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School of Nursing

DOCTOR OF NURSING PRACTICE (DNP) PROGRAM

A DNP PROJECT

INSTITUTION OF A MINDFULNESS PROGRAM TO IMPROVE NURSE ANESTHESIA STUDENTS' SELF-EFFICACY, COPING SKILLS, AND STRESS MANAGEMENT

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Abstract

Research shows that student registered nurse anesthetists (SRNA) are exposed to harmful levels of stress during nurse anesthesia programs. Stress has negative physical and psychological effects that impacts a SRNAs self-efficacy and coping skills in the didactic and clinical settings. Literature shows that the implementation of mindfulness techniques in other student populations has been successful in resisting stress' negative effects. This prospective, qualitative, pilot study was done to ascertain if the application of a mindfulness program will have a beneficial effect on SRNA self-efficacy, coping skills, and stress. Second year SRNAs' ($n = 22$) baseline levels of self-efficacy, mindfulness, and stress were measured using adapted versions of the General Self-Efficacy Scale (GSE), Cognitive and Affective Mindfulness Scale-Revised (CAMS-R), and Perceived Stress Scale (PSS). The mindfulness program was implemented. It comprised of a lecture about mindfulness and was followed by practicing its' various techniques. Post- and post post-intervention surveys were completed by participants immediately after the program and 2 months afterwards. Bivariate analysis was done using the Wilcoxon signed rank test to compare pre- with post- and pre- with post post-intervention surveys. Post- and post post- GSE, CAMS-R scores increased, while PSS decreased. Results showed pre- with post- and pre- with post post-intervention scores for CAMS-R and PSS to be statistically significant ($p < 0.05$) and GSE ($p > 0.05$) as not statistically significant. Results support that the implementation of a mindfulness program has beneficial effects for SRNAs especially with the improvement of mindfulness and stress.

Keywords: student registered nurse anesthetist, nursing students, healthcare providers, burnout, stress, stress management, self-efficacy, wellness, mindfulness intervention, meditation, diaphragmatic breathing, mindful walking, mindful eating

Introduction

The rigors of nurse anesthesia programs are known to be multifaceted and strenuous. It challenges student registered nurse anesthetists' (SRNAs) emotional and physical states both personally and professionally leading them to be susceptible to a higher level of stress and anxiety (Griffin, Yancey, & Dudley, 2017). Acute and chronic exposure to high demands in both these environments leads to stress, poor self-efficacy, and decreased academic and clinical productivity. Mindfulness therapy is an evidence-based intervention that helps individuals pay attention to the present moment without judgment to accept their current situations (Greeson, Juberg, Maytan, James & Rodgers, 2014). Techniques to build mindfulness include meditation, diaphragmatic breathing, mindful walking, and mindful eating. Meditation entails listening to spoken words used to guide focus. Diaphragmatic breathing and mindful walking involves taking notice of the sensations of the body with each deep breath and step. Mindful eating has individuals focusing on textures and flavors of a food to help focus one's attention. Literature has shown the positive impact mindfulness has had on students and their physical, emotional, and cognitive well-being. SRNAs may benefit from the implementation of a mindfulness program in their curriculums to help them improve vital traits such as self-efficacy, coping skills, and stress management that are needed to succeed in school (Conner, 2015).

Background and Significance

According to Conner (2015), specific factors such as self-efficacy, coping and social support, and stress impact the retention and success of a SRNA in a nurse anesthesia program. SRNAs who are confident and believe they can accomplish certain tasks have greater success. Whereas individuals who have low self-efficacy are less likely to succeed as they avoid confronting challenges needed to attain high achievement (Imus, Burns, & Weglarz, 2017). "A

single exposure to acute stress may affect information processing in the cerebellum-the area of the brain responsible for motor control and movement coordination, learning, and memory formation" (Chipas et al., 2012, p. 49). This stress occurs when individuals experience challenging situations that are different from their norm. Individuals may perceive these situations negatively and may be unaware of appropriate techniques to adequately cope (Lee, Kim, & Wachholtz, 2016). Critical care nurses transitioning to SRNAs are faced with new challenging experiences and literature shows that they experience stress in anesthesia programs. Chipas et al. (2012) identified a 7.2 mean level of stress out of a 10-point Likert-type scale from a survey of 1,374 SRNAs. Chipas et al. (2012) also identified that many SRNAs turn to substance use, faulting oneself, and avoidance of stressful situations to cope with this these challenges. SRNAs may not be able to perform at their optimal level for success if self-efficacy, coping skills, and stress management are not managed or maintained.

The issue of stress and its impact on the success of SRNAs have further implications on schools and healthcare systems. SRNAs are financial investments for academic institutions. Tuition is lost if a student fails to succeed in a program. Attrition rates increase and will affect future potential candidates for nurse anesthesia programs. The 2005 attrition rate for nurse anesthesia programs was around 8.2%, which has not changed since 1993. In 2005, higher attrition rates were reported with programs of longer duration (Conner, 2015). As academic institutions transition from Master of Science in Nursing (MSN) to Doctorate of Nursing Practice (DNP), it will increase the length of programs for students and will potentially lead to higher attrition rates. Self-efficacy, coping skills, and stress management can also affect patient safety in hospitals. Continuous exposure to stress has shown to decrease self-esteem and cause psychological and physical ailments such as forgetfulness, fatigue, headache, and depression

(Chipas et al., 2012). Developing poor stress management and coping skills may affect the way SRNAs practice in the future once they become certified registered nurse anesthetists (CRNAs).

Mindfulness dates back to the mid to early 20th century, where it originated from Buddhist meditational practices from Thailand and Burma. This Buddhist theory focuses on "releasing the mind from highly conditioned reactivity or suffering, both in the moment and in more extended ways" (Kristeller & Jordan, 2018, p. 2). It has evolved to meet contemporary Western needs. In 1979, an American professor named Jon Kabat-Zin, adapted this practice into a more structured program named Mindfulness-Based Stress Reduction and implemented its use at the University of Massachusetts Medical Center. This mindfulness therapy has been proven to be an effective method to manage stress and improve coping techniques. Literature has also shown that students benefit from mindfulness meditation by improving their stress and academic success (Greeson et al., 2014). Some mindfulness techniques include guided meditation, diaphragmatic breathing, mindful walking, and mindful eating. Guided meditation helps individuals to relax and direct their thoughts. Research has proven that meditators have "some degree of gray matter thickening in regions of brain most critical for memory, the hippocampus, and thinning of the gray matter in the region associated with production of anxiety and stress: the amygdala" (Rogers & Maytan, 2012, p. 50). Diaphragmatic breathing can be voluntarily controlled by an individual to adjust mood by increasing oxygen to the body. Cognitive performance, attention, and memory function has been shown to be improved among individuals that practice routine diaphragmatic breathing (Ma et al., 2017). Both mindful walking and eating teaches the individual to focus on the present moment by enhancing attention to the current activity (Rogers & Maytan, 2012). Educating SRNAs on mindfulness and implementing these techniques into the academic curriculum will provide students with evidence-based tools to

improve their self-efficacy, coping skills, and stress management. This will help them succeed in nurse anesthesia programs and will assist them in providing safe quality care in the hospital. Student success is critical as it impacts academic institutions because they influence attrition rates and are financial investments to programs.

Needs Assessment

Mindfulness has been proven to be effective in undergraduate, nursing, and medical students. However, there is a lack of literature proving the benefits of implementing mindfulness programs in nurse anesthesia curriculums.

On a local level, yoga and meditation, which is a form of mindfulness therapy was successfully utilized in the [redacted] University Wellness Program. However, other mindfulness techniques were not implemented that may be beneficial in improving coping skills and stress management. There is also a lack of continuity in offering yoga and meditation in the Wellness Program. Implementing a mindfulness program, teaching alternate techniques that can be used in students' daily lives will help bridge the gap of continuity to improve wellness and teach other coping skills useful in the didactic and clinical setting.

Data was analyzed from doctoral projects by Huang and Jenson (2018) on self-efficacy and Munoz and Rubio (2018) on salutogenesis. Self-efficacy scores from second year students, who were in part time clinical were noted to have the lowest General Self-Efficacy (GSE) scores at 2.95 compared to third year students, who were in full time clinical with scores averaging 3.1 out of a 10-point Likert scale. This data shows the greatest need for intervention should be directed towards SRNAs undergoing part time clinical in their second year (Huang & Jenson, 2018). Munoz and Rubio (2018) reported average salutogenic scores for second and third year SRNAs as 53.7 out of 70 indicating a need for intervention. Post-implementation evaluations

revealed positive feedback for developing knowledge strategies to improve SRNAs personal and professional lives since 57.2% reported that wellness activities promote balance in academic life and well-being. SRNAs identified that the greatest barrier to activities were time constraints due to their busy schedules (Munoz & Rubio, 2018). SRNAs showed interest in wellness activities and would benefit with quick activities that can be done anywhere including the use of mindfulness techniques.

Nationally, there is a serious issue of depression and suicide amongst SRNAs. Chipas et al. (2012) discovered that 47% of SRNAs were depressed and 21.3% had suicidal ideations indicating a great need for intervention. The same study identified that SRNAs suggested education about meditation to improve the AANA wellness initiative showing that mindfulness techniques were requested to be taught. There is also the problem of substance abuse. Bozimowski, Groh, Rouen, and Dosch (2014) surveyed 23 nurse anesthesia programs over a 5-year study period and discovered that 60.8% had reported at least 1 incident of SRNA substance abuse with opioids being the most common drug of choice. Providing alternate strategies to prevent substance abuse and wellness may help SRNAs, especially as their access to drugs increases during clinical and once they become practicing CRNAs. Also, attrition rates for nurse anesthesia programs in 2005 was 8.2%, which has not changed since 1993 and higher attrition rates were correlated with longer programs (Conner, 2015). SRNAs need the best tools to succeed in anesthesia programs since attrition rates will continue to be an issue as more academic institutions transition from masters to doctorate programs.

There have been many attempts to address these problems including wellness initiatives by the American Association of Nurse Anesthetists (AANA) and the standards of accreditation of nurse anesthesia programs issued by the College of Accreditation (COA). The AANA

developed a student wellness website providing links to wellness tips and resources including, but not limited to information on healthy lifestyle suggestions. The website brings awareness to both SRNAs and certified registered nurse anesthetists (CRNAs) to the problem of student well-being. The COA also addressed the problem by requiring an evidence-based wellness and substance use disorder (SUD) curriculum. They suggest that this program include concepts on the importance of wellness, healthy lifestyles, coping mechanisms, and SUD identification and interventions, but are not mandatory. Including mindfulness activities in the AANA and COA's wellness education could help improve the many issues related to SRNAs on the local and national level.

Project Question/Problem Statement

The demands of nurse anesthesia programs can lead to increased SRNA stress that affects self-efficacy and coping skills, which are valuable traits needed for program success. If a mindfulness program were implemented, will it help improve SRNAs' self-efficacy, coping skills, and stress management?

Objective and Aims

The aim of this project was to teach second year SRNAs at [redacted] about mindfulness and building it through meditation, diaphragmatic breathing, mindful walking, and mindful eating. These techniques to build mindfulness can be used to promote factors of self-efficacy, coping skills, and stress management affecting SRNA success in didactic and clinical settings. The objectives included:

1. Assessment of SRNAs baseline mindfulness by measuring an adapted Cognitive and Affective Mindfulness Scale-Revised (CAMS-R).

2. Assessment of SRNAs baseline self-efficacy by measuring an adapted Generalized Self-Efficacy scale (GSE).
3. Assessment of SRNAs baseline stress by measuring an adapted Perceived Stress Scale (PSS).
4. Determine if the program increased self-efficacy and mindfulness and decreased stress by measuring and comparing pre- against post- and post post-intervention adapted GSE, CAMS-R, and PSS.

Review of Literature

Literature Search

Articles for the review of literature were obtained primarily through [redacted] Library search engines including CINAHL, Quick Search and Google Scholar. The literature search process included search terms: stress, SRNA, wellness, nurse anesthesia, college, students, medical students, mindfulness intervention, university, healthcare providers, burnout, clinical, positive coping strategies, management, positive outcomes, mindful walking, mindful eating, well-being, cognition, mindful meditation, diaphragmatic breathing, stress management, self-efficacy. Inclusion criteria were articles published within the last 10 years and those written in English. Twenty-two articles with relevance to graduate students particularly nurse anesthesia, mindfulness techniques, stress, coping, wellness, self-efficacy, and those published within the last 10 years were considered. Landmark studies published greater then 10 years ago were also taken into consideration. (See Appendix B for Literature Search Strategy and Appendix C for Table of Evidence)

Self-Efficacy

Self-efficacy is a personal characteristic of an individual where they believe they have confidence, capability, persistence, and strength needed to cope with challenges. Self-efficacy is often associated with wellness in the academic setting. The intensity and complexity of nurse anesthesia programs affects SRNAs' emotional and physical well-being. Their overall wellness has a statistically significant correlation with their self-efficacy (Griffin, Yancey, & Dudley, 2017). SRNAs face performance anxiety, fear of failure, and fatigue during the course of their programs. These emotional challenges reduce their overall perceived wellness leading to negative self-efficacy. It can be an indicator to assess how students are coping with the stressors faced during the program. Griffin, Yancey, and Dudley (2017) suggest that low self-efficacy can reduce productivity in both academic and clinical settings as they are less apt to set goals and recover from setbacks. This research study further describes that transitioning from an MSN to DNP curriculum demands SRNAs of more time and coping techniques due to the length and complexity of their programs.

Imus, Burns, and Weglarz (2017) described self-efficacy as a strong reflection of SRNA success in both academic and clinical performance. This study conveyed that students encountered lowest self-efficacy during their first year of clinical rotations and suggested that self-efficacy was significant in predicting a student's clinical performance. Conner (2015) described that stress was interpreted differently amongst individuals and could negatively affect students. SRNA success can be affected due to negative coping of stress, which can lead to poor performance causing decreased self-efficacy.

Coping Strategies

Substantial research justifies the undeniable prevalence of stress and the significance of its impact among nurse anesthesia students. Response to stress and methods of coping varies amongst individuals. The state of anxiety and sensation of seeking was noted to be higher amongst nurse anesthesia students when compared to midwifery students through the use of Spielberger State-Trait Anxiety Scale and Zuckerman Sensation Seeking Scale (ZSSS). Perez and Carroll-Perez (1999) identified an association between an increased score on the ZSSS and substance abuse. Other studies have also shown greater correlation between higher scores on sensation seeking and substance abuse. Increased stress levels along with higher sensation seeking traits amongst nurse anesthesia students could lead to substance abuse. Perez and Carroll-Perez (1999) further reported that only 32% of students used relaxation techniques and 1.5% admitted the use of alcohol as a mean of stress relief suggesting poor coping mechanisms amongst 1,400 questionnaires answered by SRNAs. Perez and Carroll-Perez (1999) also disclosed that students were not forthcoming in expressing their concerns to faculty and administration. The questionnaire showed that 78% of responders did not have a stress management program. This response indicated the need for faculty to identify signs of stress and also help students manage these challenges by implementing a stress management program in the curriculum (Perez & Carroll-Perez, 1999).

Chipas and McKenna (2011) surveyed 7,537 AANA members and found that 27% of students reported using professional help and 19.3% reported the utilization of prescription drugs to cope with stress endured during nurse anesthesia programs. They recommended stress management to be taught during nurse anesthesia curriculums to help future CRNAs overcome the physical and emotional stress experienced in their profession (Chipas & McKenna, 2011).

Chipas et al. (2012) also pointed out the overuse of alcohol as a coping mechanism in nurse anesthesia students. One hundred fifty out of 1,275 SRNAs reported the use of alcohol to cope with stress during the program. Poor coping mechanisms such as substance use, gossip, and expression of inappropriate negative feelings were identified to be used most frequently, and meditation was found to be the least reported coping mechanism used amongst students. This study also included suggestions from SRNAs to cope with stress adequately. Students suggested implementing the use of peer support, exercise programs, stress management tips, and stress relief such as meditation to manage stress while in the program. Although Chipas et al. (2012) suggested meditation as a coping mechanism, there is a lack of literature on meditation and mindfulness techniques being utilized by SRNAs to cope with stress.

Bozimowski, Groh, Rouen, and Dosch (2014) contacted 111 nurse anesthesia programs to participate in a survey about student substance use and 23 academic institutions reported that 60.8% had at least 1 student incident of abuse during the course of a 5-year period (Bozimowski, Groh, Rouen, & Dosch, 2014). There may have been more unreported incidences of substance abuse with the 88 academic institutions who did not participate in this study. The most frequently abused substances were opioids followed by alcohol and cannabis. Out of 18 programs that partially completed the survey 8 program directors reported having wellness activities and 7 had educational offerings about wellness for students. (Bozimowski, Groh, Rouen, & Dosch, 2014). Literature showed that SRNAs are using negative coping strategies and many programs were not utilizing wellness activities or education such as mindfulness that could be beneficial to prevent these outcomes.

Stress

Stress is a response that is experienced when there is a change in normalcy. Students encounter negative well-being from the start of nurse anesthesia programs (Chipas et al., 2012). A survey completed by SRNAs and CRNAs in 2008 indicated high stress within the nurse anesthesia profession (Chipas & McKenna, 2011). SRNAs reported an average stress of 7.2 and CRNAs only reported an average of 4.7 on a 10-point Likert scale. This study further recognized that SRNAs encountered role stress as they attempted to balance the rigorous nurse anesthesia didactic curriculum, clinical rotations, and social and family life during the program (Chipas & Mckenna, 2011).

According to Chipas et al. (2012), the particular stressors amongst 1,282 SRNAs were decreased self-esteem, information overload in class, acquiring new skills at clinical (first clinical case, intubation, induction), financial strain, and lack of time to spend with significant others. The different stressors contributed to SRNAs reporting a 47% depression rate with 21.3% having suicidal ideations while in school compared with other healthcare students. The continuous exposure to stress showed a major impact on students psychologically and physically with adverse manifestations. Stress at these harmful levels could create poor academic and clinical outcomes amongst SRNAs (Chipas et al., 2012). This study also surveyed students for suggestions to provide the AANA wellness initiative with better ways to cope with stress during their programs. Suggestions included education on different type of stress relief such as meditation.

In addition, research by Perez and Carroll-Perez (1999), revealed the level of stress experienced by SRNAs and its impact on clinical and academic performance. This study also emphasized the negative impact of chronic stress on a SRNA's overall well-being (Perez &

Carroll-Perez, 1999). This study identified information overload as the highest stressor amongst nurse anesthesia students in a self-reported questionnaire. Other stressors included fear of failure especially amongst first year students, mental and physical exhaustion, and the inability to pass the national board examination. This literature suggested that a stress management program should be included in the curriculum due to these stressors and its negative impact on SRNAs (Perez, & Carroll-Perez, 1999).

Defining Mindfulness

The topic of mindfulness has been greatly examined for its beneficial effects on those who integrate its practices into their daily lives. There is a multitude of strong data that support the positive psychological effects of mindfulness such as a reduction in stress, anxiety, and depression. Literature showed that the physiologic effects of mindfulness included improved immune function, reduced blood pressure, and decreased cortisol levels. In 2012, Brown, Weinstein, and Creswell studied the impact of mindfulness on cortisol levels and psychological stress response. Participants completed surveys on mindfulness and had salivary cortisol samples taken five times when they were exposed to the Trier Social Stress Task (TSST). The TSST is a reliable procedure used to induce stress in participants for laboratory testing and involves the participant preparing a presentation in front of a panel of judges with video and audio recording. Brown, Weinstein, and Creswell found that those who were more mindful had reduced levels of cortisol in response to TSST, indicating that mindfulness can shield an individual from stressful situations (2012). Another study by Tomfohr, Pung, Mills, and Edwards determined that those who had higher scores for the trait of mindfulness were associated with lower blood pressure and levels of interleukin-6 (2014). Research on mindfulness has shown that it provides both physiological and psychological benefits. Mindfulness should be taught to SRNAs as there is

evidence-based research that proves its positive impact. Techniques to build mindfulness can be a low-cost intervention to reduce the challenging experiences that SRNAs will face throughout their didactic and clinical programs. SRNAs who develop mindfulness can experience an overall sense of well-being and can utilize it to effectively manage stressful situations in a demanding program.

Mindfulness Techniques

Meditation

Meditation is a form of mindful practice that can improve psychological well-being and also assist in academic performance. In 2010, Zeidan, Johnson, Diamond, David and Gookasian studied university students who implemented meditation and found that they had a decrease in negative mood, reduced fatigue, anxiety, and depression. This study also determined that there was a significant growth in cognitive skills particularly with sustained attention and effective information processing. The students were found to cope with frustration and anxiety as they were able to separate themselves from those negative perceptions (Zeidan et al., 2010). This technique can be useful for students in nurse anesthesia programs because academic performances may be affected by the mounting stress and their low self-efficacy.

Diaphragmatic Breathing

Diaphragmatic breathing involves filling and emptying the lungs as deeply as the individual can while focusing on sensations of the body and each breath. Similar to meditation, a study found that this mindfulness technique was able to improve cognitive skills by increasing attention, decreasing negative perceptions and stress, and provide emotional support (Ma et al., 2017). This study suggested that diaphragmatic breathing “modulates cognitive performance by predominantly exerting its influence on the autonomic nervous system” as cortisol levels were

assessed throughout the intervention and were found to be decreased as breathing was performed (Ma et al., 2017, p. 8). Diaphragmatic breathing can be done anywhere and in any setting, which is helpful to SRNAs as they have limited free time as they spend majority of their efforts on balancing school and life.

Mindful Walking

The technique of mindful walking involves focusing on sensations produced by the body as each step is taken while being present in the moment. This technique can reduce chronic and acute stress while improving psychological and physiological well-being. Teut et al. (2013) examined the effects of implementing a mindful walking program in individuals who were psychologically distressed. The research found that by implementing a 4-week walking program that participants had reduced perceived stress and their physical and mental quality of life had improved (Teut et al., 2013). Acute stress can develop into chronic stress during the course of repeated mounting pressures in nurse anesthesia programs. Walking is a part of daily life, but adding the task of being mindful can be beneficial to students who may be feeling psychologically distressed due to chronic stress.

Mindful Eating

Being present while eating is something that rarely occurs in the current era of technology. Individuals especially students, will multi-task watching television or using a smart device while eating. Redirecting the focus on eating and being present can help individuals find more satisfaction in their food and current frame of mind (Rogers & Maytan, 2012). Khan and Zadeh (2014) determined that mindful eating was found to have a significant positive correlation between mental well-being and awareness. They established that being present with non-

judgmental awareness while eating “impacts senses and internal states” (Khan & Zadeh, 2014, p. 71).

Application of Mindfulness-based Programs for Students

Undergraduate Students

The implementation of mindfulness programs and its effects have been studied in undergraduate students. Its integration during a semester and prior to exams have shown to have positive outcomes that parallel the experiences of those to SRNAs. Anxiety and stress will occur during the program and particularly before exams, which may affect test outcomes. Galante et al. (2017) examined the effects of mindfulness training on academic achievement in undergraduate students. This study found that a mindfulness program helped maintain well-being and assisted students in coping with academic stress especially before exams (Galante et al., 2017). Greeson, Juberg, Maytan, James, and Rogers (2014) modified the standard 8-week mindfulness therapy by adjusting its time constraints to fit the needs of students who had limited free time due to the rigorous nature of their academic programs. The program was titled Koru and was abbreviated to 4-weeks, which helped maintain student retention in the study. The literature showed that individuals enrolled in Koru had lower perceived stress, improved sleep, increased mindfulness, and enhanced overall psychological well-being (Greeson et al., 2014). The abbreviated nature of mindfulness therapy such as Koru is appropriate for SRNAs as they have limited time during their educational experience.

Nursing Students

Nursing students will experience stress and anxiety throughout the course of their educational experience, which will carry on to their roles as nurses. Similarly, once SRNAs graduate, they will take on the stress and anxiety-provoking responsibilities of a CRNA whose

decisions will greatly impact their patient outcomes. Learning how to manage these emotions will be pivotal in the way that healthcare providers practice. Song and Lindquist (2015) examined the effects of a mindfulness-based stress reduction program on nursing students. The study found that it was a beneficial non-pharmacological approach to improving mindfulness, depression, anxiety, and stress that could be utilized in their present academic environment and in their future careers as nurses (Song & Lindquist, 2015).

Medical Students

Medical programs are one of the most challenging educational experiences and the impact of mindfulness training was shown to have great benefits to medical students. The possibility that mindfulness will have the same impact on students in similarly challenging nurse anesthesia programs are demonstrated with the vast amount of literature that exists on this topic. Van Dijik et al. (2017) integrated mindfulness-based therapy for first year medical students during the didactic part of their program and clinical clerkship rotations for neurology and psychiatry. The research found that medical students had greater life satisfaction, improved cognition and mental health, and less psychological distress during their medical school experience when using mindfulness therapy (Van Dijik et al., 2017). Another study examined the effects of mindfulness therapy on senior medical students and found similar results of reduced stress and anxiety as shown by outcomes noted in the pre- and post- PSS and Depression, Anxiety, and Stress Scale (DASS) (Warnecke, Quinn, Ogden, Towle, & Nelson, 2011). The different intervals in which mindfulness programs were implemented showed that it's effects were flexible to different experiences and timeframes allowing for beneficial effects throughout the course of a challenging nurse anesthesia program.

Theoretical Framework

The Ottawa Model of Research was the theoretical framework chosen to structure the project of implementing a mindfulness program for SRNAs. Evidence-based literature has proven mindfulness therapy to have positive effects on students. This framework was best suited for this project as the Ottawa model aims to implement current research and knowledge. There are three phases and six primary elements within this model that focus on assessment, monitoring, and the evaluation of knowledge translation, all of which supported the project's structure and design (White & Dudley-Brown, 2016). The original Ottawa model and adapted version for this DNP project is found in Appendix D.

Phase one focused on assessing the barriers and supporters of the knowledge. It took into account identifying the evidence-based innovation, who it would affect, and where it would be implemented (White & Dudley-Brown, 2016). Prior review of past DNP projects on self-efficacy and wellness led to a literature review that identified mindfulness therapy as a cost-effective evidence-based innovation. Literature has shown that mindfulness has positive effects on self-efficacy, coping, and stress in healthcare students, but not specifically for SRNAs. The mindfulness program was altered to the needs of the adopters (SRNAs) by adjusting the amount of time required to implement the project. Literature showed that majority of mindfulness programs took place over the course of 8-weeks (Zeidan et al., 2010). The project was altered to occur over 5-weeks as SRNAs have limited time due to the increased demands of balancing the program and their own personal lives. Mindfulness sessions occurred at [redacted] during one of the most grueling semesters where clinical began and the didactic classes were challenging. The techniques taught could be utilized at any point in a SRNA's daily life outside of the [redacted] setting. A potential barrier to the knowledge translation of this project

was obtaining participation of SRNAs, having them keep an open mind to try something that they may be uneducated and skeptical about, and ensuring utilization of techniques outside of [redacted].

Phase two involved monitoring the implementation and its adoption into practice (White & Dudley-Brown, 2016). The mindfulness program was implemented over the course of five sessions in 5-weeks, where the first week focused on a brief 20-minute lecture explaining mindfulness and four different techniques including meditation, breathing, mindful walking, and mindful eating. The transfer of this knowledge was disseminated by practicing one technique in 3-minutes during the following four sessions. An e-mail reminder about mindfulness was sent out to participants to further encourage the adoption of practice outside of [redacted]. SRNAs were able to adopt mindfulness techniques into their daily lives anywhere to improve self-efficacy, coping skills, and stress management.

Lastly, phase three was the evaluation of the knowledge translation (White & Dudley-Brown, 2016). The adapted versions of GSE, PSS, and CAMS-R were completed by the SRNAs prior to the implementation of the mindfulness program's initial lecture, following the last session, and 2 months later. The results were analyzed and compared to identify the effects of the implementation of the evidence-based innovation.

Methodology

Study Design

The project utilized a prospective, qualitative, pilot study design where SRNAs participated in a mindfulness program including a lecture about its benefits followed by practicing mindfulness techniques in subsequent weeks. SRNAs were given pre-intervention surveys prior to the lecture to assess baseline mindfulness, self-efficacy, and stress. Post-

intervention and post post-intervention surveys two months later were given to SRNAs and collected data was analyzed to assess for the impact of mindfulness training on those specific personal traits.

Setting

The study took place at [redacted]. The 5-week mindfulness program was held in the [redacted] classroom. Adequate equipment such as a large projector was used to display the mindfulness program's initial lecture and ample space to perform the mindfulness techniques were available in this classroom.

Study Population

The study population consisted of [redacted] SRNAs that are currently enrolled at [redacted] (n=22 SRNAs). The SRNAs were recruited and asked to complete surveys and participate in a lecture followed by technique implementation sessions during an allotted time of the school day. The second year SRNAs were taking challenging didactic classes along with beginning their first part time clinical rotations during the time of implementation.

Study Intervention

Pre-intervention surveys were given to SRNAs before the implementation of the mindfulness program's initial lecture. The 20-minute presentation was on mindfulness and how it could improve SRNAs' stress management, self-efficacy, and coping skills. The presentation included a brief introduction and history on the concept of mindfulness, and an explanation of four different techniques including guided mediation, diaphragmatic breathing, mindful walking, and mindful eating. All techniques to build mindfulness were practiced in the following four weeks on Monday and took 3-minutes to perform. The first mindfulness technique implemented was meditation. Investigators guided participants through spoken word to increase awareness in their

lives by releasing their worries about the future, past regrets, and focusing and accepting the present moment. The second mindfulness session was diaphragmatic breathing, which is a stress management practice useful in various situations. Investigators guided participants to sit quietly with their eyes closed with one hand on their chest and the other on their belly. Participants were instructed to inhale and exhale deeply, while focusing on the body's response to each breath. The third intervention was mindful walking. Investigators instructed students to walk slowly in the 620A classroom, while bringing their attention to the body's sensations with each step taken. Lastly, mindful eating was practiced with participants. They received a cotton candy grape and were asked to focus on the texture and flavor of the food, which helped them draw their attention to the current moment. Post-intervention surveys were given to SRNAs after the last mindfulness technique to acquire data for analysis regarding the clinical question. The [redacted] nurse anesthesia program assistant sent a reminder e-mail to encourage SRNAs to use mindfulness outside of the academic institution. A post post-intervention survey was administered to participants 2 months after the mindfulness program to assess the continuity of its benefits. All surveys were completed through the Qualtrics program.

Outcomes to be Measured

Outcomes were measured through pre- and post-, and post post-intervention reliable and valid scales. Investigators adapted the GSE, PSS, and CAMS-R by choosing 5 questions from each scale that were most relevant to nurse anesthesia students. These surveys were given to participants prior to the initial mindfulness lecture, after the last technique implementation of mindful eating, and 2 months after the program to measure outcomes of self-efficacy, stress, and mindfulness. The GSE is a 10-item valid and reliable survey measuring self-efficacy correlating with emotion, optimism, and work satisfaction. The total GSE score is calculated by adding

points from all items where greater scores indicate higher self-efficacy. The PSS is also a valid and reliable tool consisting of 10-items measuring stress over the past month and scores are calculated similarly to the GSE scale with higher scores indicating greater stress. Stress is defined in the scale by the level at which participants feels life has been unpredictable, uncontrollable, or overwhelming. The CAMS-R is a 12-item valid and reliable survey measuring four traits of mindfulness including attention, awareness, acceptance, and present focus. The sum of all items are calculated and higher values indicate greater mindfulness. Refer to Appendix F, G, and H for adapted GSE, PSS, and CAMS-R.

Risks and Harms

The study posed no risk or harm to its participants. Surveys were filled out anonymously and all participants were consenting adults aged 18 years or older. No personal health information (PHI) was collected from the study.

Subject Recruitment

Subjects were recruited from the [redacted] nurse anesthesia program including SRNAs, who began their clinical experience during the summer semester of 2019. Inclusion criteria consisted of participants greater than 18 years of age and [redacted] nurse anesthesia students beginning part time clinical. Subjects less than 18 years of age, individuals unable to walk for less than 5 minutes, [redacted] SRNAs who were in the didactic phase and third year SRNAs who are in full time clinical, and non-[redacted] students were excluded from the study. The [redacted] nurse anesthesia program assistant e-mailed SRNAs with a recruitment flyer including the details of the study. The recruitment flyer is found in Appendix J.

Consent Procedure

An implied consent form was sent to potential participants for the research study. Investigators explained the consent, topics of the study, possible risks, process of data collection, participant rights, and confidentiality to participants. A copy of the consent was provided if the participant requested one for their records. The study was done by voluntary participation and SRNAs were allowed to withdraw from the study at any point. The consent was adapted from the Rutgers IRB website and can be found in Appendix I.

Subject Costs and Compensation

The participants of the study were not subjected to any costs as the interventions were held and presented on a regular scheduled academic day. Participants were not required to purchase nor print any materials. There was no compensation as there were no costs to participate in the research study.

Project Timeline

The implementation of this project was employed during the 2019 summer semester from July 8th to October 7th after IRB approval was obtained on July 10th. The initial lecture took place during a clinical week and on an academic lecture day, which are held on Mondays. The first lecture was held on July 8th. The following four mindfulness technique implementation classes of meditation, diaphragmatic breathing, mindful walking, and mindful eating took place in the subsequent weeks. Two mindfulness technique classes occured on July 15th and 22nd. The final two classes took place on July 29th and August 5th. On October 7th, post post-intervention surveys were completed by the second year SRNAs. Data analysis and evaluation occurred over two months in October and November. The project findings will be disseminated starting January until the end of April. The project timeline can be seen in Appendix E.

Resources Needed

The study required minimal finances and resources. The primary cost of the study consisted of purchasing grapes for the mindful eating intervention. The budget allotted to investigators of this study were sufficient to cover the costs.

Evaluation Plan

Data Maintenance and Security

Qualtrics was used to collect data and there was no risk of personal identifiers as data had no personal health or sensitive information. Data destruction is not required as there is no link between PHI and collected data. All data was completed anonymously and no personal identification was required while completing surveys. Collected data was stored electronically in the investigators personal secured computers specifically in Qualtrics which is a password protected program. Accessibility of data was only granted to the investigators and the chairs of the study.

Data Analysis

Data analysis was done through SPSS. Bivariate analysis was completed to look at the relationship between pre-, post-, and post post-intervention survey results from the adapted GSE, PSS, and CAMS-R tools to identify statistical significance. Means were compared within groups and tests for normality determined whether a paired t-test or Wilcoxon signed rank test was done. Inferences about the association between the mindfulness program and self-efficacy, stress, and mindfulness were assessed from the data and were made once statistical analysis was performed.

Anticipated Findings

The purpose of the study was to determine whether mindfulness will improve SRNA self-efficacy, coping skills, and stress. The anticipated results were that SRNAs would have greater

GSE and CAMS-R scores and decreased PSS scores after participating in a mindfulness program. The best anticipated time to implement the seminar and mindfulness interventions were annually during the SRNAs second year where part-time clinical begins during a challenging didactic semester. Data from the survey could further explicate the most apt time to conduct the seminar and interventions in the future.

The findings from post-intervention surveys would reveal statistical data that would determine if a mindfulness program was beneficial to SRNAs. Investigators anticipated that most SRNAs would find mindfulness to be relevant in improving self-efficacy, coping skills, and stress management.

Translation

A mindfulness program for SRNAs at [redacted] could be continued for future cohorts to benefit from its positive effects. This project was a pilot study and could be used as a model to find the effects of mindfulness in other nurse anesthesia programs and other graduate programs as it could be easily emulated without significant cost, time, or resources. This study is also beneficial for CRNAs and other advanced practice nurses as stressful and challenging situations are encountered in their professions.

Dissemination

Dissemination of the project and research findings will be presented during the defense presentation in January 2020. This presentation at Rutgers University in Newark, New Jersey is open to the public for attendance. Project results will be shared with faculty and SRNAs during the Rutgers Nurse Anesthesia Program meetings in the Spring 2020 semester once the defense presentation is completed. A poster presentation will also be held at Rutgers School of Nursing to disseminate project findings for SRNAs and faculty to view.

Professional Reporting

Research findings and outcomes from the mindfulness program study will be presented at the NJANA spring meeting on April 4, 2020. A manuscript of the study will be submitted to the AANA journal after the completion of the DNP defense in January 2020 for publication.

Results

The adapted GSE, CAMS-R, and PSS were given to the second year SRNAs pre-, post-, and post post-intervention. The surveys were 100% completed by the SRNAs (22/22). The within groups data was analyzed via SPSS for normality and was determined to be non-parametric. Statistical analysis was done using the Wilcoxon signed rank test.

Adapted General Self-Efficacy Scale

Self-efficacy was measured using an adapted 5-item GSE (Appendix F). Responses were assessed with a 4-point Likert scale. Numerical values of 1-4 were assigned to survey choices of "not all true", "hardly true", "moderately true", and exactly true. Each of the questions answers were then added to determine the self-efficacy. Scores of 5, 10, and 20 were determined to have the lowest, moderate, and highest self-efficacy, respectively. Mean values from all 22 survey scores were calculated for pre-, post-, and post post-intervention (Table 1). The initial mean pre-intervention scores were moderate to high for self-efficacy (15.64 ± 1.33). Mean values for post- and post post-intervention scores increased slightly maintaining a moderate to high self-efficacy. The greatest increase in GSE scores were from post post-intervention scores (16.55 ± 1.79). However, the comparisons for general self-efficacy were not statistically significant between pre- and post-intervention ($Z = -0.663$, $p > 0.05$) and also pre- and post post-intervention ($Z = -1.721$, $p > 0.05$), which is shown in Table 2.

Table 1. Adapted GSE Results

GSE:	Pre-Intervention	Post-Intervention	Post Post-Intervention
Mean	15.6364	15.8636	16.5455
Standard Deviation	+/- 1.32900	+/- 1.61232	+/- 1.79224

Table 2. Adapted GSE Pre-, Post-, and Post Post-Intervention Comparison

GSE:	Pre-Intervention versus Post-Intervention	Pre-Intervention versus Post Post-Intervention
Z	-0.663	-1.721
Asymp. Sig. (2-tailed)	0.507	0.085

Adapted Cognitive Alternative Mindfulness Scale-Revised

Mindfulness was measured using an adapted 5-item CAMS-R tool where responses were assessed with a 5-point Likert scale (Appendix H). Participants selected choices of "never", "almost never", "sometimes", "fairly often", and "very often" for each item in the survey. Numerical values of 0-4 were assigned to each item. The answers were totaled and individuals whose scores were around 0, 10, and 20 were determined to possess the lowest, moderate, and highest mindfulness, respectively. Mean values from all 22 survey scores were calculated for pre-, post-, and post post-intervention (Table 3). The initial mean pre-intervention scores indicated that second year SRNAs had moderate amounts of mindfulness (12.64 ± 1.36). Mean values for post- (13.77 ± 2.18) and post post-intervention (14.64 ± 2.04). scores increased maintaining a moderate to high amount of mindfulness. The comparisons for mindfulness were found to be statistically significant between pre- and post-intervention ($Z = -2.047$, $p < 0.05$) and also pre- and post post-intervention ($Z = -3.260$, $p < 0.05$), which is shown in Table 4.

Table 3. Adapted CAMS-R Results

CAMS-R:	Pre-Intervention	Post-Intervention	Post Post-Intervention
Mean	12.6364	13.7727	14.6364
Standard Deviation	+/- 1.36436	+/- 2.18069	+/- 2.03646

Table 4. Adapted CAMS-R Pre-, Post-, and Post Post-Intervention Comparison

CAMS-R:	Pre-Intervention versus Post-Intervention	Pre-Intervention versus Post Post-Intervention
Z	-2.047	-3.260
Asymp. Sig. (2-tailed)	0.041	0.001

Adapted Perceived Stress Scale

Stress was measured using an adapted 5-item PSS where responses were assessed with a 5-point Likert scale (Appendix G). All 22 participants selected choices of "never", "almost never", "sometimes", "fairly often", and "very often" for each item in the survey. Numerical values of 0-4 were assigned respectively to items 1, 2, 3, and 5. Item 4 in the PSS had reversed numerical values assigned with response scores 4-0 for "never", "almost never", "sometimes", "fairly often", and "very often". The answers to the 5-items were added and those with scores around 0, 10, and 20 had lower, moderate, and higher amounts of perceived stress. Mean values from PSS scores were calculated for pre-, post-, and post post-intervention (Table 5). Pre-intervention mean values indicated that second year SRNAs initially had moderate amounts of perceived stress (12.82 ± 2.63). Mean values for post- (10.09 ± 2.91) and post post-intervention (9.91 ± 2.16) scores decreased showing less perceived stress. The greatest decrease in stress was

found to be post post-intervention. The comparisons for perceived stress were found to be statistically significant between pre- and post-intervention ($Z = -2.541$, $p < 0.05$) and also pre- and post post-intervention ($Z = -3.331$, $p < 0.05$), which is shown in Table 6.

Table 5. Adapted PSS Mean Values

PSS:	Pre-Intervention	Post-Intervention	Post Post-Intervention
Mean	12.8182	10.0909	9.9091
Standard Deviation	+/- 2.63016	+/- 2.90990	+/- 2.15824

Table 6. Adapted PSS Pre-, Post-, and Post Post-Intervention Comparison

GSE:	Pre-Intervention versus Post-Intervention	Pre-Intervention versus Post Post-Intervention
Z	-2.541	-3.331
Asymp. Sig. (2-tailed)	0.011	0.001

Discussion

Implementing a program to develop mindfulness is beneficial to not only undergraduate, nursing, and medical students, but also SRNAs. Literature has shown its positive physical and psychological effects on other types of students and those who practice mindfulness techniques. As described in the results section, SRNAs received positive psychological benefits from learning and practicing mindfulness.

SRNAs were determined to have developed more mindfulness and general self-efficacy and decreased stress following the implementation of the mindfulness program. Self-efficacy had only slightly increased after the intervention and results showed data as not statistically

significant. The inference cannot be made that the mindfulness program had significant effect on an individual's self-efficacy. However, the most profound changes after the program's implementation were for mindfulness and stress. There was an 8.2% increase in post- and 13.7% increase in post post-intervention results for mindfulness. The lecture and techniques practiced with the SRNAs helped them to develop mindfulness immediately after the program had ended and several months afterwards. The most substantial change that occurred after implementation was stress reduction. There was a 27% decrease in stress once the program concluded and a 29.4% reduction a few months afterwards.

The changes in mindfulness and stress immediately after the conclusion of the program showed that its brevity was capable of causing effects even though it was a modified version of the standard 8-week mindfulness therapy (Greeson et al., 2014). There was a greater change for mindfulness and stress 2 months after the conclusion of the program. This indicated that there are potentially long-term sustainable benefits from learning and practicing mindfulness.

Limitations include recall bias as the same tools were used for pre-, post-, and post post-intervention surveys. The population was small and homogenous as the sample was specifically from one cohort at a school in the mid-Atlantic region, limiting the generalizability of the intervention. Future research can build on the present study by surveying how often techniques of mindfulness were practiced and demographic information could help specify if certain individual's benefit more from a mindfulness program.

Implications and Recommendations

Clinical Practice

Confidence, proficiency, and overall well-being are traits of anesthesia providers that may be enhanced with incorporating mindfulness. Clinical environments require SRNAs to know

vast amounts of information and to be proficient at new skills to provide safe and adept patient care. Mindfulness techniques may help SRNAs with mental clarity and overall improve their memory and retention skills during a stressful clinical day. It may teach SRNAs to cope better with new challenges. A mindfulness program can reduce anxiety and stress, while teaching SRNAs to have better control of their minds during stressful situations leading to overall positive outcomes.

Healthcare Policy

In 2013, the World Health Organization (WHO) issued a comprehensive mental health action plan for 2013-2020 with four major objectives including the implementation for prevention and promotion of mental health. SRNAs are identified as a vulnerable population that are subjected to intense levels of stress leading to depression and suicidal ideation (Chipas et al., 2012). The mindfulness program is an intervention that supports and accomplishes one of the major objectives of the WHO's mental health action plan for 2013-2020. Early implementation of the mindfulness program at the beginning of a nurse anesthesia program may prevent future depression and promote positive coping skills that can be utilized in an individual's personal life and future practice.

Quality and Safety

Exposure to continuous high levels of stress has physical and psychological effects that may impair the quality and safety of SRNA practice in the clinical setting. Stress can cause forgetfulness, impair sleep, and can lead to decreased self-esteem, which can prevent SRNAs practicing at their optimal capabilities (Chipas et al., 2012). SRNAs may develop poor stress management and coping skills including substance abuse specifically with opioids. These negative coping skills may impair patient safety in the clinical setting as more mistakes are likely

to occur due to less focus and attention. Implementing a mindfulness program will help SRNAs manage stress better to provide better care for their patients and for themselves. The positive coping skills they develop from this program to counter stressful situations can be utilized at any time. This will assist them in providing safe, quality, and focused care for better patient outcomes and personal life satisfaction.

Education

The mindfulness program could be adopted into the [redacted] Wellness Program because of its positive effects on self-efficacy, coping skills, and perceived stress. Mindfulness effects are evidence-based and have shown to have great physical and psychological impact on its users. It is a low-cost strategy to improve the well-being of SRNAs undergoing a challenging experience in their lives, which can be employed in any nurse anesthesia program and curriculum across the country.

Economics

The mindfulness program may have a profound financial impact on both academic institutions and SRNAs as its implementation is a low-cost intervention. Attrition is important to academic institutions. They suffer financially when SRNAs do not succeed as tuition and resources used for the student will be lost. SRNAs also make great financial sacrifices to enter anesthesia programs as most are full-time and require SRNAs to be unemployed. SRNAs have to forego a salary and some will have loans to progress through the program. Some will have families that they need to financially support and entering a program full-time unemployed can be a great financial stressor. SRNAs may succeed if they are provided with the best opportunities for support. Providing options such as mindfulness techniques on how to cope with the rigors of

academia may help reduce SRNA program failure and subsequently reduce financial loss for both the student and academic institution.

Sustainability and Plans for Future Scholarship

The mindfulness program can be sustained at [redacted] with the support of faculty and future SRNAs willing to commit to its maintained success. The program can be implemented for all cohorts as all SRNAs will benefit from developing mindfulness techniques. The program can be improved by incorporating mindfulness more frequently throughout the school year to really solidify the benefits of its practice. Techniques can be practiced prior to program meetings, which are held once a month throughout the duration of the semester to promote and continue its use. Its benefits should be assessed with continued data collection each year from the different cohorts.

Conclusion

Improving stress levels, self-efficacy, and coping skills can improve a SRNA's didactic, clinical, and personal experiences. The implementation of a mindfulness program can help SRNAs develop valuable skills that will help them overcome challenging situations. They will learn to be adequately prepared to cope with any situation leading them to a successful nurse anesthesia program experience.

The results of this study show that the mindfulness program is a cost-effective way to promote and prevent the harmful impact stress has on SRNAs. As a pilot study, the program can be used as a model at other academic institutions. Further research can be done to examine other aspects of its encouraging benefits.

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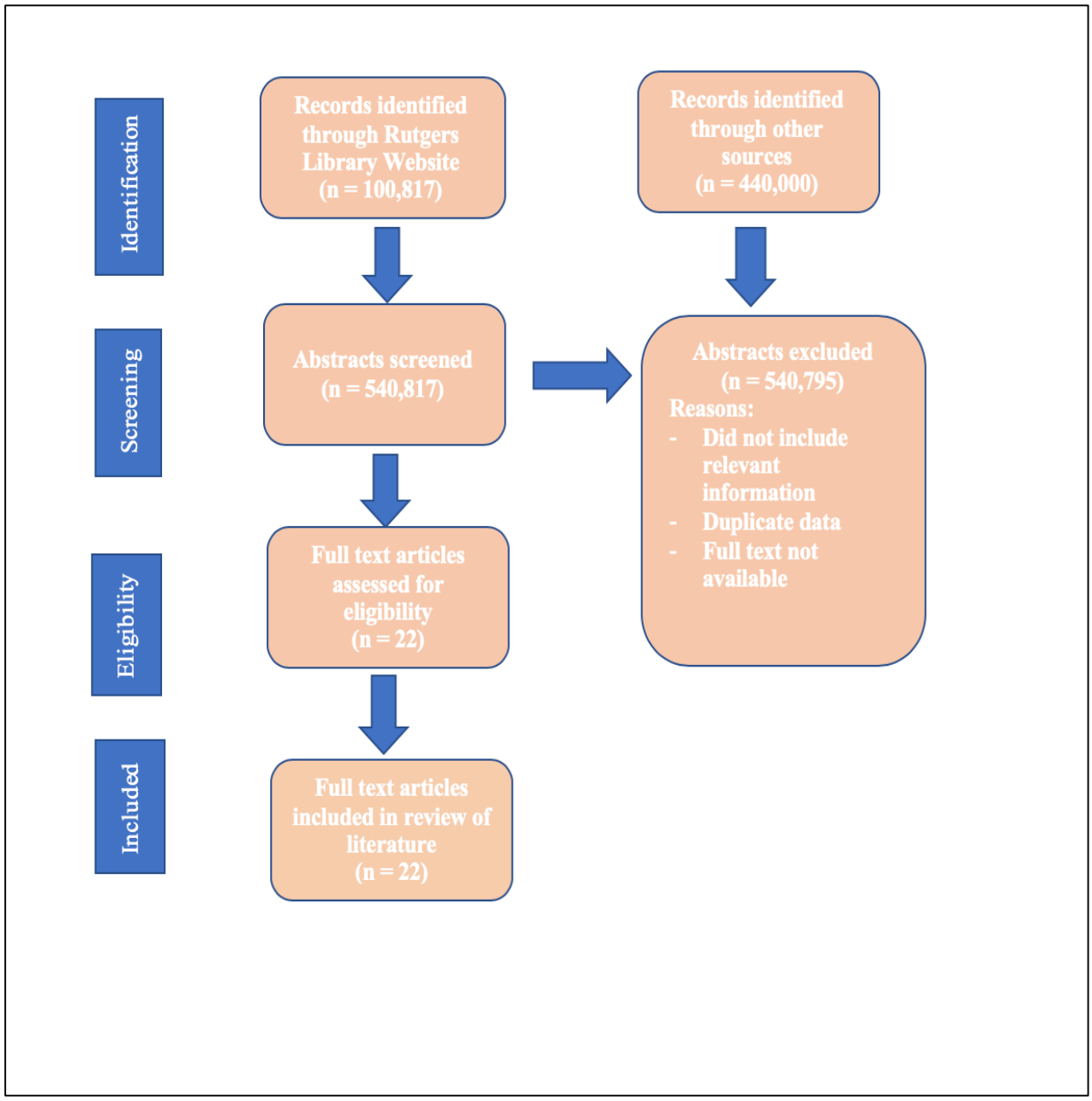
Appendix B

PRISMA Literature Search Diagram



Appendix C

Table of Evidence

Article #	**Author & Date**	**Evidence Type**	**Sample, Sample Size, Setting**	**Study findings that help answer the EBP question**	**Limitations**	**Evidence Level & Quality**
1 (Research)	Chipas, A., Cordrey, D., Floyd, B., Grubbs, L., Miller, S., & Tyre, B. (2012)	Descriptive Study, Qualitative, Cross-Sectional Study	SRNA AANA Members, N=1,282, Invitation to participate in online survey by AANA	- Mean level of stress was 7.2 for all participants - Different stressors leads to a 47% SRNA depression rate with suicidal ideation in 21.3% versus other healthcare students - Negative ailments of stress are experienced by SRNAs - Maladaptive coping mechanisms such as substance use, gossip, and expression of inappropriate negative feelings identified to be used most frequently - Meditation was found to be the least reported coping mechanism used - Suggestion to AANA wellness initiative	- Stress is an individual experience, which is highly subjective and difficult to assess	Level 3, Good Quality

				included education on different type of stress relief such as meditation		
2 (Research)	Griffin, A., Yancey, V., & Dudley, M. (2017)	Descriptive, Correlational, Pilot Study	SRNAs in 3 separate cohorts, N=75, Nurse anesthesia program in a large Midwestern state university followed over 16-month period	- Positive correlation between self-efficacy and higher perceived levels of wellness - Positive correlation between self-efficacy and emotional health - The transition of MSN to DNP make wellness a pressing issue due to the length of doctoral programs with greater demand for SRNA time and coping resources	- Correlational data, no cause-effect conclusions can be made between wellness and perceived self-efficacy - Small sample population limits result generalizability as SRNAs in the program perform at very high levels with increased prior academic and nursing success	Level 3, Good Quality
3 (Research)	Greeson, J. M., Juberg, M. K., Maytan, M., James, K., & Rogers, H. (2014)	Randomized Controlled Trial	Undergraduate, Graduate, and Professional students (Inclusions- currently enrolled undergraduate, graduate or professional student, >18 years of age, proficient in English, able to use a computer with internet access, willing to be randomized to Koru or	- Lower perceived stress after Koru, which shows similar results to other RCTs including one for college students and another for medical students that utilized a longer, stress management and skill building program with a wait-list control group - Koru produced significant decrease in	- Reliance on self-reported survey for primary outcome measures, risk for recall bias - Limited sample diversity - Use of pre- and post-intervention measures, which does not determine when beneficial effects began and lasted	Level 1, High Quality

			wait-list control group), N=90, Fall 2012 to Spring 2013	sleep problems, adds to current objective literature that Mindfulness-based stress reduction (MBSR) and Mindfulness-based cognitive therapy (MBCT) improves sleep in adult populations with history of insomnia and depression - Increase in mindfulness with Koru was comparable to increase in mindfulness with longer MBSR, MBCT, and Mindful Self Compassion (MSC) programs - Less effect size for self-compassion in comparison to MSC, which reflects that Koru targets mindful attention, awareness, relaxation, and self-regulation - The brevity of Koru training contributes to high retention and effectiveness as it works well for young adults		

				juggling competing pressures p. 231, which is consistent with other studies that had brief interventions - In summary, "Koru, a relatively brief, developmentally targeted mindfulness program, was effective at reducing symptoms of stress, enhancing psychological well-being, and promoting sleep- a key health behavior- for EAs who are students in a university setting" and it is "a viable intervention for student counseling...to provide cost-effective, low-stigma interventions for students suffering from unmanageable levels of stress (p. 231)		
4 (Research)	Ma, X., Yue, Z. Q., Gong, Z. Q., Zhang, H., Duan, N. Y., Shi, Y. T.,	Randomized Controlled Trial Pilot study	Participants recruited from a local IT company, N=40, Beijing, China	- Decreased Negative Affect scores, increased attention, can provide emotional support - Diaphragmatic breathing practice	- Used only healthy volunteers - Benefits of diaphragmatic breathing was assessed as emotion, cognition,	Level 1, Good Quality

	… Li, Y. F. (2017)			improves cognitive performance by improving attention, and reducing negative affect on individuals daily lives, and physiological consequences of stress in healthy adults - Diaphragmatic breathing might alter cognitive performance by exerting its influence on the autonomic nervous system - Diaphragmatic breathing could link mind and body together to regulate information processing related to attention	and physiology individually rather than combining them together to attain a mechanism-related results, limiting the explanation on how its effects are associated with the three concepts together	
5 (Research)	Imus, F. S., Burns, S., & Weglarz, D. M. (2017)	Descriptive Correlational Pilot study	Convenience sample of first year academic students and second year clinical students in nurse anesthesia program, N= 66, [redacted]	- Students in their clinical years have lower self-efficacy compared to students in their didactic year - Students with a higher caseload reported lower self-efficacy and confidence - Hours studied for didactic classes had a	- The sample was small and limited to only two cohorts of SRNAs in one university in a front-loaded nurse anesthesia program - This nurse anesthesia program sent their students out of state for clinical rotation limiting the	Level 3, Good Quality

				positive correlation with confidence in accepting unpredictable situations - Clinical preceptors' acceptance and understanding of low-self efficacy among students during clinical rotations may help educators create a better learning environment	generalizability of the study	
6 (Research)	Galante, J., Dufour, G., Vainre, M., Wagner, A. P., Stochl, J., Benton, A., . . . Jones, P. B. (2017)	Pragmatic Randomized Controlled Trial	Undergraduate students (Inclusions-18 years or older with no severe mental illness), N=616, [redacted]	- Students who were in the Mindfulness Skills for Students (MSS) group had reduced stress before an exam as compared to those in the support usual group - Participants in support usual group had increased stress over their academic year - Mental Well Being scores increased and were maintained in the MSS group - The support usual group had a decline in mental well-being over their academic year	- Lacked active control intervention preventing the ability to establish how participants' expectations affected the results of the study	Level 1, High Quality

				- Academic achievement was slightly higher among those students in the MSS group compared to the support usual group - MSS helps to cope with stress and maintain well-being in an academic setting particularly before an exam		
7 (Research)	Gilmartin, H., Goyal, A., Hamati, M. C., Mann, J., Saint, S., & Chopra,V. (2017)	Systematic Literature Review and Meta-Analyses	Literature from inception to January 2017 about the effects of brief mindfulness interventions on hospital provider well-being and behavior, N=14 studies, 7 out of 14 were randomized controlled trials	- Positive changes in levels of stress and anxiety were reported in 14 studies - Mindfulness interventions were effective in improving provider well-being with 9 out of 14 studies showing significant improvement in provider well-being after completion of mindfulness interventions - Stress level and burnout symptoms improved after mindfulness interventions	- Observational study, assessing association not causality - Outcomes influenced by different study designs and population - Reliability of the results is affected by the moderate quality of most studies due to omission of data related to exposure and intervention	Level 2, Good Quality

				- Positive changes in provider was seen in 2 out of 14 studies after mindfulness interventions - Brief mindfulness interventions improved perception of stress and anxiety among health care providers - Providers were able to find time to incorporate brief mindfulness techniques in their busy schedule		
8 (Research)	Chipas, A., & Mckenna, D. (2011)	Qualitative Descriptive Study	Stress and Burnout Survey through (Survey-Monkey) was sent out through electronic invitation to 28,000 Nurse Anesthetists, and Student Nurse Anesthetists enrolled in AANA, N=7,537, United States	- AANA members reported an average stress level of 4.7 in a 10 point Likert scale. - Students responded an average stress of 7.2 in a 10 point Likert scale - 48% of AANA members indicated stress being associated with work - Students responded 67% of stress was school related - 93.6% of AANA members responded either extremely	- The responses to stress is subjective and limiting it to a descriptive study	Level 3, Good Quality

				satisfied or satisfied with their career choice - 31% of AANA members and 27% of students reported seeking professional help to cope with stress - Most frequent method among both groups in handling stress was getting support from others such as family, and watching movies and television - 18.9% of AANA members and 19.3% of students took prescription drugs to help relieve stress		
9 (Research)	Conner, M. (2015)	Meta-Analysis	No search strategies and inclusion or exclusion criteria were included to determine the sample studies	- Articles show that SRNAs and other healthcare students require self-efficacy (confidence, capability, persistence, and strength) for successful completion of programs - Ideas for improving student self-efficacy in nursing and non-nursing students can be applied	- Articles were not identified as RCT, unknown number of strong evidence reviewed	Level 5, Low Quality

				to MSN and DNP anesthesia programs - Stress can have negative effects and may be interpreted by students as poor performance causing decreased self-efficacy		
10 (Research)	Delany, C., Miller, K. J., El-Ansary, D., Remedios, L., Hosseini, A., & McLeod, S. (2014)	Action Research	Final year physiotherapy students, N=27, 3 different universities	- Replacing stressful challenges w/ positive coping strategies offers a powerful tool to build self-efficacy, cognitive control, and a greater self-awareness as a learner and future health practitioner - Student descriptions in data suggest that their levels of confidence and cognitive control are increased when using a resiliency program - Resiliency programs allow students to identify and understand their own triggers and responses to help with behavioral changes	- Small sample within particular cultural and geographic context - A clinical health psychologist was a key facilitator in action research, which may have influenced results due to their skill and student interaction - Student self-reported data is subjective	Level 2, Good Quality

11 (Research)	Perez, E. C., & Carroll-Perez, I. (1999)	Descriptive Study	Nurse anesthesia students AANA mailing list, N=2200, United States	- 78% responded that their program did not have a stress management program - 86% of students responded their school had an open-door policy, but only 55% answered it met their expectations - Stress and anxiety is significant among nurse anesthesia students especially with passing the national certification exam, fear of clinical error, physical and mental exhaustion during the program, and lack of leisure and social activity - 32% of people use relaxation techniques to cope with stress - 1.5% of respondents admitted the use of alcohol for stress relief suggesting poor coping mechanisms - Unrecognized stress affects students' well-being and can interfere with performance	- Older study conducted in 1999, although results are relevant, data could be outdated	Level 2, Good Quality

12 (Research)	Song, Y., & Lindquist, R. (2015)	Randomized Controlled Trial	Nursing students, (Exclusions- regular meditation and yoga within past 6 months, current psychiatric symptoms, participants where exercise is contraindicated), N=50, KN University College of Nursing, South Korea	- At baseline there were no significant differences between groups in depression, anxiety, stress and mindfulness - Scores of depression in MBSR group decreased from 8.3 to 4.1 - Scores of mean anxiety in MBSR group decreased to 6.7 to 2.8 - Scores of mean stress decreased in MBSR group from 34.5 to 7.4 - Scores of mean mindfulness in MBSR group increased from 69.8 to 80.6 - Significantly decreased rates of depression, anxiety, stress, and increases in mindfulness were seen among the members of MBSR group	- Small, non-representative sample - Sample population was primarily female and thus should not be generalized to male nursing students - Contamination between the groups were not assessed, for example waitlist (WL) participants may have observed, participated, or had conversations with those in the MBSR group - Extraneous variables such as credit hours and clinical practicum that affects stress, anxiety, and depression were not considered	Level 1, Good Quality
13 (Research)	Diji, I., Lucassen, P., Akkermans, R., Engelen, B., Wheel,	Cluster-Randomized Controlled Trial	Medical Students from 18 clerkship group (Exclusions- under 18 years of age, non-Dutch speaking, prior	- Students in the MBSR group reported higher life satisfaction, more mindfulness skills, less dysfunctional	- Sample was taken from one medical school limiting generalizability	Level 1, Good Quality

	C., & Speckens, A. (2017)		participation in MBSR), N=232, [redacted] Netherlands	cognition, higher levels of mental health, and lower psychological distress over the course of a 20 month follow-up period compared to non-MBSR group	- Clinical clerkship students in Europe are usually younger than students in the United States and Canada, limiting international generalizability - Lacked active control conditions, which could have led to skewed results	
14 (Research)	Teut, M., Roesner, E. J., Ortiz, M., Reese, F., Binting, S., Roll, S., ... Brinkhaus, B. (2013)	Randomized Controlled Trial	Participants aged 18-65 with moderate to high levels of perceived psychological distress (Exclusions- regular walking training in last 6 weeks, psychopharmacological drugs, regular mindfulness training, other CAM treatments against stress in the last 6 weeks, acute diseases or chronic disease at baseline, inability to walk), N=74, Outpatient clinic for Complementary and Alternative Medicine (CAM) at [redacted]	- Statistically significant differences for Cohen's Perceived Stress Scale, Visual Analogue Scale (detects increased levels of psychological distress), and SF-36 Mental Component Score in Mindful Walking group versus control group where scores were noted to be decreased - Continual practice of mindful walking is needed to obtain best effects	- Cannnot determine if walking and mindfulness together is superior to walking and mindfulness alone - Open design study- blinding of the participants or study team was not possible and this design makes it impossible to assess which components of the intervention were effective in reducing stress - The study does not answer whether mindful walking is the best treatment or most effective component	Level 1, High Quality

			[redacted] in Berlin, Germany		- Sample population participants primarily female	
15 (Research)	Khan, Z., & Zadeh, Z. F. (2014)	Prospective Study	Online survey participants contacted through online food discussion groups, N=309, Karachi, Pakistan	- Pre- and Post- Surveys of Mindful Eating Questionnaire (MEQ) and Warwick-Edinburgh Mental Well-being Scale (WEMWBS) given and Pearson correlation tests were done to analyze the relationships of Mindful Eating and Mental Well-being - Significant positive correlation between overall mindful eating score and mental well-being score - Significant positive correlation between mental well-being score and awareness subscale score shows that food impacts senses and internal states when mindful eating principles allow individuals to be non-judgmental	- Sample population limited to one cultural demographic where the population may not have been taught to analyze hunger or cravings in a way that they pay attention to environmental cues - Did not identify whether sample had existing knowledge of mindfulness or mindful eating	Level 3, Good Quality

16 (Research)	Zeidan, F., Johnson, S., Diamond, Bruce., David, Z., & Goolkasian, P. (2010)	Randomized Controlled Trial	[redacted] N=63, Charlotte, North Carolina	- After mindfulness meditation (MM) training, a reduction in negative mood was noted among the students who participated - Brief MM training reduced fatigue and anxiety among students - Depression scores were significantly low among students that took part in MM - Significant increase in cognitive skills especially tasks that required sustained attention and executive processing efficiency - Those who practiced MM were found to have better ability to disengage from distractions such as frustration and anxiety	- Sample population was limited to undergraduates and cannot be generalized to older adults	Level 1, Good Quality
17 (Research)	Brown, K. W., Weinstein, N., & Creswell, J. D. (2012)	Randomized Controlled Trial	Undergraduate students (Exclusions- self-reported health conditions such as high blood pressure, health habits such as regular	- Neuroendocrine and other responses to psychosocial stress may be influenced by mindfulness as shown by survey measures	- Small sample size limits potential for observing significant predictions among some control variables	Level 1, Good Quality

			cigarette or drug use, prescription drug use), N=44, [redacted]	indicating that those with increased mindfulness had reduced cortisol levels in response to a psychosocial stress test (Trier Social Stress Task)	- Replication in larger, non-college adult samples are needed before definitive conclusions can be made about mindfulness and social threat response	
18 (Research)	Tomfohr, L. M., Pung, M. A., Mills, P. J., & Edwards, K. (2014)	Cross-Sectional, Correlational Study	Students (Exclusions-regular smoking, history of immune or cardiovascular disease, acute infection or illness, pregnancy, or psychiatric history, current use of medication except birth control), N=130, [redacted], San Diego	- The Five Facet Mindfulness Questionnaire, Perceived Stress Scale, Center for Epidemiological Studies-Depression Scale were given to students and blood pressure and blood samples were drawn to identify their correlations - A higher score of trait mindfulness was associated with lower BP and lower levels of interleukin-6	- Preliminary results limited by cross-sectional nature - Definitive conclusions cannot be made whether mindfulness influenes physiology or if better health is associated with willingness to pay attention - Sample was young and healthy	Level 3, Good Quality
19 (Research)	Warnecke, E., Quinn, S., Ogden, K., Towle, N., &	Randomized Controlled Trial	Senior medical students, N=66, [redacted]	- Decreased Perceived Stress Scale and Depression, Anxiety, and Stress Scale scores were noted to be	- Small sample size - Short period to follow-up after intervention may affect	Level 1, Good Quality

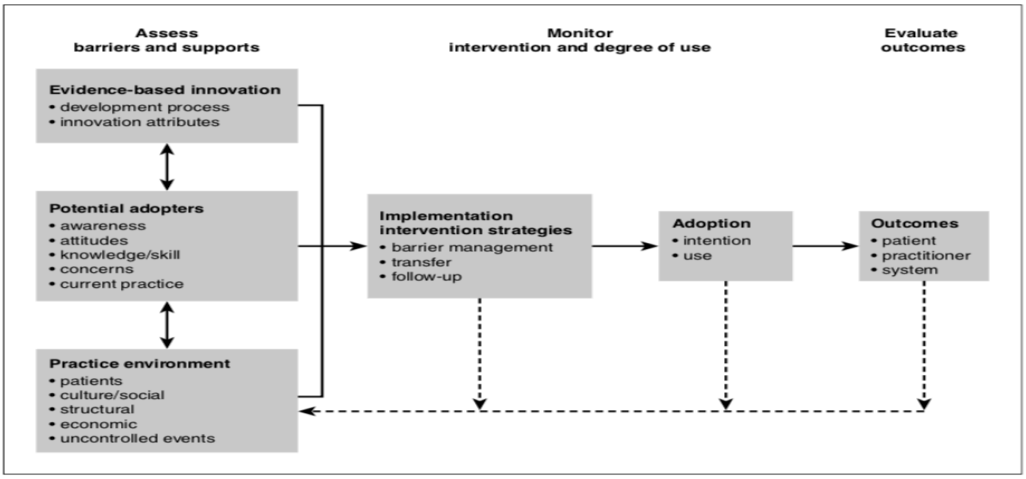
	Nelson, M. R. (2011)			decreased for those that used the audio CD of guided mindfulness practice	results showing sustained effects - Non-blind participants	
20 (Non-research)	Rogers, H., & Maytan, M. (2012)	Book		- Thorough discussion about benefits of mindfulness showing its evidence-based effects on emerging adults - Provides a detailed plan on how to implement Koru, a mindfulness-based program for emerging adults	- Reliance on self-reported survey for primary outcome measures, risk for recall bias - Limited sample diversity - Use of pre- and post-intervention measures, which does not determine when beneficial effects began and lasted	Level 4, High Quality
21 (Non-research)	Uranga, T. (2015)	Expert Opinion		- AANA newsletter states that nurse anesthetists experience unavoidable stressors in workplace - Prolonged stress have negative (physical and emotional exhaustion) effect even on resilient CRNAs	- Potential biases not recognized	Level 4, Low Quality

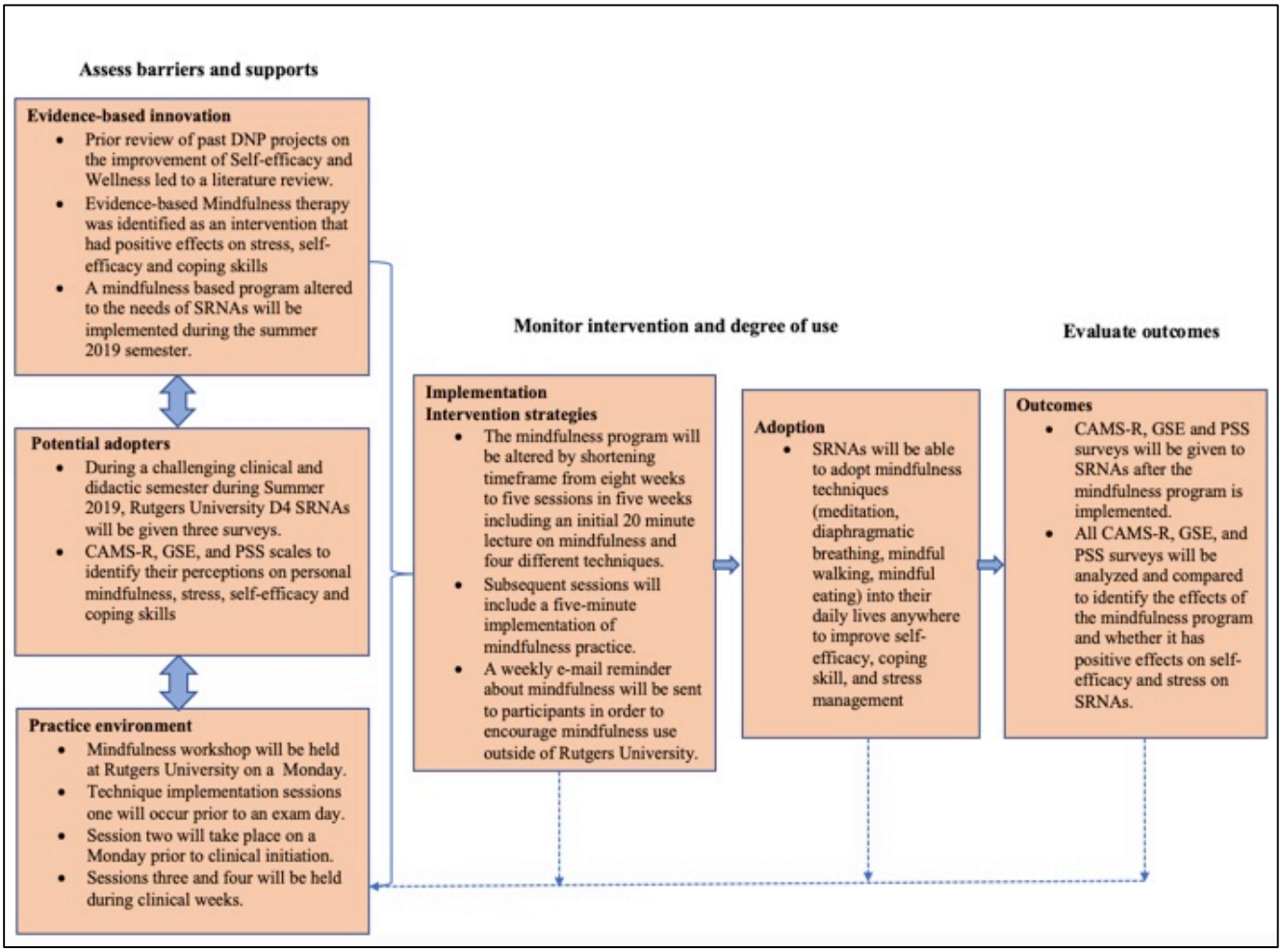
22 (Research)	Bozimowski, G., Groh, C., Rouen, P., & Dosch, Michael. (2014)	Cross-sectional, retrospective, descriptive study.	Survey sent to program directors (PD) of accredited nurse anesthesia programs. Survey asked PDs to consider responses based on current cases as well as events over a 5-year period. N=113, United States.	-Total of 111 PD participated in the survey. - Among PD that completed the survey 2439 students were admitted over the 5-year study period. -14 of 23 programs (60.8 %) that provided data identified at least I incident of student substance abuse, and 2 programs reported 2 incident for a total of 16 incidents. - Opioids were the most frequent drug of choice (n=9), followed by alcohol (n=4), cannabis (n=3), benzodiazepine (n= 1), cocaine (n=1), and polydrug use (n = 1). - Few reported the abuse of Propofol, ketamine, inhaled agents, or any other substances. -Fifty percent (n=8) of the students with an abuse incident had no	-The survey limited the study to a descriptive study, while corelative data might have provided more insight. -No psychometric assessments were performed to assure validity or reliability. -Study relied only on documented incidents of substance abuse and may be missing undocumented or unnoticed incidences.	Level 2, Good Quality

				known risk factor for substance misuse.		

Appendix D

Theoretical Framework (Adapted from the Ottawa Model of Research)

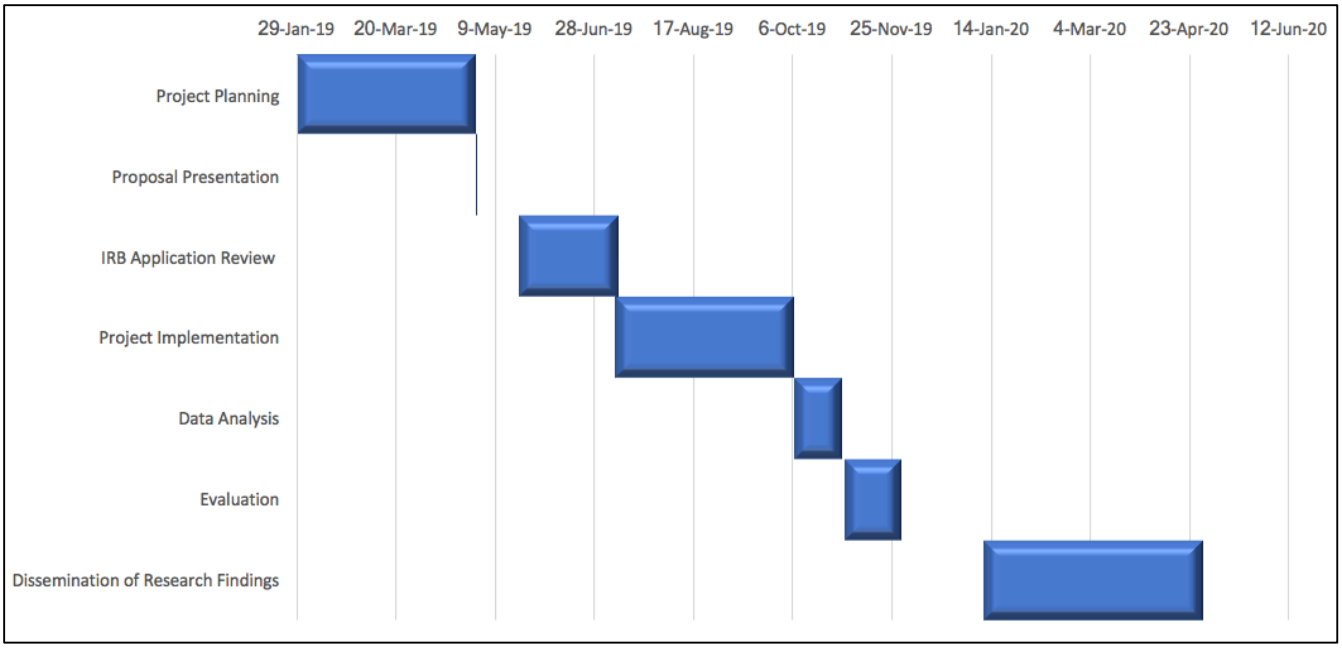




Appendix E

Project Timeline

Timeline of Events			DURATION (days)
START DATE	END DATE	DESCRIPTION	
1/29/19	4/29/19	Proposal Planning	90
4/29/19	4/30/19	Proposal Presentation	1
5/21/19	7/10/19	IRB Application Review	50
7/8/19	10/7/19	Project Implementation	91
10/7/19	10/31/19	Data Analysis	24
11/1/19	11/30/19	Evaluation	29
1/10/19	4/30/20	Dissemination of Research Findings	111



Appendix F

General Self-Efficacy Scale Adapted

Adapted Generalized Self-Efficacy Scale (GSE)

The following scale was developed to evaluate the coping ability of daily living.

Instructions: Write the number that best describes your opinion below.

Response Format: 1= Not all true, 2 = Hardly true, 3 = Moderately true, 4 = Exactly true.

_____ 1. I can always manage to solve difficult problems if I try hard enough.

_____ 2. It is easy for me to stick to my aims and accomplish my goals.

_____ 3. I am confident that I could deal efficiently with unexpected events.

_____ 4. I can remain calm when facing difficulties because I can rely on my coping abilities.

_____ 5. I can usually handle whatever comes my way.

Scoring: Add the numbers from each item. The total equals the self-efficacy score. The higher the score, the greater the self-efficacy.

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Appendix G

Perceived Stress Scale Adapted

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Adapted Perceived Stress Scale (PSS)

The PSS is the most widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress.

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, write the number that indicates how often you felt or thought a certain way.

Response Format: 0 = Never, 1 = Almost never, 2 = Sometimes, 3 = Fairly often, 4 = Very often.

_____ 1. In the last month, how often have you felt that you were unable to control the important things in your life?

_____ 2. In the last month, how often have you felt nervous and "stressed"?

_____ 3. In the last month, how often have you found that you could not cope with all the things that you had to do?

_____ 4. In the last month, how often have you felt that you were on top of things?

_____ 5. In the last month, how often have you felt difficulties were piling up so hight that you could not overcome them?

Scoring: PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the positively stated item 4 and then summing across all scale items. The greater the score indicates higher perceived stress.

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Appendix H

Cognitive and Affective Mindfulness Scale-Revised Adapted

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Adapted Cognitive and Affective Mindfulness Scale – Revised (CAMS-R)

The CAMS-R is a 12-item measure designed to capture a broad conceptualization of mindfulness with language that is not specific to any particular type of meditation training.

Instructions: People have a variety of ways of relating to their thoughts and feelings. For each of the items below, rate how much each of these ways applies to *you*.

Response Format: 0 = Never, 1 = Almost never, 2 = Sometimes, 3 = Fairly often, 4 = Very often.

_____ 1. It is easy for me to concentrate on what I am doing.

_____ 2. I can accept things I cannot change.

_____ 3. I try to notice my thoughts without judging them.

_____ 4. I am able to accept the thoughts and feelings I have.

_____ 5. I am able to focus on the present moment.

Scoring: Sum values for items 1 - 5. Higher values reflect greater mindful qualities.

[redacted]

Appendix I

Consent Form

RUTGERS

Rutgers School of Nursing
Stanley S. Bergen Building
Rutgers, The State University of New Jersey
65 Bergen Street
Newark, NJ 07101-1709

CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY:
Institution of a Mindfulness Program to Improve Nurse Anesthesia Students' Self-efficacy, Coping Skills, and Stress Management

Principle Investigator:
Michael McLaughlin, DNP, CRNA/APN
[redacted]

Co-Investigators:
Janice Mathew, BSN, RN, CCRN
[redacted]

Adrienne Padden, BSN, RN, CCRN-CSC
[redacted]

Time and location:
July 15, 2019 7:00AM
June 22, 2019 7:00AM
June 29, 2019 7:00AM
August 5, 2019 7:00AM
August 12, 2019 7:00AM
October 7, 2019 7:00 AM
[redacted]

The information in this consent form is part of an implied consent process for a research study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part, you should feel free to ask them and should expect to be given answers you completely understand. You may keep this consent for your records. Your alternative to taking part in the research is not to take part in it. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

Who is conducting this research study and what is it about?
You are being asked to participate in a research study about mindfulness, techniques to build it, and its effect on self-efficacy, coping skills, and stress management of nurse anesthesia students. The research is being conducted by the investigators listed above.

What will I be asked to do if I take part?

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IRB ID: Pro2019001131
Approval Date: 7/10/2019
Expiration Date: 7/9/2020

Upon consent, investigators will initially have participants fill out a 15 question survey, which will take 5 minutes to complete using the Qualtrics program. A 20-minute mindfulness PowerPoint lecture will be presented following survey completion. Over the course of the following four weeks, investigators will lead techniques to build mindfulness including meditation, diaphragmatic breathing, mindful walking, and mindful eating. These sessions will take 3 minutes to complete. The last session of mindful eating will also include a 15 question and in total will take 8 minutes to complete. Three months after the completion of the mindfulness program, participants will be asked to complete another 15 question survey requiring 5 minutes.

What are the risks and/or discomforts I might experience if I take part in the study?
This study contains no foreseeable risks, harms or ethical considerations.

Are there any benefits to me if I choose to take part in this study?
You will learn about mindfulness and techniques to build it. It may improve self-efficacy, coping skills, and stress management.

Will I be paid to take part in this study?
There will be no payment or reimbursement given to participants.

How will information about me be kept private or confidential?
All data collected will be anonymous, and at no point will any sensitive data will be collected and kept. There will be no participant identifiers in completed surveys. All data will be stored in a secure computer and on a password protected Qualtrics program.

What will happen to information I provide in the research after the study is over?
Information may be shared with other investigators for research without requiring additional consent.

What will happen if I do not want to take part or decide later not to stay in the study?
Your participation is voluntary. At any point of the study, you will have the right to refuse to participate within the study, and refuse to answer any question. Your refusal will not affect your relation and/or reputation amongst the investigators or Rutgers University. However, once you turn in the form, you can no longer withdraw your responses as we will not know which ones are yours.

Who can I call if I have questions?
Any questions regarding the research can be directed to either investigator listed at the top of page 1 at any time during the study. You can also contact our faculty advisor: Maureen McCartney Anderson, DNP, CRNA/APN via telephone at: [redacted] or via email at: [redacted]

If you have questions about your rights as a research subject, you can call the IRB Director at: Newark HealthSci IRB (973)-972-3608 or the Rutgers Human Subjects Protection Program at: (973) 972-1149.

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APPROVED
IRB ID: Pro2019001131
Approval Date: 7/10/2019
Expiration Date: 7/9/2020

Please keep this consent form if you would like a copy of it for your files.

By beginning this research, you acknowledge that you have read the information and agree to take part in the research, with the knowledge that you are free to withdraw your participation without penalty.

[redacted]

Appendix J

Mindfulness Program Flyer

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[redacted] needed to participate in a Mindfulness Program involving:

- Background education on Mindfulness
- Strategies to decrease stress
- Development of new coping skills
- Practice implementing mindfulness techniques

Dates
7/15 (7:00-7:20AM)- Mindfulness Lecture & Survey
7/22 (7:00-7:03AM)- Meditation
7/29 (7:00-7:03AM)- Diaphragmatic Breathing
8/5 (7:00-7:03AM)- Mindful Walking
8/12 (7:00-7:08AM)- Mindful Eating
10/7 (7:00-7:05)- Survey

Location
[redacted]

Research will be conducted to determine the benefits of mindfulness for SRNAs during their academic and clinical experiences.

Institution of a Mindfulness Program to Improve Nurse Anesthesia Students' Self-Efficacy, Coping Skills, and Stress Management

For any inquiries, please contact principal investigators Janice Mathew [redacted] or Adrienne Padden [redacted]

[redacted]

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