ADCE 2021 Poster Abstracts

General Posters
Evidence-Based Practice

Correlation Between Entry Grade Point Average and First Attempt National Certification Examination Scores for Graduate Student Registered Nurse Anesthetists

Sonja Gonzalez, BSN, RN, CCRN; Nicole Cavaliere, BSN, RN, CCRN; Alescia DeVasher Bethea, PhD, CRNA, APRN
AdventHealth University

Background/Purpose/Question: During the admission process, programs attempt to determine optimal candidates with the highest capacity to succeed. Evidence shows the use of entry grade point average (EGPA) as a best-practice standard in the admission process for graduate nurse anesthesia programs. The data provided by this scholarly project may be beneficial and relevant for nurse anesthesia programs, as these data share information from one program regarding correlation of pre-admission GPAs with graduates' initial National Certification Examination (NCE) attempts. One PICOT guided the literature review: In students who attended graduate-level healthcare programs, did GPA upon admission correlate with first attempt NCE scores? Another PICOT guided the project: In student registered nurse anesthetists attending a graduate nurse anesthesia program in the 2012-2019 graduating cohorts, did GPA upon admission correlate with first-attempt NCE scores?

Methods/Evidence Search: A quantitative, retrospective, correlational design was used to determine the relationship between the graduates' EGPA and their first attempt NCE scores. It used a convenience sample of the EGPAs for the 2012-2019 graduation cohorts from one private nurse anesthesia program in the southeastern United States and compared them to the respective first-time NCE scores. The sample included graduates in consecutive cohorts from a Master of Science in Nurse Anesthesia (MSNA) program, consisting of 8 cohorts with a total of 175 graduates. SPSS Version 21 was used to conduct a Pearson *r* correlational analysis, with a multiple regression analysis to evaluate the individual NCE domain scores. Databases used included PubMed, Google Scholar, and Cumulative Index to Nursing & Allied Health Literature. The theoretical framework for this project was adapted from Vincent Tinto's Longitudinal Model of Student Retention. The statistical analysis was reviewed for any correlation between EGPA and NCE scores from the graduates' first NCE attempt.

Synthesis of Literature/Results/Discussion: Synthesis of literature revealed that for each one-point increase in EGPA it increases successful completion of a graduate nursing program by as much as 7.12 times, and students are 4.2 times less likely to be subject to academic probation. An EGPA of 3.25 and undergraduate nursing GPA of 3.00 reflects up to a 99% program success rate. A total score of 450 or greater is needed to pass the NCE. In this project: those whose NCE scores were less than 450 (N=20), the average EGPA was 3.29 with a standard deviation of 0.214 based on a 4.00 scale, with a range of 2.89 to 3.67. For NCE scores 450 or greater (N=154), the average EGPA was 3.48 with a standard deviation of 0.269 based on a 4.00 scale, with a range of 2.97 to 4.00. A *t*-test was performed and revealed that graduates whose NCE total score was 450 or greater had notably higher EGPAs. An EGPA of 3.75 or higher (N=33) correlated with an average NCE score of 521. An EGPA of 3.50 to 3.74 (N=46) correlated with an average NCE score of 506. An EGPA of 3.25 to 3.49 (N=47) correlated with an average NCE score of 499. An EGPA of 3.00 to 3.24 (N=43) correlated with an average NCE score of 490. Finally, an EGPA of 2.99 or less (N=5) correlated with an average NCE score of 465 or less. EGPAs of 3.75 or

higher showed a statistically significant correlation (*P*=.002) with increased NCE scores when compared to EGPAs below 3.75.

Conclusion/Recommendations for Practice: EGPA had a significant correlation with total NCE scores and showed a score of 450 or greater was associated with higher EGPAs. Limitations included a small sample size and convenience sampling, not having a breakdown of EGPA categories, different methods of NCE test preparatory systems, and limited data due to confidentiality. Data demonstrated the average EGPA that correlated with a total NCE score of 450 or greater on the first NCE attempt was 3.48, with a standard deviation of 0.269. Therefore, an admission criterion of a minimum 3.21 EGPA is recommended, which is one standard deviation less than the average EGPA of 3.48, rather than the program's current minimum EGPA of 3.00, to increase the likelihood of candidates' capacity to achieve a total NCE score of 450 or greater on a first NCE attempt. Evidence suggests 3.25 as the minimum EGPA for admission to nurse anesthesia programs. Therefore, in accordance with evidence-based practice, a minimum of 3.21 EGPA for admission to this graduate nurse anesthesia program is recommended.

An Evidence-Based Approach to Student Registered Nurse Anesthetist Clinical Success

Lucas Urbi, BSN, RN; Leigh Taylor, DNP, CRNA
Middle Tennessee School of Anesthesia

Background/Purpose/Question: In nurse anesthesia programs, student registered nurse anesthetists (SRNAs) must demonstrate didactic and clinical preparedness before taking certification exams. Didactic success is quantifiable by the grades earned. Current evidence has revealed significant predictors of didactic success in anesthesia programs such as overall/science GPA, GRE score, and ICU experience. Admission committees can assess for the presence of these factors during the application process and identify successful applicants. However, there is a lack of current evidence involving nurse anesthesia programs describing admission criteria predicting future clinical success. As a result, finding clinically capable applicants remains a challenge for admission committees. The purpose of this project is to synthesize evidence surrounding clinical success predictors and subsequently to outline a rubric for admissions usage.

Methods/Evidence Search: This project used the John Hopkins Nursing Evidence-Based Practice (JHNEBP) model to formulate an inquiry regarding clinical success predictors, find evidence to support, and translate the evidence to create a rubric for admissions. The authors utilized the databases of OVID, Medline, Google Scholar, CINAHL, and the *AANA Journal* and began the search in April 2020 with completion in September 2020. Search terms included were "admissions criteria AND clinical success," "rubric AND clinical predict*," and "clinical OR admissions." The date range was increased to 20 years to include a landmark study that involved student registered nurse anesthetists (SRNAs) published by the *AANA Journal*. The results were evaluated using the JHNEBP rating scale, and only high-quality evidence was included in the foundation of the rubric.

Synthesis of Literature/Results/Discussion: Admissions committees across medical professions share the dilemma of assessing applicants for clinical success. Researchers examined medical admissions interview data and academic credentials for predictors of clinical success. Students reported to have high levels of maturity, nonacademic achievement, motivation, or rapport were 2-3 times more likely to receive outstanding internship recommendations. Clinical faculty at military nurse anesthesia programs were given a 35-item survey regarding SRNA characteristics needed for clinical success. The "essential" characteristics included integrity, ability to learn from mistakes, judgment, clinical awareness, commitment, and hardiness. Safe anesthesia practice is congruent with clinical success. A survey of perceptions of SRNA characteristics representative of safe clinical practice include vigilance, accepting responsibility for actions, ethical, good critical thinking skills, honesty, and good judgment. The article argues that personality characteristics are gradually developed and are neither easily formed nor removed. Therefore, the characteristics revealed in the clinical setting ought to be present throughout the application process. Here, the significance of this implication is that admission committees should be intentional in the identification of both positive and negative characteristics in consideration of an applicant.

Conclusion/Recommendations for Practice: The evidence outlined describes the relationship between noncognitive factors such as motivation and maturity to clinical success. There are a multitude of ways that admissions committees can adapt the application process to account for these characteristics. To avoid dismantling existing application infrastructure, the easiest tool to adopt is a three-point Likert scale (negative, neutral, positive) to assess for noncognitive factors predicting clinical success. These factors reflect the results of the previously mentioned studies. This scale should be completed upon review of the paper application and directly after the applicant interview by each member of the

committee. The purpose of this tool is to identify characteristics of successful clinical SRNAs, assist in documentation, and facilitate deliberation of an applicant. The use of the scale is not intended to exclude applicants based on their score, but rather highlight individuals who demonstrate predictors of clinical success. It is the aim of this project to incorporate best evidence and principles for success in the admission of SRNAs. A rubric has been developed to assess clinical and didactic success among candidates. This rubric utilizes the best predictors of success on the National Certification Examination (NCE) with the best attempt to vet success clinically and professionally, as well. Predictors utilized in the program to evaluate success will be clinical evaluations, grades, NCE pass rate, and programmatic professional markers termed *cards*. Due to the length of the program, it will not be known if the rubric will be successful in admitting a qualified student for greater than 3 years. In that timeframe, new evidence could develop in predictive values of success in nurse anesthesia programs.

Correlating Graduate Record Examination Scores with National Certification Examination First-Attempt Scores

Breann Montgomery, BSN, RN; Taylor McQuaig, BSN, RN; Alescia DeVasher Bethea, PhD, CRNA, APRN
AdventHealth University

Background/Purpose/Question: The performance data from graduates' first-time attempt National Certification Examination (NCE) passing percentages has declined since 2008 from 89.9 percent to 84.3 percent for 2019. Not only does the first-attempt NCE affect the graduate, but also program accreditation. CRNA programs are also changing from master's to doctoral level, increasing the length of time in school and the amount of debt acquired by the student. The purpose of this scholarly project was to determine whether a relationship exists between GRE scores and NCE scores. The PICOT question asked, in student registered nurse anesthetists who graduated from one private southeastern university's nurse anesthesia program during 2015-2019, is there a correlation between Graduate Record Examination scores and first attempt NCE scores?

Methods/Evidence Search: Databases searched included Google Scholar and ScienceDirect. Key search terms included: nurse anesthesia, admission criteria, first time board pass, certification pass, advanced practice nurse, physical therapy program, physician assistant program, graduate record exam (GRE) correlation. Exclusion criteria included: non-English language, articles dating back greater than 27 years, and publication outside the United States. The total articles found were 2,632, and after exclusion criteria were applied, the articles were narrowed down to a total of 18. The study used a quantitative retrospective correlational design to examine data regarding overall GRE and first-attempt total NCE scores by nurse anesthesia graduates from one private southeastern university between 2015 to 2019. A multiple regression design was conducted comparing subcategories of the GRE score, verbal and writing, to first-attempt total NCE score. Statistical analysis used the IBM Statistical Package for Social Sciences (SPSS) software version 21.

Synthesis of Literature/Results/Discussion: Literature lacked that focuses solely on the GRE's role in the admission criteria but was generally examined in conjunction with other criteria. ETS (creator and distributor of the GRE) finds it predictive of graduate GPA (GGPA), 1st year GGPA, faculty ratings, comprehensive examination scores, and degree attainment. Literature has shown varying results regarding whether the GRE has significant impact or correlation with first-time board pass rates. Literature was also mixed when determining whether the GRE held a meaningful value in its relationship to academic success, first-time pass certification examinations (in similar healthcare programs), and academic pass rates. To investigate the correlation between GRE sub-scores (verbal and quantitative) with NCE total score, a partial correlation was conducted. The results indicated there was no significant correlation between the verbal sub-score GRE value and the NCE total score while controlling for GRE quantitative scores as indicated by r = -.008 and P = .939. However, statistical significance was achieved in the correlation between the quantitative GRE sub-score and the NCE total score when controlling for GRE Verbal as indicated by r = .264 and P = .01.

Conclusion/Recommendations for Practice: A significant correlation was determined between total GRE scores and first-attempt NCE total scores. However, the predictive ability of total GRE scores, estimated at 5.02%, indicates there is little predictive value, because a strong predictive ability score is considered to be 30% or greater. Therefore, while the GRE total score can be correlated with total NCE scores, data indicate a low predictive value. Verbal sub-scores of the GRE demonstrated no significant correlation with total NCE first-attempt scores, yet the quantitative GRE sub-scores demonstrated a positive correlation with the total NCE first-attempt scores. The researchers recommend this nurse anesthesia

program to use the total GRE score in conjunction with other admission criteria. A second recommendation would be to consider the GRE quantitative sub-score more than the qualitative sub-score. The final recommendation is to expand this study to include additional nurse anesthesia programs across the United States.

Virtual Cadaver Dissection Prior to Clinical Experiences in Nurse Anesthesia

Hannah Ruholl, BSN, RN; Kyle Smith, BSN, RN; Kevin Stein, DNAP, CRNA
Southern Illinois University Edwardsville

Background/Purpose/Question: Anatomy and physiology (A&P) courses are the foundation of anesthesia training. Student registered nurse anesthetists (SRNAs) must be A&P experts as they perform clinical skills for the first time. Traditionally, cadaver dissection has been used to enhance comprehension of A&P. However, not all facilities can allocate the time, space, or financial resources for cadaver dissection within their programs of study, especially at institutions that lie outside of major medical centers. Despite the presence of a virtual cadaver at a nurse anesthesia program in the Midwest, its introduction to SRNAs as a resource had not been fully employed. The goals of this project were to further integrate virtual cadaver dissection into the nurse anesthesia curriculum and assess student perceptions.

Methods/Evidence Search: The literature review included a comprehensive search using EBSCO Host's Academic Search Complete, EBSCO, CINAHL, ERIC, Medline Complete, PsycINFO, Cochrane Center of Controlled Trials, and the Cochrane Database of Systematic Reviews. Significant citations from relevant articles were searched via Google Scholar. Search terms included combinations of virtual, cadav*, educat*, and Anatomage. Original work from the authors was also included. Twenty-five articles and two presentation abstracts were included in the literature review. After reviewing the efficacy of virtual dissection from the evidence and institution IRB approval, the formation of a quick-start user guide along with a formal orientation were provided to first-year SRNAs. The SRNAs (N=24) were surveyed on three occasions throughout project implementation: immediately after orientation (n1=17), before starting clinical experiences (n2=12), and approximately 2 weeks after their first clinical experiences (n3=18).

Synthesis of Literature/Results/Discussion: Virtual cadaver dissection is a novel technology that has not been studied at length. According to the available literature, virtual cadaver dissection is comparable, but not fully equitable, to traditional cadaver dissection. It has been shown to be a useful adjunct for learning A&P. Each modality of anatomical dissection had advantages and disadvantages and no method was consistently superior to others. In the surveys, SRNAs described overall positive experiences with virtual cadaver dissection and favorable impact on their first clinical experiences. SRNAs reported increased ease in identifying airway and neuraxial A&P while at clinical, assistance with didactic coursework, and expanded comprehension of anesthesia procedures. Barriers to implementation according to SRNAs were group sizes, availability, time constraints, and the COVID-19 pandemic.

Conclusion/Recommendations for Practice: Further research is needed to discern advantages and disadvantages of virtual dissection specific to nurse anesthesia curricula. There is some evidence to suggest benefit in other specialties, medical education, and dentistry. The implementation results of this project demonstrated potential benefit to SRNAs. Based on the needs and available resources of this institution, in addition to the project results, virtual cadaver dissection is a suitable alternative to traditional cadaver dissection and should be implemented further into the curriculum as an adjunctive tool to improve A&P comprehension. As more research is published, nurse anesthesia programs should weigh the evidence and consider the impact of virtual dissection on future students and their understanding of A&P.

General Posters
Invention/Innovation

Virtual Dissection: Alternative to Cadaveric Dissection for a Pregnant Nurse Anesthesia Student

Terri M. Cahoon, DNP, CRNA; Nicholas B. Washmuth, DPT, DMT, OCS; Katrina Tuggle, MSN, CRNA; Ronald N. Hunsinger, PhD

Samford University Department of Nurse Anesthesia

Introduction: Nurse anesthesia education incorporates basic science courses, such as anatomy, upon which to build clinical knowledge and skills. Cadaveric dissection (CD), the gold standard for anatomy education, allows students to transfer didactic concepts to concrete, tactile experiences. Formaldehyde, used to preserve cadavers, can render laboratory sessions a health risk. Formaldehyde exposure during pregnancy has been associated with increased risk of defects including birth malformations, spontaneous abortions, preterm labor, and low birth weight. Evidence indicates that pregnant students should avoid formaldehyde exposure in anatomy laboratories altogether; other means of laboratory experience should be offered. An alternative method is a virtual cadaver dissection (VCD) table with life-size 3-D digital cadaveric images, which students can rotate, magnify, label, dissect, and transect by touch or stylus. VCD allows dissections to be repeated or saved for customization for students.

Development/Design: Anatomy teaching strategies range from CD to models to plastination to VCD. Limited evidence shows varied results. No one technique was consistently superior in meeting competencies. CD was preferred over VCD and other techniques by students and anatomists; however students recognized value of using VCD. The ethics of research within a cohort to examine CD compared to VCD might be questionable. With a pregnant student (Student V) who needed to avoid formaldehyde exposure, an opportunity to challenge the traditional method and gather data for comparison was taken with IRB approval. Student V completed dissection labs using VCD while peers in the control group performed CD. All students attended lectures and took the same course assessments, including four written and four practical exams. In lieu of using cadavers for practical exams, the professor utilized digital photographs of cadaver structures to provide equitable testing with no formaldehyde exposure. Examination results of the CD cohort and examination results of Student V were analyzed.

Proof of Concept/Results: The course numerical grade outcomes for the two groups were similar. The small sample size limited the use of higher level statistical analysis. Student V performed slightly better than the CD group with a higher course average. Her grade fell within the interquartile range (IQR) (2.94) of the median (96.38) value for the CD group. Student V's grades on each examination also were within the IQR of the CD group's median. Student V was representative of her cohort as her demographics (age, GPA, GRE, critical care experience) fell within one SD of those of the CD cohort. Student V shared qualitative perceptions of utilizing VCD including the advantage of efficiency and flexibility of viewing cross-sections and reconstructing to correct or to study structural relationships. She acknowledged the challenges of isolating small structures and lack of contact with tissues. During her clinical education, Student V reflected that her VCD experience prepared her for regional anesthesia and ultrasound-guided techniques.

Discussions and Conclusions: Incorporation of VCD into nurse anesthesia education is supported by the demonstrated competencies in anatomy and clinical application by both the VCD and CD groups. The revolving cost of acquiring cadavers and maintaining a functional dissection environment are not insignificant. The expense of a VCD table is a capital investment that might be shared across

interprofessional departments. The large-scale “tablet-like” interactive experience allows students to work asynchronously and digitally save their dissection. Student V recognized the ability to correct a mistake in dissection using VCD while peers saw the consequences of an errant scalpel. The ability to view spatial relationships after dissecting out a structure with reversal of steps and transecting views were valued aspects of VCD. Although the size of the groups is a limitation to generalizability, the results support the importance of visualization and contribution of both VCD and CD for meeting anatomy-related outcomes. Manipulation of tissues is lost with VCD. Although minimal and easily resolved, VCD is subject to technical issues with upgrade requirements. Faculty members, unlike digitally native students, may require technical training. Virtual cadaver dissection is an innovative, safe alternative to cadaver dissection to teach foundational anatomy to nurse anesthesia students preparing for clinical practice.

Enhanced Remote Teaching Strategies for Graduate Nurse Anesthesia Students

CAPT Valerie J. Diaz, DNP, CRNA, APRN, NC, USN; Yasmine N. Campbell, DNP, CRNA, APRN
Florida International University

Introduction: A nationwide transition to distance learning among programs of higher learning compelled nurse anesthesia faculty to quickly adopt nontraditional teaching strategies to ensure seamless instruction and learning experiences for student registered nurse anesthetists (SRNAs) across the United States whose learning was abruptly halted by COVID-19. In the absence of traditional face-to-face instruction journal club, a valued pedagogy of clinical practice and medical education; gamification; and remote simulation were launched to foster scholarly engagement and bridge the educational gap for students. This article aims to showcase journal club and game-based learning as innovative teaching strategies to prepare SRNAs for clinical experiences while fostering engagement within the remote learning environment.

Development/Design: As technology advances, a myriad of educational delivery platforms are available for every generation of learner. Gamification is a versatile technique that has shown success in traditional face-to-face classrooms and virtual remote-learning environments. Designed to streamline study habits, gamification provides a goal-oriented approach to analyze case-based scenarios. The gaming platform enriches case-based learning using a questioning strategy to foster critical thinking, clinical judgment, and enhance test-taking to prepare for the National Certification Examination. Journal club, a problem-centered, student-directed activity, is aligned with Knowles' Adult Learning Andragogy. As a teaching strategy the journal club established a forum of scholarly exchange and collaborative interaction between junior and senior SRNAs to foster bidirectional peer mentorship, mitigate graduate student stress and anxiety, promote confidence, and augment clinical performance, all required to address the uncertainties of COVID-19 and the looming pandemic.

Proof of Concept/Results: Seven empirical studies were evaluated on gamification as a learning catalyst for nursing education. The majority of the studies conveyed advantageous student learning outcomes such as enriched problem solving, higher grades on formative and summative exams, and improved cognitive memorization skills. The research revealed that students exposed to learning platforms such as Kahoot and Jeopardy are more engaged and have greater confidence in answering test questions than students who have not been exposed to gamification. A systematic review of sixteen studies supports the use of journal club as an effective method of improving content expertise and clinical confidence. The evidence further suggests journal club participation fosters critical thinking, research awareness, and critical appraisal. Participation in journal club facilitates students' integration of clinical teaching into practice.

Discussions and Conclusions: Journal club is a long-standing pedagogy that evolved to enhance contemporary clinical practice, clinical education, and interdisciplinary collaboration. It reflects the rapidly changing technological fabric of the clinical setting in which SRNAs are immersed. Journal club has well-documented educational benefits, however the traditional delivery runs the risk of participants becoming passive learners. Assigning an appraisal tool as pre-work ensures preparation and engagement. The remote virtual flipped classroom approach creates more time for scholarly exchange between faculty and students through use of a web-based conferencing platform, whiteboard technology, and computer display screen sharing. Gamification in nursing education reflects adult learning andragogy that promotes student self-direction and knowledge attainment from problem-solving experiences. Though lauded for its many educational benefits, faculty may face barriers to executing innovative technology due to lack of monetary support, instructional training, and time.

Gamification is generationally favored and while it supports diverse learning styles it is met with a measure of resistance by a select few. Planning and designing games can be time consuming for the educator, therefore, should be implemented when adequate resources exist.

General Posters
Quality Improvement

Intraoperative Risk Factors as Predictors of Postoperative Cognitive Dysfunction for Spine Surgery Patients: An Educational Intervention

Kathryn Fellner, RN, BSN; Candace Jaruzel, PhD, MSN, CRNA
Medical University of South Carolina

Background: Postoperative delirium (POD) and postoperative cognitive dysfunction (POCD) are common postoperative cognitive complications (POCC) linked to surgical stressors and anesthesia that increase patient morbidity and mortality. With Americans having progressively long lifespans, there are more patients undergoing spine surgery. Research shows higher rates of POCC in this population, with POD following spine surgery occurring in approximately 24.3% of elderly patients. It is evident that the best treatment is prevention. Current causative mechanisms related to anesthesia include the type of anesthetic, anesthetic agent used, cerebral hypoperfusion, and neuroinflammation. It is important to be cognizant of the risk of POCC and take precautions in the perioperative period to mitigate this risk. The goal of this project is to review the literature on modifiable anesthetic perioperative risk factors and to educate Certified Registered Nurse Anesthetists on anesthetic strategies to reduce the risk of POCC for spine surgery patients.

Method: This project was conducted at the institutional level of a Level I academic medical center. Certified Registered Nurse Anesthetists were invited to attend a 60-minute pre-test/post-test educational seminar about POCC affecting spine surgery patients, a preoperative screening tool (Mini-Cog), and evidenced-based anesthetic management of surgical patients to reduce the intraoperative risk of POD and POCD. Nurse anesthetists were also surveyed about previous training on the Mini-Cog and potential barriers to the implementation of evidence-based aesthetic strategies. Data were analyzed in Excel using pre-test/post-test comparisons and basic statistics to determine the impact of the intervention, measured by correctness of content questions and feedback. Short answer information gathered from the demographics and evaluation sections (barriers and feedback) was also included to assess the impact of the intervention.

Results: The content questions tested the knowledge of POD and POCD, the Mini-Cog (scoring and application to anesthetics), and pharmacologic, surgical, and other anesthetic risk factors for POD and POCD. The mean score on the pre-test and post-test were 54.2% and 88.8%, respectively, demonstrating a statistically significant, 34% mean increase in score following the educational intervention. There was significant improvement in CRNA ability to understand and score the Mini-Cog, as assessed by three questions. An additional five questions tested specific anesthetic strategies to reduce the risk of POD and POCD and also included two true/false questions testing common misconceptions related to the use of TIVA and ketamine in neuroprotective anesthetics. At baseline, all CRNAs recognized that longer duration of spinal surgery is associated with higher rates of POCC. For the other five content questions in this category, the educational seminar led to significant improvement in knowledge and score improvement.

Discussion: The results from this project indicate that further education is needed to expand CRNA knowledge about the perioperative care of spine surgery patients to reduce the incidence of POD and

POCD to ensure these interventions are incorporated into practice. During the evaluation of the education session, all CRNAs indicated that the education was useful to their practice. The final survey question asked if there were practice barriers to the implementation of intraoperative POD/POCD interventions. While half of CRNAs could see no barriers, the other half noted barriers such as a lack of resources, time-constraints, lack of high-level evidence "to convince stakeholder buy in," "the ACT model of aesthesia care," and anesthesiologists "not willing to change practice ideas." The information gathered from this project will inform future learning interventions, as the Mini-Cog and anesthetic strategies to reduce POCC are opportunities for improvement.

Stress Reduction in Student Registered Nurse Anesthetists via a Semi-Structured Peer Mentor Program

Jennifer Keshishian; Shaquitta Bell; Jarrod Moulds; Srinidhi Vittal; Edwin Aroke, PhD, CRNA
University of Alabama at Birmingham

Background: According to numerous peer-reviewed articles and systematic reviews, nursing students experience higher levels of stress with more physical and psychological symptoms compared to majors in other health-related disciplines. Stuent registered nurse anesthetists (SRNAs), in particular, have reported perceived stress levels of 7.2 out of 10 while Certified Registered Nurse Anesthetists (CRNAs) had scores of 4.7 out of 10. At the institution where this quality improvement project was implemented, graduate students in health professional programs are the largest consumers of counseling services. In a population that is already at risk for mental health symptoms, adding stress of a global pandemic may lead to both physical and mental illness. Students may have feelings of isolation and anxiety due to social distancing, the transition from in-person to online studies, and limited access to psychiatric care. This quality improvement project aims to reduce SRNA stress through a semi-structured peer mentor program implemented over the course of the Summer 2020 semester.

Method: A semi-structured peer mentorship program was developed to reduce SRNA stress during a major transition in the nurse anesthesia (NA) program. Upon initiation of the quality improvement project, Counseling Services representatives gave a presentation on stress reduction techniques to potential mentee participants. Following this presentation, interested mentee participants completed the Perceived Stress Scale so that baseline perceived stress scores were established. Each mentee was paired with a volunteer mentor from the senior NA class, forming 15 mentor-mentee pairings. During the intervention period, mentor-mentee communication took place at least twice a month. The duration of the mentorship intervention was 2 months beginning June 26, 2020 and ending August 26, 2020. Following conclusion of the intervention, the Perceived Stress Scale was re-administered. Mean perceived stress scores pre- and post-intervention were analyzed using *R*. In addition, descriptive statistics were run in Microsoft Excel.

Results: The project took place in the school of nursing at a large southeastern university. Of the 40 students in the NA cohort of interest, 15 students consented to take part in the mentorship program; 11 were female and 4 were male. Participants were majority Caucasian ranging from 20-43 years of age. When surveyed on the impact COVID-19 has had on their schooling, 9 out of 13 students report that COVID-19 has moderately or severely hindered their ability to learn clinical anesthesia skills and their preparedness for the transition to clinical practice. Perceived stress scores were evaluated on a scale from 0 to 4 and prior to mentorship averaged 1.855 (SD = 0.48). A midpoint check-in revealed 6 of 9 responding mentees have been in regular communication with their mentor, and 8 of 9 found their mentor relationship to be helpful. Post-intervention perceived stress scores averaged 1.282 (SD = 0.47). A Welch two sample t-test revealed a statistically significant difference in mean perceived stress scores pre- and post-intervention (P = 0.00989).

Discussion: Key findings include a handful of mentees who reported that although they have not explicitly needed their mentor, they felt it was reassuring to have someone should the need arise. This demonstrates that while students may be self-sufficient, a network of peers to “fall back on” is comforting. In addition, findings demonstrate the clear negative impact of COVID-19 on students’ transition to clinical practice. Amplified efforts to ease SRNA stress during this unprecedented time are imperative, and peer support through mentorship appears to be an effectual first step. Although efforts were made to standardize communication across pairings through distribution of a mentor preparation

packet and check-in reminders sent via a GroupMe chat, there exists an inherent inability to ensure uniform communication across pairings. This is a function of mentor's engagement with the program, their comfort level with their assigned mentee, and perhaps also the mentee's involvement with mentor. Project outcomes included attenuating SRNA stress, improved clinical performance, and student satisfaction with the mentor program. Furthermore, positive interactions between junior and senior SRNAs improved rapport and inter-cohort relations. Project results may support the implementation of a peer-mentoring program for the entirety of the NA program rather than an abbreviated period.

Improving the Physical Wellness Habits of Student Registered Nurse Anesthetists

Erin Propst, BSN, RN; Michele Ballister, DNP, CRNA, APRN, CHSE
Medical University of South Carolina

Background: Student registered nurse anesthetists (SRNAs) undergo rigorous graduate-level education with the goal of becoming Certified Registered Nurse Anesthetists. Data show that many students of the health professions, including SRNAs, have background awareness of the need to engage in physical activity, maintain a healthy weight, consume nutrient-dense foods, get adequate sleep, and sustain relationships, yet these behaviors are often lacking in their routine. Known benefits of physical wellness include stress reduction and improvement in cognition, anxiety, and mood. Omission of wellness habits leads to increased health risks and often results in the adoption of negative coping mechanisms for stress. Improving physical wellness habits will better prepare SRNAs to use this positive coping skill to manage and overcome the stress of an anesthesia program and evolve into safe, competent providers. The purpose of the project is to improve the physical wellness habits of SRNAs through the implementation of a physical wellness challenge.

Method: The project followed a longitudinal design, in which a pre-post-post study was used to assess change in physical wellness habits following the implementation of a 30-day physical wellness challenge. Participants completed a pre-survey assessing time spent in physical activity per exercise session, the number of physical activity sessions per week, types of physical activity, and frequency of use of the on-campus fitness center. Following completion of the pre-survey, participants logged daily physical activity for 30 days. All data including survey responses and daily physical activity were saved to an electronic database. Participants completed two post-surveys, the first at 1 month and the second at 5 months following completion of the challenge. Statistical analysis of all survey responses was used to assess the wellness habits of participants before, during, and at various stages after completion of the challenge.

Results: Twenty-five doctoral SRNAs completed the pre-survey and participated in the wellness challenge. Attrition accounts for a decrease in sample size to 15 participants who completed all three surveys. Of participants who completed the pre-survey, 72% of SRNAs reported exercising. The most frequently reported types of exercise included cardio, high-intensity interval training, and strength training. Of the students who exercised at the time of the pre-survey, the majority reported a frequency of 2-4 days per week, with the mean minutes of exercise per session being 45.6 ± 22.8. Students' individual logs of daily physical activity during the wellness challenge were graphed; graphing showed no consistent increase or decrease in the number of minutes spent in physical activity from day 1 to day 30 of the wellness challenge. Subgroup analysis of students who completed pre-, post-, and post-post surveys showed an increase in the mean number of minutes of physical activity per workout session in both the post- and post-post surveys.

Discussion: Pre-survey results showed that the majority of participants failed to meet World Health Organization (WHO) recommendations for 150 minutes of weekly physical activity. This is consistent with existing literature that over half of health professional graduate students fail to meet recommended physical activity requirements and/or report a negative change in exercise habits after starting a program. Although not statistically significant, analysis showed a cohort-wide increase in the mean number of minutes spent in physical activity per exercise session following the completion of the physical wellness challenge. This increase was noted both during the didactic semester and following transition into full-time clinical rotations. This increase in minutes is met with an increase in the number of students who meet the WHO's weekly physical activity recommendations. Project limitations include the use of convenience sampling and therefore limited sample size, along with attrition over the course

of the project. Self-reported results are subject to possible participant bias and/or falsified data entry. Further study is needed to determine specific barriers to improving exercise habits of SRNAs, as well as longevity of improved exercise habits and the development of positive coping mechanisms.

Eye Protection in Anesthesia

Morgan McMahon, RN, BSN; Elliot Barnwell, RN, BSN; Matthew Raymond, RN, BSN; Susan McMullan, PhD, MSN, CRNA, CNE, CHSE

University of Alabama at Birmingham School of Nursing

Background: A landmark study found 21 out of 60,965 patients developed a corneal abrasion (CA), the most common ocular injury in non-ocular procedures, after anesthesia. Inadequate or inappropriate protection of the eyes by anesthesia providers can leave patients at risk for developing serious eye and skin related injuries. To the best of our knowledge, there is not a standard eye-care protocol in place causing a gap between evidence-based practice guidelines and the care currently provided. In addition, there is a lack of documentation in many hospitals. A questionnaire survey was used to gather data to investigate CRNA practice for eye care. The purpose of this project was to analyze those data collected, to look for patterns of practice, and to compare it to evidence-based practice in order to decrease the number of CAs and eliminate the pain and suffering patients experience from CAs.

Method: Following the linear Donabedian model and approval by the University of Alabama at Birmingham School of Nursing, a questionnaire survey was sent to all CRNAs at three facilities in the southeast including a community hospital, a metropolitan private practice hospital, and a major academic medical center. The survey was created in Survey Monkey and consisted of 15 questions that investigated CRNA habits for eye care, experiences with CAs, documentation of eye care, and other information. The survey was made available for 1 month to the CRNAs and all answers were anonymously collected. Data were extracted through the collection and analysis of the completed surveys and compared with current evidence-based practice. Data and privacy protection were ensured by the use of a de-identified dataset, by not collecting IP addresses, and storage of data on a locked computer in a locked office.

Results: Sixty-three practicing CRNAs responded to the questionnaire, which represents a 38% response rate for the survey. CRNAs reported over 30% (n=19) had an experience with a patient that suffered a CA. Over 50% (n=34) reported that there was no place in the medical record to document CAs or did not know where to document them. Forty percent (n=25) of participants indicated their anesthesia department does not have a standardized eye care protocol and found that the eye protection they use varies based on what is available at their facility. All respondents indicated (n=166) that there is a specific location to document performing eye care. A majority of participants (n=50, 80%) stated they have encountered patients with issues with adhesive tapes. The top three types of eye care applications used alone or in conjunction with other eye care methods include: tegaderm (n=38, 60%), eye lubricant (n=33, 53%), silicone or plastic tape (n=27, 43%). Over 75% of CRNAs reported placing eye protection after placement of the airway device (n=49).

Discussion: Despite literature reports that CAs occur only in 0.03% of cases, in this project over 30% of CRNAs indicated that they were aware of one or more patient(s) developing a CA. There is a lack of clear institutional guidelines on the management of intraoperative eye care amongst CRNAs. Furthermore, CRNAs are not aware if there is a process to formally document CAs should they occur in the anesthesia department. There was a taping method variance from provider to provider and depended on the current supplies available at the hospital. This suggests that CRNAs use what is available to them and potentially not what is safest for the patient. The results of the surveys were then shared with each facility in conjunction with evidence-based articles. The wide range of eye methods utilized signifies the need for standardized care given the high incidence of reported CAs. However, the problem is complex and compounded by the possible risk of skin tears in special populations, positioning, and other

idiosyncratic traits that anesthesia providers must evaluate when choosing an appropriate eye care method. This project is the first step in the development of a standard of care protocol. More research needs to be conducted on the current practice of eye care methods, high risk factors for developing CAs, and comparison of eye care methods before this can be accomplished.

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First Case On Time Starts: A Quality Improvement Project

Katie Carter, RN, BSN; Ryan Hughes, RN, BSN; Taylor Rice, RN, BSN; Michael McConville, MSN, CRNA; Susan McMullan, PhD, MSN, CRNA, CNE, CHSE

University of Alabama at Birmingham

Background: The efficiency of an operating room (OR) can greatly impact patient and provider satisfaction. Delays in first case on time starts (FCOTS) contribute to an increase in the number of hours worked, which may be associated with elevated levels of burnout among anesthesia providers. FCOTS delays are also an important metric for cost containment and patient outcomes. However, there are many variables that can negatively impact OR efficiency. The OR accounts for 60%-70% of hospital revenue and up to 40% of hospital costs. With OR costs estimated to be between $15-$50 per minute, improving OR efficiency is paramount to operating a financially successful hospital and contributes to both patient and staff satisfaction and patient safety. Today's value-based healthcare market necessitates containment of these costs; even a modest increase in OR efficiency can lead to appreciable savings. To measure the efficiency of a surgical department, hospitals use data they can readily capture, such as a standard, universal, and measurable metric like percentage of FCOTS.

Method: The perioperative staff, including nurses and nurse anesthetists, participated in surveys regarding their perception of frequency, causes, and problems associated with FCOTS delays. The project team developed and administered the surveys anonymously through an online system with IP addresses blocked. The survey obtained demographic data and addressed staff perception of frequency of delays by asking how many times per week the patient is in the OR after the scheduled time for the first case of the day. The respondents were asked to list the primary cause of delays in FCOTS then asked to list the three most common causes of delays. Respondents were also asked to list three problems they have noticed that were associated with FCOTS delays. In addition, data were obtained from the electronic health record (EHR) from November to December of 2019 regarding the percentage of FCOTS delays and reasons for delay documented in the record. The data were compiled, analyzed with descriptive statistics, and presented to the perioperative staff.

Results: Answers from survey respondents ranged from less than 1 case delayed per week to 20. Surgeon delays were cited by 68% of respondents as the primary cause of FCOTS delays, while a lack of pre-admission testing came in second from 11% of respondents. The other most-common causes of FCOTS delays cited were related to preoperative staff and equipment delays. In data obtained from the EHR, surgeon-related causes were also the primary documented cause of FCOTS delays, responsible for 37.1% of delays. Patient, staff, and anesthesia-related delays were responsible for 29.9%, 17.5%, and 15.5% of FCOTS delays, respectively. The primary problem associated with delays according to survey respondents was also related to the surgeon, with some staff stating delays put the "surgeon in a bad mood." The next most common problem according to survey respondents was a delayed OR schedule, leading to staff staying late to complete cases. "Unhappy" staff and patient anxiety were also cited by multiple respondents as impacts of FCOTS delays.

Discussion: Surgeon-related delays were documented in the EHR as the primary cause of FCOTS delays and cited as the most common cause of FCOTS delays by survey respondents. In another study, staff were required to report causes of delays each day, and surgery-related causes were greatest at 34%. Surgery-related delays were then categorized into specific causes. The open-ended questions presented in the staff survey mirrored this elaboration with similar findings. A delayed OR schedule was the second most common listed problem. In parallel, another study found that staff overtime and personnel costs decreased with improvements in FCOTS. This study was limited by the small sample size who

participated in the survey. When questioned about problems associated with delays, several respondents reiterated causes for delays instead of stating repercussions due to the delays. This question could have been posed more clearly or with additional explanation. Because surgeons are both the primary cause of delays and the primary group affected, further investigation into methods to improve surgeon delays may not only improve the financial situation but also surgeon and employee job satisfaction. Inclusion of staff perceptions may benefit quality improvement projects by increasing staff buy in and obtaining more detailed information than what is available in the EHR for root cause analysis.

The Creation and Analysis of an Evidence-Based Question Bank

Julia Dziewatkoski, BSN, RN; Candace Jaruzel, PhD, MSN, CRNA
Medical University of South Carolina

Background: First-time pass rates for the National Certification Examination (NCE) have progressively declined in recent years, highlighting the need for additional tools to better prepare nurse anesthesia students for certification examination. Consistently low scores on the NCE are concerning for recent graduates, potential employers, and nurse anesthesia programs. Current available literature supports the use of evidence-based question banks, using a multiple-choice question format, to improve knowledge, academic performance, and certification examination pass rates in other medical specialties. This project aimed to provide a valuable tool to increase NCE first-time pass rates through the creation, implementation, and analysis of an evidence-based, 75 multiple-choice question bank focused on advanced principles anesthesia material.

Method: This project was determined to be a quality improvement project not requiring IRB approval. The item writing course provided by the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA) was completed by the team leader. Following item writing course completion, a 75-question test bank was created utilizing the NCE content outline provided by the NBCRNA. Question bank items were reviewed by a content expert who provided input. Once reviewed, the question bank was administered to board eligible student registered nurse anesthetists via an online learning management system. Discrimination index and facility index values were calculated and analyzed following completion of the question bank by students. Question performance was determined, and poorly performing questions were edited or deleted from the question bank.

Results: Twenty-eight nurse anesthesia students completed the question bank items prior to completing the nurse anesthesia program and taking the NCE. Students had access to the question bank one time during a 3-day period for 75 minutes during the attempt. The average score for items in the test bank was 71.49%, with a median score of 75%. The lowest and highest scores were 40.67% and 86.67%, respectively. Facility index and discrimination index values were analyzed from the results. Based on facility index values, 44 of 75 questions were found to be within an acceptable range of difficulty. Only one question was determined very difficult. From discrimination index values, 29 of 75 questions demonstrated adequate discrimination. However, 22 of the remaining questions did not fall within the optimal facility index range, making it difficult to assess the true discrimination of these items.

Discussion: Overall, a majority of the items tested fell within the desired range of test statistics. Questions that did not fall within the desired ranges for facility index and discrimination index were re-examined for errors, clarity, and plausibility of distractors. When test bank performance was compared with NCE pass rates, it was unclear whether the question bank contributed to NCE performance. First-time pass rates on the NCE in 2020 did not improve from the previous year at the same institution. However, it is important to note the difficulty in determining the true impact of question-bank use based on the number of confounding variables. Due to the global pandemic, nurse anesthesia students participating in this project did not have the same amount of clinical time as students previously. Safety concerns during this time also prevented students from completing the question bank on site. Therefore, students had access to various materials while completing the test bank, possibly skewing results. In addition, the NBCRNA recommends at least 100 exposures for an item to be calibrated effectively. Due to the small sample size, statistical values may be skewed. While the impact of the question bank is unclear, evidence in the literature supports its use, providing a potentially valuable study tool for nurse anesthesia students preparing for board examination.

End-Tidal CO_2 Education to Improve Utilization in the Post-Anesthesia Care Unit

Isabel Ryan, BSN, RN; Candace Jaruzel, PhD, MSN, CRNA
Medical University of South Carolina

Background: End-tidal carbon dioxide ($ETCO_2$) monitoring or capnography has an important role in the post anesthesia care unit (PACU). $ETCO_2$ monitoring detects the adequacy of ventilation at the alveolar level, which can be measured through specialized devices that sample CO_2 during exhalation. Post-surgical monitoring systems must meet the demand with accuracy and reliability due to the increased complexity of patient comorbidities. Educating PACU nurses on $ETCO_2$ monitoring can reduce barriers to adopting $ETCO_2$ monitoring as a standard of care in patients who have an increased risk of developing postoperative respiratory distress. Where pulse oximetry detects the adequacy of oxygenation, $ETCO_2$ monitoring detects the quality of ventilations.

Method: The $ETCO_2$ education module consisted of a pre-test/post-test design, the online education presentation, a demographics survey, and post-education survey. For each PACU nurse, an email was sent that contained instructions for participation in this quality improvement project. The participants began with the demographics survey, which upon completion, directed them immediately to Panopto. The online module consisted of a pre-recorded presentation, the pre-test, and then the post-test embedded in a sequential timed manner. The educational content presented in the online module was mapped to the learning objectives and guided by the hospital's organizational policy on $ETCO_2$ monitoring.

Results: There was a 60% participation rate, and 18 participants were included in the data analysis. Prior to the education, most participants reported that they did not utilize $ETCO_2$ monitoring. The mean score and on the pre-test and post-test were significantly improved from 61% and 94% respectively ($P = 0.03$). The post-education evaluation data indicated that most responded positively to the education module.

Discussion: Ongoing education about $ETCO_2$ and capnography guidelines has improved this cohort of PACU nurses' understanding and willingness to adopt $ETCO_2$ monitoring as a standard of care for all patients, thus contributing to an additional level of safety. Due to the limited sampling population of this single PACU, the results of this quality improvement project are not generalizable to all PACUs.