was used to perform a paired samples t-test that compared pre and post test assessment scores completed by the SRNAs immediately prior to and again immediately following the presentation. Mean values and standard deviations were calculated, and a p-value was derived. These findings allowed the researchers to determine if the assessment results were statistically significant or, conversely, if no significant increase in scores occurred.

Results and Findings

A paired samples t-test was conducted to analyze the data collected from the pre and post test scores. Results revealed an average pre test score of 43.7% and an average post test score of 93.4%. The obtained t value was -10.723 and the p value was $< .001$ which was determined to be statistically significant. (See Appendix C.) Therefore, there was a significant improvement in the post test scores as compared to the pre test scores.

Limitations and Conclusions

Although this study was determined to be an overall success, there were limitations to this project. First, and perhaps most importantly, this project was presented to students that were currently aspiring to be CRNAs. Furthermore, the SRNAs may have had preconceived notions or bias regarding AAs. Existing knowledge, observations in the clinical setting, or on-going job competitiveness may have contributed to the SRNAs' personal feelings about the topic of discussion and caused them to be uninterested or unwilling to increase their current knowledge. It is also important to note that a level of pride is often associated with one's area of expertise, which may have led pre and post testing results to favor CRNAs over AAs. Second, the sample size of 24 senior SRNAs was small and may have affected the confidence of the statistical

significance of the findings. Additionally, the use of an instrument created by the researchers may have affected the reliability and validity of the survey. Finally, this presentation was completed after a single sitting, and the administration of a post test examination immediately after the presented material does not prove that each SRNA will retain this new-found knowledge or if they will apply this knowledge to their future practice. A post test given at a later date would be more effective in determining knowledge retention of the presented topic. However, the timeline of this project did not present this opportunity to the researchers.

In conclusion, the PowerPoint presentation was proven to be successful in increasing the knowledge among a small group of SRNAs regarding the similarities and differences that exist among CRNAs and AAs. While the SRNAs held a baseline of knowledge regarding CRNA programs and admission requirements, it was proven that a deeper understanding regarding the scope of practice, government policies, and the Anesthesiologist Assistant was needed. Comparison of pre and post test scores demonstrated that the mean percentage of scores increased significantly following the PowerPoint presentation. The statistical analysis revealed a p value of $<.001$; therefore, it can be concluded that the results were significant. As demonstrated by the results revealed from the statistical analysis performed, the objectives of this study were proved to have been met. (See Appendix C.)

Results from this study revealed that a small group of nurse anesthesia students had a general lack of understanding of the similarities and differences among CRNAs and AAs. Additionally, if this gap in knowledge was evident among 24 students who were currently aspiring to be non-physician anesthesia providers, it could be possible that such a gap in understanding is more prevalent among healthcare providers, more specifically among anesthesia providers, than once thought.

More education may be helpful among healthcare providers and those who employ them about the similarities and differences that exist among CRNAs and AAs. While these two professions do share some commonalities, several distinctions exist. A sound understanding of the resemblances and differences among these two types of non-physician anesthesia providers as they pertain to backgrounds, educational pathways, scope of practice, and government policies could help employers to utilize each profession effectively by determining which provider is more qualified for a specific assignment or position. Ultimately, understanding and respecting the distinctions between CRNAs and AAs is a step in providing patients with safe and accessible anesthesia care.

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Appendix A

ADU NAP CAPSTONE PROJECT – INFORMED CONSENT

Our names are Brittani Neely and Diana Scholl, and we are MSNA students in the Nurse Anesthesia Program (NAP) at Adventist University of Health Sciences (ADU). We are doing a Capstone Project called *Certified Registered Nurse Anesthetists (CRNAs) vs. Anesthesiologist Assistants (AAs): A Comprehensive Review of Similarities and Differences*. This project is being supervised by Alescia L. DeVasher Bethea, Ph. D., CRNA. We would like to invite you to participate in this project. The main purpose of this form is to provide information about the project so you can make a decision about whether you want to participate.

WHAT IS THE PROJECT ABOUT?

The purpose of this project is to educate Student Registered Nurse Anesthetists enrolled in the Nurse Anesthesia Program at Adventist University of Health Sciences regarding the similarities and differences that exist between Certified Registered Nurse Anesthetists (CRNAs) and Anesthesiologist Assistants (AAs).

WHAT DOES PARTICIPATION IN THIS PROJECT INVOLVE?

If you decide to participate in this project, you will be asked to complete an anonymous pre-assessment, attend a classroom presentation, and then complete an anonymous post-assessment. The assessment will address differences in educational pathways, scope of practice, and government policies among CRNAs and AAs. Your participation by attendance at the presentation and completion of the survey is anticipated to take approximately 45-60 minutes.

WHY ARE YOU BEING ASKED TO PARTICIPATE?

You have been invited to participate as part of a convenience sample of students currently enrolled in the ADU NAP. Participation in this project is voluntary. If you choose not to participate or to withdraw from the project, you may do so at any time.

WHAT ARE THE RISKS INVOLVED IN THIS PROJECT?

Although no project is completely risk-free, we don't anticipate that you will be harmed or distressed by participating in this project.

ARE THERE ANY BENEFITS TO PARTICIPATION?

We don't expect any direct benefits to you from participation in this project. The possible indirect benefit of participation in the project is the opportunity to gain additional knowledge about the similarities and differences among CRNAs and AAs.

HOW WILL THE INVESTIGATORS PROTECT PARTICIPANTS' CONFIDENTIALITY?

The results of the project will be published, but your name or identity will not be revealed. To maintain confidentiality of assessments, the investigators will conduct this project in such a way to ensure that information is submitted without participants' identification. This will be achieved by using a pre-filled numbering system on the pre- and post-tests. Thus, the investigators will not have access to any participants' identities.

The completed tests will be stored in a locked and secure location in which only the investigators will have access. All electronic information and data collected will be confidential and stored on two password-protected, personal computers each owned and operated by the investigators. Access to these files will only be available to the investigators after successful entry of a personal password. At the completion of this project, all paperwork will be shredded and discarded appropriately and all files pertaining to this project will be deleted from the two computers used to store the project information.

WILL IT COST ANYTHING OR WILL I GET PAID TO PARTICIPATE IN THE PROJECT?

Your participation will cost approximately 60 minutes of your time, but will require no monetary cost on your part. You will not be paid to participate.

VOLUNTARY CONSENT

By signing this form, you are saying that you have read this form, you understand the risks and benefits of this project, and you know what you are being asked to do. The investigators will be happy to answer any questions you have about the project. If you have any questions, please feel free to contact Brittani Neely (Brittani.Neely@my.adu.edu) or Diana Scholl (Diana.Scholl@my.adu.edu). If you have concerns about the project process or the investigators, please contact the Nurse Anesthesia Program at (407) 303-9331.

_____ **Participant Signature (PRINTED LEGIBLY)**

_____ **Participant Name (PRINTED LEGIBLY)**

_____ **Date**

Appendix B**Certified Registered Nurse Anesthetists (CRNAs) vs. Anesthesiologist Assistants (AAs):
A Comprehensive Review of Similarities and Differences****Pre and Post Test**

1. Approximately how long have nurses been providing anesthesia in the United States?
 - a. 50 years
 - b. 75 years
 - c. 100 years
 - d. 125 years
 - e. 150 years
2. Approximately how long have AAs been practicing in the United States?
 - a. 50 years
 - b. 75 years
 - c. 100 years
 - d. 125 years
 - e. 150 years
3. What is the average number of years of critical care nursing experience among applicants who have been granted acceptance into nurse anesthesia programs?
 - a. 1.5
 - b. 3.4
 - c. 5.5
 - d. 7.2
4. Which one of the following is not a requirement for acceptance into an accredited AA program?
 - a. Prior medical experience
 - b. Bachelors degree
 - c. Completion of pre-medical prerequisites with a focus on science and math
 - d. Appropriate MCAT or GRE score
5. What is the current regulation regarding performing regional anesthesia in the state of Florida?
 - a. Both AAs and CRNAs can perform regional anesthesia
 - b. Only CRNAs can perform regional anesthesia
 - c. Only AAs can perform regional anesthesia
 - d. Neither AAs or CRNAs can perform regional anesthesia unless directly supervised by an anesthesiologist
6. According to Florida regulations, who can develop and implement an anesthesia care plan? (Select all that apply.)
 - a. CRNAs
 - b. AAs independently

- c. Medical doctor of anesthesiology
 - d. AAs under the direct supervision of an anesthesiologist
7. CRNAs are licensed to practice in _____ states, and AAs are licensed to practice in _____ states.
- a. 14; 50
 - b. 50; 31
 - c. 49; 31
 - d. 50; 14
8. As of June, 2017, how many states have opted out of the CMS requirement for physician supervision for CRNAs?
- a. 15
 - b. 16
 - c. 17
 - d. 18
9. Which one of the following is NOT within the scope of practice of an anesthesiologist assistant?
- a. Insert and maintain invasive lines
 - b. Administer induction agents, narcotics, and anesthetic gases
 - c. Intubation and administration of ventilator support
 - d. Prescriptive authority
10. How many AAs may be supervised by one anesthesiologist at one time?
- a. 1
 - b. 2
 - c. 3
 - d. 4
11. Florida HB423-ARNP/PA Controlled Substance Prescribing allows:
- a. CRNAs and AAs to prescribe controlled substances
 - b. CRNAs to prescribe up to a year supply of controlled substances
 - c. CRNAs to prescribe a 7-day supply of controlled substances
 - d. CRNAs and AAs to prescribe controlled substances under an Anesthesiologist's DEA number
12. Which one of the following is true about the scope of practice of CRNAs?
- a. CRNAs can only work under the direct supervision of a medical doctor of anesthesiology
 - b. CRNAs may be supervised by any physician in any health care setting where anesthesia is being delivered
 - c. CRNAs can only work in 17 states in the U.S.
 - d. CRNAs must work as part of the Anesthesia Care Team

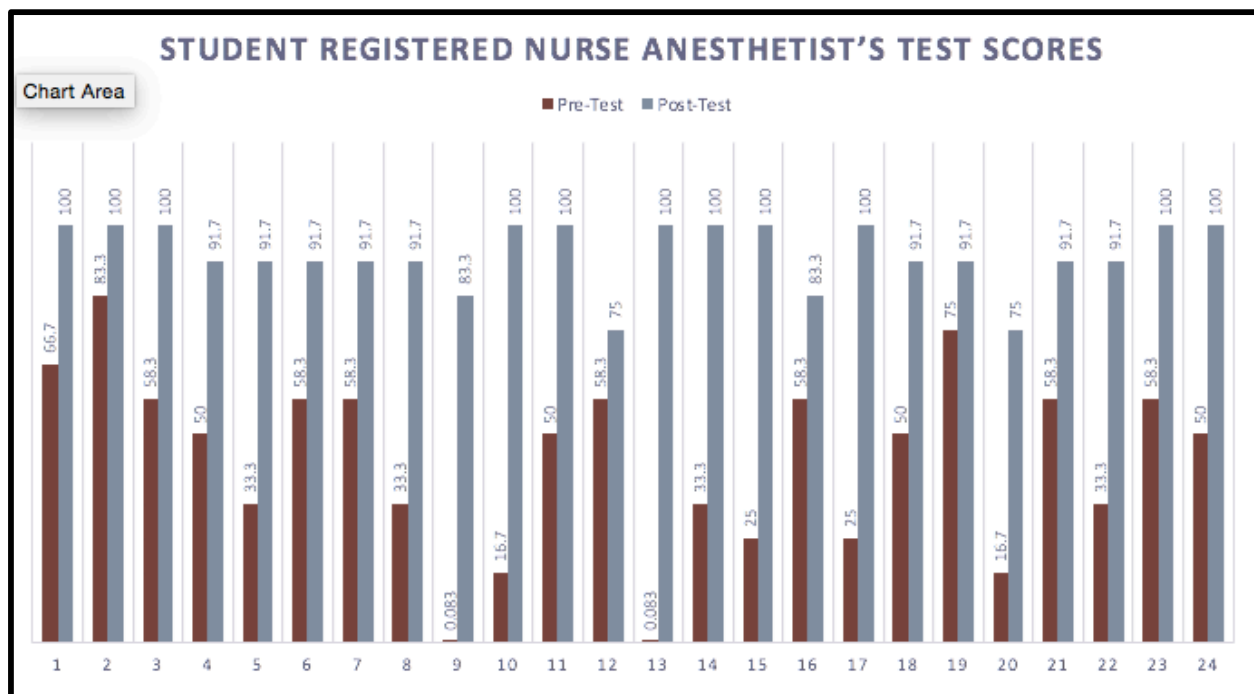
Appendix C

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VAR00001	43.7444	24	21.99070	4.48883
	VAR00002	93.4125	24	7.76365	1.58475

Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	VAR00001 - VAR00002	-49.66808	22.69225	4.63204	-59.25018	-40.08599	-10.723	23	.000



Appendix D

**Certified Registered Nurse Anesthetist
vs. Anesthesiologist Assistant:
A Comprehensive Review of Similarities and Differences**



Editor: Heidi, BS, RN and Diana Scott, BS, RN
Project Manager: Dana Reed, MSN, CRNA, LORNA-PCOR
Consultant: Cheri, Andrea L. O'Connell, MSN, CRNA
Main Anesthesia Program, Adventist University of Health Sciences

Objectives

- Understand the history of Certified Registered Nurse Anesthetists (CRNAs) and Anesthesiologist Assistants (AAs)
- Understand the similarities and differences between CRNAs and AAs as they pertain to:
 - Educational Pathways
 - Admission Requirements
 - Graduation Requirements
 - Scope of Practice
 - Locations to work
 - Prescriptive Authority
 - Government Policies
 - Continuing Education
 - Federal vs. State Law

Problem

- Increasing efforts to decrease cost of health care combined with shortage of anesthesia providers
 - Non-physician anesthesia providers more frequently utilized
- CRNAs and AAs
 - Two types of non-physician anesthesia providers
 - Often compete for same jobs
 - Income settings, considered interchangeable
 - Many unknown children's difference that distinguish each profession
 - Are they really that similar?



What is a CRNA? AA?

Two types of non-physician anesthesia providers

Certified Registered Nurse Anesthetist (CRNA)

- Masters or Doctorate Degree
- Licensed Advanced Practice Registered Nurses (APRNs)
- Currently 4,300 CRNAs in US.
- CRNAs' practice regulated by state boards of nursing

Anesthesiologist Assistant (AA)

- Masters Degree
- May be either licensed as Certified AAs or practice under the license of an anesthesiologist under the principle of delegation
- Currently 300 AAs in the US.
- AAs' practice regulated by state boards of medicine

History:

Non-physician anesthesia providers

Certified Registered Nurse Anesthetist (CRNA)

- Nurses have been providing anesthesia for over 100 years
 - Late 1800's
 - Provided anesthesia to wounded soldiers during the Civil War
- First training program: 1909
- Main anesthesia provider:
 - Nearly all rural hospitals in the U.S.
 - U.S. Military

Anesthesiologist Assistant (AA)

- Practicing for 60 years
 - Developed by Anesthesiologists
 - Increasing surgical demands
 - Shortage of anesthesia providers
- First training program: 1966

Educational Pathway:

Programs and Admission Requirements

Certified Registered Nurse Anesthetist (CRNA)

- 330 accredited programs in the US.
 - 98 states
- Bachelor of Science in Nursing or Bachelor of Science with Associate of Nursing
 - Minimum 1 year of clinical nursing experience required
- Current, unencumbered license as either APRN (not LPN)
- Accepted applicants have
 - An average of 4 years of clinical care experience

Anesthesiologist Assistant (AA)

- 32 accredited programs in the US.
 - 37 states
- Bachelor's Degree with pre-medical prerequisite
 - Focus on math and science
- Prior medical experience or exposure, although not required

What is "critical care experience"?

According to the Standards for Accreditation of Nurse Anesthesia Educational Programs (2016)....

- "During this experience, the registered professional nurse has developed skills in critical care and professional skills in managing a patient's airway, circulation, and the administration and titration of anesthetic drugs. A critical care unit is defined as a unit where an anesthesiologist, the registered professional nurse manages a case involving intubation, invasive hemodynamic monitoring (eg, pulmonary artery, central venous pressure), and arterial cathetering cardiac output, drug, mechanical ventilation, and vasoactive infusions."
- "Examples of critical care units may include but are not limited to surgical intensive care, cardiothoracic intensive care, coronary intensive care, medical intensive care, pediatric intensive care, and neonatal intensive care. Those who have experience in other areas may be considered provided they can demonstrate competence with necessary skills for critical care monitoring, ventilation, and circulatory management."



Educational Pathway:

Graduation Requirements

Certified Registered Nurse Anesthetist (CRNA)

- 600 cases
- 2,000 clinical hours
- Advanced regional techniques
- Advanced regional techniques
- 24-36 months
 - In 2021, doctoral education is normative

Anesthesiologist Assistant (AA)

- 800 cases
- 2,000 clinical hours
- Advanced regional techniques
- Advanced regional techniques
- 24-36 months

Scope of Practice:

What can they do?

- Both AA and CRNAs can:
 - Insert and maintain endotracheal tubes
 - Administer induction agents, narcotics, and anesthetic gases
 - Establish an airway (ventilator support)
 - Use ASA standard monitors and appropriately interpret their results
 - Perform a awake intubation during the use of ALOS/ALS/ALS



Scope of Practice

Certified Registered Nurse Anesthetist (CRNA)

- Critics of Medicine and Medical Services (CMMMS) require CRNAs to work under the supervision of an anesthesiologist
 - Ratio 24:1 when working as part of the AGT
- AA's licensed as independent practitioners working under their own license
- Provide anesthesia services in a variety of settings:
 - Critical illness, ambulatory surgical centers, pediatric surgery centers, and post-operative clinics
- May practice independently without any physician supervision within the US.

Anesthesiologist Assistant (AA)

- Always practice under the direct supervision of an anesthesiologist
 - Ratio 24:1
 - Level of supervision is dictated by each jurisdiction
- May be licensed or practice under the license of an anesthesiologist by delegative authority
- Found mostly in hospital setting
 - Anesthesia Care Team with an anesthesiologist

Scope of Practice:

Formulating an Anesthesia Care Plan

Certified Registered Nurse Anesthetist (CRNA)

- Can perform initial anesthesia consult
- Obtain informed consent
- Able to develop and implement an anesthesia care plan
 - Licensed AAs who have the capability to work independently

Anesthesiologist Assistant (AA)

- Able to assist an anesthesiologist in developing and implementing an anesthesia care plan

Scope of Practice:

Where can they work?

Certified Registered Nurse Anesthetist (CRNA)

- Licensed in all 50 states, D.C., and Puerto Rico
- May work under the supervision of any physician, or can work independently in any jurisdiction
 - CRNA "not out" states:
 - IA, HI, IL, IN, MI, MN, NY, ND, PA, RI, SC, VA, AL, OK, WI, SD, WI, CA, CO, UT

Anesthesiologist Assistant (AA)

- Licensed in 44 states and D.C.
 - HI, IL, IN, MI, MN, NY, ND, PA, RI, SC, VA, AL, OK, WI, SD, WI, CA, CO, UT
- Delegatory Authority in 3 states
 - HI, IL, IN
- Only works under the direct supervision of an anesthesiologist
- Any Veterans Affairs Facility in U.S.

Scope of Practice (Specific to Florida): Prescriptive Authority

- Florida HB 433-ARNP/PA Controlled Substance Prescribing
 - Signed into law on April 14, 2016
 - Awarded ARNPs and physician assistants (PA) the authority to prescribe controlled substances under a prescribing protocol and supervision requirements
- As of January 1, 2017:
 - CRNAs have the authority to prescribe a seven-day supply of controlled substances such as narcotics
- CRNAs must:
 - Complete 3 hours of Continuing Education (CE) in addition to CE requirements
 - Controlled substance prescribing
 - Apply for Florida Nurse Anesthetist Administration (FNA) number

Scope of Practice (Specific to Florida): Prescriptive Authority

<u>Certified Registered Nurse Anesthetist (CRNA)</u>	<u>Anesthesiologist Assistant (AA)</u>
<ul style="list-style-type: none"> <u>Prescriptive authority</u> <ul style="list-style-type: none"> As of Jan. 1, 2017 Prescribe controlled substances under prescribing protocol and supervision requirements 7-day supply of controlled substances 	<ul style="list-style-type: none"> No prescriptive authority

Scope of Practice (Specific to Florida): Regional Administration and STAT Labs

<u>Certified Registered Nurse Anesthetist (CRNA)</u>	<u>Anesthesiologist Assistant (AA)</u>
<ul style="list-style-type: none"> Ability to perform (initiate) and manage regional anesthesia Ability to perform STAT lab tests 	<ul style="list-style-type: none"> Ability to perform (initiate) and manage regional anesthesia <ul style="list-style-type: none"> Controversy regarding the legality of performing (initiating) regional anesthesia In May 2012 the Board of Medicine ruled that CRNAs may perform regional anesthesia Final Order by the Board of Medicine accepted its recognition November, 2012 Inability to perform STAT lab tests <ul style="list-style-type: none"> Not recognized as personnel who may perform STAT lab tests in clinical laboratory

Government Policies: Credentialing and Licensing

<u>Certified Registered Nurse Anesthetist (CRNA)</u>	<u>Anesthesiologist Assistant (AA)</u>
<ul style="list-style-type: none"> National Board of Certification and Recertification For Nurse Anesthetists (NBCRNA) Licensed by State Board of Nursing <ul style="list-style-type: none"> MI Some states require A/PRI Required in Florida 	<ul style="list-style-type: none"> National Commission for Certification of Anesthesiologist Assistants (NCCAA) May be either licensed as Certified AA or practice under the license of an anesthesiologist under the principle of delegation <ul style="list-style-type: none"> Details regarding delegation and licensing of AA's are different from state to state 

Government Policies: Recertification

<u>Certified Registered Nurse Anesthetist (CRNA)</u>	<u>Anesthesiologist Assistant (AA)</u>
<ul style="list-style-type: none"> NBCRNA revised system in 2016 <ul style="list-style-type: none"> Continual Professional Certification program (CPC) Every 4 years 100 CE hours <ul style="list-style-type: none"> 60 class-A 40 class-B CPC Examination beginning in 2024 <ul style="list-style-type: none"> Every 8 years 	<ul style="list-style-type: none"> Every 3 years 40 CE hours Continual Demonstration of Qualifications Examination (DDQ) <ul style="list-style-type: none"> Every 8 years

Government Policies: Federal vs. State Level

<u>Certified Registered Nurse Anesthetist (CRNA)</u>	<u>Anesthesiologist Assistant (AA)</u>
<ul style="list-style-type: none"> Licensed in all 50 states, Puerto Rico, and D.C. <ul style="list-style-type: none"> CMS mandates CRNAs must work "under the supervision of the operating practitioner or qualified anesthesiologist" State exception or "Opt-out" <ul style="list-style-type: none"> CMS "opt-out" states where CRNAs may work independently without physician supervision <ul style="list-style-type: none"> 23 states CA, HI, IL, IN, NH, NJ, NY, ND, NE, WA, WI, OR, MT, SD, WY, CO, UT, AZ 	<ul style="list-style-type: none"> Licensed in 14 states and D.C. <ul style="list-style-type: none"> NY, CO, DE, MD, WI, RI, OH, MS, AL, GA, FL, SC, NC, VA, D.C. Delegatory Authority in 2 states <ul style="list-style-type: none"> NY, DC

Government Policies: AA Work States 2017



Government Policies: CRNA Independent Practice 2017



Summary

- While CRNAs and AAs do share many similarities, important differences distinguish the two professions
 - Educational Pathways
 - Admission Requirements
 - Education Requirements
 - Scope of Practice
 - Locations to work
 - Prescriptive Authority
 - Government Policies
 - Credentialing/Licensure
 - Federal vs. State Level
- Important to understand these differences
 - Healthcare providers and state where they work

In Review...

	CRNA	AA
History	120 years (invented)	20 years
Scope of Practice	Able to provide anesthesia in any setting, anesthesia is being delivered under the supervision of any physician May also work independently in 17 states	Work under direct supervision of an anesthesiologist, as part of the Anesthesia Care Team Mainly found in hospital setting
Scope and Clinical Practice Requirements	Box Cases 2000 Hours	Box Cases 2000 Hours
Regional Requirements	25 administered/ 25 managed	40 administered or managed
How healthcare experience	Required Average of 24 years of critical care experience	Preferred

In Review...

	CRNA	AA
Number of states in which they are <u>allowed</u> to work	30	equivalent (collaborative authority in 10 states)
Independent Practice (without any physician supervision)	Yes equivalent	No
Issuance of Invasive Lines Airway Management Ventilator support	Yes	Yes
Prescriptive Authority (FLORIDA)	Yes only supply of controlled substances Personal CRNA number	No
Perform Regional Blocks (FLORIDA)	Yes	Yes



Understanding and respecting the similarities and differences between these two professions are essential to providing patients with safe and accessible anesthesia care.

Questions?



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Appendix E

**Certified Registered Nurse Anesthetist vs. Anesthesiologist Assistant:
A Comprehensive Review of Similarities and Differences**



**ADVENTIST UNIVERSITY
OF HEALTH SCIENCES**
Florida Hospital's University

Authors: Brittani Neely BSN, RN and Diana Schell BSN, RN
 Committee Chair: Aleneia L. DelMashor, Bethel, Ph.D., CRNA
 Project Mentor: Dee Ross, MSNA, CRNA; USAP – Florida
 Nurse Anesthesia Program, Adventist University



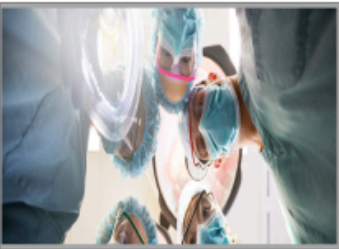
Sigma
Chi Upsilon Chapter

PROBLEM

With increasing efforts to decrease the cost of healthcare combined with a shortage of anesthesia providers, non-physician providers are utilized more frequently than ever before (Greenwood & Biddle, 2015; Hogan, Seifert, Moore, & Simonson, 2010). This has presented a problem as non-physician anesthesia providers compete for employment opportunities with similar job descriptions, yet have different clinical backgrounds, program admission requirements, and scope of practice. In some settings, CRNAs and AAs are more commonly referred to as interchangeable, leaving many healthcare providers unaware of the distinct differences between the two professions (American Society of Anesthesiologists, 2013).

METHODOLOGY

A PowerPoint presentation describing the similarities and differences that exist among CRNAs and AAs was prepared and presented to a convenience sample of 24 senior SRNAs currently enrolled at Adventist University of Health Sciences. A pre and post test was administered and scores were analyzed using SPSS.



ANALYSIS

A paired samples t test was conducted to analyze the data collected from pre and post test scores. The obtained t value is -10.723 ($p < .001$) which is statistically significant. It therefore can be concluded that the mean percentage scores increased significantly following the PowerPoint presentation.

Non-Parametric Statistics									
	Mean	SD	N	Sum of Squares	Sum of Products	Sum of Squares of Products	Sum of Squares of Squares	Sum of Squares of Cubes	Sum of Squares of Fourth Powers
Pre	60.0000	10.0000	24	1440.000	1200.000	1440.000	1440.000	1440.000	1440.000
Post	70.0000	10.0000	24	1960.000	1680.000	1960.000	1960.000	1960.000	1960.000

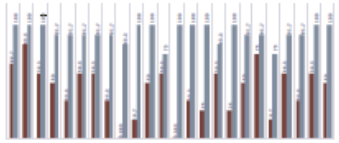
LITERATURE REVIEW

While CRNAs and AAs do share some similarities, important differences exist that distinguish these non-physician anesthesia providers into two unique professions. Differences among educational pathways, scope of practice, and government policies are evident. Primary aspects about CRNAs that are different from AAs include:

- Advanced Practice Registered Nurse (license in every state)
- Background in critical care
- Prescriptive authority (process varies by state)
- Independent practice (to include regional anesthesia administration)
- Ability to work anywhere in the United States

RESULTS

STUDENT REGISTERED NURSE ANESTHETISTS' TEST SCORES



CONCLUSIONS

In conclusion, as demonstrated by the statistical analysis of pre and post tests, the PowerPoint presentation was successful in increasing the knowledge among 24 SRNAs about the similarities and differences of CRNAs and AAs.

OBJECTIVE

The goal of this project was to increase the knowledge of Student Registered Nurse Anesthetists (SRNAs) regarding the similarities and differences among CRNAs and AAs.

IMPACT ON FINDINGS

Results from this study revealed that a small group of healthcare providers had a general lack of understanding of the similarities and differences among CRNAs and AAs. As evidenced by analysis of pre and post test scores, more education regarding these two similar, yet different professions is needed among healthcare providers and those who employ them. Understanding and respecting the differences between CRNAs and AAs is a step in providing patients with safe and accessible anesthesia care.

REFERENCES

Available upon request.