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# Implementing Mindfulness Meditation Among Nurse Anesthesia Students to Decrease Stress and Anxiety and Improve Self-Awareness

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Implementing mindfulness meditation among nurse anesthesia students to decrease stress and

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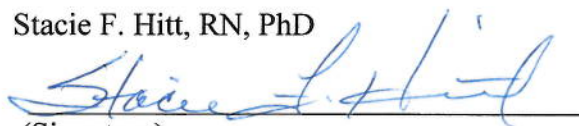Terineka Thompson

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Abstract

Throughout the country, Student Registered Nurse Anesthetists (SRNAs) are experiencing stress at an alarming rate.  While stress is unavoidable, it tends to upset academic and clinical performance and overall health.    This project was the implementation of mindfulness meditation among nurse anesthesia students to decrease stress and anxiety and improve self-awareness.  The implementation of mindfulness meditation among nurse anesthesia students to decrease stress and anxiety and improve self-awareness will subsequently enhance the ability to learn.  Literature supports the effects and importance of mindfulness interventions to reduce stress, anxiety, improve self-efficacy, resiliency and general health.  Mindfulness interventions are not routinely incorporated into graduate nursing curricula; therefore, students are not learning these types of stress reduction techniques needed on a day-to-day basis. This study selected a convenience sample of nurse anesthesia students enrolled in the only two programs in Indiana.  A pre/postsurvey via the Perceived Stress Scale-14 along with instructions to download the Mindfulness app to a mobile device and utilize it for 10 minutes a day for 14 days.  Upon completion of the mindfulness meditation implementation, a reassessment of the perceived stress level of each participant was administered post-final exams of the spring semester.  Findings suggest that the implementation of the Mindfulness app for meditation can be fundamentally related to decreased perceived stress and improve self-awareness among nurse anesthesia students.

*Keywords:* mindfulness, stress, anxiety, awareness, resilience, graduate students, nursing, medical

Implementing mindfulness meditation among nurse anesthesia students to decrease stress and

anxiety and improve self-awareness

## Introduction

Anesthesia, as an advanced practice nursing specialty, is one that requires, not only

critical thinking and technical skills, but also adaptability and resilience.  This ability is

challenging and not achieved easily.  The path one takes to accomplish this, can be daunting, but

it is a rewarding endeavor that requires a high level of emotional intelligence and self-efficacy.

Within this world of emotional intelligence and self-efficacy, it is well received that nurse

anesthesia education is high stress, high stakes mission, neither of which seem to support the

development of adaptability and resilience (Connor, 2015).  A student registered nurse

anesthetist (SRNA) must meet the rigors and requirements of the educational curricula, that

ultimately place demands on their personal and professional lives (Griffin, Yancey, & Dudley,

2017).  Studies that have been conducted thus far on SRNAs' experiences describe the nature

and types of stressors that are encountered by students and expand the understanding of the

"pathogenesis" of stress and how it can lead to undesirable outcomes (Griffin et al., 2017).

Without the ability to recognize and appropriately handle stress, it can lead to untoward

consequences.  The utmost concern, as addressed in this project, is how to best manage stress for

SRNAs to decrease stress and increase self-awareness.

## Background

The matter of interest in safeguarding the health and mitigating the negative coping

strategies that can ensue with stress at a manageable level seems to be an ongoing issue among

graduate nursing students.   One cannot predict performance by merely referencing the stressful

stimuli, and that to predict outcomes in performance, it requires attention to the psychological

process that created individual differences in reaction (Lazarus & Folkman, 1984). Everyone

reacts to stress differently. How one perceives stress is something innate within a person

considering their psychological and neurochemical characteristics. While some degree of stress

is necessary for motivation and higher performance (Griffin et al., 2017), the multifactorial

nature that causes higher stress and coping strategies, diminish the opportunity to increase self-

awareness and resilience (Slavin, Schindler, & Chibnall, 2014). In considering options to

decrease the stress levels in SRNAs, mindfulness meditation can be implemented. Mindfulness

has foundations in several indigenous cultures and is a spiritual practice and is an emerging

concept within healthcare that has been proclaimed as a means of resiliency against stress,

burnout and mental exhaustion (White, 2013). While mindfulness interventions may be ideal at

the start of a nurse anesthesia program (NAP), implementation at any point in this journey can

improve the SRNA's ability to cope with stress and learn new skills through cultivating present

moment awareness and counteract stressors that lead to increased stress and anxiety.

**Problem Statement/Project Purpose**

Nurse anesthesia students experience a plethora of stress in an environment that is high

stakes and complex. The demands that are placed on SRNAs may tend to negatively impact self-

confidence and performance levels, which can ultimately trigger unhealthy habits and coping

mechanisms. Given the nature of nurse anesthesia education, three major types of stressors may

be present: academic stressors, clinical stressors, and external stressors, all of which may vary in

each student (Chipas et al., 2012). The American Association of Nurse Anesthetists (AANA)

recognizes the impact of stress among SRNAs as a significant concern (American Association of

Nurse Anesthetists, 2019). The purpose of this project is to use a mindfulness intervention for

SRNAs to manage stress and anxiety to improve their overall sense of well-being. This project

titled "Implementation of mindfulness meditation among nurse anesthesia students to decrease stress and anxiety and improve self-awareness" addresses this notorious problem. While there are several stress reduction techniques used, mindfulness-based stress reduction (MBSR) techniques, is flexible, customizable and mindfulness is practiced in the manner that best suits the individual (Kabat-Zinn, 2003).

## Review of the Literature

A literature review (Table 1) was conducted as a foundation for the project using the search terms *stress, anxiety, graduate education, mindfulness, and interventions.* A literature search was completed using Google Scholar, PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. The scope of the articles was extensive when graduate education was utilized in the search (Thompson, 2018). Upon using mindfulness as a search term, the number of items narrowed, and therefore, the literature scope was acceptable for review.

The sum of 26 articles was reviewed initially, and nine were chosen for this project on inclusion criteria. The articles included were published in the English language and within the last decade to disseminate the most current literature (Thompson, 2018). These articles were also from peer-reviewed journals from various disciplines within the specialty of health science and psychology. The exclusion criteria consisted of studies that were not in a university setting and not within levels of evidence I or II.

Mindfulness well-defined refers to a meditation practice that cultivates present moment awareness, which encompasses attending to relevant aspects of experience in a non-judgmental manner (Ludwig & Kabat-Zinn, 2008). The study design was limited to randomized control trials (RCT) and meta-analysis to provide the highest level of evidence and reduce bias. The

studies that were reviewed were divided into three categories.  First, does mindfulness reduce stress and anxiety?  Secondly, does participation in the meditation aspect of mindfulness as an intervention increase self-efficacy and/or resiliency?  Lastly, how does mindfulness specifically affect students' level of stress in health science programs, and what is its relationship to improving self-awareness?

Biofeedback utilized as a mindfulness technique was a study that focused on the myriad of stressors that plague nursing students (Ratanasiripong, Park, Ratanasiripong, & Kathalae, 2015).  Biofeedback was found to reduce anxiety significantly ($p = 0.001$), but not stress ($p > 0.05$) and mindfulness meditation significantly decreased both stress and anxiety ($p = 0.002$).  This study was conducted among 89 nursing students in Thailand who were randomly assigned to one of three groups (Ratanasiripong et al., 2015).  There was an intervention biofeedback group, an intervention mindfulness meditation group, and a control group.  The control group was the group exposed to the same stimulus; however, no intervention was utilized.  In conclusion, while both interventions were effective, mindfulness meditation was effective in both anxiety and stress, and biofeedback was useful in anxiety only.  A deficiency of this study is the concentration on the immediate rather than the long-term effects of mindfulness.  The study was limited to one nursing school and to improve its reliability, a more diverse population is needed.  Mindfulness, is an intervention to enhance self-efficacy, is a platform for future research from this study.

In an RCT of 75 Malaysian medical students, a mindfulness-based stress management (MBSM) intervention called Mindful -Gym was introduced to decrease stress and anxiety. The effectiveness of this mindfulness-based stress management (MBSM/Mindful-Gym) to evaluate outcomes relative to perceived stress, mental distress and self-efficacy was the focus, and MBSM

was implemented to improve psychological distress and manage stress among medical students (Phang, Mukhtar, Ibrahim, King, & Sidik, 2015). This RCT included 75 medical students enrolled in their first through the third year of study from Universiti Putra Malaysia. The design of the study included measurable variables via pre/post surveys. This study utilized a modified (5-week) MBSM based on the principles of the standard 8-week MBSR programs (Kabat-Zinn, 2003) to have more emphasis on experimental training and daily practice tailored for medical students (Phang et al., 2015). There were significant improvements in perceived stress ($p = 0.009$), mental distress ($p = 0.003$), and self-efficacy ($p < 0.001$) at one-week post-intervention. Thus, six months post-intervention higher self-efficacy reported no difference regarding stress or psychological distress. The objective of the study was to establish an effective stress management program for medical students; this was achieved. Furthermore, indications from this research conclude that this program is critical to stress management and increased self-efficacy as a resolution for Malaysian medical students.

Warnecke, Quinn, Ogden, Towle, & Nelson (2011), carried out a single-blinded RCT in three medical schools attached to the University of Tasmania to determine whether mindfulness reduces the level of stress in medical students in their senior year. The authors conducted this study among 66 medical students and concluded that mindfulness practice reduced stress and anxiety. The study design included two-self report surveys at baseline then at eight weeks concerning the intervention that included an audio cd of guided mindfulness meditation. The findings were that mindfulness reduced stress in senior medical students and the prevalence of stress can have adverse effects not only on the students but the patients as well (Warnecke et al., 2011). An important discussion point in this is that there was a wide range of baseline stress scores and stress, which was controlled by multivariable analysis. Thus, stress is the focal point

in this study.  Multivariable analysis was used to control Despite the small sample size as a

limitation, there was a sustained effect in utilizing mindfulness interventions.  The study, despite

the limitation, still impart support to the use of mindfulness to decrease stress and anxiety.

The discussion of the various aspects of mindfulness and its relationship to stress and

anxiety have been supported by the reviewed research.  The authors maintain that stress for

students is unlikely to decrease; therefore, it would be essential to provide an avenue for the

students to increase their ability to cope with stress.  The research, as listed in the matrix of the

literature review is comprised of RCTs and meta-analysis (Table 1), all convenience samples to

include large and small sample sizes.

**Summary from Literature Review**

Conclusions from this review propose that MBSR interventions are used in several ways

to decrease stress and anxiety.  While stress and anxiety share several of the same physical

indicators, there are some key differences.  In short, stress is the body's reaction to an external

trigger, which can be positive or negative and anxiety is a sustained mental health disorder that

can be triggered by the negative effect of stress (Hurley, 2019).  Therefore, despite variations in

types of mindfulness interventions, the literature supports the suggestion that the incorporation of

mindfulness in daily practice reduces perceived stress, increase self-awareness, and overall

resiliency in health science students.  Furthermore, the literature supports the fact that regardless

of health science specialty, mindfulness interventions are effective in decreasing stress.

The likelihood that the use of mindfulness can foster a link between promoting improved

self-efficacy in students is essential to optimal outcomes.  Many have concentrated on medical,

dental, and nursing undergraduate and graduate-level students.  A valid case has been made

concerning the amount of stress and anxiety that encompasses health science majors at all levels.

The literature supports the implementation of mindfulness intervention during education for nursing, medical and dental students to increase self-efficacy, decrease stress and anxiety, and overall well-being.

The link between mindfulness, reduced stress, reduced anxiety, and increased self-efficacy has remained identified in the literature as an effective way to reduce perceived stress and anxiety.  While the literature provides a plethora of examples of how useful mindfulness interventions are, there are some limitations.  Additional research is warranted to recognize broader, diverse RCTs regarding the acknowledged barriers via the utilization of MBSR programs.   Throughout the literature, mindfulness interventions at various lengths have been described, with no gold standard as a guide.

**Table 1. Literature Matrix**

| Author/Year | Study Design | Sample | Mindfulness Intervention | Primary Outcomes | Results | Conclusion |
|---|---|---|---|---|---|---|
| Warnecke et al. 2011 | RCT | N=66  Medical students | Meditation | Stress | Significant reduction in for stress (p<.050) and anxiety (p=.050) | Mindfulness practices reduce stress and anxiety among medical students. |
| Greeson et al. 2015 | RCT | N=90  College students and emerging adults | Koru | Perceived stress, sleep problems | Significant correlations were observed among changes in perceived stress (*p*=.037) and sleep problems (*p*=.033) | The use of Koru is effective for emerging adults in a university setting. |
| Ratanasiripong, et al. 2015 | RCT | N=89  Nursing Students | Biofeedback and meditation | Stress and Anxiety | Biofeedback significantly decreased anxiety and maintained stress levels in nursing students. Mindfulness meditation similarly reduced anxiety levels (*p=.002*) while also lowering stress levels (*p= .001*) | The use of biofeedback and mindfulness meditation supported |
| Phang et al | RCT | N=75 | Mindfulness-based stress | Stress | Significant progress in perceived stress, | Effective stress management |

| Author/Year | Study Design | Sample | Mindfulness Intervention | Primary Outcomes | Results | Conclusion |
|---|---|---|---|---|---|---|
| **2015** | | Medical students | management (Mindful Gym) | | mental distress, and self-efficacy. *p*>.020 | program for medical students |
| **Falsafi, N** **2016** | RCT | N=90 College students | Meditation and yoga | Depression Stress Anxiety | Depression, anxiety, and stress symptoms decreased significantly (*p*< .010) | Mindfulness meditation and yoga were helpful with symptoms of depression, stress, and anxiety. Some preferred one over the other due to minor limitations. |
| **Kuhlmann et al.** **2016** | RCT | N=183 Medical or Dental students | MediMind | Stress | A selective drop-out for students who suffered more often from psychological symptoms was detected (*p*=.020). On the BSI, a significant overall interaction effect became apparent (*p*=.002) post hoc analyses were not significant. | The use of MediMind contributes to a decrease in psychological morbidity. |

| Author/Year | Study Design | Sample | Mindfulness Intervention | Primary Outcomes | Results | Conclusion |
|---|---|---|---|---|---|---|
| **Lynch et al.** <br><br> **2018** | Randomized Wait-List Control Study | N=38 Graduate and undergraduate students. | Meditation | Academics, anxiety, depression and perceived stress | Significant decrease in anxiety p=.01), perceived stress (p=.01) and depression (p=.05) | Mindfulness-based coping for university life is an acceptable and useful program, however further investigation with larger sample size needed |
| **Bamber et al.** <br><br> **2018** | Meta-Analysis | N=1492 Graduate and undergraduate students. <br><br> 22 journal studies <br><br> 3 dissertations | Meditation | Anxiety | Mindfulness-based interventions are significantly effective in decreasing anxiety in college students (p<.001). | Mindfulness-based interventions should be flexible to encourage participation and eliminate inconsistency.  It is important to explore further utilizing mindfulness-based interventions in this specific population considering anxiety is rapidly increasing. |

| Author/Year | Study Design | Sample | Mindfulness Intervention | Primary Outcomes | Results | Conclusion |
|---|---|---|---|---|---|---|
| **Yusufov et al. 2018** | Meta-Analysis | N=4400 Graduate and undergraduate students. | CBT, coping skills training, relaxation training, | Anxiety and Stress | Cognitive-behavioral therapy, coping skills, and social support interventions were more effective in reducing perceived stress, whereas relaxation training, MBSR, and psychoeducation were more effective in reducing anxiety. *p*<.001 | All techniques were effective in reducing stress-related outcomes |

RCT: Randomized Control Trial; MBSR: Mindfulness-Based Stress Reduction; CBT: Cognitive-Based Therapy; BSI; Brief Symptom Inventory

## Theoretical Framework

Based on results from the review of the literature, Lazarus and Folkman's Psychological Stress and Coping Theory (1986), also known as Transactional Model for Stress and Coping (Appendix A) was chosen as the theoretical framework for this project.  This theory highlights the transactional approach of stress which refers to a relationship with the environment that the person appraises as significant for his or her well-being and in which the demands tax or exceed available coping resources (Lazarus & Folkman, 1986).  This theory can be applied to SRNAs as the focus of the theory and the resultant self-awareness of how unmanaged stress and anxiety can lead to adverse consequences, which can ultimately impede their ability to become a certified registered nurse anesthetist (CRNA).  The theory predicts that mindfulness interventions will provide a gateway to decreased stress and anxiety in SRNAs that may subsequently improve self-awareness.

Grounded on Lazarus and Folkman's theory, which analyzes the role of personal control in stress and coping from the perspective of cognitive appraisal and coping (Folkman, 1984).  This theory posits that cognitive appraisal and coping, as mediators of stress related outcomes according to Folkman (1984), along with control as a generalized belief of an individual concerning the extent to which outcomes can be controlled.  Therefore, interventions must allow the SRNA to practice stress reduction and improved self-efficacy in a way that appraisals of personal control are likely to change throughout a stressful situation.  The use of mindfulness meditation as a technique to cope with stress helps alter thoughts and actions an individual applies to manage the external and/or internal demands of a specific environmental transaction that is appraised as stressful (Lazarus & Folkman, 1984).  Mindfulness can be viewed as a type of self-control strategy (Marlatt & Marques, 1977) to counteract stimuli that may aggravate

stress.  An appraisal is an assessment that categorizes the stressor according to the level of

importance and outcome.  An appraisal is a subjective process that is based on context, perceived

threat, and past experiences. Cognitive appraisal is subdivided into primary and secondary

appraisals.  Primary appraisal is the evaluation of a stressor perceived as a threat or challenge.

Secondary appraisal encompasses how one handles the stressor and the available resources to

manage the situation.  Individual differences and vulnerabilities effect the appraisal process and

the quality of emotions experienced (Lazarus & Folkman, 1984).  The utilization of mindfulness

meditation, grounded in the theoretical principles of Lazarus and Folkman's theory of stress and

coping, may ultimately decrease stress and anxiety, thus increasing self-awareness.

## Methods

The student participants were from both nurse anesthesia programs in Indiana slated to

graduate in year 2020 and 2021 and were recruited via email invitation sent by the administrative

assistant of Marian University Leighton School of Nursing Doctor of Nursing Practice program

and the program director of University of St. Francis Doctor of Nursing Practice program during

the 12th week of the spring semester.  The interested students gave their consent by accessing the

link to the survey (Appendix E).    All of the students were enrolled in at least 12 credit hours.

The student participants were provided instructions within the email to download the

Mindfulness App (Appendix B) and were asked to commit 10 minutes per day for 14 days.  This

activity was solely their decision as to how much time they invested in practicing mindfulness.

Confidentiality was maintained during the pre- and post-survey, as there were no identifiers

disclosed regarding the participants except to identify their age group, which nurse anesthesia

program they were enrolled in, and graduation year.  The administrative assistant re-administered

the PSS-14 to the student participants at the prescheduled time at the end of the semester

following final exams.

**Goals/Outcomes**

The objective of this project was to learn how a mindfulness intervention affected stress

levels in SRNAs, to utilize a mindfulness technique to decrease perceived stress and anxiety and

improve self-awareness through mindfulness meditation.  It is expected that a decrease in stress

and anxiety level will ultimately improve self-awareness, learning ability, and resiliency.  The

stakeholders included in this project are registered nurses who are pursuing graduate-level

education specializing in anesthesia.  According to the literature, students pursuing this

educational track, are at risk for increased stress and anxiety, which can ultimately have adverse

outcomes.  This intervention will objectively measure the result of mindfulness on the perceived

stress and anxiety levels.

**Project Participants**

The participants were recruited as a convenience sample and consisted of students who

are actively enrolled in the University's DNP program anesthesia track. SRNAs in Indiana from

the only two programs in the state in their first and second year of the program.  Both

universities are comprised of a total of 59 SRNAs.  The first year SRNAs (n=33) are currently in

the didactic portion of the program and have not started clinical rotations.  The second year

SRNAs (n=26) have begun clinical rotations as well as didactic courses.  The only restriction

was that participants were actively enrolled in one of the DNP nurse anesthesia programs in

Indiana.

Both programs are similar in many ways.  They offer the DNP as the terminal, 36-month

degree. Clinical rotations begin in the second year, and both programs have virtually the same

academic plan and credit requirements for degree completion.  Both programs are private and

faith-based, and neither are on medical campuses.  Also, both programs accepted their inaugural

class the same year.  Based on the curriculum in both programs, the 2020 cohorts was expected

to juggle didactic classes in addition to clinical rotations, while the 2021 cohorts were in didactic

classes without clinical rotations.  With the similarities, there are some slight differences in

admission criteria, Marian University requires a prerequisite online course in

statistics/epidemiology offered by the university and the University of St. Francis requires two

courses in chemistry.  Despite the differences, both programs have similarities that are rigorous,

intense and time-consuming.  This amount of rigor tends to awaken the stress response.  Lazarus

and Folkman's Theory of Stress and Coping provides a model that allows for recognizing the

stress, appraising it, and then utilizing a coping process to manage internal and external

demands.  Lazarus & Folkman (1986), explain that stress is a condition or feeling experienced

when one perceives that the demands exceed the personal and social resources of the individual's

ability to can handle.

**Protection of Human Subjects/Ethical Considerations**

The intervention project was reviewed by the Institutional Review Board of Marian

University and deemed to be exempt from the need for human subjects' protection (Appendix

C).  This DNP project does not pose a conflict of interest in either university.  The subjects were

self-selected and were not considered to be a vulnerable population, as no faculty were involved

in the project.  The literature supports this intervention and has found it to be effective.

Therefore, limited harm or risk to the participants is anticipated.  All data have been password

protected by the principal investigator.  Oversight of this project was done by the principal

investigator in collaboration with the faculty and project mentor(s).

**Perceived Barriers**

There are several possible barriers during the implementation that can be encountered. The study did not include any control group or randomization as the participants were self-selected.  The lack of this could create bias related to sampling and decreases the generalizability of findings.  The sample size will most likely prove to be a limitation of the project.  Initially, the project began with 14 participants; the goal throughout the 2-week project was that all participants were able to complete all elements of the project. Thus, only 10 participants completed the post survey. Other barriers are the inability to verify that the same participant(s) who completed the pre-survey also completed the post-survey; therefore, the ability to control compliance is limited.  Future studies may benefit from a design that includes randomization and a control group, increased number of participants, and instruction on the benefits of mindfulness interventions.

Providing the participants with a mobile phone application to download, proved to be a limitation as technology, skepticism, and distractions could be overpowering elements with the intervention.  Additionally, the aspects of the Mindfulness App demonstrated complexity as it had various features within the app.  The daily requirement of practicing mindfulness for two weeks posed another limitation as setting aside time every day was challenging.  Failure to understand the philosophy and functionality of mindfulness meditation could also lessen the benefits of the intervention.

**Data Collection**

The survey was administered electronically using school email accounts and data were collected using Qualtrics so that the calculations of the PSS-14 were available to the principal investigator.  The surveys were completed online, and participants were provided a link before

implementation and after implementation was complete.  The participants entered the data into

the survey via the link provided.  The pre-survey scores provided a baseline analysis of perceived

stress and anxiety and was utilized to determine the effect of the intervention.  After participating

in the intervention, a post-survey was sent to the participants via email following final exams.

Participants had approximately 14 days to complete the post-survey for definitive data collection.

**Instrument/Tool/Evaluation**

The Perceived Stress Scale (PSS-14) (see Appendix D) was utilized to measure the level

of perceived stress of the participants.  The PSS-14 was established by Sheldon Cohen and is

broadly regarded as a psychological instrument for evaluating stress perception (Cohen &

Williamson, 1988).  This tool was developed to measure the degree to which a situation is

perceived as stressful (Cohen, Kamarck, & Mermelstein, 1983).  This tool tends to exhibit

acceptable reliability across the literature. Specifically, items are designed to measure the extent

to which one's life is perceived as "unpredictable, uncontrollable, and overloading" (Cohen et

al., 1983).  The principal investigator asked the participants to complete the survey and indicate

on a 5-point Likert-type scale (0 = never to 4 = very often) as a reply to each question. The pre-

and post-survey took approximately 10 minutes each to complete and was distributed via an

online link with complete instructions (Appendix E). The outcomes in this pre/post assessment

are the aggregate scores of the PSS-14 post-intervention application and demonstration of a

change in perceived stress, anxiety, and self-awareness.

**Data Analysis**

Measurement approaches aim to encompass a quantitative analysis of PSS-14 scores to

compare stress and anxiety pre and post-intervention. Differences between the pre/post survey

item means for the 2020 cohort are reported in Table 2.  Differences between the pre/post survey

item means for the 2021 cohort are reported in Table 3.  Mean differences between the two

cohorts are reported in Table 4.  This aimed to determine if the difference in the mean between

the pre/post surveys would be zero.  To confirm that all the data were free of errors, Qualtrics

was used so that all questions had a predetermined response. The distribution of scores for each

test was determined and found to be standard by separating each cohort's responses.

### Results

The outcome measures for the project were assessed and based on the changes in the

scores from the PSS-14.  Descriptive statistics were used to evaluate patterns of perceived stress

as a result of participating in mindfulness medication via the Mindfulness app.  A total of 16

students were initially recruited and completed the pretest survey.  Six participants were

excluded from analysis because of failure to complete the post-survey.  As a result, ten

participants (n=10) completed both pre and post surveys.  Of the 10 participants, 60% (n=6) of

them were enrolled in didactic courses in addition to clinical rotations, and the other 40% (n=4)

were enrolled in didactic courses without clinical rotations.  There was not a noteworthy

difference in perceived stress between those who were in clinical rotations and those who were

not.

The results of the project for the 2020 cohort (Table 2) and the 2021 cohort (Table 3)

showed that self-reported perceived stress decreased stress overall.  Thus, there were substantial

decreases post intervention in how often stress was felt, increases in being control of situations,

staying on top of thing and accomplishing tasks.   Participants also reported a decrease in how

often they felt upset due to something that happened unexpectedly and an increase in how

confident they were in their ability to handle their personal problems.  The mean difference is

thought-provoking to note that utilizing mindfulness meditation for 10 minutes per day for two

weeks had a positive effect on all participants, despite where they were within the nurse anesthesia program.  Subsequently, the 2021 cohort showed a remarkable difference (Table 4) as it related to things going their way, coping with things that had to get done, and controlling the irritations of life.

**Table 2.** Cohort 2020 pre- and post-intervention means (n=8)

| Item | Pre-intervention | Post-intervention | Pre- to post-difference |
|---|---|---|---|
| 1. In the last month, how often have you been upset because of something that happened unexpectedly? | 3.0 (8) | 2.5 (6) | - 0.5 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life? | 2.8 (8) | 2.6 (6) | - 0.2 |
| 3. In the last month, how often have you felt nervous and "stressed"? | 3.9 (8) | 3.3 (6) | - 0.6 |
| 4. *In the last month, how often have you felt confident about your ability to handle your personal problems? | 3.6 (8) | 4.0 (6) | 0.4 |
| 5. *In the last month, how often have you felt that things were going your way? | 3.3 (8) | 3.8 (6) | 0.5 |
| 6. In the last month, how often have you found that you could not cope with all the things that you had to do? | 2.6 (8) | 2.5 (6) | - 0.1 |
| 7. *In the last month, how often have you how often have you been able to control irritations in your life? | 3.6 (8) | 3.7 (6) | 0.1 |
| 8. *In the last month, how often have you felt that you were on top of things? | 3.6 (8) | 4.1 (6) | 0.5 |

| Item | Pre-intervention | Post-intervention | Pre- to post-difference |
|---|---|---|---|
| 9. In the last month, how often have you been able to control the irritations in your life? | 2.8 (8) | 2.7 (6) | - 0.1 |
| 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? | 2.3 (8) | 2.2 (6) | - 0.1 |
| 11. In the last month, how often have you been angered because of things that happened that were outside of your control? | 2.8 (8) | 2.7 (6) | - 0.1 |
| 12. In the last month, how often have you found yourself thinking about things that you have to accomplish? | 4.8 (8) | 4.3 (6) | - 0.5 |
| 13. *In the last month, how often have you been able to control the way you spend your time? | 3.3 (8) | 3.4 (6) | 0.1 |
| 14. In the past month, how often have you felt difficulties were piling up so high that you could not overcome them? | 2.4 (8) | 2.4 (6) | 0 |

**NOTE**: Responses of two participants were excluded from reporting and analysis, because they were the only respondents from the second institution and did not complete the post-test survey. The responses consisted of a cohort (2020) who were in clinical rotations along with didactic courses. *Numbers 4, 5, 7, 8, and 13 are scored in reverse direction.

**Table 3:** Cohort 2020 pre- and post-intervention means (n=6)

| Item | Pre-intervention | Post-intervention | Pre- to post-difference |
|---|---|---|---|
| 1. In the last month, how often have you been upset because of something that happen unexpectedly? | 3.1 (6) | 2.4 (4) | - 0.7 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life? | 3 (6) | 2.6 (4) | - 0.4 |
| 3. In the last month, how often have you felt nervous and "stressed"? | 4 (6) | 3.3 (4) | - 0.7 |
| 4. *In the last month, how often have you felt confident about your ability to handle your personal problems? | 3.5 (6) | 3.9 (4) | 0.4 |
| 5. *In the last month, how often have you felt that things were going your way? | 3.2 (6) | 4.0 (4) | 0.8 |
| 6. In the last month, how often have you found that you could not cope with all the thing that you had to do? | 2.8 (6) | 2.4 (4) | - 0.4 |
| 7. *In the last month, how often have you how often have you been able to control irritations in your life? | 3.5 (6) | 3.9 (4) | 0.4 |
| 8. *In the last month, how often have you felt that you were on top of things? | 3.6 (6) | 4.1 (4) | 0.5 |
| 9. In the last month, how often have you been able to control the irritations in your life? | 2.9 (6) | 2.7 (4) | - 0.2 |

| Item | Pre-intervention | Post-intervention | Pre- to post-difference |
|---|---|---|---|
| 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? | 2.4 (6) | 2.2 (4) | - 0.2 |
| 11. In the last month, how often have you been angered because of things that happened that were outside of your control? | 2.8 (6) | 2.6 (4) | - 0.2 |
| 12. In the last month, how often have you found yourself thinking about things that you have to accomplish? | 4.7 (6) | 4.1 (4) | - 0.6 |
| 13. *In the last month, how often have you been able to control the way you spend your time? | 3.3 (6) | 3.6 (4) | 0.3 |
| 14. In the past month, how often have you felt difficulties were piling up so high that you could not overcome them? | 2.5 (6) | 2.4 (4) | - 0.1 |

**NOTE**: Responses of two participants were excluded from reporting and analysis, because they were the only respondents from the second institution and did not complete the post-test survey. The responses consisted of a cohort (2021) who were taking didactic courses without clinical rotations. *Numbers 4, 5, 7, 8, and 13 are scored in reverse direction.

**Table 4:** Mean differences comparison between Cohort 2020 and 2021 by item

| Item | 2020 difference | 2021 difference |
|---|---|---|
| 1. In the last month, how often have you been upset because of something that happen unexpectedly? | -0.5 | -0.7 |
| 2. In the last month, how often have you felt that you were unable to control the important things in your life? | -0.2 | -0.4 |
| 3. In the last month, how often have you felt nervous and "stressed"? | -0.6 | -0.7 |
| 4. *In the last month, how often have you felt confident about your ability to handle your personal problems? | 0.4 | 0.4 |
| 5. *In the last month, how often have you felt that things were going your way? | 0.5 | 0.8 |
| 6. In the last month, how often have you found that you could not cope with all the thing that you had to do? | -0.1 | -0.4 |
| 7. *In the last month, how often have you how often have you been able to control irritations in your life? | 0.1 | 0.4 |
| 8. *In the last month, how often have you felt that you were on top of things? | 0.5 | 0.5 |
| 9. In the last month, how often have you been able to control the irritations in your life? | -0.1 | -0.2 |
| 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? | -0.1 | -0.2 |

| Item | 2020 difference | 2021 difference |
|---|---|---|
| 11. In the last month, how often have you been angered because of things that happened that were outside of your control? | -0.1 | -0.2 |
| 12. In the last month, how often have you found yourself thinking about things that you have to accomplish? | -0.5 | -0.6 |
| 13. *In the last month, how often have you been able to control the way you spend your time? | 0.1 | 0.3 |
| 14. In the past month, how often have you felt difficulties were piling up so high that you could not overcome them? | 0 | -0.1 |

**NOTE**: *Numbers 4, 5, 7, 8, and 13 are scored in reverse direction.

**Discussion**

The principal objective of this project was to implement mindfulness meditation as an adjunct to decrease stress among nurse anesthesia students who encounter high stress in a rigorous and demanding program.  The sequential purpose of the project is to improve self-awareness using mindfulness meditation to mitigate the effects that come from increased stress. A two-week, 10-min per day mindfulness meditation via an app was implemented with initially 16 students from two cohorts. However, only 14 completed the entire program.  Overall, participants from both cohorts were able to engage in the project as intended.

The literature supports that other approaches to decrease anxiety, for example, biofeedback unaccompanied, decreases anxiety, but not stress levels.  Mindfulness interventions decreased anxiety, along with stress (Ratanasiripong et al., 2015).  Numerous MBSR programs have lengthy time commitments, which is an identified barrier.  The rigor of a nurse anesthesia program is vastly stressful, thus rendering time constraints on students.  Students would benefit from understanding the relevance of this intervention and its valuable effects on stress reduction. Warnecke et al. (2011), further substantiate that there is a sustained effect of using mindfulness. Their research was impacted by a small sample size; however, the use of mindfulness is still substantially supported.

Lazarus and Folkman's Theory of Stress and Coping focuses on the transactional approach to stress and coping, which identifies that a response to a stressor has two main components, an environmental relationship that is appraised as stressful, and an appraisal of how well the stressor can be managed (Lazarus & Folkman, 1984).  In this project, the rigors of nurse anesthesia education is the stressor, and this can be managed by SRNAs utilizing mindfulness interventions.

## Conclusion

SRNAs, at the doctoral level, are challenged with a demanding and stressful educational and clinical environment that reflects the current state of healthcare.  Nurse anesthesia education is both high stakes and overwhelming concerning knowledge acquisition and the development of clinical skills to deliver safe care.  To develop competent, capable, and resilient anesthesia providers to serve a challenging patient population is the challenge.

The intervention implemented was a Mindfulness-Based Stress Reduction program and was presented to a sample of Doctor of Nursing Practice nurse anesthesia students. Implementation was through the MINDFULNESS app and was composed of 10-minute daily meditations for a period of two weeks.  The techniques within the app focused on breathing and present moment awareness.  Their level of perceived stress was assessed by way of pre- and post-survey answers.  The association between the intervention and decreased perceived stress and increased self-awareness proved useful.  It is apparent that the use of mindfulness meditation positively affected the perceived stress levels and self-awareness of the students.  It would prove helpful to know if introduced at the beginning of the program in addition to utilizing a control group would pose a more significant effect.  This would be a suggestion in future research.  A program geared toward nurse anesthesia students specifically will be discussed and proposed as an adjunct to current Wellness Center offerings. This project will be presented upon request

High stress in an environment where optimal performance is paramount that SRNAs are receiving education and the clinical setting is not conducive to knowledge acquisition or the development of empathy.  Mindfulness interventions are necessary to promote what may be essential to deliver safe, anesthesia care.

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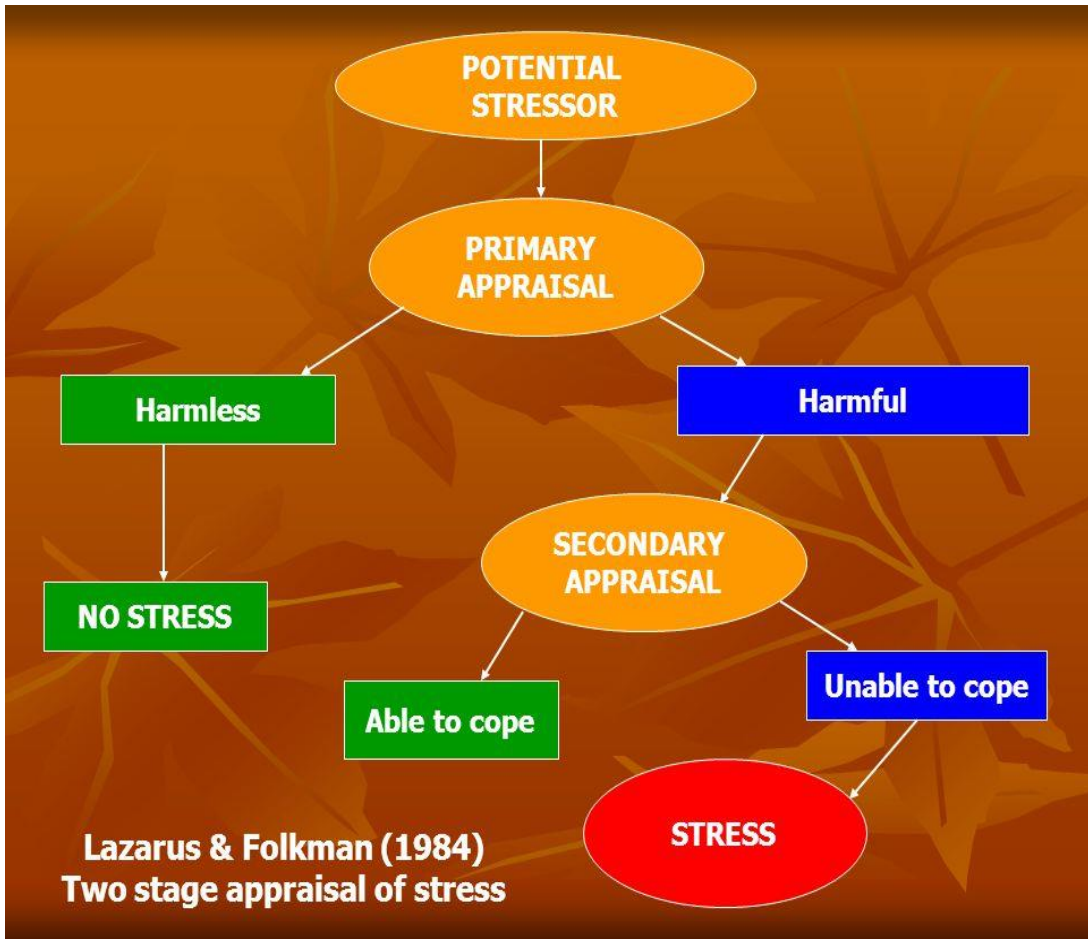
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Appendix A
Transactional Model for Stress and Coping



Lazarus & Folkman (1984)
Two stage appraisal of stress

Appendix B

Appendix C

# MARIAN UNIVERSITY
## ——— Indianapolis ———®

## *Institutional Review Board*

DATE:                    February 5, 2019

TO:                      Terineka Thompson

FROM:                    Marian University IRB

RE:                      IRB Protocol # S19.004

TITLE:                   Implementation of mindfulness meditation among nurse anesthesia students
                         to decrease stress and anxiety and improve self-awareness

SUBMISSION TYPE:         New Project

ACTION:                  Determination of Exempt Status

DECISION DATE:           February 1, 2019

The Institutional Review Board at Marian University has reviewed your protocol and has determined the procedures proposed are appropriate for exemption under the federal regulations. As such, there will be no further review of your protocol and you are cleared to proceed with your project. The protocol will remain on file with the Marian University IRB as a matter of record.

It is the responsibility of the PI (and, if applicable, the faculty supervisor) to inform the IRB if the procedures presented in this protocol are to be modified or if problems related to human research participants arise in connection with this project. Any procedural modifications must be evaluated by the IRB before being implemented, as some modifications may change the review status of this project. Please contact Karen Spear at (317) 955-6115 or kspear@marian.edu if you are unsure whether your proposed modification requires review. Proposed modifications should be addressed in writing to the IRB. Please reference the above IRB protocol number in any communication to the IRB regarding this project.

Although researchers for exempt studies are not required to complete online CITI training for research involving human subjects, the IRB **recommends** that they do so, particularly as a learning exercise in the case of student researchers. Information on CITI training can be found on the IRB's website: http://www.marian.edu/academics/institutional-review-board

*Karen L. Spear*
_____
Karen L. Spear, Ph.D., Interim-Chair, Marian University Institutional Review Board

Appendix D

**The Perceived Stress Scale (14 items) - Cohen et al, 1983**

*Recommended by The NIH Centers for Population Health and Health Disparities (CPHHD)-Measures and Methods Work Group (MMWG)*
**CPHHD Taxonomy- <u>Health and Mental Health [Well-being]-stress</u> & <u>hypervigilance-Perceived Stress</u>**

*Also recommended by MacArthur Foundation (see <u>http://www.macses.ucsf.edu/research/psychosocial/stress.php#perceived</u>)*

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control important things in your life?
3. In the last month, how often have you felt nervous and  "stressed"?
4. In the last month, how often have you dealt successfully with irritating life hassles?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

[0=never; 1=almost never; 2=sometimes; 3=fairly often; 4=very often]

*Note: Items 4, 5, 6, 7, 9, 10, and 13 are scored in reverse direction.*

Appendix E

Dear fellow SRNAs,

You are invited to participate in a research study titled "Implementation of mindfulness meditation among nurse anesthesia students to decrease stress and anxiety and improve self-awareness."

This study is being conducted by Terineka Thompson, principal investigator and student registered nurse anesthetist at Marian University. The purpose of this survey is to examine the prevalence of mindfulness meditation in nurse anesthesia programs and to determine student stress levels and perceived self-awareness. You are being asked to take part in this study because you are a student in a Nurse Anesthesia program in Indiana.

The survey consists of 17 multiple choice questions with the last three questions relating to demographics for group comparison.

Once the survey has been completed, please download the **MINDFULNESS APP** to your mobile device, available for iPhone and Android users.  This phase of the project consists of utilizing the app **DAILY for 14 days** via timed sessions for 10 minutes each day.  There will be a follow up survey sent via email after final exams.

**Pre and post surveys will take approximately 10 minutes each to complete.**

Participation in this study is entirely voluntary. You can choose not to participate at all, decline to answer any of the questions, or discontinue participation and not submit the online survey. Regardless of your decision, there will be no effect on your relationship with the researcher, Marian University or University of St. Francis.

If you agree to participate, you are asked to fill out an online survey – the link to the survey is provided below.  All the responses to this survey will remain anonymous. Once you submit your completed survey, there will be no way to withdraw your responses from the study. Results of the survey will be provided to the Principal Investigator.

If you have any questions regarding the survey, the mindfulness app, or this research project in general, please contact the principal investigator, Terineka Thompson via email at tthompson607@marian.edu or her advisors Memory Mdlongwa at memorym@umaryland.edu or Stacie Hitt at sfhitt@marian.edu.

By completing and submitting this survey, you are indicating your consent to participate in this study.  Note: This invitation does not imply any endorsement of the survey, research and/or its findings by Marian University, University of St. Francis, INANA or AANA.   The survey contents and findings are the sole responsibility of the individual conducting the study.

Sincerely,

Terineka Thompson, SRNA, Doctoral Candidate, Marian University

Your feedback is humbly requested by April 24, 2019.  To start the survey, please follow the link below.
https://marian.co1.qualtrics.com/jfe/form/SV_eJbtuxFgHOeqO5T