Use of Cognitive Aids in Student Nurse Anesthetists Simulation Training

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By

Ashley McDonald BSN, RN and Joy Lacorte BSN, RN

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Approved by:

Steven Fowler DNP, CRNA., Project Chair

Marc Lindley MS, CRNA

Leesuk Ferencsik Ph. D., RN

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Abstract

In academic medical programs, the use of cognitive aids in simulation scenarios has become more prevalent in training for crisis management. Crisis management is an essential component of healthcare, and the key to successful management is preparation and appropriate training. The objective of this scholarly project was to investigate the effects that cognitive aids have on student registered nurse anesthetists (SRNAs) at AdventHealth University and their ability to manage a crisis scenario. Students from one cohort were divided into two groups. One group had the Stanford Cognitive Aid available, and the second group did not. All groups encountered the same scenario. Correct management was determined by (1) time to problem recognition and (2) the number of correct interventions implemented. Video recording was utilized during each scenario to ensure proper data collection. In this study, the study result did not correlate with previous studies. Due to limited participation, results and conclusions cannot be generalized, and data analysis was limited. This scholarly project was not able to correlate the impact the Stanford Cognitive Aid has on the management of a Total Spinal Anesthesia simulation scenario; therefore, the implications of this project are also limited. The major implications of this project are to improve recruitment tactics to increase participation, repeat this project with more participation, and remove other limitations related to technical difficulties and Covid-19.

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Use of Cognitive Aids in Student Nurse Anesthetists Simulation

Nearly 250,000 people die from medical errors every year. Medical errors are now the third leading cause of death (Makary & Daniel, 2016) and cost about four to 20 billion dollars (about $62 per person in the US) per year (Rodziewicz & Hipskind, 2019). Unfortunately, the field of anesthesia is not immune to medical errors. According to Nanji, Patel, Shaikh, Seger & Bates (2016), about one in 20 medications administered in the operating room resulted in a medical error and adverse drug event. Of the medical errors that occurred, one-third resulted in adverse drug events, while two-thirds had the potential to harm the patient (Nanji et al., 2016).

Cognitive errors, also referred to as a thought-process error, play a significant role in medical errors (Stiegler, Neelankavil, Canales & Dhillon, 2012). The study findings of Stiegler et al. (2012) revealed that in 50% of the simulated emergency scenarios, seven out of nine cognitive errors occurred. Anesthesia often requires rapid decision-making, and the need for anesthesia providers' proficiency in this skill is high (Stiegler & Tung, 2014). Ariagga (2013) communicated that human errors could be reduced significantly using checklists and cognitive aids, thus reducing the number of mortalities and healthcare costs.

Significance and Background of Clinical Problem

Medical Errors and Cognitive Errors

Medical errors continue to be a problem in anesthesia (Cooper & Nossaman, 2013). Anesthetic medication errors frequently occur; about one in 20 medications given in the operating room result in medical errors (Nanji et al., 2016). Of those medical errors, one-third result in adverse effects (Nanji et al., 2016). Cognitive errors play a crucial role in medical errors (Stiegler et al., 2012). Anesthetists often encounter sudden changes in patient conditions that

require emergent management/intervention based on quick assessment. In this emergency, decision-making and vigilance are crucial, yet cognitive errors are more likely to occur.

According to Kromback (2015), only 34% of healthcare providers feel comfortable relying on their memory alone when dealing with emergencies. Cognitive aids can help bridge the gap in knowledge and confidence and provide a checklist to follow when information gaps occur. Healthcare providers' memory can worsen under stress, and distractions interrupt planned actions. The implementation of cognitive aids is the solution to maximizing patient safety (Webster, 2017). Cognitive aids increase adherence to evidence-based practice, reduce errors, and improve patient safety (Hageman, 2014).

Currently in healthcare, the implementation and use of cognitive aids during a crisis is not the standard of care. The use of cognitive aids can potentially decrease the time to appropriate problem identification and promote corrective actions of the provider. Cognitive aids have been shown to reduce errors during operating room emergencies by up to 75% (Ariagga, 2013). However, they are not being utilized to their full potential.

Simulation Pedagogy in Clinical Training

Simulation is utilized in academic programs to improve assessment skills and expose students to emergency scenarios that they may encounter in the clinical arena (Shin, Park, & Kim, 2015). Simulation is defined as a fabricated scenario designed to imitate a real-life scenario to expose a student to the situation without experiencing the situation in actual practice. Simulation provides the opportunity to build communication skills and collaboration with the multidisciplinary team in a fabricated critical situation (Shin, Park, & Kim, 2015).

The use of cognitive aids has begun to come to the forefront to increase patient safety and rapid interventions. During a clinical simulation, educators can provide SRNAs with the ability

to treat critical patients in a controlled environment. The use of simulation allows the student to learn without fear of an adverse outcome to the patient. Utilizing cognitive aids in a simulated scenario allows educators to foster an expansion of knowledge within the students while maintaining a controlled environment to evaluate and guide the student.

Spinal Anesthesia and Cognitive Aids

Though there is evidence from studies that have shown cognitive aids improve the treatment of emergencies, little research explores the use of cognitive aids in simulation training and how it affects student nurse anesthetists' ability to appropriately identify and effectively treat a total spinal anesthesia. One serious example of a critical situation is total spinal anesthesia after the placement of an epidural catheter for pain management. When this type of emergency happens, which is not very often, providers must identify and treat it according to evidence-based practice. Cognitive aids could help in this situation. Sadler & Fettes (2018) stated that spinal anesthesia is achieved when local anesthetic solution is injected into the intrathecal space. Spinal anesthesia is utilized to provide surgical anesthetic and anesthesia for procedures below the umbilicus. Total spinal anesthesia is when a block extends up to the cervical region (Sadler & Fettes, 2018). Signs of a total spinal are rapid onset of profound motor and sensory blockade, followed by cardiovascular and respiratory collapse, which require urgent intervention (Sadler & Fettes, 2018). Understanding the risk of death with this situation, the anesthesia providers must know how to appropriately treat it.

Therefore, a quantitative study of SRNAs at AdventHealth University in a simulation scenario of total spinal was conducted. The proposed innovation for this scholarly project was the use of The Stanford Cognitive Aid in simulation. It focused on whether the cognitive aid decreased the time to appropriate problem identification and improved the SRNAs' corrective

actions when caring for a patient experiencing total spinal anesthesia. The use of a cognitive aid as a part of simulation will be compared to the management of the same simulation scenarios without access to cognitive aids. The purpose of this scholarly project is to identify the effectiveness of using the Stanford Cognitive Aid in SRNAs simulation training and to identify if it assists with problem identification and improves overall treatment of total spinal anesthesia.

PICOT Evidence and Review Questions

The following are two questions posed in PICO format that have assisted in a systematic review of the literature. The first PICO question addresses the clinical problem: For student registered nurse anesthetists (SRNA) in simulation training (P), does the use of a Stanford Cognitive Aid (I) decrease time to appropriate problem identification and improve corrective action (O), when compared to the management of the same simulation scenario without access to a Stanford Cognitive Aid (C)?

The second PICO question addresses the clinical innovation: In the 2022 Doctor of Nurse Anesthesia Practice (DNAP) student cohort at Advent Health University, enrolled in DNAP 703 (P), does the use of the Stanford Cognitive Aid (I) decrease time to appropriate problem identification and improve corrective action of a patient experiencing total spinal anesthesia (O), when compared with the management of the simulation scenarios without access to the Stanford Cognitive Aid (C)?

Search Strategy and Results

The search strategy included the following databases: PubMed and Google Scholar. Key Search Terms and MESH combinations included: *Cognitive Aid AND Simulation*, *Anesthesia AND Simulation, Simulation AND Awareness, Use of Cognitive Aid During Crisis*, *Cognitive Aid AND Randomized Controlled Trial.* MESH Terms: *cognitive aid; simulation; anesthesia*

simulation, simulation awareness. Limits included: research articles within the last ten years, English language. The initial search yielded 21 results. However, ten studies that met inclusion criteria were selected for review.

GRADE Level of Evidence

The literature was classified using Grading of Recommendations Assessment, Development, and Evaluation (GRADE) criteria (see Appendix A for GRADE evidence matrix tables). GRADE criteria is a transparent framework for developing and presenting summaries of evidence and provider a systematic approach for making clinical practice recommendations (Guyatt et al., 2008). Overall, the GRADE level of evidence for the literature was moderate. The initial rating of the evidence was high, as the literature was primarily randomized control trials, pilot students, retrospective observational studies, cohort studies, and case-controlled studies. The literature was rated down due to problems associated with imprecision, including loss of follow-up, wide confidence intervals, and selection bias. Indirectness and mythological flaws were also noted. No further points were given for rating up. The intervention with the most support was that the implementation of a cognitive aid was beneficial. The overall quality of evidence is moderate, so more studies do need to be done. However, a recommendation could be made to implement cognitive aid use in simulation training at this time.

Literature Review and Synthesis of Evidence

Different methods are utilized in simulation training to improve clinical performance. Although the literature covers several of these tools, this review will focus on the use of cognitive aids in simulation training. The use of cognitive aids and how it correlates to improving patients' outcomes is a major theme that repeatedly emerged throughout the literature.

There was a specific comparison made between the use of cognitive aids in simulation and the outcome of scenarios.

Cognitive Aids and Performance

Many scholars believe that cognitive aids in patient care settings have been associated with improved technical skills in providers and fostered a culture of safety in inpatient management (Gleich et al., 2018; Goldhaber-Fiebert et al., 2016; Lelaidier et al., 2017). Integration of cognitive aids in simulation scenarios in educational settings has improved situational awareness and enhanced technical skills in SRNA (Hawkins et al., 2014; Marshall & Mehra, 2014; Wright & Fallacaro, 2011).

In contrast to these beliefs, some scholars state that the use of cognitive aids may foster a dependence not to enhance performance in the simulation scenario (Bould et al., 2009; Everrett et al., 2017). They argued that if cognitive aids are used by students as a crutch rather than an aid, it could potentially cause the students to be reliant on the aid and not their knowledge. System-wide implementation of cognitive aid has also been difficult since it required a change in the system's culture. During attempts to integrate cognitive aids into the operating rooms, many hospitals had difficulty achieving buy-ins and did not successfully implement cognitive aids; employees found it cumbersome and unusual to use (Alidina et al., 2018; Gleich et al., 2018).

Regardless, the literature supports integrating the use of cognitive aid in the academic setting and clinical practice. For the use of cognitive aids to be accepted as a system, its implementation should be initiated in the academic settings and then taken into the workforce. This project attempts to accomplish this change in culture by integrating the use of cognitive aids in medical programs. Its implementation also has the potential to produce well-rounded providers that are equipped to handle emergencies.

Project Aims

The primary aim of this scholarly project was to determine if the Stanford Cognitive Aid helped to decrease time to appropriately identify the problem and improve corrective actions of SRNAs, in simulation training at AdventHealth University when caring for a patient experiencing total spinal anesthesia. A secondary aim was to make evidence-based recommendations appropriate for the department of nurse anesthesia at AdventHealth University based on the findings of this project. The project objectives are delineated below:

Objective 1: Determine if there is a correlation between using The Stanford Cognitive Aid and a decrease in time to appropriate problem identification within the 2022 DNAP cohort by November 2020.

Objective 2: Determine if there is a correlation between the use of The Stanford Cognitive Aid and the ability to complete all four of the correct interventions within the 2022 DNAP cohort by November 2020.

Objective 3: Make recommendations for the appropriate use of The Stanford Cognitive Aid as an influencing factor for DNAP simulation training in the future.

Methods

Design

This scholarly project was a quantitative, single-blinded, randomized control trial study. The samples were SRNAs from cohort 2022 at AdventHealth University. The students were selected to be in a control or comparison group by simple randomization. A faculty member of the school outside of the DNAP program who has no ties to this project, program, nor students will select students for both groups. Two separate envelopes were delivered to the DNAP office with names of the students in group A (Control group) and group B (comparison group).

Sample and Setting

The inclusion criteria of the samples for this project were SRNAs (a) at AdventHealth University in cohort 2022) and (b) currently enrolled in DNAP 703. Students who did not meet the inclusion criteria were excluded from this study. The participants were recruited by an email sent to the 2022 cohort (Appendix B). Twenty-seven students in the class of 2022 were emailed, and eight responses were received. Of those eight responses, only seven students participated in the simulation. The seven participants were divided into control and comparison groups by randomization. Both groups received simulation training using the Total High Spinal Crisis Scenario. However, only the control group had the Stanford Cognitive Aid available during the simulation, and the comparison group will not. This simulation took place at the AdventHealth University anesthesia simulation laboratory.

Ethical Considerations

The risks associated with participation in this study were minimum. Students were asked to participate in an anesthesia crisis scenario where they may experience some physiological and psychological stress. In addition, breach of confidentiality was low. Their performance in the scenario has not been discussed outside of the simulation lab. However, we were unable to guarantee that the students' privacy or confidentiality was not breached.

The sample was randomly selected by faculty outside of the DNAP Department who did not have any knowledge of students by assigning a number, therefore maintaining the anonymity of each sample. No personal information was attached to the rubric. The data that was collected was on a paper rubric, and these papers were stored securely in a locked filing cabinet in the DNAP office at AdventHealth University. Only the researchers have access to the data. Once the

study is complete and the results are recorded, all forms of physical data will be shredded and disintegrated by the researchers within five years.

Informed consent (Appendix C) was obtained from each participant after explaining the study process before collecting data. The consent contained a non-disclosure agreement as the details of the scenario should remain unknown for the integrity of the project. The consent form included permission to revisit the simulation scenarios to be reviewed for accuracy. Permission for the use of The Stanford Cognitive Aid was obtained from Stanford University.

Data Collection and Analysis Plan

Data were collected by the researchers during the simulation activities using a data collection sheet (Appendix D). All simulation activity was video recorded for review to ensure accurate data collection. Data collection was focused on the dependent variables: time to correct diagnosis and the number of correct interventions implemented will be measured. Appropriate interventions are (a) initiation of CPR and epinephrine in the event of cardiac arrest, (b) support ventilation, intubate if necessary, (c) treat significant bradycardia or hypotension with epinephrine, and (d) administer intravenous fluid bolus. A data collection sheet, a modified rubric used in DNAP 702: Integration/Clinical course for adult simulation activities, will be used to record times and number of interventions completed. This data collection sheet has not been validated. During each scenario, the researchers recorded the time at which the correct diagnosis was made and how many correct interventions were implemented.

During each scenario, the researchers recorded the time spent to correctly diagnose and the number of correct interventions implemented. Throughout the project, interactions between the participants and researchers were limited to three times: (a) while obtaining written consent

before the simulation activities, (b) provided handoff reports to participants, and (c) again once the simulation was completed.

The Stanford Cognitive Aid was utilized for this project. The aid was created by Stanford University for emergency scenarios. The Stanford Cognitive Aid is free to use under the creative commons license without obtaining author permission as long as no modifications are made, and credit is given. The data analysis was unable to be conducted due to the small sample size; therefore, rigor could not be addressed.

Planning and Procedures

The key stakeholders were identified by their expertise in simulation and research. Each key stakeholder helped guide the project to implementation. The resources needed for this project were the utilization of the simulation laboratory space and personnel to help run the simulation. No grants were received, and no budget was needed due to the nature of this scholarly project (Appendix E).

Key stakeholders' interviews were completed, where the integrity of the project was a main concern throughout the interviews. Prior to implementation of the scenario, a script was developed Fall of 2019, and a pilot study was completed Summer of 2020. In this pilot study, the developed scenario was tested on experienced anesthesia providers (i.e., professors, CRNAS) to streamline the scenario and eliminate any discrepancies in the script, estimate appropriate time need for each scenario, and develop directions in which providers may take during the study. Embedded actors involved in the simulation were prepped and oriented to the scenario, including appropriate responses to the possible questions by the participants. Professors involved in implementing this scenario were also prepped and made aware of the script and timeline of the scenario.

The simulations took place in the Fall of 2020. The storyboard and script were developed in Fall 2019, and the pilot study was conducted in Spring 2020. The goal for the simulations was to conduct two within one hour with 10-minute turnovers. A final comprehensive project timeline was completed, and there were no major variations between the initially proposed timeline and the final timeline (Appendix F). The storyboard included the process of the simulation day, the professors' roles in implementing a pre-brief, which was the handoff report. The detailed information of the handoff report can be found in Appendix G.

The simulation scenario progressed in the following steps. The first person in each group entered the scenario and received a handoff report from the outgoing CRNA. After the participant received the handoff report, the patient became hypotensive. Fifteen seconds into the scenario, the patient started having irregular respirations. After that, the patient's condition deteriorated following a sequence of desaturating, bradycardia, became apneic, and then went into cardiac arrest. These symptoms occurred within 60 seconds increment, and each symptom followed by subsequently worsening symptoms.

The time spent by each participant to correctly identify problems and initiated interventions and the number of applied interventions were recorded. A notation was made whether the Stanford Cognitive Aid was available in the room or not and if it was utilized. The four possible interventions that could be applied during the simulation were (a) initiation of CPR and epinephrine in the event of cardiac arrest, (b) support ventilation, intubate if necessary, (c) treat significant bradycardia or hypotension with epinephrine, and (d) give an intravenous fluid bolus. The patient's condition did not require code blue for 15 seconds, and the code team did not arrive. There was no debriefing after the scenario. Turnover time was five minutes. Data were obtained and compiled after the completion of each simulation activity. The project mentor

assisted the data analysis process using Chi-square analysis. The project was completed by the end of Fall 2020.

One of the significant potential barriers was maintaining the integrity of the scenario between the groups. To help maintain the integrity of this project, the researchers explained to each participant how important it was to keep the simulation information confidential. Technological failure was an anticipated barrier, and it did occur during the simulation. The expired carbon dioxide from the mannequin failed during the afternoon simulations. There was a pilot study conducted to help decrease the risk of these types of failures, but it was impossible to remove the risk altogether.

Results/Findings

The final sample size included seven nurse anesthesia students. None were excluded. Six students were female (86%), and one student was male (14%). The first four students had the cognitive aid available, and the last three students did not have the cognitive aid. One of the four students in the control group and one of the three students in the comparison group were the only students to identify the problem correctly.

When compared, the group without The Stanford Cognitive Aid identified the problem quicker than the counterpart. The results did not show that the participants who used The Stanford Cognitive Aid response time to the interventions was shorter or provided a higher number of the correct interventions when compared to the group without the aid (Figure 1). There was a total of seven participants. Six of the students' total scenario times were in the five-to-ten-minute range, and one student's total time was in the ten-to-fifteen-minute range. Regardless of which group they were in, all seven students-initiated CPR, and all but one student correctly managed the airway with intubation. The one student who did not intubate was a

student in the cognitive aid group. Two students who did not have the cognitive aid correctly treated hypotension, and two other students who had the cognitive aid administered resuscitative fluids (Figure 2).

Due to several factors, this quantitative study had a limited sample size of seven participants. With so few participants, a robust statistical analysis was not able to be conducted. In statistical analysis, there are several factors that are required to have a meaningful minimum sample size, for example: level of significance, power of the study, pooled standard deviation of the variable under study, and minimum clinically significant difference (Binu, Mayya & Dhar, 2014). This study did not have a meaningful sample size, so graphs were utilized to illustrate trends.

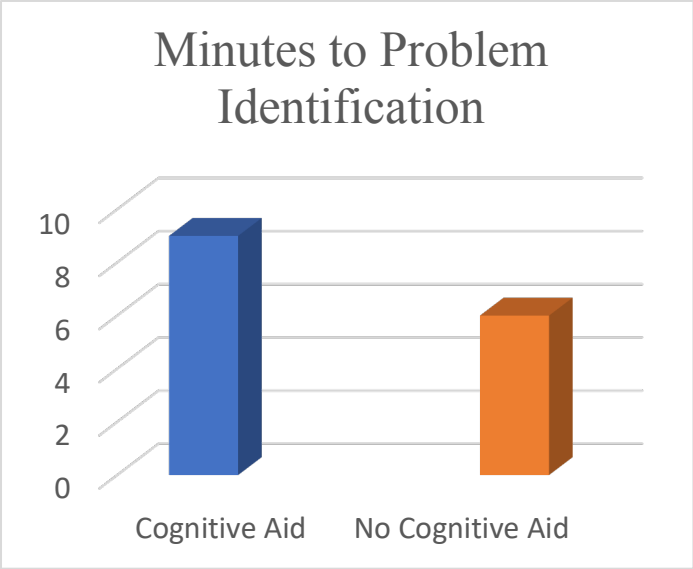

Figure 1. Minutes to Problem Identification

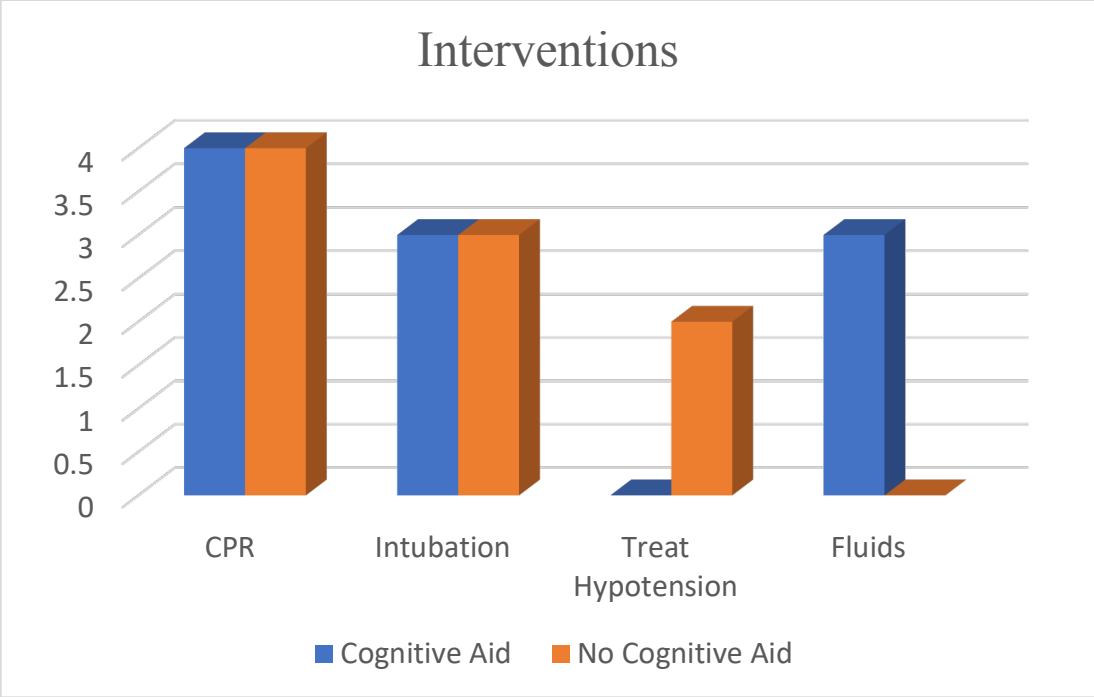

Figure 2. Interventions Completed

Discussion

The use of cognitive aid is not standard in simulation settings. Despite how some studies show that cognitive aids decrease errors, it is not widely implemented. The purpose of this project was to evaluate the impact of the use of a cognitive aid in student performance in simulation.

Key findings revealed that students without the cognitive aid identified the problem faster than those who had the cognitive aid available. Only one student from each group was able to correctly identify the problem. Regardless of the group they were in, all seven participants initiated CPR. Of those seven students who initiated CPR, six of them intubated the patient, three from the control group and three from the comparison group. However, only two students treated hypotension, both of which did not have a cognitive aid. None of the students with the cognitive

aid treated hypotension. Moreover, only three of the seven students administered resuscitative fluids, all of which had the cognitive aid. The sample was an uneven number, with more students utilizing the cognitive aid. Our sample size was small and did not provide enough data for statistical analysis. However, a side-by-side comparison revealed conflicting results, and this study should be further investigated.

Looking at the time to recognition, it would show that students who did not have the cognitive aid were able to identify the problems more quickly. There is no specific literature that aligns directly with these findings. However, one assumption is that the group who had the cognitive aid available was more fixated on the aid itself than treating the patient. In regard to interventions, both groups failed to implement different actions. Students with the cognitive aid seemed to defer to the cognitive aid to diagnose the problem instead of clinical skills. Students were focused on the cognitive aid and not diagnosing the problem based on the clinical scenario.

The study was planned; the simulation scenario was built with rubrics to coincide with the timing of decompensation. The simulation was done in one day with the cognitive aid subjects in the morning and those without cognitive aids in the afternoon. The cognitive aid did not decrease time to problem identification, nor did it improve the students' corrective actions when caring for patients experiencing total spinal anesthesia**.** Recommendations for a future study are to improve recruitment strategies and repeating this study with a larger sample size.

It is important to understanding how The Stanford Cognitive Aid can help to improve patients' outcomes. The conception model of Plan, Do, Study, Act (PDSA) Cycle helped to organize and guide this project to successful completion. This model provided a framework that assists in the development, testing, and implementation that gives rise to improvement (ACT Academy, 2019). The "planning" stage involved identifying the problem to be improved. In this

project, PICOT questions were created, literature was reviewed, a committee was created, and implementation tools were created. The “do” stage of the implementation phase is when the simulation was completed. The “study” stage was when data was compiled and cleaned. The “act” stage is the last stage where the development of recommendations was made and disseminated based on the findings.

Implications

In the practice setting, cognitive aids are few and far between. Cognitive aids are often out of sight, and the availability of the aids is not made a priority by the operating room management or anesthesia management. While this study did not show great significance in the simulation setting, other studies showed that cognitive aid could decrease error (Stiegler, Neelankavil, Canales & Dhillon, 2012). However, this project did bring to light that using an aid can lead to provider dependence instead of using clinical assessment skills.

For educational purposes, cognitive aids are useful for those who are still growing in the field. It gives students a guideline to manage crises that are not familiar. Students must realize that clinical assessment skills and knowledge of the disease process do not replace a cognitive aid.

Cognitive aids are used as an adjunct resource, and expert practitioners can manage a crisis -based on clinical experience alone. Hospital policy can be changed to ensure that cognitive aids are available in every room or that all anesthesia providers know the location of the cognitive aid as a part of the training. Nurse anesthetists are frequently faced with crises, and their ability to respond quickly and appropriately is crucial to patients' survival. Cognitive aids can be an excellent resource to the skilled certified registered nurse anesthetist (CRNA) and SRNA for their decision-making process.

Several research studies suggest the implementation of cognitive aids into nurse anesthesia programs has yielded an improvement in teamwork and controlling high-stress situations (Hawkins et al., 2014; Marshall & Mehra, 2014; Wright & Fallacaro, 2011). Although current evidence supports the use of cognitive aids in medical programs yielded positive results, using cognitive aid in nurse anesthesia simulation training was not studied extensively. Therefore, further exploration on identifying the effectiveness of using the Stanford Cognitive Aids in SRNA simulation training is needed.

In the current practice, the use of cognitive aid is not the norm. The literature discusses that it is difficult to implement a system-wide change. If SRNAs become accustomed to its use and bring it into practice, a change of practice can benefit both the patient and the providers. This scholarly project was to determine what kind of impact, if any, cognitive aids had on student performance in a crisis scenario.

More research can be done in regard to determining the impact of a cognitive aid in real crisis situations. Many of the studies in the hospital setting were done as a training simulation. Studies can be done with a retrospective analysis on how a crisis scenario was handled with a cognitive aid available versus other emergency situations in which a cognitive aid was not available.

Limitations

This study included several limitations. The first limitation was a small sample size. Only seven students volunteered. Due to the Covid-19 virus and strict social distancing rules, there were specific limitations related to utilizing the simulation lab. Also, being limited to one University and only one cohort may have led to having a small sample size of the SRNAs that meet the inclusion criteria.

The other limitation was technical issues. In the scenarios with the cognitive available, which were done in the morning, the simulator was fully functioning. In the scenarios without the cognitive aid, the simulator had technical issues with the C02 waveform, which did not appear. This may have caused inconsistencies between the two groups because the C02 waveform changed simultaneously with the patient's decompensation, and this was a trigger to students that something was wrong. The researchers verbalized to the students what the C02 waveform was and provided more information at the student's request. One intervention that was not listed in the cognitive aid but should be recorded for another study is whether the student turned off the epidural and propofol infusions.

No specific participant bias was seen due to voluntary participation. However, this study cannot be generalized due to the inconsistencies of the results and small sample size. There was also a risk of confounding variables due to the unpredictable nature of simulation scenarios. The students' performances in the simulation were evaluated with a data collection sheet to ensure each study was graded on the same outcomes for consistency. There was a lack of reliable, validated evaluation rubrics, so a specific rubric was created using the objectives listed to grade each scenario.

Conclusion

Cognitive aids can make a difference in academic and clinical settings, yet there are few studies to determine how much of an impact they can make. Cognitive aids have led to a decrease in clinical errors and may save many lives. Further investigation should be conducted with a larger sample size to yield meaningful results. The results of this project were inconclusive. Therefore, further research regarding the impact of a cognitive aid in simulation

for nurse anesthesia students is needed to determine the correlation between performance and cognitive aids.

Dissemination Plan

The plan for dissemination is to create an online Posterboard and PowerPoint presentation with a voiceover that is uploaded to a course created by the research coordinator of the Department of Nurse Anesthesia in Canvas, Spring of 2021, at AdventHealth University. The targeted audience would be any faculty or student at AdventHealth University enrolled in this course, which is open to the entire university.

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Appendix A: Matrix Tables

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Purpose	**Variables**	**Setting/Subjects**	**Measurement and Instruments**	**Results**	**Evidence Quality**
Study One: Defined implementation effectiveness as reporting consistent use of cognitive aids during OR crises **Study Two:** Investigate the effects of smart phone application on technical and nontechnical performance of anesthesia residents dealing with simulated crises	**Study One:** Primary outcome: Identify individuals who had downloaded OR cognitive aid Secondary outcome: Identify significant predictors of reported, regular OR cognitive aid use during OR crises **Study Two:** Primary outcome: Technical performance (adherence to guidelines from the SFAR or the European Society of Cardiology) Secondary outcome: Non- technical outcome Leader's non-technical performance was rated by two experienced simulation instructors	**Study One:** US Hospitals and ambulatory surgical centers **Study Two:** The simulation center at Lyon, France July 1, 2015-Feburary 8, 2016 (SimMan 3G, Laerdal Medical Stavenger, Norway) Participants were anesthesia residents with >1 year of clinical experience.	**Study One:** Web based surveys to examine factors that might be related to success in implementing OR cognitive aids. Downloaded OR cognitive aids from the websites of Ariadne Labs or Stanford University between 2013-2016 **Study Two:** Ottawa Global Rating Scale, two independent observers remotely assessed performance on video recordings	**Study One:** Successful implementation of cognitive aids in ORs was associated with a supportive organizational context and following a multi-step implementation process **Study Two:** The use of hand-held cognitive aid was associated with better technical performance of residents dealing with simulated crisis (CI 0.95)	**Study One:** Methodological flaws: Providers from diverse cultures and backgrounds were questioned, different facility sizes were included, experience with other tools may be different Inconsistency: could have biases including social desirability bias, biases in who chooses to response (favoring successful implementers), outcome measure is perception rather than an actual measurement, same source bias, was possible to have one person respond twice Indirectness: Small facility sizes, not able to adjust for clustering, limit ability to understand sustainability Imprecision:96 incomplete responses, they also excluded responses that neither agreed nor disagreed, and respondents from international hospitals. Publication bias: None **Study Two:** Methodological flaws: various levels of experience, during briefing the diagnosis was made obvious. Inconsistency: 6 participants were excluded for technical issues; independent observers were not blinded to the use of MAX because it was not technically possible. Indirectness: None Imprecision: First year residence was not included. Publication bias: Funding- Ottawa Hospital Anesthesia Alternate Funds Association
Design				**Implications**	
Study One: Retrospective observational study **Study Two:** Population-based matched cohort study				**Study One:** Building strong organizational support and following a well-planned multi-step process will increase the use of OR cognitive aids during intraoperative crises, which may improve patient outcomes. **Study Two:** Theses finding could help digital cognitive aid to find their way into daily medical practice and improve the quality of health care when dealing with high-stakes crises	

Wright, S. M.; & Fallacaro, M.D. (2011). Predictors of situation awareness in student registered nurse anesthetists. *AANA Journal, 79*(6), 484.
Hawkins, R., Bendickson, L., Benson, P., Osborne, L., McPherson, J., Todd, L., … Bohan, K. (2014). A pilot study evaluating the perception of certified registered nurse anesthetists toward human patient simulation. *AANS Journal, 82*(5), 375.

Purpose	**Variables**	**Setting/Subjects**	**Measurement and Instruments**	**Results**	**Evidence Quality**
Study One: Provide educators with a best-evidence predictor model of situational awareness in SRNAs **Study Two:** Perceptions of CRNAs toward use of simulation for initial certification, continuing education, and recertification **Design** **Study One:** Correlational design, Multiple regression analysis **Study Two:** A pilot study	**Study One:** Primary outcome: Memory, Cognition and automaticity based on Endsley's theory of SA **Study Two:** Primary outcome:1 day simulation would improve their perception toward simulation use	**Study One:** 71 SRNAs from Virginia Commonwealth University, Louisiana State University and, Samford University **Study Two:** Practicing CRNAs in the District of Columbia, Maryland and Virginia. 9 CRNAs were selected to complete the experience	**Study One:** Wondrous Original Method for Battle Airmanship Testing in Complex Systems WOMBAT-CS **Study Two:** Questionnaire	**Study One:** Successful **Study One:** Cognition is the best predictor of situation awareness in graduate SRNAs with the addition of memory and automaticity contributing no additional predictive value **Study Two:** Out of 378 CRNAs that responded to the questionnaire 85.7% of CRNAs strongly agrees that human patient simulation is an important part of anesthesia provider training **Implications** **Study One:** The results have the potential to make a positive impact on the admission, education and training of SRNAs. Contributes evidence for further research examining the use of high- fidelity simulation in promoting SA in SRNAs **Study Two:** It does indicate that changing the perceptions of CRNAs is possible. Future research could be directed at examining perceptions with other modes of simulation exposure, such as computer-based simulation, video observation, or peer-based discussion with simulation participants. Prerequisite to using other methods of simulation, it is recommended that an examination should be done of barriers to the use and effect on perception.	**Study One:** Methodological flaws: Cases missing WOMBAT-CS scores, and those with multi-variate outliers were eliminated from the analysis, a convenience sample was chosen Inconsistency: Individual differences between pilots and SRNAs, no evidence of a relationship between automaticity and SA in this study Indirectness: None Imprecision: Attrition 36 subjects had no scores on the measure of SA Publication bias: None **Study Two:** Methodological flaws: 1,688 questionnaires were sent, they only received 378 back Inconsistency: None Indirectness: None Imprecision: 15 people who were randomly selected were initially selected to participate in the simulation but 6 dropped out so only 9 CRNAs participated, there were 8 women and only one man, all with various levels of experience Publication bias: None

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Everett, T. C., Morgan, P. J., Brydges, R., Kurrek, M., Tregunno, D., Cunningham, L., . . . Tarshis, J. (2017). The impact of critical event checklists on medical management and teamwork during simulated crises in a surgical daycare facility. *Anaesthesia, 72*(3), 350-358. http://doi.org/10.1111/anae.13683

Purpose	**Variables**	**Setting/Subjects**	**Measurement and Instruments**	**Results**	**Evidence Quality**
Study One: Investigate whether the presence of a cognitive aid improved performance in a simulated neonatal resuscitation. First unblinded prospective study **Study Two:** Investigate the impact of implementation of critical event checklists on medical management in a staged crisis simulation at a surgical day care facility	**Study One:** Primary outcome1: Residents who had previously passed the NRP **Study Two:** *Primary outcome:* Test improvement of management of crisis simulation between practitioner teams.	**Study One:** The Hospital for Sick Children, University of Toronto Canada and St Michael's Hospital, University of Toronto, Canada, 32 anesthesia residents who had previously passed NRP **Study Two:** Seven teams that participated in eight scenarios produced a total of 56 simulation encounters	**Study One:** Check list of life saving interventions **Study Two:** Team Emergency Assessment Measure (TEAM) which is a measurement instrument for rating non-technical skills of medical emergency teamwork; Kirkpatrick Level one data regarding perceptions and reactions using the Likert scale; debriefing model – Promoting Excellence and Reflective Learning in Simulation (PEARLS).	**Study One:** Cognitive aid did not improve performance at simulated resuscitation **Study Two:** There was no difference demonstrated in medical management when checklists were available during initial sessions. In retention sessions performed. CI = (-0.71-0.77 and -1.08-0.41)	**Study One:** Methodological flaws: Limited sample size Inconsistency: Could not see the poster on the video recording Indirectness: Unfamiliarity of cognitive aid because it is not commonly used Imprecision: None Publication bias: None **Study Two:** *Methodological flaws:* None *Inconsistencies:* small sample size and same teams were used *Indirectness:* None *Imprecision:* None. CI scores were (-0.71-0.77 and -1.08-0.41) *Publication Bias:* None
Design				**Implications**	
Study One: A single-blinded randomized controlled trial **Study Two:** Practitioners randomly assigned to teams. Pre and posttest analysis. Each team serves as its own control.				**Study One:** Aid did not improve performance, retention of skills and knowledge after resuscitation training remains an ongoing challenge for medical educators **Study Two:** The use of cognitive aids had no effect on medical management or teamwork during stimulated operating theatre crises. A reliance on cognitive aid was produced. Teams did not function well without them.	

Gleich, S. J., Pearson, A. C. S., Lindeen, K. C., Hofer, R. E., Gilkey, G. D., Borst, L. F., . . . Martin, D. P. (2018). Emergency manual implementation in a large academic anesthesia practice: Strategy and improvement in performance on critical steps. *Anesthesia & Analgesia, 128*(2), 335-341. http://dx.doi.org/10.1213/ANE.0000000000003578

Goldhaber-Fiebert, S. N., Pollock, J., Howard, S. K., & Bereknyei Merrell, S. (2016). Emergency manual uses during actual critical events and changes in safety culture from the perspective of anesthesia residents: A pilot study. *Anesthesia & Analgesia, 123*(3), 641-649. http://dx.doi.org/10.1213/ANE.0000000000001445

Purpose	**Variables**	**Setting/Subjects**	**Measurement and Instruments**	**Results**	**Evidence Quality**
Study One: To implement emergency manuals (EM) in a large anesthesia practice and subsequently evaluate team member performance in critical steps **Study Two:** 1) Assess perspectives on local OR safety culture regarding cognitive aid use before and after systemic implementation. 2) Describe early clinical uses of EMs during critical events	**Study One:** *Primary outcome:* successful implementation by anesthesiologist attending physicians, residents, CRNAs, and SRNAS of the Stanford cognitive aids. **Study Two:** *Primary Outcome:* implementation of cognitive aids in practice by anesthesia residents	**Study One:** *Setting:* Mayo Clinic *Subjects*: 59 MDAs, CRNAs and SRNAs in pre-implementation phase and 60 in the 6-month post-implementation phase **Study Two:** *Setting:* Stanford University School of Medicine *Subjects:* 74 anesthesia residents	**Study One:** Utilization of EM was tested in a regular clinical environment with all available resources using a standardized verbal simulation of 3 crisis events both pre-implementation and post-implementation. Individual members of the anesthesia team were asked to verbalize interventions for specific crisis events over 60 seconds. **Study Two:** SurveyMonkey, Delphi process to build survey	**Study One:** Implementation of an EM in a large academic anesthesia practice is difficult and full integration was not accomplished at 6-month target Only 41.7% utilized EM during simulation. However, after implementation, verbalization of critical steps in simulated crisis events were improved when EMs were utilized **Study Two:** Residents reported successful use of EMs during clinical critical events. Response rate for pre-implementation surveys -52%, post-implementation – 57%. Residents reported that the culture of the OR supported cognitive aid use in some way	Methodological flaws: **Study one:** Limited sample size due to lack of available resources **Study Two:** No formal validation of surveys using psychometric analyses Inconsistency: **Study One:** Despite rollout and publicity of EMs, only 41.7% utilized the EM for verbal simulation **Study Two:** Low response rate, 52% pre-implementation, 57% post-implementation. Indirectness: **Study One:** No reliable control group **Study Two**: None Imprecision: **Study One:** Wide CI: 2.4-6.2 **Study Two:** Qualitative data only began to show relevant themes, there was no opportunity for follow up questions. Publication bias: **Study One:** Many anesthesia department members and were aware of the study, therefore the Hawthorne effect applied. **Study Two:** Study was done in response to previous study done by Stanford. No formal validation of surveys using psychometric analyses
Design **Study One:** Implementation of EM in Large Academic Anesthesia Practice at Mayo Clinic **Study Two:** Quantitative and Qualitative study, pilot study				**Implications** **Study One:** Implementation of EM in large academic setting is challenging, but it raises awareness of interventions for crisis events **Study Two:** It is feasible and beneficial to implement the use of cognitive aids	

Bauer, B., Rebel, A., Dilorenzo, A., Schell, R. M., Dority, J. S., Lukens, F., & Sloan, P. A. (2016). Cognitive aid use improves transition of care by graduating medical students during a simulated crisis. *Medical Education Online, 21*(1), 32118-8. http://dx.doi.org/10.3402/meo.v21.32118

Marshall, S. D., & Mehra, R. (2014). The effects of a displayed cognitive aid on non-technical skills in a simulated 'can't intubate, can't oxygenate' crisis. *Anaesthesia, 69*(7), 669-677. http://dx.doi.org/10.1111/anae.12601

Purpose	**Variables**	**Setting/Subjects**	**Measurement and Instruments**	**Results**	**Evidence Quality**
Study One: 1) Assess graduate medical students' ability to perform transfer of care (ToC) in a crisis situation. 2) whether cognitive aid improves ToC quality **Study Two:** Determine whether an educational intervention on nontechnical skills could improve the performance of nontechnical skills during anesthesia crisis simulation with a group of first year SRNAs	**Study One:** *Primary outcome:* improve ToC by anesthesia residents **Study Two:** *Primary Outcome:* Improve nontechnical skills of first year SRNAs during simulated crisis situations	**Study One:** *Setting:* University of Kentucky, anesthesiology department *Subjects*: 112 senior medical students **Study Two:** *Setting:* Florida International University *Subjects:* 32 first year SRNAs	**Study One**: t-Test, Mann-Whitney U test **Study Two:** Quasi-experimental pretest and posttest, Anesthetists' Non-technical Skills (ANTS)	**Study One:** Completeness score of the ToC and overall quality improved with cognitive aid. Participants increased their rating of knowledge and comfort in ToC **Study Two:** After a 3-hour educational simulation intervention, performance of nontechnical skills improved significantly. Nontechnical skills are acquired through instruction rather than experience. Simulation-based education will enhance learning of nontechnical skills that will improve quality of care.	Methodological flaws: **Study one:** None **Study Two:** Student familiarity, one SRNA did not participate in post-test Inconsistency: **Study One:** Limited sample size **Study Two:** Lack of inter-rater reliability testing Indirectness: **Study One:** Unfamiliarity of cognitive aid because it is not commonly used **Study Two**: None Imprecision: **Study One:** None **Study Two:** None Publication bias: **Study One:** Bias with choosing which cognitive aid to implement. Creators of cognitive aid were more comfortable with paper aid vs today's generation preferring digital **Study Two:** None
Design				**Implications**	
Study One: Randomized control trial **Study Two:** Quasi-experimental study				**Study One:** Implementation of cognitive aid improves ToC for graduate medical students **Study Two:** Implementation of simulation to improve nontechnical skills ism effective in first year SRNAs	

Appendix B: Recruitment Materials

Email to Students:

Congratulations, you are the lucky one! You are receiving this email because you are enrolled in DNAP 703 during the Fall trimester. As Student Registered Nurse Anesthetists at AdventHealth University Class of 2022, your participation is requested for our Scholarly Project that will evaluate the use of the Stanford Cognitive Aid in simulation training. This simulation will take place on **Friday, November 13th at AdventHealth University Simulation Lab.** Times are TBD based on the number of confirmed participants.

Your participation in our scholarly project is completely voluntary and will only take about 30-45 minutes of your time. However, if you participate your name will be placed in a drawing for a $40 gift card! If you do wish to participate written consent forms and a confidentiality agreement will be required. Any forms we collect will have no personal identifying information on them, but they will be placed in a locked filing cabinet that is only accessible to by the principal and co-investigators of this project. The forms will be shredded within 5 years. Your participation in this scholarly project does not affect your grades in the DNAP program.

Your participation is paramount to a successful scholarly project and to grow our knowledge base about the use of the Stanford Cognitive Aid in simulation. If you do wish to participate, please respond to this email before **October 28th to confirm your participation.** Once participation is confirmed you will receive an additional email with more information.

We would greatly appreciate your participation and hope to see you in the simulation lab **Friday, November 13th.**

Kindest regards,

Steven Fowler DNP, CRNA. Project Chair, Principal Investigator

Ashley McDonald BSN, RN, DNAP Candidate. Co-Investigator

Joy Lacorte BSN, RN, DNAP Candidate. Co-Investigator

Appendix C: Informed Consent

AdventHealth University (AHU)

Consent Document to

Participate in a Human Research Study

Study Title: Use of Cognitive Aids in Student Nurse Anesthetists Simulation Training

Principal Investigator (PI): Steven Fowler DNP, CRNA

Co-investigator(s) (Co-Is): Ashley McDonald BSN, RN, DNAP Candidate & Joy Lacorte BSN, RN, DNAP Candidate

Introduction of the Study

We are Ashley McDonald and Joy Lacorte. We are doctoral nurse anesthesia students at AdventHealth University, class of 2021. We are asking you to participate in this research study entitled "Stanford Cognitive Aid in Student Nurse Anesthetists Simulation Training". You are invited to take part in this research study because we feel that your experience and insight as a nurse anesthesia student can contribute to our understanding and knowledge.

As part of this research we are conducting a study on cognitive aids and its use in simulation training. We plan to utilize nurse anesthesia students from Cohort 2022. Your participation is voluntary, and you are not required to participate. You may ask any questions and take your time to decide whether or not you would like to participate.

Purpose of the Study

The purpose of the research is to determine the impact of a cognitive aid, specifically the Stanford Cognitive Aids on student performance in simulation training during a crisis scenario.

Procedures

You will be asked to participate in this research in the following ways. Your initial participation will take approximately 20 minutes to complete a simulation

scenario. You will be taken through a crisis scenario. Once the scenario is completed you will be asked to leave the premises.

Possible Risks and Discomforts Associates with the Study

The risks associated with participation in this study are minimum. You will be asked to participate in an anesthesia crisis scenario which in which you may experience some physiological and psychological stress.
In addition, breach of confidentiality is low. Your performance in the scenario will not be discussed outside of the simulation lab. However, we cannot guarantee that your privacy or confidentiality will not be breached.

Potential Benefits

We cannot guarantee or promise that you will receive any benefits from participation in this study. However, you may benefit in the following ways: in the event that our research shows that the use of cognitive aid is associated with higher student performance, you will be better equipped in the clinical setting to deal with this crisis scenario. In addition, there may be benefits to other cohorts who come after you.

You will not be provided any direct benefit from participating in this research study, but your participation will help us understand the impact of cognitive aids in simulation training and contribute to scientific knowledge and the betterment of the nurse anesthesia program.

Confidentiality

The research team will work to protect your confidential information. We will collect data on your performance during the crisis scenario on face validated rubrics. This data will be kept private and stored in a locked room. Any information stored on computers are password protected. We will take steps to protect your privacy and confidential information, however we are unable to guarantee or promise that your privacy will not be breached. Governmental agencies and the IRB may request access to study-related data. We will work to ensure that your privacy is protected.

Sharing the Results

The knowledge that we obtain from your participation will be shared in the following ways: presentation to department faculty on findings and at the local Florida Association of Nurse Anesthetists. AdventHealth University conducts a research fair and our results will also be shared at this event. No information that you shared with us will be presented with your name or any other identifying information. All information when presented is de-identified without any links to you and presented as group data.

Voluntary Participation

Your participation in this study is voluntary. You may choose to not to participate. The decision to participate or not participate in this research study is completely up to you. If you choose not to participate your refusal to participate in this research study will involve no penalty or loss of benefits to you. If you choose to participate, you can change your mind later and withdraw your consent and discontinue participation from this study at any time. If you chose to withdraw informed the PI of your wishes.

Right to Refuse or Withdrawal from the study

You do not have to participate in this research study and choosing not to participate in this study will not involve any penalty or loss of benefit to you. The decision to participate or not participate in this research study is completely up to you. If you choose to participate, you can change your mind later and withdraw your consent and discontinue participation from this study at any time. If you chose to withdraw from the study informed the PI of your wishes.

Compensation

There will be no incentives or compensation for participation in this study.

Contact Information

If you have questions, concerns, or complaints regarding this study you may contact the Principal Investigators via email Ashley McDonald or Joy Lacorte at: Ashley.Mcdonald@my.ahu.edu or Joy.Lacorte@my.ahu.edu. You may also contact AHU research office at (407) 407-609-1388 or AHU.Research.Office@ahu.edu or the IRB Office at (407) 303-5619.

Other Information

We thank you for your participation in this research study. The information that we gathered during this research will not be used or distributed to any other researcher for any other research purposes not clearly outlined in this consent form.

The simulation scenarios will be recorded for further review. These videos will not be shared and will only be viewed under university computers. We ask your permission to record you and to review these videos

This research study requires the element of surprise in the scenarios and to maintain the integrity of the study we ask that you do not share the scenario or discuss it once you have left the scenario.

This research has been reviewed and approved by AdventHealth University Institutional Review Board, which is tasked to protect research participants from harm. If you want to learn more about

the Institutional Review Board and its role in protecting research participants feel free to contact AdventHealth University IRB at (407) 303-5619.

Participant's Understanding

- I have been invited to participate in research.
- I understand that my participation is voluntary.
- I understand that all data collected will be limited to the use disclosed above.
- I understand that I will not be identified by name in any presentation or publication.
- I am aware that all my information will be kept confidential and secured by the researcher.
- I understand that I may withdraw from the study at any time.
- I understand that the simulation will be recorded for later review
- I understand that I am not to discuss the details of the simulation scenario once the simulation is completed

I have read the forgoing information and it has been explained to my satisfaction. I have had the opportunity to ask questions. I consent voluntary to be a participant in this study.

_____

Printed Name of Participant

_____

Signature of Participant (required)Date Day / Month/ Year

_____

Name of Person Obtaining Consent

_____

Signature of Person Obtaining Consent (required) Date Day / Month/ Year

Appendix D: Data Collection Tool

Total High Spinal Scenario

Scenario # Participant initials: Cognitive Aid Available: Yes or No	
Simulation Start:	
Time Problem identified and verbalized: _____	
Interventions: □ Cardiac arrest → Initiate CPR: _____ □ Ventilation → Intubate: _____ □ Hypotension → epinephrine (10-100 mcg): _____ □ IV fluid bolus: _____	
Simulation End Time:	
Comments:	

Appendix E: Budget

Due to the nature of this scholarly project no budget was require.

Appendix F: Completed Project Timeline

Task	Recommended Target Trimester	Date Completed
1. Determine topic for DNAP Project	**4th and 5th Trimester Summer/Fall 2019**	
1.1 Identify one or two areas of focus		5/17/19
1.2 Review the AHU Scholarly Repository to ensure your project of interest has not previously been completed.		5/17/19
1.3 Review relevant literature and evaluate feasibility		5/31/19
1.4 Discuss and refine best idea with 2021 cohort and DNAP faculty		5/17/19
1.5 Develop and Complete Scholarly Project Initial Presentation		11/1/19
1.6 Assignment of DNAP Scholarly Project Chair		8/12/19
2. Identify scholarly project site for DNAP Project	**5th Trimester Fall 2019**	
2.1 Discuss site options with DNAP faculty		6/21/19
2.2 Consult with key site personnel for the Analysis and Comparison of Key Players Assignment and gain preliminary approval from DNAP faculty to continue with the proposed project		6/21/19
2.3 Once DNAP faculty and key site personnel approval has been obtained: A. ***Complete the Study Site Director Approval Letter Template*** (Under Academics > University Research > Guides and Forms) and have it signed by an authorized representative from the project site. This form must be completed if the scholarly project is to be conducted on students or at sites other than within the NAP (Ex. Nursing department, AdventHealth, USAP Anesthesia Group). B. Once signed, please submit the signed Study Site Director Approval Letter, via email to the DNAP department chair (Dr. Devasher) to obtain approval.		6/21/19

C. Send contact information for someone at the project site familiar with your proposed project to the NAP Executive Assistant (Vivian.Rivera-Molina@ahu.edu) for your student file D. Submit Study Site Director Approval Letter, when completed, to CANVAS DROPBOX **Note: This form must also be submitted with the IRB/SRC application**		
3. Form DNAP Scholarly Project Committee (SPC)	**5th Trimester Fall 2019**	
3.1 Review requirements for SPC composition In the Student Scholarly Project Guidelines		8/13/19
3.2 Identify committee members, consider alternatives and select members.		10/6/19
3.3 Obtain approval from the NAP Program Administrator for proposed project mentor(s) and reviewer		10/6/19
3.4 Partially complete ***DNAP Scholarly Project Committee form*** by obtaining project mentor and project reviewer signatures		10/11/19
3.5 Submit partially completed form and department chair approval email thread to CANVAS DROPBOX		10/11/19
4. Develop DNAP Scholarly Project Proposal Paper	**4th and 5th Trimester Fall 2019**	
4.1 Prepare draft of DNAP scholarly project proposal paper		7/5/19
4.2 Revise the draft until a score of 95% has been obtained and the student has been notified of their eligibility for SRC/IRB submission A. **Note: You may be required to submit multiple drafts and/or attend appointment(s) with the AHU writing center prior to obtaining approval** B. Determine instrumentation and obtain permission for use or complete face validation process. Note: Some		A. 10/11/19 B.10/1/19

revisions to the second PICOT statement may be required . C. Consult with statistician (Roy.Lukman@ahu.edu) to refine proposed analysis. D. Complete informed consent. E. **Obtain written verification of your Project Mentors' approval** of your proposal by having him/her sign the ***NAP Scholarly Project Proposal Approval Form*** prior to submission to the Scholarly Project Chair. F. Your Scholarly Project Chair will then submit the form to the NAP department chair (program administrator) for approval and signature		C. 10/30/19 D. 10/11/19 E. 10/16/19 F. 12/4/19
4.3 Submit the completed and signed NAP Scholarly Project Concept/Plan Approval Form to CANVAS DROPBOX		12/4/19
5. Obtain AHU Institutional Review Board Approval	**5th and 6th Trimester Fall 2019-Spring 2020**	
5.1 Once the student group has received a 95% or greater on the Scholarly Project paper and have been notified of their eligibility for SRC/IRB submission, the ***Working Document for Web-Based Research Project Submission form*** and the ***Department Chair Certification Letter*** must be completed. A. A Scholarly Project Chair will then be assigned. B. A thumb drive containing multiple required documents (See DNAP 793 Syllabus for list) should be prepared and submitted to the Scholarly Project Chair C. The chair, will review the documents, sign the ***DNAP Scholarly Project Proposal Approval Form*** and will submit it to the Department Chair for his/her signature. It will then be returned once completed and uploaded to CANVAS by the students.		A. 8/13/19 B. 11/25/19 C. 12/4/19

D. In the application to SRC/IRB application, The Scholarly Project Chair will be designated as the Principal Investigator. Students will be designated as Co-Investigators		D. 12/4/19
5.2 Once the working document is completed submit to Scholarly Project Chair for review and approval.		12/4/19
5.3 The Scholarly Project Chair will then complete and submit the IRB/SRC Web-based Scholarly Project Application (Note this was completed by the students) A. The Research Office will notify the investigators about the summary of the SRC review within 13 working days B. Following the SRC review, the Research Office will be responsible to submit the study proposal to **IRB** and will notify the investigators about the summary of the IRB review within **18 working days** C. The total time to complete the "AHU Web-based Research Project Submission Process" with Scientific Review Committee (SRC) and Institutional Review Board (IRB) approvals **is approximately 36 working days** D. IMPORTANT: this timeline is frequently exceeded. Please submit projects as soon as possible to prevent a delay in the scholarly project completion date and subsequent graduation		Submitted to IRB/SRC 12/4/19 Resubmittied changes to IRB 7/19/20 A. 1/14/2020 B. 1/29/2020 C. 3/6/2020 Received approval from IRB for changes 7/21/20 D. √

5.4 The student **MUST SUBMIT** the **AHU IRB NOTICE** of Exemption (at minimum) or Approval (if required) **TO** the designated **DROPBOX** in Canvas **BEFORE** proceeding with any aspect of project **IMPLEMENTATION**		3/8/2020 Resubmitted for changes 7/19/20, approved 7/21/2020
6. Implement the DNAP Project Plan	**6th and 7th Trimester Spring and Summer 2020**	
6.1 Create database and data dictionary in Excel for project data entry and analysis. **Obtain the Scholarly Project Chair's approval for data dictionary via email**		1/13/2020
6.2 Implement your Project Proposal's plan per the SRC/IRB approved methodology		7/20/20 – Scenario practice. 11/13/2020 Project implementation
7. Develop final manuscript for professional dissemination	**8th and 9th Trimester Fall 2020-Spring 2021**	
7.1 Write results/findings, conclusion/limitations, and application to CRNA practice sections		12/4/2020
7.2 Revise the wording in all prior sections of your proposal to now utilize past tense as appropriate		11/3/2020
7.3 Complete your final Scholarly Project paper per the posted rubric		12/4/2020
7.4 Submit the completed Scholarly Project final draft to your Project Mentors and Scholarly Project Chair for their review, recommendations for revision and editing. A. Obtain verification of your Project Mentor and Project Reviewer's approval of the Scholarly Project Final Manuscript by having him/her sign the ***NAP Scholarly Project Final Manuscript Approval Form.***		

1. Include all project components such as informed consent form, questionnaire/survey, power point presentation if applicable, analysis charts, etc. in the final manuscript after the reference section. Each component should be labeled as a separate appendix. B. Submit the NAP Scholarly Project Final Manuscript Approval Form (signed by mentor and reviewer), to the Scholarly Project Chair for his/her approval. C. If further revisions are not required the Scholarly Project Chair will submit the NAP Scholarly Project Final Manuscript Approval Form to the NAP Department Chair (Program Administrator) for approval and signature.		
7.5 Submit the completed and signed NAP Scholarly Project Concept/Plan Approval Form to CANVAS DROPBOX		
8. Develop and revise poster presentation	**8th and 9th Trimester Fall 2020-Spring 2021**	
8.1 **Develop an electronic PowerPoint version of your proposed poster** about your project, using the Scholarly Project Poster Guidelines. This PowerPoint slide must be submitted for review and feedback.		11/20/2020 rough draft was submitted
8.2 **The AHU logo** A. The student must obtain the electronic version of the logo from the AHU Marketing department's website portal. B. The student must also email the electronic version of the poster with logo to the AHU Marketing department (eric.cadiente@ahu.edu) *(& cc the email*		

to the Scholarly Project Chair), to obtain approval from Marketing for the appropriate use of the logo. Once approved please do not alter the shape or placement of the logo without follow up approval. C. The AHU logo must be placed in the upper left-hand corner and the STTI logo placed in the upper right-hand corner		
8.3 **Submit** the **FINAL (NOT Draft) electronic PowerPoint** slide of your Poster to your Scholarly Project Chair via AHU email and to DROPBOX. **A.** After the Scholarly Project Chair has given their approval for the electronic version of the final poster, it is the student's responsibility to **have the poster printed professionally, in compliance with the Scholarly Project Poster Guidelines** B. Final posters will be presented at the **AHU NAP Scholarship/Poster Presentation Day, which is tentatively planned for 4/5/2021 from 1-3pm (Monday afternoon)**.		
9. Submit final electronic copy of completed documents to library archive	**9th Trimester Spring 2021**	
9.1 Submit a complete electronic copy (including all appendices) of the final approved documents to the AHU library **(**Neal.Smith@ahu.edu**).**		
10. Prepare for and complete professional Dissemination	**8th and 9th Trimester Fall 2020-Spring 2021**	
10.1 Prepare a faculty – approved manuscript for submission to a professional journal		
10.2 In addition to professional journal		

submission, the following are considered appropriate methods of dissemination: A. Submission of abstracts for oral presentation and poster presentations at professional meetings B. Executive summaries (as part of a business plan) C. Professional web page D. Guest editorials, news releases in print or on public radio/television		
10.3 Revise article or other appropriate method of dissemination as needed based on committee and other feedback		
10.4 Obtain official submission/completion documentation and submit to DNAP Scholarly Project Chair and to Canvas DROPBOX		
11. Prepare for Final Oral Presentation	**9th Trimester Spring 2021**	
11.1 Review guidelines and course schedule for conduct of presentation sessions A. Project Presentation (within DNAP 893) – Select AHU community members invited B. Clinical Site/Project site presentation		
11.2 Obtain and complete the DNAP Final Project Presentation form with committee signatures and submit to DNAP Scholarly Project Chair		
12. Complete final requirements for Scholarly Project Completion	**9th Trimester Spring 2021**	
12.1 Submit to CANVAS completed Scholarly Project documentation (All documents in one PDF) A. Completed Project Final presentation (date and time completed only) B. ***DNAP Project Final Presentation form*** completed C. DNAP Project Hours Log D. E-copy of final manuscript		

E. Proof of journal submission or official completion document for project dissemination F. Student Data Declaration – where is your project data stored, when it will be destroyed and who will be responsible for it (i.e. at the clinical site or at AHU per IRB documents) G. IRB disposition-Students must close their projects with IRB after proof of submission or official completion documents are obtained		

Appendix G: Hand-off Report

The handoff report was as follows: a 75-year-old male in for a left hip replacement who received an epidural and MAC anesthesia. He has a history of a right hip replacement in 2018 and a cholecystectomy in 2001. No issues with anesthesia in the past. Allergies include penicillin and latex. Medications include metoprolol, aspirin (discontinued 7 days ago), simvastatin, lisinopril, and metformin. ASA two and malampati one will be documented on the preoperative form.