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# The Effects of Meditation in Lowering Blood Pressure and Reducing Symptoms of Stress in Baccalaureate Nursing Students

Isabella Fleming

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The University of Southern Mississippi

Honors College Thesis: The Effects of Meditation in Lowering Blood Pressure and  
Reducing Symptoms of Stress in Baccalaureate Nursing Students

by Isabella Fleming

A Thesis  
Submitted to the Honors College of  
The University of Southern Mississippi  
in Partial Fulfillment  
of Honors Requirements

April 2019



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## Abstract

Hypertension and stress are two conditions that have the capability to cause extensive and long-term damage to both mental and physical health. Baccalaureate nursing students report high levels of stress while in the process of obtaining a degree. This population is at risk for consistently high stress levels; therefore, they are also at risk for physiologic complications of stress such as hypertension.

In this study, all participants were asked to complete two short surveys: one assessed their stress, and one survey assessed their perceptions of meditation. The blood pressure (BP) of all participants was measured as well. Once the surveys and BP measurements were done, the participant group was split into two. One-half of the participants sat quietly in a room while the other half of the participants completed a meditation session. At the completion of the study, all participants reconvened to complete the post-test surveys and receive another set of blood pressure readings.

The results of this study indicated that mindfulness meditation can be used to decrease both blood pressure levels and symptoms of stress in baccalaureate nursing students at the University of Southern Mississippi College of Nursing (USM CON). When compared to the control group, those that participated in meditation experienced an overall greater decrease in both systolic blood pressure (SBP) and diastolic blood pressure (DBP) as well as perceived stress. Further research is needed to determine the greater implications of mindfulness meditation in these treatment modalities; however, the results are promising.

Key Words: hypertension, stress, nursing students, meditation, mindfulness



## Dedication

To my beautiful friends and family:

Thank you for your unwavering love and kindness.

You are the best humans, and I am grateful for the support you've given me.

## Acknowledgements

I would like to take a moment to thank my thesis advisor, Ashley Krebs, for her support and guidance in mentoring me during the process of completing this study. This piece of work would not have been possible had it not been for her leadership, patience, and kindness. Thank you for everything.

I would also like to thank Daniel Capper whose instruction allowed for a seamless transition for a beginner in meditation. Your willingness to help with this study, expert guidance, and patience were very appreciated.

Additionally, I pay special thanks to the faculty of The Honors College and The College of Nursing and Health Professions. During my years at The University of Southern Mississippi, their support meant so much to me.



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## LIST OF ABBREVIATIONS

BSN- Bachelor of Science in Nursing

CDC-Centers for Disease Control

CON- College of Nursing

BP- Blood pressure

SBP- Systolic blood pressure

DBP- Diastolic blood pressure

MM- Mindfulness meditation

DASH- Dietary Approaches to Stop Hypertension

RCT- Randomized Control Trials

USM- University of Southern Mississippi

## **Chapter 1: Introduction**

Hypertension is defined as a systolic blood pressure (SBP) of 140 mm Hg or higher or a diastolic blood pressure (DBP) of 90 mm Hg or higher. In order to be diagnosed with hypertension, the individual must present with these readings in two or more blood pressure measurements that occur one to four weeks apart. These blood pressure readings must be taken by a healthcare provider in order to be recorded as hypertension (Hinkle, Brunner, Cheever, & Suddarth, 2014).

There are several different stages of hypertension, and each stage corresponds with different comorbidities or complications with ranging severity. The higher the blood pressure, the more associated health risks. The Joint National Committee defines a normal and healthy blood pressure to be anything below 120/80. Prehypertensive ranges include an SBP of 120-139 or a DBP of 80-89. In order to be diagnosed with stage 1 hypertension, the individual must have records of an SBP of 140-159, or a DBP of 90-99. In order to be diagnosed with stage 2 hypertension, the individual must have records of an SBP of 160 or greater, or a DBP of 100 or greater (Hinkle et al., 2014).

The Centers for Disease Control and Prevention (CDC, 2019) reports that approximately 75 million American adults are currently diagnosed with hypertension; this means that about 32% of the adult population in the United States has hypertension or one in three adults. Beyond this, one in three American adults fall into the prehypertension range- this means that their blood pressure is not in hypertension ranges yet but is higher than normal. Therefore, only one in three American adults have a blood pressure in the healthy range of less than 120/80 (CDC, 2019).

The prevalence of hypertension varies by gender and race. The prevalence of

hypertension in America is as follows: 30% in Hispanic men, 30% in Hispanic women, 32% in Caucasian men, 30% in Caucasian women, 45% in African American men, and 46% in African American women (Hinkle et al., 2014).

Current treatment for hypertension is aimed at lifestyle modifications, pharmacological therapy, and if complications arise, surgery. Lifestyle modifications include weight loss, cessation of alcohol and tobacco use, reduction of sodium intake, regular exercise, and the implementation of a diet high in fruits, vegetables, and low-fat dairy products. If the individual presents with a blood pressure that is in the lower ranges of hypertension, the physician may try lifestyle modification before implementing pharmacological therapy (Hinkle et al., 2014). The Dietary Approaches to Stop Hypertension (DASH) diet includes a diet rich in fruits, vegetables, whole grains, low-fat or fat-free dairy products, and lean meats or fish; this diet is often used by doctors to attempt to lower blood pressure in patients who are borderline hypertensive (Hinkle et al., 2014). Pharmacologic therapy for the treatment of hypertension currently includes the following classes of medications: diuretics, aldosterone receptor blockers, beta blockers, alpha 1 blockers, central alpha 2 agonists, vasodilators, angiotensin-converting enzyme inhibitors, angiotensin II receptor blockers, calcium channel blockers, and direct renin inhibitors (Hinkle et al., 2014). Each medication comes with the risk for adverse effects, and these vary from medication to medication.

Hypertension is often dubbed the “silent killer” because many patients do not exhibit symptoms until severe damage to the body has occurred. Complications of hypertension include: left ventricular hypertrophy, stroke, myocardial infarction, heart failure, transient ischemic attack, cerebrovascular disease, renal insufficiency, chronic

kidney disease, retinal hemorrhage, and several other conditions (Hinkle et al., 2014). Hypertension often occurs with several other disease processes. Hypertension is often accompanied by atherosclerotic cardiovascular disease, dyslipidemia, obesity, diabetes, metabolic syndrome, a sedentary lifestyle, and sleep apnea. If the blood pressure remains in unhealthy ranges, blood vessels throughout the body are constantly damaged. The blood vessels in the heart, kidneys, brain, and eyes are particularly damaged. Prolonged hypertension along with prolonged damage to the blood vessels and associated organ systems can lead to complications such as heart failure, stroke, and death (Hinkle et al., 2014).

Although there are many treatment modalities available for the management of all stages of hypertension, this disease process remains a “silent killer” in America. Of the 32% of the American adult population that is currently diagnosed with hypertension, only about half of them (54%) have their blood pressure under control (CDC, 2019). In 2017, 32-38.6% of adults in Mississippi aged 20 or older reported that they are diagnosed with hypertension. In 2014, unhealthy blood pressure was a primary or contributing cause of death for 410,000 American adults (CDC, 2019). Thus, hypertension is an urgent and severe medical issue that must be treated aggressively and quickly.

Nursing is a high-stress career, and nursing school is no exception. Many studies have found that nursing students experience higher-than-normal levels of stress while completing their nursing degree program (Senturk & Dogan, 2018; Song & Lindquist, 2015; Khater, Akhu-Zaheya, & Shaban, 2014). Nursing students experience stress in both the academic setting and the clinical setting which leads to an overall increase in stress when compared to individuals not in nursing school (Senturk & Dogan, 2018). Stressors

in nursing school include factors such as: taking care of patients, the high workload and number of assignments, the hospital environment, competition from peers, pressure from teachers, discrepancies between nursing theory and practice, high expectations, and the enormous responsibility in the clinical setting (Khater et al., 2014). When students are under extreme stress in both the academic and the clinical setting, they are at risk of providing decreased quality of patient care; therefore, allowing for more opportunity for errors. It is important that student nurses can manage their stress and anxiety in order to increase their patient care effectiveness (Song & Lindquist, 2015).

Research to determine the link between psychosocial stress and high blood pressure levels has increased, and current literature strongly supports the possibility of psychosocial stress functioning as a risk factor for the development of hypertension (Touissant, Shields, Dorn, & Slavich, 2014; Spruill, 2010). A recent study found that individuals with higher levels of psychosocial stress experience an increased risk of high blood pressure (Liu, Li, N., Li, W.A., & Khan, 2017). It is also significant to note that a 2017 study found that hypertensive individuals were more likely to experience psychosocial stress; thus, it is reasonable to believe that psychosocial stress and hypertension may have a correlational relationship (Liu et al., 2017). Further research should be done to confirm the link between psychosocial stress and chronic hypertension.

A 2014 analysis reviewed the literature from 2010-2014 surrounding psychosocial stress and its link to hypertension. This analysis reviewed 21 articles, and researchers were able to indicate the following possible psychosocial risk factors for the development of hypertension: occupational stress, mental health, personality, housing instability, social support/isolation, and sleep quality (Cuffee, Ogedegbe, C., Williams, Ogedegbe, G., &



Schoenthaler, 2014). The studies examining mental health and personality as psychosocial risk factors for hypertension had mixed reviews, but the remaining risk factors were significantly associated with an increased risk for hypertension (Cuffee et al., 2014). Nursing students may be at risk for decreased sleep quality, occupational stress, and/or social support/isolation. Further research is suggested to draw strong conclusions about the incidence of these risk factors and hypertension.

Because nursing students usually experience higher-than-normal levels of stress, it is reasonable to hypothesize that this population may also be at risk for higher-than-normal blood pressure levels which puts them at risk for the dangerous complications of hypertension. It is important that student nurses manage their stress and keep their blood pressure levels in healthy ranges.

Mindfulness meditation is a form of meditation in which the individual practices mindfulness which is the phenomena of being hyper-aware of one's surroundings, thoughts, and feelings (Hilton et al., 2016). When practicing mindfulness meditation, the individual pays attention to the present moment and refocuses their thoughts and actions accordingly. This practice of detached observation of both internal thoughts and external environment allows for the fullest experience of the present moment (Hilton et al., 2016). Current research is being performed to assess whether mindfulness meditation can impact levels of stress or blood pressure, but many studies support the use of meditation in both blood pressure and stress reduction (Chen, Yang, Wang, & Zhang, 2013; Razon, Pickard, McCown, & Reed, 2018; Shi et al., 2017).

The purpose of this study was to assess whether mindfulness meditation can be used to decrease blood pressure levels and/or decrease levels of perceived stress in

6

baccalaureate nursing students. Thirteen participants of the baccalaureate nursing program at the University of Southern Mississippi participated in either a session of mindfulness meditation or a moment of quiet sitting. The blood pressure and stress levels of each group were assessed before and after. The results supported the hypothesis that mindfulness meditation may be used to decrease blood pressure and/or decrease levels of perceived stress in baccalaureate nursing students, but further research must be done on the subject.

## Chapter 2: Review of the Literature

Mindfulness meditation, a practice of intentional internal and external mindfulness, or awareness of reality, has been examined for many health-related benefits. Although there is growing literature on the use of mindfulness meditation, there is not substantial research regarding the effects of mindfulness meditation in nursing students specifically. Nursing students experience an increased level of stress when compared to the average college student and will be faced with the stresses of functioning as a nurse upon graduation (Senturk & Dogan, 2018). As discussed in Chapter 1, stressors in nursing school include factors such as taking care of patients, the high workload and number of assignments, lack of professional skills, the hospital environment, competition from peers, pressure from teachers, discrepancies between nursing theory and practice, high expectations, and the enormous responsibility in the clinical setting (Khater et al., 2014).

The link between psychosocial stress and hypertension has been supported by studies that examine stress as a risk factor for increased blood pressure levels (Touissant et al., 2014; Spruill, 2010). As discussed in Chapter 1, individuals with higher levels of psychosocial stress experience an increased risk of high blood pressure (Liu et al., 2017). A 2017 study found that hypertensive individuals were more likely to experience psychosocial stress; thus, it is reasonable to believe that psychosocial stress and hypertension must have a correlational relationship (Liu et al., 2017). In a 2014 meta-analysis discussed in Chapter 1, researchers were able to indicate the following possible psychosocial risk factors for the development of hypertension: occupational stress, mental health, personality, housing instability, social support/isolation, and sleep quality

(Cuffee et al., 2014). The studies examining mental health and personality as psychosocial risk factors for hypertension had mixed reviews, but the remaining risk factors were significantly associated with an increased risk for hypertension (Cuffee et al., 2014). Due to the rigorous academic workload, students may be at risk for decreased sleep quality, occupational stress, and/or social support/isolation.

Mindfulness meditation is currently a topic of many studies, some of which assess its use for treating conditions such as hypertension, chronic stress, pain, and anxiety reduction (Chen et al., 2013; Razon et al., 2018; Shi et al., 2017). The purpose of this study was to assess the effects of mindfulness meditation in lowering blood pressure and/or perceived stress levels in baccalaureate nursing students which is a population that frequently experiences increased levels of stress.

Although it is important to note that nursing programs likely vary greatly internationally, current research in other countries can allow for insight into the use of meditation in nursing students. In a 2013 study in China, researchers used a sample size of 60 nursing students (Chen et al., 2013). Participants underwent a seven-day-long meditation program in which participants completed a session of mindfulness meditation for approximately 30 minutes each day. Participants were separated into a 30-person control group which the remaining 30 participants completed the meditation sessions. Participants were given self-rating scales for both anxiety and depression, and both heart rate and blood pressure were measured before and after implementation. Results indicated that mindfulness meditation was useful in reducing self-rated anxiety but not useful in reducing self-rated depression. Systolic blood pressure was reduced more in the meditation group when compared to the control group with an average reduction of 2.2

mm Hg. Researchers concluded that brief mindfulness meditation was useful in reducing both self-rated anxiety and systolic blood pressure in Chinese nursing students (Chen et al., 2013). When a group of 89 nursing students in Thailand underwent a study regarding the use of biofeedback and meditation in reducing anxiety and stress, researchers found that both biofeedback and meditation decreased both anxiety and stress levels (Ratanasiripong, P., Park, Ratanasiripong, N., & Kathalae, 2015).

In a 2015 study in Korea, nursing students completed an eight-week long mindfulness meditation program in which they meditated for two hours each week. When compared to the control group, the students who participated in meditation experienced significantly greater decreases in depression, anxiety, and stress (Song & Lindquist, 2015). This study supported the use of meditation as an intervention to decrease stress levels in nursing students specifically. Another 2015 study compared physical activity and mindfulness meditation to assess each activity's usefulness as a stress reduction technique. In this long-term study, meditation was found to be just as effective as physical exercise was in reducing stress levels (van der Swan, de Vente, Huizink, Bogels, & de Bruin, 2015).

A narrative synthesis performed in 2016 examined current literature on the use of mindfulness meditation in reducing stress, anxiety, and depression in college students. This study examined 57 studies on mindfulness meditation to assess its overall efficacy in stress reduction. Researchers found that mindfulness meditation was effective in decreasing stress in 78% of the studies reviewed. In the studies in which mindfulness was an outcome, mindfulness increased by 94%. Physiologic signs of stress, such as blood pressure readings, had inconsistent results, and researchers noted that further studies must

be done in order to deem mindfulness meditation a useful technique in treating physiologic signs of stress (Bamber & Schneider, 2016). Thus, current research supports the use of mindfulness meditation as a technique to reduce stress levels in college students which includes baccalaureate nursing students.

There is increasing research that supports the idea that psychosocial stress can contribute to the development of hypertension; thus, it is reasonable to believe that they must both be treated in order to reduce risk for complications and minimize damage to physical and/or mental health (Spruill, 2010). In recent studies, greater total lifetime stress was linked with an increased incidence of both physical and mental health symptoms (Touissant et al., 2014; Spruill, 2010).

A 2017 meta-analysis of randomized clinical trials (RCT) on the connection between meditation and blood pressure yielded promising results. This meta-analysis analyzed RCTs from 1980-2015 that assessed the use of meditation in lowering both SBP and DBP. The pooled results from the applicable studies that used non-ambulatory blood pressure measurements, similar to the methods of this study, showed that meditation decreased SBP by about five, and decreased DBP by about 2.5 (Shi et al., 2017). Thus, this study supported the use of meditation as a blood pressure reduction technique; however, this meta-analysis was not specific to mindfulness meditation. Researchers noted that further studies must be done in order to support the use of mindfulness meditation in reducing blood pressure.

More recently, researchers have explored the use of mindfulness meditation in blood pressure reduction. In a 2018 study, participants completed a six-week-long mindfulness meditation program, in which heart rate and blood pressure were assessed

before and after meditation sessions. In both the first day of the study and the last day of the study, it was found that blood pressure decreased after the completion of a meditation session. Thus, this supports the idea that mindfulness meditation may be useful in reducing the physiologic symptoms of stress, such as an elevated blood pressure, in college students (Razon et al., 2018).

Overall, existing research supports the use of meditation as a stress-reduction technique, but further research must be done in the population of baccalaureate nursing students in order to determine the efficacy of meditation as a stress-reducer in this population. Additionally, existing research supports the use of meditation in reducing blood pressure levels; however, research is needed in the population of baccalaureate nursing students.

### **Chapter 3: Methodology**

This study involved a one-day meditation session with half of the participants completing the meditation session and half of the participants functioning as a control group by sitting quietly in a room. This study required that participants were actively enrolled in the University of Southern Mississippi's baccalaureate nursing program, and that they were senior level students. Data regarding participants' perceived stress levels, perceived impact of stress on daily life, perceived success of coping mechanisms, and opinion on meditation was gathered before and after the session. Data regarding the participants' blood pressure was also gathered before and after the session.

Participants were asked to sign-in on a numbered sign-in sheet. The number beside their name was then used on all corresponding data collection tools. No names were used on any information to protect the participants' confidentiality.

Before beginning, the study was fully explained, and participants were welcomed to ask questions or voice concerns. Informed consent was obtained, and participants were informed that participation was voluntary, anyone could leave the study at any point in time, and that there were no anticipated risks involved in participating. The only incentive offered for completing this study was a free meal that would be provided after the study's completion, and the participants were reminded that their participation in this study was optional.

Participants were given a set of two surveys to complete before the study began. One survey assessed the participant's current stress levels, their perceived effect of stress on their lives, their perceived effectiveness of coping mechanisms, etc. The second survey assessed their opinions on meditation and their opinions on the efficacy of



meditation as a treatment for blood pressure and stress, etc. Participants were also given a demographic survey which gathered information on the age, race, gender, and academic standing in the nursing program.

Before the participants were separated between the control group and the meditation group, blood pressure readings were taken. Blood pressure was measured using a portable automatic device called a Dinamap. All participants were asked to sit quietly without their legs crossed while the blood pressure reading was being obtained to ensure accuracy in readings. While moving from participant to participant, it was ensured that the blood pressure cuff was fully deflated to ensure accuracy in readings.

Once the surveys had been completed and the initial blood pressure readings had been recorded, the participants were divided into a control group and a meditation group. Of the 13 participants, the even-numbered participants were asked to step outside and into a classroom across the hall. They were informed that they would function as the control group for the study, and they were instructed to sit quietly for the duration of the study. Of the 13 participants, the odd-numbered participants were informed that they would participate in the meditation session. Thus, the control group consisted of six participants, including participants 2, 4, 6, 8, 10, and 12, while the meditation group consisted of seven participants, including participants 1, 3, 5, 7, 9, 11, and 13.

Professor Daniel Capper, a religion professor at the University of Southern Mississippi, provided brief and simple instruction on how to participate in mindfulness meditation. He instructed participants on posture, breathing techniques, body mechanics, and techniques on focusing thoughts to be as mindful as possible. Participants were encouraged to remain as still as they could while remaining comfortable and were asked

to refrain from leaving the room if possible. Once the participants had received instruction on the meditation session, they sat quietly for approximately 15 minutes of silent meditation. There was no talking, there were no other individuals leaving or entering the room, and there were no distracting sounds or sights.

Once the meditation session was over, participants from the control group were asked to quietly return to the room so that all participants were in the same room. Once all 13 participants had returned to the same classroom, they were instructed to complete surveys. These surveys were copies of the same surveys they had taken before the session. One survey assessed the patient's current stress levels, their perceived effect of stress on their lives, their perceived effectiveness of coping mechanisms, etc. The second survey assessed their opinions on meditation, their opinions on the efficacy of meditation as a treatment for blood pressure and stress, etc.

As the participants were completing the surveys, their blood pressure was once again taken using the Dinamap. Just as before, the participants were asked to sit quietly without their legs crossed to ensure an accurate blood pressure reading. Once all participants had completed the surveys and received a blood pressure reading, participants were welcomed to ask any questions or voice any concerns. After this, participants were led to another room where the incentive, a free meal, was waiting for them.

## **Chapter 4: Results**

### **Demographics**

This study consisted of 13 participants. Of the 13 participants, the majority were ages 21 and 22. Eight participants were ages 21-22, four participants were ages 23-24, and one participant was age 25 or older. All 13 participants were senior baccalaureate nursing students in the fifth level at the University of Southern Mississippi College of Nursing. Of the 13 participants, two had repeated a class while in the nursing program. This was significant because the University of Southern Mississippi College of Nursing only allows students to repeat two classes- if the student fails any more classes, they are dropped from the program. It is reasonable to believe that repeating a class would be a significant cause of stress in a baccalaureate nursing student. Of the 13 participants, five were male and eight were female. Twelve of the participants were Caucasian and one was Asian or Pacific Islander.

### **Self-reported Stress and Coping**

Before beginning the sessions, the participants were asked to complete two questionnaires regarding their perceived stress levels and perceived ability to cope with that stress. All 13 participants reported that they feel stressed on a weekly basis, while 12 of the 13 participants reported feeling stressed daily. Only five of the 13 participants reported that they feel as if they have effective coping mechanisms to manage their stress. Six of the seven participants reported that they did not have effective coping mechanisms to manage their stress, and the remaining two participants were undecided on this topic. Although these facts are self-reported, it is significant to note that 100% of this population reported weekly stress, and approximately 92% reported daily stress, with

only 38% of this population reporting feeling as if they have their stress under control.

### **Stereotypes and Meditation**

Before beginning the sessions, participants were asked to complete several questions regarding their perceptions of stereotypes surrounding meditation, and the impact of these stereotypes on their participation in meditation. Twelve of the 13 participants agreed with the theme that there are stereotypes associated with the idea of meditation, while one participant remained undecided on this fact. Of the 13 participants, six agreed that the stereotypes surrounding meditation had prevented them from pursuing the subject. The other seven participants disagreed with this, noting that the stereotypes associated with meditation had not prevented them from pursuing the subject.

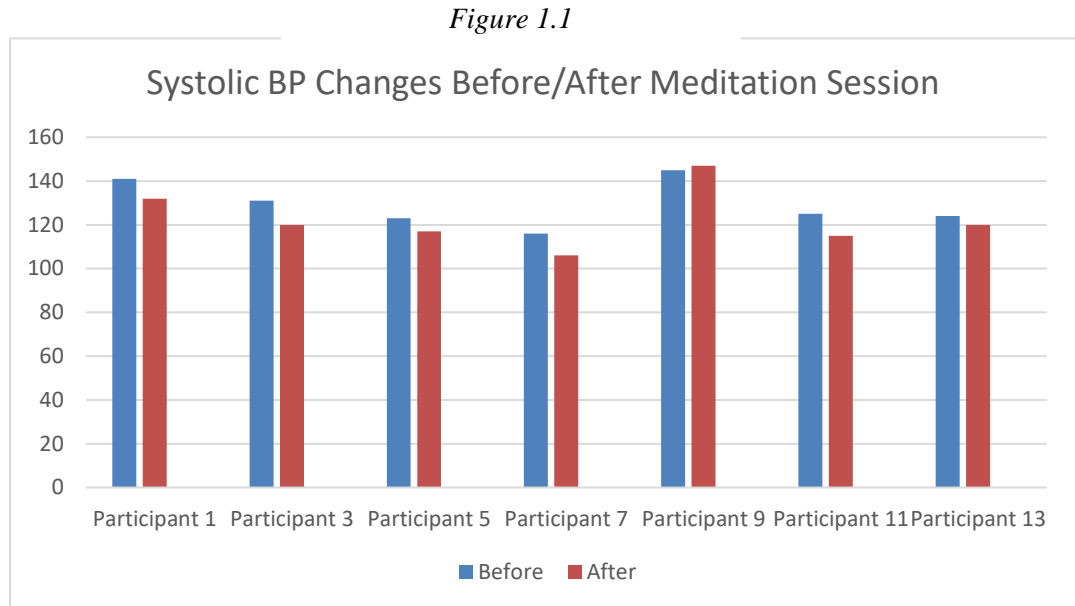
### **Blood Pressure Changes**

Changes in systolic blood pressure were assessed in both the control group and the meditation group. Of the six participants in the control group, three participants had a decrease in SBP with an average decrease of 8 mm Hg in those three participants. In the control group, three participants had an increase in blood pressure with an average increase of 26 mm Hg in those three individuals. These results can be seen in *Figure 1.2*. Thus, 50% of the control group experienced a decrease in blood pressure after sitting quietly in a room while the meditation group participated in meditation.

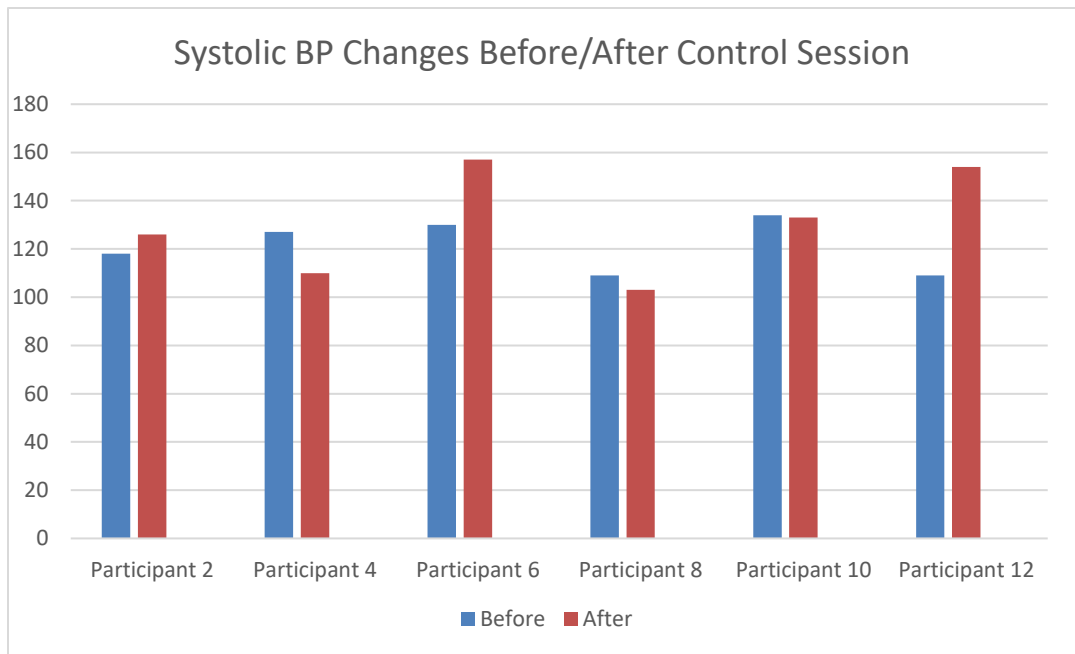
The meditation group had seven participants. Of the seven participants, six experienced a decrease in systolic blood pressure. Of the six participants of the meditation group who experienced a decrease in SBP, there was an average SBP decrease of 8.3 mm Hg. In the meditation group, one participant experienced an increase in systolic blood pressure with an increase of 2 mm Hg. Thus, approximately 85% of the

meditation group experienced a decrease in SBP, with an average decrease of 8.3 mm Hg in the six participants who experienced a decrease in SBP. These results can be seen in

*Figure 1.1.*



*Figure 1.2*

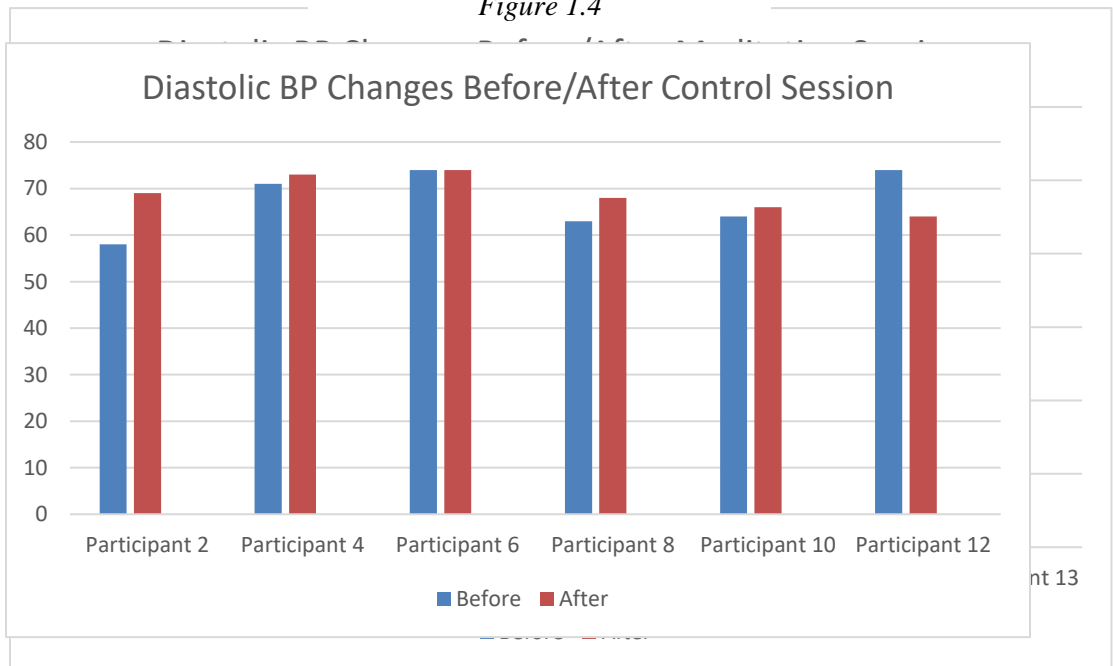


Changes in diastolic blood pressure were also assessed. Of the six participants in the control group, one participant experienced a decrease in diastolic blood pressure with

a decrease of 10 mm Hg. One participant’s diastolic blood pressure did not change from the blood pressure reading taken before the control session. Four participants experienced an increase in diastolic blood pressure, with an average increase of 5 mm Hg for those four individuals. Thus, approximately 16.7% of the participants in the control group experienced a decrease in diastolic blood pressure after sitting quietly in a room with an average decrease of 10 mm Hg. These results can be seen in *Figure 1.4*.

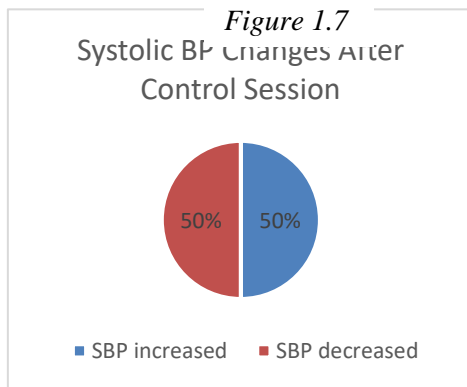
Of the seven participants in the meditation group, five participants experienced a decrease in diastolic blood pressure, with an average decrease of 6.6 mm Hg in these participants. Two participants experienced an increase in diastolic blood pressure with an average increase of 5 mm Hg in these participants. Thus, approximately 71% of the participants in the meditation group experienced a decrease in diastolic blood pressure with an average decrease of 6.6 mm Hg. These results can be seen in *Figure 1.3*.

Figure 1.4

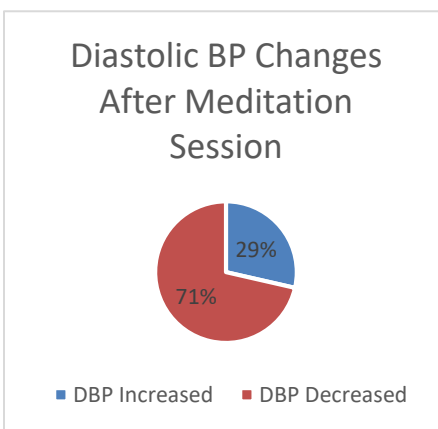
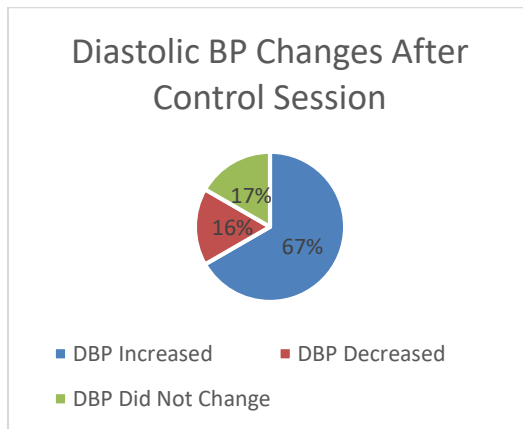
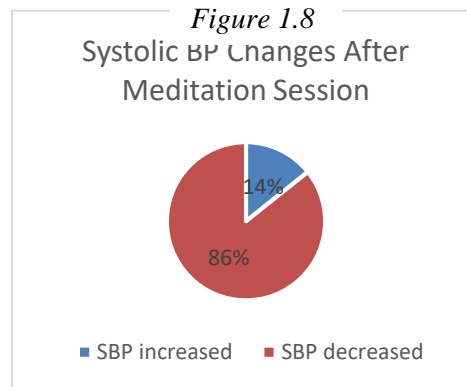


In sum, the participants of the meditation group experienced a greater decrease in both SBP and DBP. Approximately 85% of the meditation group experienced a decrease in SBP with an average decrease of 8.3 mm Hg. Approximately 71% of the meditation group experienced a decrease in DBP, with an average decrease of 6.6 mm Hg. 50% of the control group experienced a decrease in SBP with an average decrease of 8 mm Hg. 17% of the control group experienced a decrease in DBP with an average decrease of 10 mm Hg. These changes can be seen in *Figures 1.5, 1.6, 1.7, and 1.8*.

*Figure 1.5*



*Figure 1.6*



### Changes in Perceived Stress Levels

Of the six members of the control group, five reported that they felt stressed before beginning the control session of quiet sitting. At that time, one of the six reported

that they did not currently feel stressed. After the control session was completed, four of the six reported that they still felt stressed, and two were undecided. Approximately 83% of the control population felt stressed before the session, and approximately 67% of the control population felt stressed after the session. Since two of the six members of the control group were undecided on their stress level after the control session, it cannot be assumed that the control session was successful in decreasing perceived stress levels.

Of the seven members of the meditation group, six reported that they felt stressed before beginning the meditation session. At that time, one of the seven reported that they did not currently feel stressed. After the meditation session was completed, six of the seven participants reported that they no longer felt stressed, and one participant was undecided. It should be noted that one of the participants reported no perceived stress before or after the meditation session; therefore, it cannot be assessed whether the session affected this specific participant's perceived stress level. Approximately 86% of the meditation group felt stressed before the session, and 0% of the participants in the meditation session reported feeling stressed after the session. Thus, the meditation session was successful in reducing perceived stress levels in this population.

Of the seven members of the meditation group, all seven either agreed or strongly agreed with the statement "I feel less stressed after meditating." All seven members of this group also reported that they would like to meditate again after attending this session. Therefore, the meditation session allowed for a decreased perception of stress in this population.



## **Chapter 5: Discussion**

### **Research Questions and Hypotheses**

The hypothesis that mindfulness meditation can be used to decrease blood pressure levels was supported by this study. The participants of the meditation group experienced a greater overall decrease in both SBP and DBP than those in the control group. The hypothesis that mindfulness meditation can be used to decrease perceived stress levels was supported by this study.

Future research should focus on the use of long-term mindfulness meditation in decreasing long-term blood pressure levels. Research questions include the following: Can mindfulness meditation alone reduce blood pressure? Can mindfulness meditation reduce blood pressure so significantly that it can return participants with previously unhealthy blood pressure levels into healthy blood pressure ranges? Can mindfulness meditation be used as a long-term treatment for high blood pressure? Does meditation have any other physiologic effects on the body in relation to stress reduction?

### **Limitations**

It should be noted that a significant limitation included the number of participants in this study. This study only included 13 participants, and a greater population would have allowed for a more conclusive assessment of the efficacy of mindfulness meditation in reducing stress and/or blood pressure. The small sample size provided opportunity for any errors to hold more weight in the statistics; therefore, allowing for a greater possibility of skewed statistics. If the study had included a larger sample size, it may have more accurately represented senior baccalaureate nursing students and allowed for increased generalizability of results.

In addition, this study was only one day long, and for many participants, it was their first experience with meditation. If the study had been conducted over time, participants may have felt more comfortable with meditation and may have been more mindful. Another limitation was the limited time the participants experienced mindfulness. While mindfulness did decrease stress levels, a study over time would have allowed for better understanding of how to utilize mindfulness and data collected over time would be more useful.

Although all participants were given instructions to sit quietly while receiving a blood pressure reading, not all aspects of their blood pressure levels could be controlled. The initial blood pressure could have been high due to nervousness, medication, caffeine consumption, exercise before attending the study, diagnosed hypertension, etc. None of these aspects were included in the questionnaire, so it is impossible to know if the participants' blood pressure readings were impacted by any of these factors. This allowed for the possibility of error in blood pressure measurements which provided a possibility for skewed results in the data.

Much of the data from this study was gathered from self-reported participant data gathered through a series of questionnaires. Participants reported subjective statistics, such as their current stress level, their perceived quality of coping mechanisms, their weekly stress level, and their thoughts and perceptions of mindfulness meditation. Self-reported data is a significant limitation because it does not allow for verification by the researchers.

A possible limitation in this study was the bias surrounding meditation as a practice. (Include info from surveys on opinions of meditation). A bias could make it

harder for a participant to successfully practice mindfulness meditation and could allow for errors in the study.

### **Directions for Future Research**

Future researchers should use long-term studies when assessing the efficacy of mindfulness meditation as a stress reduction and/or blood pressure reduction technique. This study was only one day long, and for many of the participants, it was their first experience with meditation. A long-term study would allow for participants to feel more comfortable with meditation and would improve their meditation techniques; therefore, allowing for a better assessment of true mindfulness meditation. Thus, researchers would be able to achieve more accurate mindfulness meditation which could contribute further to the current literature and allow more insight into the impact of true mindfulness meditation and its long-term implications.

In the future, mindfulness should be used as a measurable outcome when performing research related to mindfulness medication. This would help to fill gaps in the literature and allow for a deeper understanding of this connection, thus allowing for a more effective use of mindfulness meditation as a stress reduction technique (Bember & Schneider, 2016).

If this study was replicated, the participants should be allowed to quietly sit for a determined amount of time before assessing blood pressure. This would help to prevent errors related to increased blood pressure due to exercise, caffeine, and other factors that cannot be controlled by researchers. This would allow for a more accurate assessment of blood pressure; therefore, results would yield a more accurate assessment of the use of meditation as a blood pressure reduction technique.

It should be recommended that in future studies, researchers use a larger sample size than what was used in this study. A larger sample size allows for a more accurate and distributive representation of the specific population, and therefore, can provide more insight into specific data about a specific group.

## **Chapter 6: Conclusion**

Hypertension and stress, although common conditions in the United States, can have severe and far-reaching health-related complications. Hypertension remains a significant cause of mortality and morbidity in the United States with approximately one-third of American adults struggling with poorly managed hypertension, and another one-third of American adults falling in the pre-hypertension range (CDC, 2019). This study supported the use of mindfulness meditation in reducing blood pressure levels. Current literature notes that nursing students experience increased levels of stress, which can impede their personal lives, their academia, and their patient care. This study supported the use of meditation in reducing stress levels in baccalaureate nursing students at the USM CON.

The results of this study supported the hypothesis that mindfulness meditation can help to decrease blood pressure. The participants of the meditation group experienced a greater decrease in both SBP and DBP than those in the control group. Approximately 85% of the meditation group experienced a decrease in SBP, and 71% of the meditation group experienced a decrease in DBP. Meanwhile, 50% of the control group experienced a decrease in SBP, and 17% of the control group experienced a decrease in DBP.

This study supports the use of mindfulness meditation in the reduction of blood pressure, and therefore, the use of mindfulness meditation in the treatment of hypertension. Further research must be done before the use of mindfulness meditation in blood pressure reduction can be introduced into clinical practice as a treatment modality for hypertension. However, this study has significant implications in the prevention and/or treatment of hypertension. If future studies support the use of mindfulness

meditation in the treatment of hypertension, individuals who struggle with high blood pressure would be provided with a simple and free treatment modality with minimal time requirements. This would save money and prevent individuals from struggling with possible side-effects of blood pressure medication. Future researchers should repeat larger and more extensive studies examining the long-term effects of mindfulness meditation in the reduction of blood pressure. Overall, the future of meditation in the use of blood pressure reduction is promising.

Current literature explores the effects of mindfulness meditation in many health-related conditions. Although there is increasing research on the use of mindfulness meditation, further research must be done on the population of both college students and nursing students specifically.

This study supports the use of mindfulness meditation in the reduction of stress in baccalaureate nursing students at the USM CON. This is significant because nursing students experience greater levels of stress when compared to non-nursing college students (Senturk & Dogan, 2018). It is important for nursing students to be able to effectively manage their stress, because increased levels of stress and anxiety can impede quality patient care (Song & Lindquist, 2015). Therefore, this study provides insight into a useful stress-reduction technique for baccalaureate nursing students.

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*psychophysiology and biofeedback*, 40(4), 257-26

**NOTICE OF INSTITUTIONAL REVIEW BOARD  
ACTION**

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER: IRB-18-203

PROJECT TITLE: Honors Thesis

SCHOOL/PROGRAM: School of LANP, School of PRNP

RESEARCHER(S): Isabella Fleming, Ashley Krebs

**APPENDIX A**

**IRB APPROVAL LETTER**

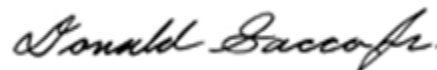
IRB COMMITTEE ACTION: Exempt

CATEGORY:

Exempt

Category 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

APPROVED STARTING: March 1, 2019



**Donald Sacco, Ph.D.**

**Institutional Review Board Chairperson**

## APPENDIX B

### INDIVIDUAL PARTICIPANT BLOOD PRESSURE

Participant Number	BP Before	BP After
1	141/70	132/76
2	118/58	126/69
3	131/74	120/78
4	127/71	110/73
5	123/80	117/77
6	130/74	157/74
7	116/68	106/54
8	109/63	103/68
9	145/97	147/92
10	134/64	133/66
11	125/62	115/57
12	109/74	154/64
13	124/78	120/72