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Benson's Relaxation Response: Psychological and Physiological Responses Among Patients with COPD

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BENSON'S RELAXATION RESPONSE: PSYCHOLOGICAL AND PHYSIOLOGICAL RESPONSES AMONG PATIENTS WITH COPD

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Abstract

Chronic obstructive pulmonary disease (COPD) is the third leading cause of death in the United States. In patients with COPD, distress is significantly prevalent and can have adverse psychological and physiological effects. Considering the increased rate of COPD, a mind-body intervention focusing on the reduction of both psychological and physiological responses such as anxiety, elevated blood pressure (BP), heart rate (HR), dyspnea, and respiratory rate must be integrated into the patient's plan of care. The *relaxation response* (RR) is a term coined by Dr. Herbert Benson in the 1970s describing the body's ability to counter the fight-or-flight response to decrease psychological and physiological responses. Although there are numerous studies on Benson's RR, to date, no study has examined its effectiveness in the COPD population.

The aims of this study were to: (1) assess if implementing Benson's RR decreased anxiety, (2) examine if Benson's RR reduced a patient's perception of breathlessness, and (3) examine if Benson's RR improved systolic and diastolic BP, HR, respiratory rate, and oxygen saturation. This quasi-experimental study used a pre- and post-test design. The sample (N = 25) consisted of a single group of patients diagnosed in stages 2-4 of COPD obtained through a rolling convenience sample at an outpatient pulmonary rehabilitative clinic in Midwest region of the United States. The theoretical framework used to guide this study was a modified version of the Roy Adaptation Model. Inferential statistics were used to determine the psychological and physiological differences pre- and post-intervention utilizing the State-Trait Anxiety Inventory (STAI Form Y–1), Modified Borg Scale (MBS); and BP, HR, respiratory rate, and oxygen saturation levels. Participants listened to a pre-recorded audio to guide them through the Benson's RR technique for 10 minutes.

Results indicated a significant mean change in anxiety ($p < .001$), perception of breathlessness ($p < .001$), and a decrease in the respiratory rate ($p = .001$) after implementing Benson's RR. Although there was clinical improvement in BP, HR, and oxygen saturation, these findings were not statistically significant ($p > .05$). The findings of this study contribute to understanding how nursing can assist patients with COPD in adapting to the negative symptoms experienced with the overall goal of improving patients' psychological and physiological responses to distress.

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Dedication

I would like to dedicate this dissertation to my family. It's dedicated to my husband, Doug, who has supported each of my educational dreams over the past thirteen years. You have provided for me spiritually, emotionally, and financially. You have encouraged me to keep going by helping me see the grit and strength I possess. The past five years has been extremely difficult for many reasons – thank you for loving me unconditionally and reminding me that "this too, shall pass".

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Chapter One: Introduction

This chapter introduces the research design and covers the following: (a) research background, (b) research significance to nursing and how research addresses existing gaps in knowledge, (c) research aims, and (d) research hypotheses.

Research Background and Problem Statement

Chronic obstructive pulmonary disease (COPD) is a disease of the lungs characterized by an obstruction of airflow hampering gas and air exchange. COPD is the third leading cause of death in the United States with more than 15 million new cases diagnosed every year (National Center for Health Statistics, 2016). In addition, it is suggested that another 12 million Americans have undiagnosed COPD (U.S. Department of Health and Human Services, 2017), increasing the estimated number of those currently living with this incurable disease to 27 million. Literature has shown that, in patients with COPD, the loss of productivity and the need to be placed on disability are secondary in perceived stressfulness to frequent hospitalizations from exacerbations of respiratory symptoms (Erdal et al., 2014). For the patient with COPD and their family, this decrease in productivity and the increase in hospitalizations leads to millions of dollars in lost income (Patel, Nagar, & Dalal, 2014), and billions of dollars expended for care, making COPD not only one of the leading causes of death in the US, but also one of the US' major healthcare expenditures (Dalal, Shah, D'Souza, & Rane, 2011; Lin, Shaya, & Scharf, 2010; National Heart, Lung, and Blood Institute, 2012).

In patients with COPD, distress is significantly more prevalent than in patients without COPD (Norweg & Collins, 2013). Distress occurs when an individual perceives stress as negative (Ridner, 2004), and is often seen in patients who are unable to adapt and cope with the symptoms of COPD and their environments, or situations (Beng et al., 2016; Ridner, 2004).

Oftentimes, distress among patients with COPD results in an increase in the psychological response of anxiety (Beng, et al., 2016; Norweg & Collins, 2013; Ridner, 2004). This is supported by the literature, which estimates that up to 70% of patients with COPD exhibit anxiety (Yohannes, Willgoss, Baldwin, & Connolly, 2010). In addition, distress and anxiety may lead to the physiological responses of elevated blood pressure (BP), elevated heart rate (HR), and elevated respiratory rate, as well as a decrease in oxygenation saturation levels occurring after the activation of the fight-or-flight response (Benson, 2000).

When a threat to the body occurs, the body activates the fight-or-flight response, which involves the autonomic nervous system (ANS) and the body's desire to maintain homeostasis and balance (Benson 2000; Ernst, 2017). When the body perceives an event as stressful, the hypothalamus activates the sympathetic nervous system (SNS), which responds by increasing epinephrine. Because of increased epinephrine levels, increased BP, blood flow, body metabolism, HR, and respiratory rate occur (Benson, 2000; Ernst, 2017). Furthermore, if an individual remains in the fight-or-flight response for an extended period, the continual activation of the hypothalamus, pituitary, and adrenal glands may result in psychologic changes, such as depression, anxiety, or both (Harvard Health Publishing, 2016; Norweg & Collins, 2013; Zabora, Brintzenhofeszoc, Curbow, Hooker, & Piantadosi, 2001).

In patients with COPD, the psychological response of anxiety and the physiological changes of elevated BP, HR, respiratory rate, and decreased oxygen saturation result in the patient being more prone to illness and disease (Benson, 2000). One way to counter the fight-or-flight response and reduce these psychological and physiological responses among patients with COPD is by practicing an intervention to elicit the "relaxation response" (RR).

The relaxation response. The relaxation response (RR) is a term coined by Dr. Herbert Benson in the 1970s describing the body's ability to counter the fight-or-flight response to decrease physiological and psychological symptoms of distress, such as HR, BP, and anxiety (Benson, 2000). There are many ways to elicit the RR, including through the practice of yoga, progressive muscle relaxation (PMR), hypnosis, guided imagery, tai chi, and bio-feedback (Cafarella, Effing, Usmani, & Frith, 2012; Galvin, Benson, Decrko, Fricchione, & Dusek, 2006). Benson created his own RR technique from a variation of Transcendental Meditation, the process of repeating a mantra to guide oneself to self-awareness and relaxation (Mahone et al., 2018). Benson's RR technique includes four simple steps: (1) sitting in a comfortable and relaxed position with eyes at a soft gaze or closed, (2) relaxing the body, beginning with the toes and moving towards the head, (3) breathing at a pace that is comfortable for the individual and, when exhaling, choosing a word or phrase to repeat (e.g., "calm"), and (4) maintaining a nonresistant attitude (Benson, 2000). According to Benson (2000), the four components of his RR technique must all be practiced to fully benefit from the intervention. Sitting in a comfortable position with the eyes at a soft gaze or closed allows the mind the opportunity to decrease or eliminate external distractions that may be present (Benson, 2000); choosing and repeating a word or phrase while exhaling decreases internal distractions within the brain and assists in clearing the mind (Benson, 2000); relaxing the entire body releases unwanted or unknown tension within the muscles, allowing the body to further progress to a state of relaxation (Benson, 2000); finally, maintaining a nonresistant attitude encourages the individual to refrain from focusing on the thoughts that pass through the mind and to re-focus instead on the chosen word. Practicing these four steps outlined in Benson's RR technique leads the individual into a consciously relaxed state, resulting in decreased distress (Benson, 2000).

Significance of Research in Nursing and Gaps in Knowledge

Among patients with COPD, the inability to breathe leads to anxiety, which further intensifies the patient's perception of breathlessness, creating a negative feedback loop of distress, further anxiety, and dyspnea (Chan, Giardino, & Larson, 2015; Norweg & Collins, 2013). The increased levels of anxiety and dyspnea may elicit the physiological changes of increased HR, respiratory rate, and BP, as well as a decrease in oxygen saturation (Benson, 2000). Once inside this negative feedback loop, it is difficult for patients to exit this cycle accompanying their reoccurring symptoms. It has been shown that patients with COPD and anxiety have higher functional limitations, poorer health outcomes, and more frequent COPD exacerbations and hospitalizations than those without anxiety (Eisner et al., 2010), all of which contribute to higher healthcare costs. Nurses must expand their current plan of care by incorporating cost-effective interventions for patients with COPD that reduce the negative effects of the distress that may accompany this incurable disease and assist patients in exiting negative feedback loops.

According to the Global Initiative of Chronic Obstructive Lung Disease (GOLD, 2017), the current guidelines for caring for patients with COPD involve: (a) prescribing medication, (b) pulmonary rehabilitation, (c) exercise, (d) vaccinations, (e) supportive and palliative care, and (f) smoking cessation. Supportive and palliative care measures encompass mind-body interventions. A variety of mind-body interventions have been examined among patients with COPD to reduce their psychological and physiological responses; however, each mind-body intervention has failed to reduce both the psychological and physiological responses (respectively, anxiety and increased BP, HR, respiratory rate, dyspnea, and decreased oxygen saturation). Multiple studies have suggested that implementing a mind-body intervention into the daily care of patients with

COPD has the potential to lessen the cost of care (Stahl et al., 2015). To date, no consistent mind-body intervention is taught nor incorporated in the plan of care among patients with COPD attending a pulmonary rehabilitative program. Therefore, nurses caring for patients with COPD must focus on providing comprehensive care beyond pharmacologic measures by including care through psychologic support.

Purpose of the Study

The purposes of this study were to:

1. Assess whether implementing Benson's RR decreases anxiety among patients with COPD, as measured on Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1)
2. Determine whether implementing Benson's RR reduces COPD patients' perceptions of breathlessness, as measured using the Modified Borg 0–10 Scale (MBS)
3. Investigate whether Benson's RR improves systolic and diastolic BP, HR, respiratory rate, and oxygen saturation levels among patients with COPD

Research Hypotheses

The hypotheses tested were:

1. Benson's RR will decrease anxiety levels among patients with COPD, as measured on Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1).
2. Benson's RR will decrease the perception of breathlessness among patients with COPD according to the Modified Borg 0–10 Scale (MBS).
3. Benson's RR will decrease systolic blood pressure among patients with COPD.
4. Benson's RR will decrease diastolic blood pressure among patients with COPD.

5. Benson's RR will decrease respiratory rates among patients with COPD.
6. Benson's RR will increase oxygenation saturation levels among patients with COPD.
7. Benson's RR will decrease heart rates among patients with COPD.

Theoretical and Operational Definitions

The variables used in this study were defined and operationalized by the researcher and are listed below (Polit & Beck, 2014).

Psychological response. An emotional response that occurs when an individual perceives an event or stimuli as stressful. A psychological response may be displayed through feelings of anxiety, depression, or both (Norweg & Collins, 2013). For this study, psychological response was measured by the amount of anxiety experienced using Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1).

Anxiety. Subjective emotional feeling experienced by an individual when an event or stimuli is deemed stressful (Norweg & Collins, 2013). For this study, anxiety was measured using STAI (Form Y-1).

Physiological response. Internal reactions and biological changes experienced when the fight-or-flight response is activated. The physiological response occurs secondary to internal or external distress (Benson, 2000). For this study, the physiological response was measured by dyspnea, BP, HR, respiratory rate, and oxygen saturation levels.

Dyspnea. Feeling short of breath, having difficulty breathing, or breathlessness (Crisafulli & Clini, 2010; Gift, Moore, & Soeken, 1992). Dyspnea was measured according to the patient's perception of breathlessness using the Modified Borg 0–10 Scale (MBS).

Blood pressure. “The amount of pressure exerted against the blood vessel walls by circulating blood as it is pumped throughout the body” (Wagner & Hardin-Pierce, 2014, p. 335). Blood pressure was measured using an Omron® blood pressure measuring device.

Heart rate. The number of heartbeats per minute (Wagner & Hardin-Pierce, 2014) and was measured using an Omron® blood pressure measuring device.

Respiratory rate. The number of inspirations and expirations per minute and was measured by the researcher manually.

Oxygen saturation. The percentage of hemoglobin saturated with oxygen (Robinson & Scullion, 2009) and was measured using a handheld pulse oximeter.

Assumptions

In quantitative and qualitative research, it is important to describe all possible assumptions made as assumptions can impact the researcher's interpretations of the study and findings (Hagger & Chatzisarantis, 2009). Assumptions made are deemed true based on logic (Polit & Beck, 2014). For this study, the following assumptions have been made:

1. Patients with COPD experience anxiety (Eisner et al., 2010; Yohannes, Willgoss, Baldwin, & Connolly, 2010).
2. Dyspnea can stimulate anxiety, and anxiety can stimulate dyspnea (Eisner et al, 2010; Gift, Moore, & Soeken, 1992).
3. The terms “dyspnea” and “breathlessness” can and will be used interchangeably since patients are more familiar with the term "breathlessness," while the literature preferences "dyspnea."
4. Anxiety causes dyspnea and increased blood pressure, heart rate, and respiratory rate (Benson, 2010).

5. Benson's RR improves anxiety, dyspnea, oxygen saturation, blood pressure, and heart rate (Benson, 2010).
6. Patients recruited for this study practiced Benson's RR to improve anxiety, dyspnea, heart rate, blood pressure, and oxygen saturation.
7. Patients in this study responded honestly to the STAI (Form Y-1) and MBS questionnaires.
8. Patients with COPD who practice Benson's RR will have a decreased perception of anxiety and breathlessness.
9. Nurses can provide care for patients with COPD by incorporating Benson's RR technique into their practices to improve anxiety and dyspnea among patients with COPD.

Chapter One Summary

COPD will continue to be one of the leading causes of death as a result of smoking and exposure to environmental pollutants (Adeloye et al., 2015), and subsequently, COPD is one of the leading expenditures of US healthcare dollars (Lin, Shaya, & Scharf, 2010). Much of the standardized nursing care provided to patients with COPD focuses on the GOLD (2017) guidelines of medication administration, pulmonary rehabilitation, smoking cessation, and vaccination administration. Currently, there is no consistent nursing intervention recommended or practiced as part of the supportive and palliative care GOLD (2017) guidelines. This leaves many individuals with COPD seeking a supportive and cost-effective intervention to reduce the distress they experience alongside the many chronic and exacerbated symptoms that accompany this disease. Implementing Benson's RR is one supportive intervention that may assist in providing both the psychological and physiological support patients need while simultaneously reducing national and individual healthcare costs. It is imperative for the nursing field to offer an

intervention that assists patients with COPD in maintaining homeostasis by reducing the psychological and physiological responses triggered by the distress associated with COPD, ultimately enhancing the health and wellbeing of this vulnerable population.

Chapter Two: Literature Review

This chapter reviews the literature surrounding Herbert Benson's relaxation response (RR), briefly discusses current mind-body interventions practiced by various patients with COPD, and describes the state of the science. The databases utilized for this literature review were ProQuest, CINAHL, PubMed, EBSCOHost, Scopus, and PSYCinfo. Search terms included "relaxation response," "Herbert Benson," "Benson's relaxation response," "relaxation technique," "relaxation therapy," "COPD," "chronic obstructive pulmonary disease," and "anxiety." The literature examined ranged in publication date from 1974 to 2019. These search parameters yielded a total of 1,059 studies. Limiting articles to only "Benson's RR technique" yielded a total of 47 articles that were then analyzed. Articles were excluded if they did not involve a research study, were not in English, or examined the implementation of Benson's RR technique in healthy individuals. After excluding articles that did not fit the search criteria, 22 articles were used for this review. Among the articles reviewed, Benson's RR was shown to reduce many psychological and physiological responses.

Herbert Benson's Relaxation Response

Benson's RR has been implemented and studied over the past four decades. Researchers have focused on the effectiveness of Benson's RR in reducing psychological as well as physiological states, including BP, HR, and anxiety. Each of the studies included in this literature review utilized the four key components of Benson's RR technique: sitting in a comfortable position with eyes at a soft gaze or closed, relaxing the entire body beginning with the toes and moving towards the head, breathing at a normal pace and, when exhaling, repeating a word or phrase, and maintaining a nonresistant attitude (Benson, 2000). Some of the studies examined practiced the technique for ten minutes once a day, while other studies implemented the

technique twice a day for ten minutes. The amount of time Benson's RR technique was practiced ranged from a single occurrence to a span of three years.

Physiological responses to Benson's relaxation response. According to Benson (2000), physiological responses occur secondary to the internal stress experienced when the fight-or-flight response is activated. For example, BP, HR, respiratory rate, and metabolism are all physiological responses that can be increased during an event deemed stressful. Benson's RR has been shown to reduce the physiological responses of BP and HR. Dusek and colleagues (2008) examined 122 hypertensive patients and found that implementing Benson's RR significantly reduced BP over lifestyle modification. They also found that 66% of patients in the relaxation group were significantly more likely to eliminate their prescribed antihypertensive medications after practicing Benson's RR for eight weeks (Dusek et al., 2008). It is important to note that, within Dusek and colleagues' (2008) study, there was not a definitive lifestyle modification the patients were told to implement; the patients were educated on various lifestyle modifications and each patient decided which modification to initiate. However, despite not having a standardized lifestyle modification set, Dusek and colleagues (2008) were able to show how Benson's RR can significantly reduce BP over standardized care for the hypertensive patient.

Beyond the hypertensive patient, a reduction in BP has also been shown in other patient populations. Nikbakht and colleagues (2005) compared the use of religious rosaries and Benson's RR in 70 patients undergoing abdominal surgery and found a significant reduction in systolic BP as well as HR in both the rosary and Benson's RR groups. Munro and colleagues (1988) also saw a reduction in diastolic BP when implementing Benson's RR in 27 post-myocardial infarct patients over the control group (N = 30). Although positive findings were noted, it is uncertain if Munro and colleagues' (1988) findings can be generalized since all their

patients were male. Guzzetta (1989) examined HR in 80 coronary care patients randomly assigned to Benson's RR group, a music therapy group, or a control group. HR was significantly lowered in both the Benson's RR and the music therapy groups, compared to the control group (Guzzetta, 1989). It is important to highlight, however, that patients in the music therapy group received guided training on Benson's RR prior to listening to the musical tape; it is unknown if music alone would have produced the same effects (Guzzetta, 1989).

Despite reductions in BP and HR in the studies cited above, a change in BP and HR was not observed in 45 patients undergoing a femoral angiography (Mandel et al., 1990). Mandel and colleagues (1990) placed patients into three interventional groups: Benson's RR (N = 15), listening to instrumental music (N = 14), or listening to a blank tape (N = 16). No change in BP or HR was found in any of the three groups (Mandel et al., 1990). However, these findings may reflect the administration of anti-anxiety and pain medications in preparation for the femoral angiography procedure.

Psychological responses to Benson's relaxation response. Psychological distress is an emotional response that occurs when an individual perceives an event or stimuli as stressful (Norweg & Collins, 2013). Among patients with COPD, a common psychological response to the distress experienced in conjunction with symptoms is anxiety; anxiety may lead to an overall decrease in quality of life (Valenza et al., 2014). Many studies across a variety of patient populations examined Benson's RR in the reduction of the psychological response of anxiety. Bagheri-Nesami and colleagues (2006) conducted an experimental study examining 50 patients with rheumatoid arthritis to determine the effects of implementing Benson's RR on anxiety, depression, and feelings of wellbeing using the Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1), the Beck Depression Inventory, and the Clinical Manifestation

Questionnaire. They found those who practiced Benson's RR twice a day for eight weeks had a significant reduction in anxiety and depression as well as an increase in feelings of wellbeing, compared to the control group (Bagheri-Nesami et al., 2006). Beard and colleagues (2011) also compared the effects of practicing either Benson's RR (N = 15) or, Reiki (N = 15) against a control group (N = 18) among patients with prostate cancer for the reduction of anxiety, depression, and an increase in quality of life. Reiki and Benson's RR training were implemented in the intervention groups prior to patients' radiation treatments. Significant improvements in emotional wellbeing and scores on the STAI (Form Y-1) among the group that had higher baseline anxiety was found only in the group that practiced Benson's RR (Beard et al., 2011).

Patients with hypertension also saw a reduction in anxiety after implementing Benson's RR. Lesserman and colleagues (1989) taught Benson's RR, nutrition, and exercise to 59 hypertensive patients and measured anxiety and depression levels after the initial intervention and again at 3-5 years post-intervention. They saw a significant reduction in anxiety and depression on the Hopkins Symptom Checklist compared to baseline measurements both after the initial intervention and at the 3-5-year mark (Lesserman et al., 1989). The long-term findings of Lesserman and colleagues' (1989) study should be taken lightly since the possibility of additional variables also impacting anxiety and depression during this timeframe cannot be excluded.

Benson's RR was also shown to reduce anxiety in pre- and post-operative patients, and in patients undergoing procedures. Nikbakht and colleagues (2005) studied patients undergoing abdominal surgery. They compared Benson's RR to the use of religious rosaries in 70 patients and found a significant reduction in anxiety in both groups, according to the STAI (Form Y-1) (Nikbakht et al., 2005). Yeka and colleagues (2017) studied 69 patients, comparing Benson's RR

and rhythmic breathing to a control group in post-surgical mastectomy patients. They found a significant reduction in anxiety as measured by the Cognitive-Somatic Trait Anxiety Questionnaire in both the Benson's RR and rhythmic breathing groups compared to the control group (Nikbakht et al., 2005). However, when examining Nikbakht and colleagues' (2005) study, the rhythmic breathing intervention implemented was near identical to Benson's RR: the only difference was awareness and seeking to regulate breathing patterns rather than placing focus on word or short phrase. It is possible that the rhythmic breathing group saw a reduction in anxiety as a result of the first steps of the intervention: sitting comfortably, relaxing the entire body, and repeating a word or phrase. Finally, Mahdavi and colleagues (2013) examined the anxiety and depression levels of 80 patients undergoing hemodialysis using the Depression and Anxiety Stress Scale. Patients (N = 40) were randomly assigned into two groups: Benson's RR and a control group. A significant reduction in depression and anxiety in the RR group was found. These findings suggest that Benson's RR reduces anxiety, BP, HR, depression, and enhances feelings of wellbeing in a variety of patient populations and settings.

Current Mind-Body Interventions Practiced

There are other interventions implemented in patients with COPD to reduce psychological and physiological responses associated with the disease, such as pursed-lip breathing (PLB), cognitive behavioral therapy (CBT), mindfulness-based stress reduction (MBSR), and progressive muscle relaxation (PMR). However, there is a paucity of research in the effectiveness of each intervention in reducing both the physiological (i.e., HR, BP, respiratory rate, dyspnea, and oxygen saturation levels) and psychological responses (i.e., anxiety).

Pursed-lip breathing. One supportive measure that has been implemented among patients with COPD is pursed-lip breathing (PLB), an intervention taught to patients with COPD to assist in regulating breathing patterns (Cantwell-Gab, 2014). PLB has been shown to reduce physiological responses associated with the disease in the COPD population. Ramos and colleagues (2009) implemented PLB in 16 patients with COPD in stages 1-3 and measured HR variability, respiratory rate, oxygen saturation levels, and BP. They found a significant change in HR variability, respiratory rate, and oxygen saturation levels. Mayer and colleagues (2018) conducted a systematic review of eight studies on PLB examining the patient's perception of dyspnea as well as the effects of PLB on exercise tolerance, HR, respiratory rate, and oxygen saturation. A significant change was noted in respiratory rate in patients who practiced PLB. Despite these findings, there is a paucity of research examining the direct effect PLB has in reducing psychological responses of distress among patients with COPD.

Cognitive behavioral therapy. Cognitive behavioral therapy (CBT) is another mind-body intervention commonly practiced among patients with COPD in hopes of reducing anxiety. CBT focuses on identifying negative thoughts and transforming them to positive, adaptive thoughts (Harrison et al., 2016). However, CBT has not been shown to significantly reduce anxiety. Kunik and colleagues (2008) examined CBT and routine COPD education on anxiety and depression levels in 238 patients with COPD (stages 2-4) using the Geriatric Depression Scale and the Beck Anxiety Inventory. No difference was found between the two groups in terms of the reduction of anxiety or depression (Kunik et al., 2008).

Mindfulness-based stress reduction. Mindfulness-based stress reduction (MBSR) is the process of focusing on being present in every situation. It involves meditating on the feelings and emotions experienced and learning how to accept the negative and move forward, towards the

positive (Victorson et al., 2014). There are limited studies examining physiological responses when practicing MBSR. Chan and colleagues (2015) conducted a pilot study examining respiratory rate and level of mindfulness, comparing 19 patients enlisted in the MBSR program to 22 patients in a control group. They found a significant increase in respiratory rate using the ClevMed Bio-Radio System in the MBSR group compared to the control group. Furthermore, a reduction in mindfulness on the Freiburg Mindfulness Inventory was noted (Chan et al., 2015). Mularski and colleagues (2009) examined the effects of MBSR on dyspnea using the Borg scale and the Six Minute Walk Test (6-MWT). Mularski and colleagues (2009) compared the MBSR intervention (N = 44) to a control group (N = 42) in patients with COPD in stages 2-4 according to GOLD guidelines and did not find an improvement in the patient's dyspnea score in the MBSR group.

Progressive muscle relaxation. In addition to CBT and MBSR, progressive muscle relaxation (PRM) is another technique practiced in patients with COPD. PMR involves tensing and relaxing each muscle in the body. Lolak and colleagues (2008) examined 83 patients with COPD in non-specified stages where half participated in pulmonary rehab and half participated in pulmonary rehab plus PMR for eight weeks. At the end of eight weeks, a significant reduction in anxiety on the Hospital Anxiety and Depression Scale (HADS) was found in both groups. However, no differences between the two groups were found in the reduction of anxiety or depression, making it difficult to determine if PRM alone was an effective intervention (Lolak et al., 2008). Furthermore, Baraniak and Sheffield (2011) performed a systematic review and meta-analysis in the ability of CBT and PMR to improve anxiety, depression, and quality of life in patients with moderate to severe COPD. They examined eight articles and found mixed results

on the effectiveness of CBT and PMR in the reduction of anxiety, depression, and improvement of overall quality of life (Baraniak & Sheffield, 2011).

The effect PMR has on physiological measures has also been studied. A study by Singh and colleagues (2009) compared music and PMR on 72 hospitalized patients with COPD and found a reduction in systolic BP, HR, and respiratory rate in both groups; however, neither PMR nor music therapy resulted in a reduction of diastolic BP. In addition, BP, HR, and respiratory rate were obtained by "nursing staff," preventing standardization across the sample (Singh et al., 2009). Although the findings of a reduction in systolic BP, HR, and respiratory rate were favorable, it is unknown if PMR would produce the same results in a less stressful environment, such as a pulmonary rehabilitative clinic (Sing et al., 2009), or if PMR without music therapy would have the same effect. Finally, a systematic review and meta-analysis by Volpato and colleagues (2015) examined 25 articles that implemented various relaxation interventions, such as PMR, guided imagery, biofeedback, diaphragmatic breathing, PLB, yoga, and Tai Chi. They concluded the relaxation techniques described had a small effect on anxiety and depression, but a greater effect on increased quality of life (Volpato et al., 2015).

Clearly, the research findings discussed above evince that there is some effectiveness in implementing various mind-body interventions to reduce anxiety, dyspnea, BP, HR, respiratory rate, and improve oxygen saturation levels. Regardless, there are holes in the research: findings are often inconsistent and mixed, different patients may prefer different relaxation interventions (Hyland et al., 2016), and not a single intervention reduced both psychological *and* physiological responses. This study aimed to investigate and mediate this gap in the literature.

State of the Science

To the researcher's knowledge, no published study has examined the effectiveness of implementing Benson's RR in the COPD population. Benson's RR is unique from other interventions since it combines muscle relaxation along with a singular focus of thought. According to Harrison and colleagues (2016), there is value in patients with COPD placing their focus on a singular thought rather than regulating the pace of their breathing since regulation efforts may lead to increased anxiety and dyspnea. Benson's RR places the focus on the repetition of a word or phrase while exhaling. Although the patient is still conscious of their breathing, the focus is shifted away from regulating their breathing pattern and placed instead on the calming word they choose to repeat. Being conscious of relaxing the body's movements and focusing on repeating a word or phrase while breathing at a pace that is comfortable for the patient with COPD allows the body to adapt to the distress experienced by countering the fight-or-flight response. This results in decreased respiratory rate, HR, BP, muscle tension, anxiety, and oxygen-consumption (Benson, 2000). Calisi (2017) suggests that nurses are confident in teaching Benson's RR to patients. However, there is a paucity of research on the implementation of Benson's RR technique among the COPD population.

Chapter Two Summary

Over the last four decades, Benson's RR has been shown to improve both psychological and physiological responses to distress, such as anxiety, HR, and systolic and diastolic BP, in a variety of patient populations. Current mind-body interventions failed to show a reduction in anxiety, dyspnea, systolic and diastolic BP, HR, and respiratory rate, nor an improvement in oxygen saturation levels, in patients in stages 2-4 of COPD enrolled in an outpatient pulmonary rehabilitative program. It is imperative for the nursing field to provide patients with COPD an

intervention that may be implemented on-demand to reduce both the psychological and physiological responses to distress associated with the disease.

Chapter Three: Conceptual Framework

This chapter describes Roy's Adaptation Model (RAM) as the research's conceptual framework guiding this study. This chapter will begin with a background of why RAM was chosen as the framework for this research study, then describe the concept of adaptation, and conclude with a discussion of how the application of the two adaptive modes discussed can encourage adaptation in patients living with COPD after implementing Benson's RR.

Background on Conceptual Framework

Health is described in RAM as the adaptive interaction between health and illness (Roy & Andrews, 1999). The RAM was chosen as the conceptual framework for this study because it emphasizes how individuals constantly adapt to stimuli to maintain balance (Masters, 2015). Individuals adapt to stimuli in their environments through both awareness and effort (Roy & Andrews, 1999); they must be aware of the stimuli negatively affecting their health and consciously decide to make the necessary changes to adapt to these stimuli. Within RAM, the nurse assists and empowers patients to achieve adaptation and homeostasis when facing health adversity (Chinn & Kramer, 2011; Masters, 2015; Roy & Andrews, 1999). RAM applies to the patient with COPD since they experience negative stimuli (dyspnea and accompanying anxiety), then search for adaptive strategies to decrease these negative stimuli and, thus, restore homeostasis and adapt to living with the disease and its symptoms (Costi, Brooks, & Goldstein, 2006; Warwick, Gallagher, Chenoweth, & Stein-Parbury, 2010). According to Roy and Andrews (1999), "nurses aim to enhance system relationships through acceptance, protection, and fostering interdependence and to promote personal and environmental transformations" (p. 55). Nursing who care for patients living with COPD must include an easily deployed intervention that encourages and fosters adaptation to assist in achieving optimal health.

Concepts of adaptation within RAM. Maintaining homeostasis is the body's defense mechanism against a threat. According to RAM, a threat to self is the definition of a stimulus (Roy & Andrews, 1990). There are different stimuli (threats to self) to which an individual must adapt, including both focal and contextual (Roy & Andrews, 1990). A focal stimulus is the stimulus most pressing to an individual, while contextual stimuli consist of both internal and external influences surrounding the focal stimulus (Roy & Andrews, 1999).

Adapting to a stimulus can be done through innate and acquired coping (Roy & Andrews, 1990). For patients with COPD, the threat to self is the disease of COPD itself and the psychological and physiological responses that accompany it. Innate coping mechanisms are processes that are genetically embedded within individuals and are automatically deployed when encountering unwanted stimuli (Masters, 2015). In contrast, acquired coping mechanisms are processes and skills or interventions that are learned (Masters, 2015). Benson's RR was implemented as an acquired coping mechanism to promote adaptivity to the psychological and physiological responses displayed in patients with COPD.

According to RAM, once the innate or acquired coping mechanism is deployed, an individual psychologically and physiologically adapts to the stimuli through the regulator and cognator subsystems. Masters (2015) states "the regulator subsystem responds through neural, chemical, and endocrine coping channels" (p. 129), and "the cognator subsystem responds through perceptual and information processing, learning, judgment, and emotion" (p. 129). After implementing Benson's RR, the regulator and cognator subsystems will show adaptation through the reduction of the activation of the fight-or-flight response and through the restoration of homeostasis within the body. This adaptation will be shown by a reduction in anxiety, dyspnea, and respiratory rate.

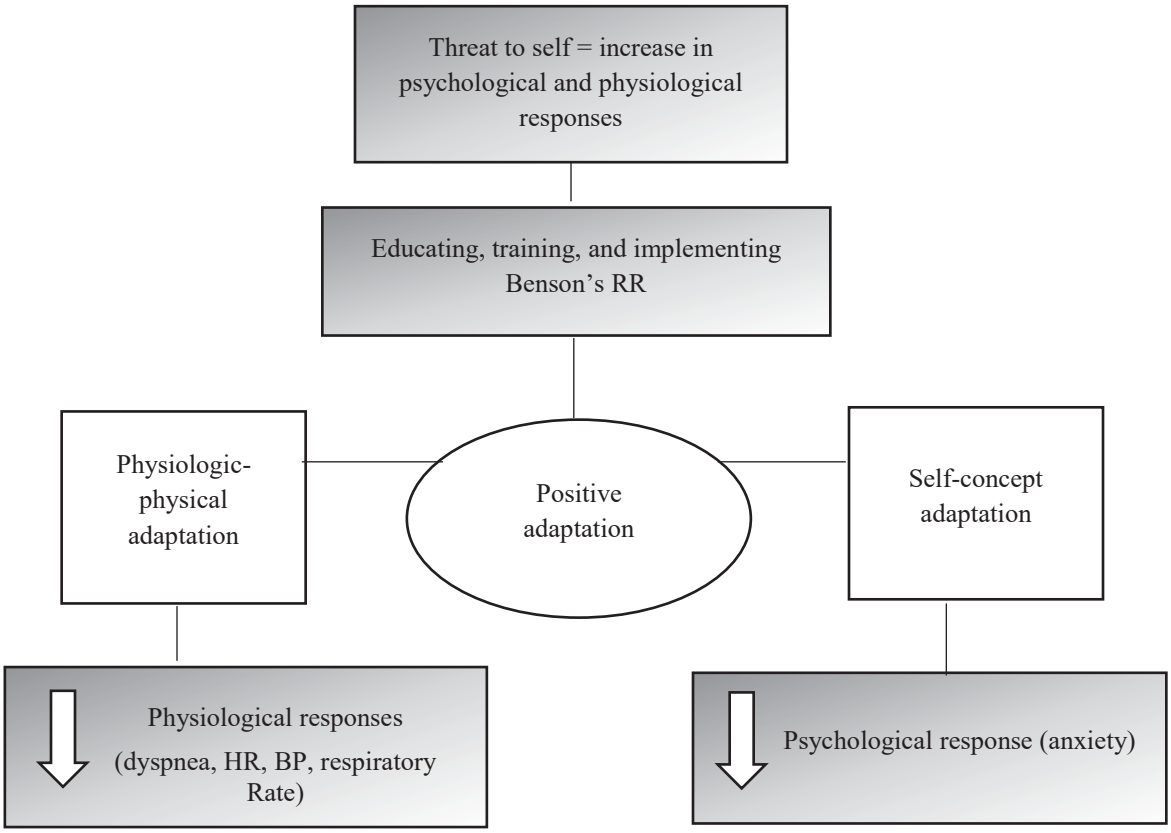
Application of Adaptive Modes

There are four adaptive modes within RAM: physiologic-physical, self-concept, role function, and interdependence (Akyil & Erguney, 2012; Masters, 2015). This study was guided by the first two adaptive modes of RAM, the physiologic-physical mode and the self-concept mode.

Physiologic-physical adaptive mode. The physiologic-physical adaptive mode focuses on an individual's biological responses to stimuli and the continual desire for the body to meet the basic needs of "oxygenation, nutrition, elimination, activity and rest, and protection" (Masters, 2015, p. 115) to sustain life. Interventions are implemented to empower the patient to manage the stimuli (Frederickson, 1993). In patients with COPD, a threat to the biological integrity of an individual exists simultaneous to the physiological responses that occur with the chronic disease. Educating COPD patients on, then guiding them through Benson's RR promotes adaptation to COPD by providing a coping mechanism to implement when patients feel "[threats] to self." This adaptation will be seen post-intervention by a reduction in dyspnea and respiratory rate.

Self-concept adaptive mode. The self-concept adaptive mode includes feelings and emotions, ideals, and the spiritual identity (Roy & Andrews, 1990). The psychological response of anxiety and other symptoms accompanying COPD inhibit self-concept adaptation and create a negative view of self (Akyil & Erguney, 2012). Educating and training patients with COPD on a way to reduce anxiety and, thus, exit the negative feedback loop creates empowerment and personal self-adaptation (Akyil & Erguney, 2012). This enhances coping and produces improved personal and physical adaptation. This enhanced coping and adaptation will be reflected in a reduction in the post-intervention STAI (Form Y-1). Figure 1 illustrates the overall impact of Benson's RR in patients with COPD using RAM as the theoretical foundation.

Figure 1 Roy's Adaptation Model as a Framework for Studying Benson's RR among Patients with COPD



Reprinted from: Roy, Sr. C., & Andrews, H. A. (1999). *The Roy adaptation model* (2nd ed.). Stamford, CT: Appleton and Lange. *Note***.** Additions made to Roy's Adaptation Model (RAM) for this study are shaded.

Chapter Three Summary

Roy's Adaptation Model (RAM) was the conceptual model chosen to guide this study because it focuses on patient adaption to stimuli to promote optimal health. Patients with COPD adapt through the regulator and cognator subsystems and through the adaptive modes of physiologic-physical and self-concept. Through the implementation of Benson's RR, patients with COPD can learn how to adapt both physically and mentally to the health and illness

continuum that recurrently exists in their lives to reduce both the psychological and physiological responses to the stress associated with COPD symptoms.

Chapter Four: Methodology

This chapter describes the research purposes, sample, setting, design, variables, instruments, and data analysis processes.

Research Purposes

The purpose of this research is:

1. To assess whether implementing Benson's RR decreases anxiety, as measured on Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1), among patients with COPD
2. To determine whether Benson's RR reduces perceptions of breathlessness using the Modified Borg 0–10 Scale (MBS), among patients with COPD
3. To measure whether Benson's RR improves systolic and diastolic BP, HR, respiratory rate, and oxygen saturation levels among patients with COPD

Hypotheses

Each hypothesis was tested among patients with COPD stages 2-4 according to the GOLD (2017) guidelines, with the stage of COPD evaluated by the provider upon initial admission to the pulmonary rehabilitative clinic. According to the GOLD (2017) guidelines, stage 2 was classified as moderate with a FEV_1 of 50–79, stage 3 as severe with an FEV_1 of 30–49, and stage 4 as very severe with a FEV_1 of < 30 of the disease progression.

The research tested seven hypotheses. The hypotheses tested were:

1. Benson's RR will decrease anxiety levels among patients with COPD, as measured on Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1).
2. Benson's RR will decrease the perception of breathlessness among patients with COPD according to the Modified Borg 0–10 Scale (MBS).

3. Benson's RR will decrease systolic blood pressure among patients with COPD.
4. Benson's RR will decrease diastolic blood pressure among patients with COPD.
5. Benson's RR will decrease respiratory rates among patients with COPD.
6. Benson's RR will improve oxygenation saturation levels among patients with COPD.
7. Benson's RR will decrease heart rates among patients with COPD.

Research Design

This study was quasi-experimental, with a pre- and post-test design consisting of a single group of patients obtained through a rolling convenience sample at a single pulmonary rehabilitation clinic in the Midwest region of the United States. This design was chosen considering the feasibility of recruiting the number of patients needed. The site where the study was conducted enrolled roughly 2-3 patients with COPD into the program each week, leaving a small sample from which to recruit. In addition, Boutou and colleagues (2014) found that nearly half of patients with COPD fail to complete the 12-week pulmonary rehabilitative program, further reducing the number of patients available to recruit. For these reasons, a pre- and post-test design was chosen over the inclusion of a control group. Within this study, patients served as their own control since baseline measurements were obtained prior to the implementation of the intervention.

Research Variables

The independent variable was Benson's RR, and the dependent variables were anxiety, the patient's perception of breathlessness, systolic and diastolic BP, HR, respiratory rate, and oxygen saturation levels (Table 1). Dyspnea (or breathlessness) and anxiety were chosen as two of the dependent variables because they are common physiological and psychological responses exhibited by patients with COPD and can indicate physiological and psychological distress

(Baraniak & Sheffield, 2011; Benson, 2000; Eisner et al., 2009; Valenza et al., 2014). Blood pressure, HR, respiratory rate, and oxygen saturation levels were also chosen as dependent variables since they are measurements of physiological responses (Storm-Versloot et al., 2014) and may be used to determine adaptation to the distress experienced (Benson, 2000; Wallace, Benson & Wilson, 1971).

Table 1 Concepts, Variables, and Tools Identified in Proposed Research Study

Concept	Variable(s)	Tool
Psychological response	Anxiety	Spielberger, Gorsuch, Lushene, Vagg, & Jacobs's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1)
Physiological responses	Blood pressure	Omron® blood pressure measuring device
	Heart rate	Omron® blood pressure measuring device
	Respiratory rate	Manually by the researcher
	Oxygen saturation level	Handheld pocket pulse oximeter
	Dyspnea	Modified 0-10 Borg Scale

Sample

A power calculation was conducted using the statistical software G*Power 3.1 to determine the sample size necessary to detect mean change in score pre- and post-intervention. Initially, for a medium effect size (Cohen's $d = 0.5$) with 80% power, and moderate correlation (alpha = 0.06), the desired number of patients to include in the study was approximately 41.

Patients were recruited from March 1, 2019, through August 19, 2019, at a single pulmonary rehabilitative clinic in the Midwest region of the United States. The researcher and respiratory therapist offered a flyer to 49 patients with COPD during this timeframe. Of the 49 patients offered a flyer, 40 agreed to participate and were screened against the inclusion criteria. Thirteen patients did not meet the inclusion criteria. Two patients met the inclusion criteria and scheduled an intervention appointment, but failed to show and did not wish to re-schedule. Twenty-five patients (N=25) met the criteria and completed the study. A second power analysis calculation was conducted using the statistical software G*Power 3.1 to see if N = 25 would detect a mean change in score pre- and post-intervention. It was determined for a medium effect size (Cohen's $d = 0.6$) with 80% power, and moderate correlation (alpha = 0.06), 25 patients were adequate. A medium effect size was chosen to determine if changes in psychological and physiological responses occur. In addition, a medium effect size is large enough to detect a visible change (Sullivan & Feinn, 2012).

COPD is diagnosed through the subjective complaints of dyspnea, chronic cough, and excess sputum production (GOLD, 2017). In addition, forced exhaled volume in one second (FEV_1) is the amount of air exhaled in one minute and is also used to diagnose and stage COPD (GOLD, 2017; Hinkle & Cheever, 2014). For this study, patients in stages 2-4 of COPD were included. The stage of COPD was evaluated by the provider upon initial admission to the

pulmonary rehabilitative clinic. Stage 2 was classified as moderate with a FEV_1 of 50–79, stage 3 as severe with an FEV_1 of 30–49, and stage 4 as very severe with a FEV_1 of < 30 of the disease progression, according to 2017 GOLD guidelines (GOLD, 2017). Stages 2-4 were chosen in the hopes of implementing the intervention in the more anxious patients with COPD. This is a result of the finding that, as the severity of the disease increases, so does associated anxiety (Eisner et al., 2010; Norweg & Collins, 2013; Peiffer, 2008).

According to the National Heart, Lung, and Blood Institute (2013), COPD begins to be diagnosed most commonly in adults ages 40 and up. Therefore, the inclusion criteria included adults ≥ 40 years old who were pulmonary rehabilitative patients with a diagnosis of COPD in stage 2-4, per the GOLD (2017) guidelines, and who could read and speak in English. The exclusion criteria included patients who: could not communicate or follow directions; were deaf; had pneumonia, asthma, or lung cancer; had paralysis; had taken benzodiazepines or other anti-anxiety medications within the medication's half-life timeframe; had consumed pain medications within one hour of the intervention; or had been diagnosed with a mental health condition including bipolar disorder, panic disorder, schizophrenia, borderline personality disorder, or post-traumatic stress disorder (PTSD). It is important to note that many patients with COPD have anxiety (Yohannes, Willgoss, Baldwin, & Connolly, 2010) and may be on anti-anxiety medication. Therefore, patients who took prescribed anti-anxiety medication were not excluded from this study. However, time of administration and type of anti-anxiety medication was recorded, and patients were excluded if anti-anxiety medication was taken within the medication's half-life timeframe to minimize negative effects on the validity of study results.

Setting

The setting was a single pulmonary rehabilitation clinic in the Midwest region of the United States. Patients were recruited directly from the clinic and the intervention took place within the clinic setting. A pulmonary rehabilitation clinic was chosen over the hospital setting because hospitalized patients with acute exacerbations of COPD are anxious, overwhelmed, and in a state of chaos, making it difficult to process information and learn (Cornforth, 2013). In addition, it has been found that, once an exacerbation of COPD is over, patients have a desire to learn adaptive strategies to enhance their health (Cornforth, 2013; Holden, 2005). Therefore, the optimal time to assist patients in learning a new adaptive strategy (such as Benson's RR) is after a COPD exacerbation (Costi, Brooks, & Goldstein, 2006; Warwick, Gallagher, Chenoweth, & Stein-Parbury, 2010).

Measurements

Multiple measurements were used to assess the effectiveness of Benson's RR in the reduction of psychological and physiologic responses associated with COPD-accompanying distress. As previously mentioned, the psychological response of anxiety was measured using the STAI (Form Y-1). Physiological responses were measured by the MBS score as well as through BP, HR, respiratory rate, and oxygen saturation measurements.

Psychological measurements.

Spielberger's (1983) State-Trait Anxiety Inventory (Form Y-1). Spielberger and colleagues' (1983) STAI (Form Y-1) was used to assess pre- and post-intervention anxiety levels (Appendix A). The STAI (Form Y-1) contains 20 statements written at a fifth-grade reading level that seek to understand how the patient perceives their anxiety at the time of completing the questionnaire (Gift, Moore, & Soeken, 1992; Warner et al., 1992). A 1-4 Likert scale is used to

assess each statement; 1 being “none” and 4 being “very much”. The total number of points on the questionnaire ranges from 20–80, with the higher number indicating more anxiety. The STAI (Form Y-1) has been shown to be a reliable and valid tool for measuring anxiety in the COPD population (Singh et al., 2009) with a reliability rating of Cronbach’s alpha = 0.79 (Gift, Moore, & Soeken, 1992).

Modified Borg 0–10 Scale. To measure dyspnea, the patient’s subjective perception of breathlessness was assessed by the Modified Borg Scale (MBS) (Appendix B). The MBS was chosen over the original Borg Scale because, in the original Borg scale, patients rate their dyspnea on a scale ranging from 6–20. This deviated from the 0–10 scale with which patients were familiar, leaving them uncertain how to rate their dyspnea (Sassi-Dambron, Eakin, Ries, & Kaplan, 1995). Kendrick, Baxi, and Smith (2000) added the term “breathlessness” to the MBS scale to provide clarification to patients since the term “dyspnea” was poorly understood. The resulting MBS is at a fifth-grade reading level and contains a 0–10 scale, where 0 denotes no breathlessness and 10 denotes maximal breathlessness. The MBS has been found to be a valid and reliable tool to assess the current state of the patient’s perception of breathlessness at the time of completion (Crisafulli & Clini, 2010; Kendrick, Baxi, & Smith, 2000; Sassi-Dambron et al., 1995). Kendrick, Baxi and Smith (2000) examined the MBS to determine the reliability of the scale to measure dyspnea in pre- and post-nebulizer treatment patients with COPD and found changes in MBS scores correlated with direct changes in peek expiratory flow rates ($r = -.42$, $p < 0.001$). Furthermore, the MBS tool is sensitive to eliciting a subjective change in a patient’s perception of breathlessness from pre-measurement to post-measurement (Crisafulli & Clini, 2010; Kendrick, Baxi, & Smith, 2000).

Physiological measurements.

Blood pressure, heart rate, respiratory rate, & pulse oximetry. The patient's BP, HR, respiratory rate, and oxygen saturation level were obtained pre- and post-intervention by the trained researcher who has over 14 years in vital sign assessment and teaching skills. The researcher who obtained the vital signs was trained according to American Heart Association (AHA) standards (Jarvis, 2016; Pickering et al., 2005).

The patient's BP and HR were measured using the Omron® digital BP measuring device. The Omron® has been found to be a valid and reliable tool to accurately measure BP and HR (Chahine et al., 2015; Altunkan, Ilman, & Altunkan, 2007). Asmar and colleagues (2010) examined 33 adults to determine the validity of the Omron® BP measurements by comparing its measurements to manual mercury sphygmomanometer BP measurements. They found the Omron® to be valid in measuring BP, with the difference between the Omron® and the manual mercury sphygmomanometer being -0.02 $\pm$ 3.7 for systolic blood pressure and -2.2 $\pm$ 3.9 for diastolic blood pressure (Asmar et al., 2010).

To promote standardization, BP was measured on the upper left arm (unless contraindicated) with patients in a sitting position with legs uncrossed, performed according to the AHA recommendations (Giorgini, Weder, Jackson, & Brook, 2014). In addition, BP was measured twice, with a one-minute waiting period between measurements; the average of the two measurements was used (Dusek et al., 2008; Pickering et al., 2005).

Respirations were counted by the researcher for one minute and oxygen saturation was assessed through a handheld pocket pulse oximeter using the patient's right pointer or middle fingers (Jarvis, 2016). Costa and colleagues (2016) examined the validity of the pocket pulse oximeter by comparing the oximetry findings to a standard pulse oximeter and arterial blood

oximetry in 95 patients. The pocket oximeter had a mean difference of 1.85 ($p < 0.001$) compared to the arterial blood oximetry, while the standard pulse oximeter had a mean difference of 1.84 ($p < 0.001$). Therefore, the pocket pulse oximeter was found to be a valid measurement of oximetry.

Study Procedures

The steps of data collection and analysis as well as the study's timeframe are shown in Appendix C. The steps of the intervention, including its timeframe, is shown in Appendix D.

Ethical considerations and recruitment. Approval of the proposed research was sought and secured through the University of Nevada, Las Vegas' (UNLV's) and the pulmonary rehabilitative clinic's distinct institutional review boards (IRBs) prior to any research activities. The doctoral student researcher was responsible for recruitment. Patients were recruited directly from the pulmonary rehabilitative clinic where the intervention took place. Recruitment was done in four ways: the doctoral student researcher ("the researcher") had a small booth in the corner of the waiting room displaying information about the study (Appendix E), a flyer was posted in the waiting room and restrooms (Appendix F); the researcher handed out flyers prior to the clinic's weekly COPD education session; and the respiratory therapist offered patients flyers and referred them to the researcher. If the researcher was not physically present when a potential patient expressed interest, the patient referred to the recruitment flyer and contacted the researcher via phone.

The researcher brought potential patients interested in joining the study to a private intake room to explain the study's purpose, its confidentiality protections, the study intervention, informed consent, and the time commitment required to participate (Appendix D). To ensure privacy, the door was closed with a sign on the front stating "Testing, Please Do Not Disturb." If

the patient desired to further review the consent form prior to signing, they took the consent form home and returned it to the researcher at their next pulmonary rehab appointment. Once consent was attained, the participant was screened by the researcher against the inclusion criteria, and demographic data was collected by administering the demographic data questionnaire to the participant via paper format (Appendix G). If the participant met the inclusion criteria, the researcher and patient scheduled an appointment to complete the study. To promote standardization, the intervention appointment was scheduled just prior to the patient's next pulmonary rehabilitative appointment. For example, if the patient's pulmonary rehabilitative appointment were on a Tuesday at 10 am, the researcher would schedule the patient's appointment for Tuesday at 9 am. After an appointment was established, the researcher accessed the patient's medical record at the pulmonary rehabilitative clinic to obtain a list of current medications and verify the stage of the patient's COPD. The researcher placed a checkmark next to medication(s) the patient currently took (Appendix H) and verified the medications listed with the patient. Once a date and time were determined and medications were verified, the researcher sent the patient home with an appointment reminder card containing the researcher's contact information (Appendix I).

Data collection and intervention. Once the patient arrived for their study intervention appointment at the clinic, the researcher greeted them and assisted the patient in finding a comfortable seated position in a quiet, private room. The researcher asked the patient if they had consumed any anti-anxiety medications or pain medications in the past 10-20 hours, writing the medication consumed and time consumed on their medication sheet, if applicable. The researcher then explained the procedure and answered any additional questions (Appendix J). Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1) and the Modified Borg 0–10 Scale

(MBS) were then administered to patients via paper format and verbal instructions on how to complete each questionnaire were provided (Appendix K). A paper format was chosen over a computerized format as the older adult population finds computerized questionnaires harder to navigate and read versus paper ones (Fanning and McAuley, 2014). After completing the STAI (Form Y-1) and the MBS, the researcher obtained the patient's BP, respiratory rate, HR, and oxygen saturation measurements. The researcher read the scripted instructions to the patient regarding what to expect during the intervention (Appendix L). After instructions were given, the researcher provided an MP4 player and headphones to the patient. To promote standardization, the researcher created pre-recorded audio instructions written by an Advanced Holistic Nurse Board Certified (AHN-BC®) practitioner, and recorded by the researcher to guide the patient through Benson's RR (Appendix M). Patients used the MP4 player to listen to the pre-recorded relaxation technique, which guided them through Benson's RR technique for ten minutes.

After the patient listened to the pre-recorded relaxation technique, the researcher reassessed anxiety levels and the patient's perception of breathlessness by re-administering the STAI (Form Y-1) and MBS questionnaires. Blood pressure, HR, respiratory rate, and oxygen saturation levels were also reassessed post-intervention by the researcher. As a gift for participating, each patient was given the MP4 player and headphones.

After the patient went through the intervention and completed the post-intervention measurements, the researcher asked if the patient was interested in receiving a call from the researcher after one month for a brief follow-up to ascertain if the patient was still practicing Benson's RR (Appendix N). Questions were read to the patient and responses were summarized and transcribed by the researcher.

Once the intervention and measurements were complete, the researcher provided the patient with an instructional card detailing how to practice Benson's RR at home (Appendix O). The total time of interaction between the researcher and the patient for this study was approximately 55 minutes (Appendix D).

To ensure confidentiality throughout the entire research process, each patient was assigned a study code; the code was written on top of their questionnaires, medication list, demographic data, and vital signs. All informed consents forms, as well as the master study code document that link codes to patients and their informed consent forms, was kept in a locked filing cabinet in the researcher's private locked work office.

Data Analysis

Demographic data was analyzed using inferential statistics using International Business Machines (IBM) Statistical Package of Social Sciences (SPSS) version 26. A paired sample *t*-test with exact testing was performed to determine the mean difference in anxiety on the STAI (Form Y-1), the patient's perception of breathlessness using the MBS form, and the systolic and diastolic BP, HR, respiratory rate, and oxygen saturation levels in patients pre- and post-intervention. A bootstrap of 10,000 samples was performed to ascertain the predicated *p*-value. A paired *t*-test was chosen as all patients underwent the intervention with HR, pulse, respiratory rate, BP, oxygen saturation levels, dyspnea, and anxiety measured both before and after the intervention. Furthermore, a paired *t*-test "compares the mean difference between [samples] and the difference [expected] ... between population means, and then takes into account the standard error of the differences" (Field, Miles, & Field, 2012, p. 368). A bootstrap of 10,000 samples was used considering the sample size and the violation of normality among two of the dependent variables (Field, Miles, & Field, 2012).

Chapter Four Summary

This quasi-experimental study took place at a single pulmonary rehabilitative clinic in the Midwest region of the United States. Twenty-five (N=25) patients completed the study intervention. A paired *t*-test was used for data analysis in this study to detect a mean change pre- and post-intervention on the STAI (Form Y-1), MBS form, systolic and diastolic BP, HR, respiratory rates, and oxygen saturation levels.

Chapter Five: Results

This chapter includes a definition of the sample population and the results of the hypotheses tested within this study. Furthermore, this chapter will describe the post-intervention questionnaire results.

Demographics

The patient's ages ranged from 50-89 years, with 80% of patients falling into the 60-69 age group (N = 10) or the 70-79 age group (N = 10). Ninety-two percent of patients were Caucasians and nearly 63% were women. Fifty-six percent of the patients were in stage 4 of COPD and 40% had been diagnosed with COPD for 6-10 years (Appendix P).

As shown in Table 2, each patient included within this study was prescribed and taking one bronchodilator, 64% were taking inhaled or oral corticosteroids, and 68% were prescribed anti-hypertensive medications. One patient was taking an antibiotic, and none of the patients consumed anti-anxiety or pain medications within the half-life timeframe prior to the intervention.

Table 2 Medications Consumed by Patients

Therapeutic Classification	N	Percent (%)
Bronchodilators	25	100
Corticosteroids		
Inhaled	11	44
Oral	5	20
Total	16	64
Combination inhalers (Bronchodilators + Corticosteroids)	9	36
Antihypertensives	17	68

Note. N denotes sample size. Total N = 25.

Regarding participant's medical conditions: 88% of patients had at least one comorbid condition beyond COPD, with 64% having hypertension (Table 3). When asked if patients were using any intervention beyond medications and pulmonary rehab to improve their COPD symptoms, four responded yes with three admitting to exercising in some form (golf, climbing stairs, walking or jogging on a treadmill) and one stating occasional use of a calming app on their smartphone.

Table 3 Current Medical Conditions of Patients

Medical Condition	**N**	**Percent (%)**
Hypertension	16	64
Hyperlipidemia	9	36
Hypothyroidism	5	20
Heart problems	6	24
Kidney disease	2	8
Stomach ulcers	1	4
Anemia	1	4
Total *n* of patients with at least one medical condition	22	88

Note. N denotes number. Total N = 25.

Statistical Analysis

Normality of distribution was examined for the differences between scores of each of the dependent variables. The skewness did not exceed 0.8, and the kurtosis was less than two for each of the dependent variables except for diastolic blood pressure (skewness = 1.57; kurtosis = 6.53). As seen in Table 4, the Shapiro-Wilk test of normality was also examined for the difference in each dependent variable, determining each variable to be non-significant except for the difference in the MBS and diastolic blood pressure ($p < .05$).

Table 4 Shapiro-Wilk Test of Normality in the Difference of Measured Variables

Variable	Statistic	df	Significance
STAI	.942	25	.164
MBS	.799	25	.000
Respiratory Rate	.964	25	.499
SPO2	.950	25	.245
Systolic BP	.964	25	.505
Diastolic BP	.848	25	.002
Pulse	.933	25	.103

Note. STAI denotes State-Trait Anxiety Inventory (Form Y-1); df denotes degree of freedom; MBS denotes Modified Borg Scale; SPO2 denotes oxygen saturation; BP denotes blood pressure.

With the normality tests concluding that some variables did not meet assumptions, and considering the small sample size of 25 patients, a paired *t*-test with exact testing was performed in SPSS version 26. A bootstrap of 10,000 samples was performed in order to ascertain the predicted *p*-value. Table 5 outlines the descriptive statistics of the pre- and post-test scores on each of the dependent variables, and Table 6 displays the results of the paired *t*-test of each dependent variable using the paired *t*-test bootstrapping analysis.

Table 5 Mean and Standard Error of Dependent Variables

Variable	Time	*M*	SE
STAI	Pre-STAI	32.80	2.05
	Post-STAI	25.24	1.44
MBS	Pre-MBS	2.88	.33
	Post-MBS	1.72	.22
Pulse	Pre-pulse	78.92	2.70
	Post-pulse	77.84	2.37
Respiratory rate	Pre-respiratory rate	18.44	.71
	Post-respiratory rate	16.56	.63
Oxygen saturation	Pre-SPO2	93.20	.45
	Post-SPO2	92.48	.47
Systolic BP	Pre-systolic BP	132.56	2.75
	Post-systolic BP	130.64	2.96
Diastolic BP	Pre-diastolic BP	80.00	2.03
	Post-diastolic BP	78.56	2.12

Note. N = 10,000 bootstrap samples. *M* denotes mean; SE denotes standard error mean; STAI denotes State-Trait Anxiety Inventory (Form Y-1); MBS denotes Modified Borg Scale; SPO2 denotes oxygen saturation; BP denotes blood pressure.

Table 6 Paired *t*-Test with Exact Testing of Dependent Variables

Dependent variable	**Mean**	**SE**	***p*-Value**
STAI	7.56	1.47	< .0001*
MBS	1.16	.24	< .0001*
Pulse	1.08	1.52	.50
Respiratory rate	1.89	.49	.001*
SPO2	.72	.36	.06
Systolic BP	1.92	1.39	.19
Diastolic BP	1.44	1.80	.45

Note. N = 10,000 bootstrap samples. *M* denotes mean; SE denotes standard error mean; STAI denotes State-Trait Anxiety Inventory (Form Y-1); MBS denotes Modified Borg Scale; SPO2 denotes oxygen saturation; BP denotes blood pressure. * denotes significant *p*-value.

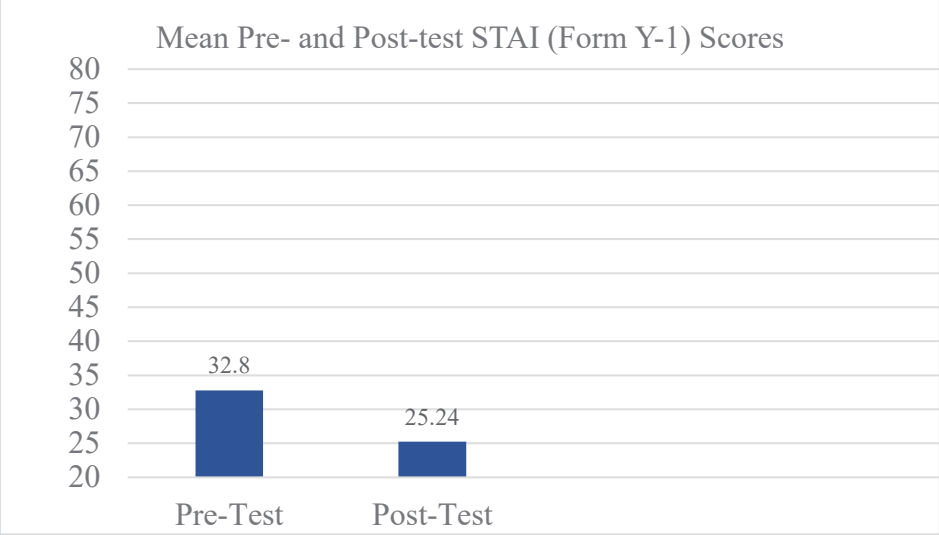
Hypotheses Tested

There were seven hypotheses examined within this study. Each hypothesis focused on a single psychological or physiological response that assisted in measuring an individual's distress. Each hypothesis examined if a mean change in pre- to post-test scores occurred after practicing Benson's RR for 10 minutes.

Hypothesis one. The first hypothesis examined was that Benson's RR would decrease anxiety levels among patients with COPD, as measured on Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1). The results of the analysis indicated a statistically significant difference in anxiety scores on the STAI (Form Y-1) from pre- to post-test. Figure 2 displays a comparison of means scores in pre- to post-test STAI (Form Y-1) scores. Patients scored lower on the STAI questionnaire after the intervention (M = 25.24, SE = 1.44) than before

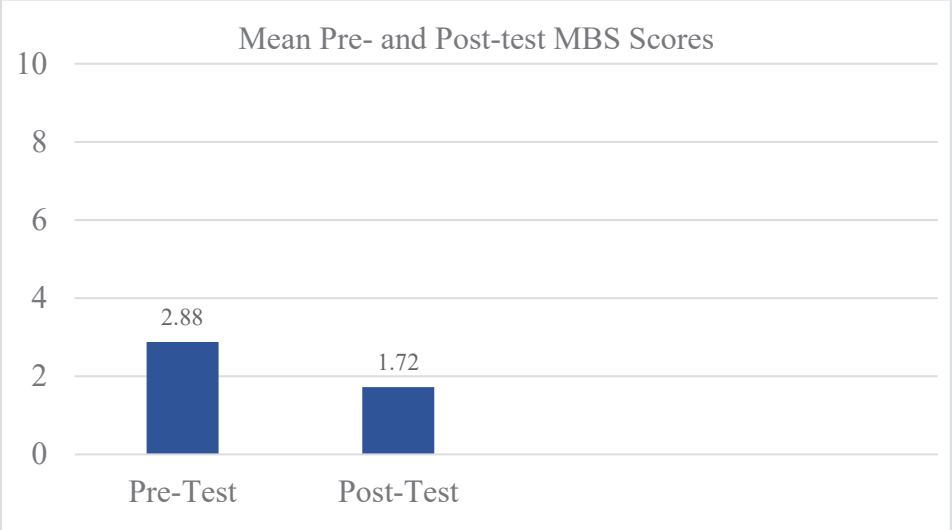
the intervention (M = 32.80, SE = 2.05). With a medium effect size (d = 0.72), the difference of 7.56 [95% CI (4.76, 10.52)] was statistically significant.

Figure 2 Mean Pre- and Post-test STAI Scores



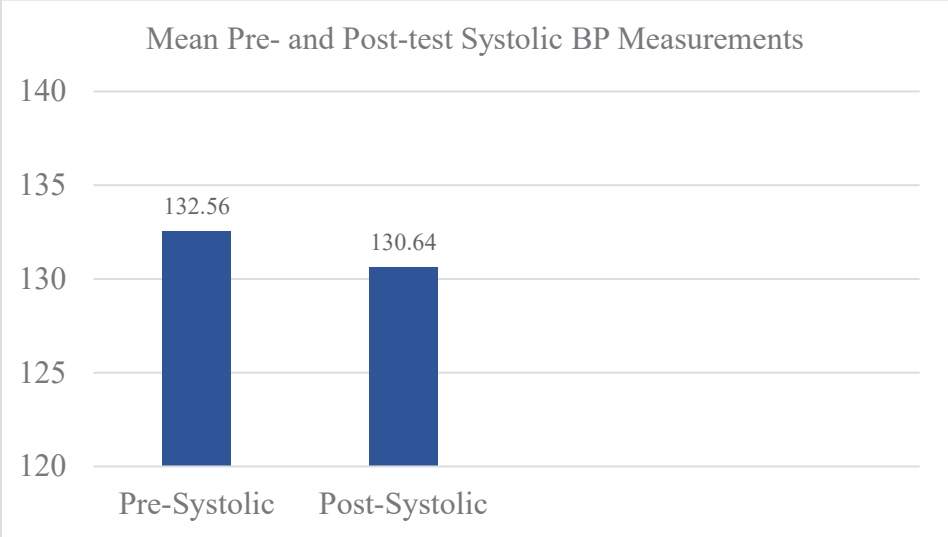
Hypothesis two. The second hypothesis examined was that Benson's RR would decrease the patient's perception of breathlessness according to the Modified Borg 0–10 Scale (MBS). The results indicated MBS scores were significantly lower on the post-test (M = 1.72, SE = .22) than on the pre-test (M = 2.88, SE = .33). With a large effect size (d = 0.96), the difference of 1.16 [95% CI (.68, 1.64)] was statistically significant. Figure 3 displays a comparison of mean scores in pre- to post-test MBS scores.

Figure 3 Mean Pre- and Post-test MBS Scores



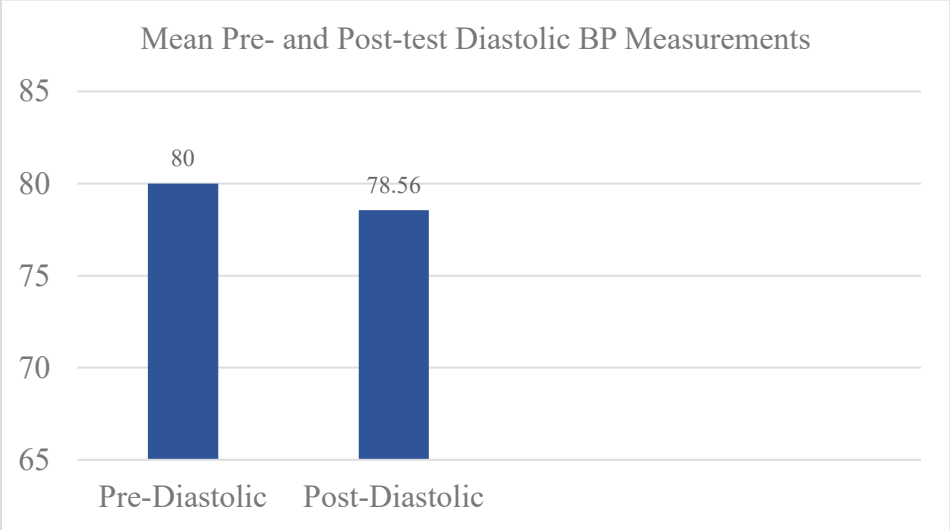
Hypothesis three. The third hypothesis examined was that Benson's RR would decrease systolic blood pressure (BP) among patients with COPD. Patients' systolic BP measurements were lower after the intervention (M = 130.64, SE = 2.96) than before the intervention (M = 132.56, SE = 2.75). Figure 4 displays a comparison of mean measurements in pre- to post-test systolic BP measurements. However, the difference of 1.92 [95% CI (-.80, 4.64)] was not statistically significant.

Figure 4 Mean Pre- and Post-test Systolic BP Measurements



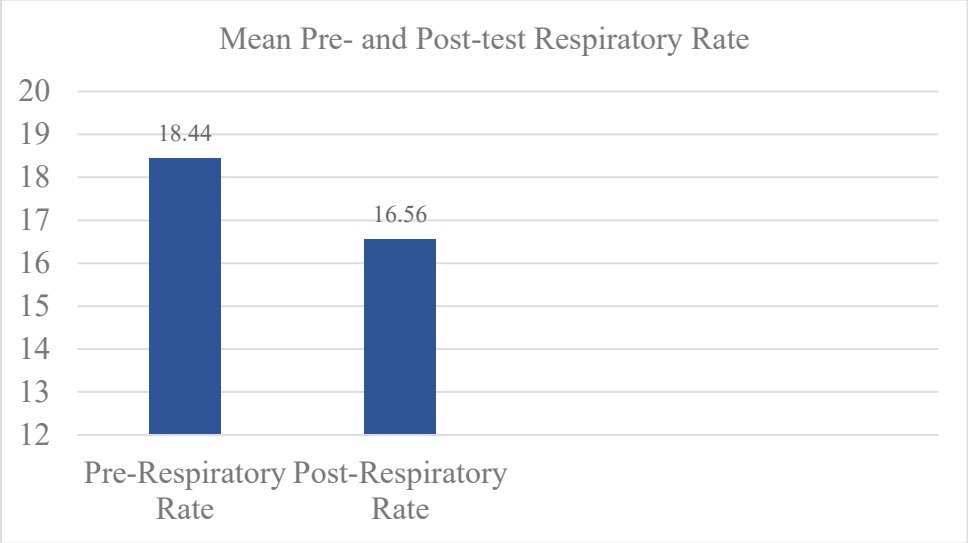
Hypothesis four. The fourth hypothesis examined was that Benson's RR would decrease diastolic blood pressure (BP) among patients with COPD. Patients' diastolic BP measurements were lower after the intervention (M = 78.56, SE = 2.12), than before the intervention (M = 80, SE = 2.03). However, the difference of 1.44 [95% CI (-1.92, 5.16)] was not statistically significant. Figure 5 displays a comparison of mean measurements in pre- to post-test diastolic BP measurements.

Figure 5 Mean Pre- and Post-test Diastolic BP Measurements



Hypothesis five. The fifth hypothesis examined was that Benson's RR would decrease respiratory rates among patients with COPD. Patients' respiratory rate measurements were lower after the intervention (M = 16.56, SE = .63) than before the intervention (M = 18.44, SE = .71). Figure 6 displays a comparison of mean measurements in pre- to post-test respiratory rate measurements. With a medium effect size (d = 0.73), the difference of 1.88 [95% CI (.92, 2.84)] was statistically significant.

Figure 6 Mean Pre- and Post-test Respiratory Rate Measurements



Hypothesis six. The sixth hypothesis examined was that Benson's RR would increase patients' oxygen saturation levels among patients with COPD. Among the participants, 64% were not using supplemental oxygen. The number of patients on oxygen and their prescribed liter of oxygen delivered can be found in Table 7.

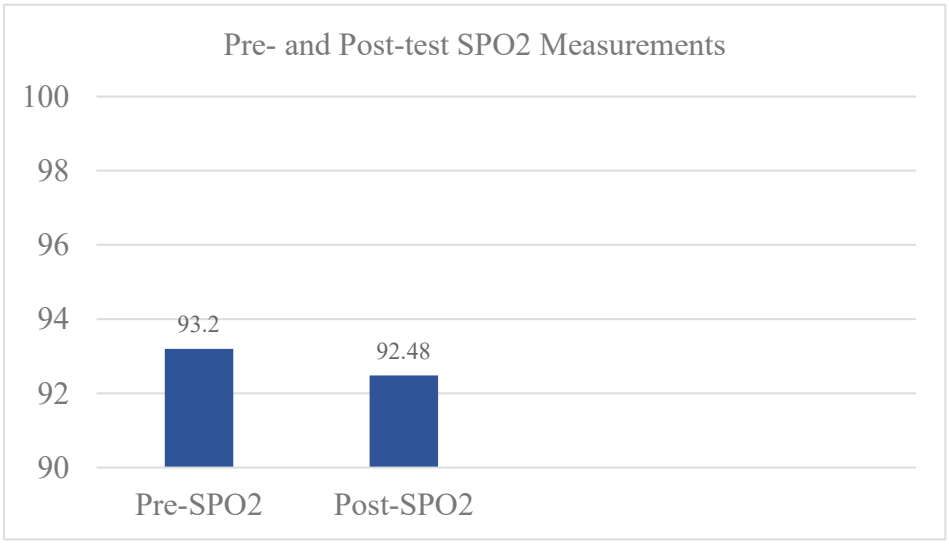
Table 7 Prescribed Oxygen in Liters

Liters	Frequency	Percent
None	16	64
2	2	8
3	2	8
4	4	16
5	1	4

Note. Total N = 25.

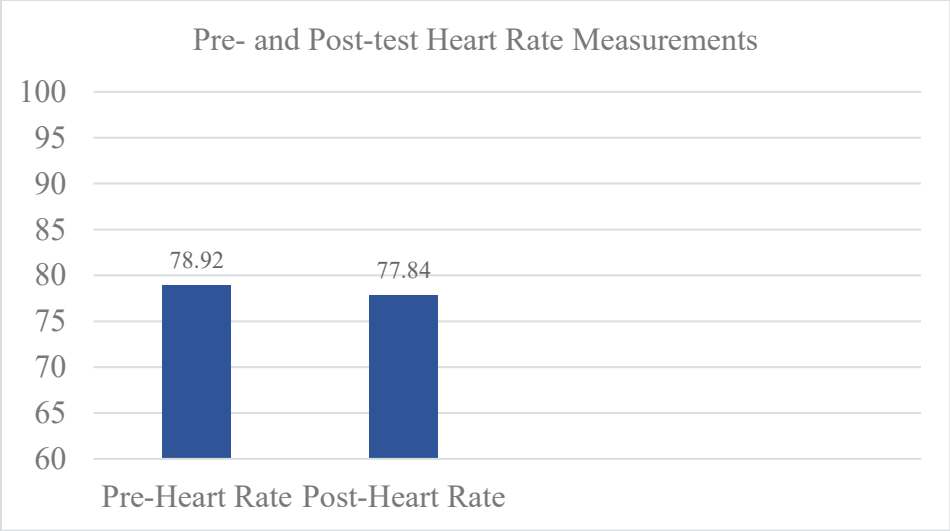
Patients' oxygen saturation measurements were found to be lower after the intervention (M = 92.48, SE = .47) than before the intervention (M = 93.20, SE = .45). However, the difference of .72 [95% CI (.00, 1.40)] was not statistically significant. Figure 7 displays a comparison of mean oxygen saturation measurements in pre- to post-test oxygen saturation levels.

Figure 7 Mean Pre- and Post-test Oxygen Saturation Measurements



Hypothesis seven. The seventh hypothesis examined whether Benson's RR would decrease heart rate (HR) among patients with COPD. Patients' HR measurements were lower after the intervention (M = 77.84, SE = 2.37), than before the intervention (M = 78.92, SE = 2.70). However, the difference of 1.08 [95% CI (-2.04, 3.88)] was not statistically significant. Figure 8 displays a comparison of mean HR measurements in pre- to post-test HR.

Figure 8 Mean Pre- and Post-test Heart Rate Measurements



Post-Study Questionnaire Results

To ascertain if patients were still practicing Benson's RR technique, patients who agreed to be phoned at home one-month after the intervention were called. Eight out of 20 participated in the follow-up phone call questionnaire. Of the eight patients who participated, roughly 88% answered in the affirmative when asked if they had continued to practice Benson's RR. The single patient who stated they had not practiced the technique during the one-month follow-up call stated they had not felt anxious since the weather had changed, and therefore, they found no

need to practice the technique. During the one-month post-intervention period, patients were asked to practice the technique at home twice a day. However, as seen in Table 8, patients displayed a wide range of how often they practiced the technique.

Table 8 How Often Patients Practiced Benson's RR at Home

Practiced Daily		**Practiced Weekly**		**Practiced Monthly**	
How Often	Percent (%)	How Often	Percent (%)	How Often	Percent (%)
Once a Day N = 2	29%	Twice a Week N = 2	29%	Four Times a Month N = 1	14%
Twice a Day N = 1	14%			Five Times a Month N = 1	14%
Total N = 3	43%	Total N = 2	29%	Total N = 2	29%

Note. N = number. Total N = 7.

The majority of patients who practiced Benson's RR technique at home did not find it difficult nor burdensome and were satisfied. The mean and standard deviation for each question on the questionnaire is shown in Table 9.

Table 9 Descriptive Statistics of Post-Intervention Questionnaire

	Likely to continue	**Difficult to practice**	**Useful of a technique**	**Burdensome to practice**	**Satisfied with technique**
M	4.29	1.71	4.29	1.29	4.43
SD	.95	.95	.49	.49	.79

Note. *M* = mean; SD = standard deviation. Likert Scale was 1-5.

After the sixth question, patients were asked if they had any additional comments they would like to share. The researcher summarized and transcribed their responses. Of the seven who answered the questionnaire, two did not leave additional comments. One patient stated he would practice the technique more if the researcher had incorporated soothing music or sounds of rainfall in the background. Three other patients commented how the technique decreased their anxiety. One patient stated: "It just calms me. It keeps me from quitting that last minute of rehab when I start to feel anxious 'cause I can't breathe. It calms me down so I can finish." Another patient stated how focusing on her chosen word decreased her dyspnea: "It really helps me when I'm feeling short of breath. I just focus on my word." These comments suggest that those who continued to practice the technique after the intervention found it favorable in the reduction of anxiety and perception of breathlessness. Furthermore, these comments support the statistical findings of a reduction in anxiety and breathlessness on the STAI (Form Y-1) and the MBS from the statistical analysis conducted.

Chapter Six: Discussion

This chapter discusses the study findings, the limitations, study feasibility and nursing implications, and concludes by identifying future areas of research.

Demographics

The age of the sample is consistent with the CDC (2011) demographic characteristics for the specific Midwest state studied, with majority of patients being 65 or older. However, the race of the sample did not reflect the CDC (2011) demographic statistics of the Midwest state where the study was conducted. According to the CDC (2011), 9.9% of all African Americans in the setting where the study was conducted have COPD compared to 7.9% of all Caucasians. However, 92% of patients enrolled in this study were Caucasians, which reflected the patient population at the pulmonary rehab clinic. According to Spitzer and colleagues (2019), nearly 30% of African Americans fail to enroll in a pulmonary rehabilitative program, which could explain the lack of representation of African Americans in this sample. The higher incidence of females in this sample is also consistent with the CDC (2011) statistics that found 9.0% of all females in the state studied have a diagnosis of COPD, compared to 6.8% of all men. The present study also found 68% of patients with COPD were being treated for hypertension. This finding is consistent with Mohammadien and colleagues' (2016) study that approximately 85% of patients with COPD have a comorbid diagnosis of cardiovascular disease.

Research Variables and Hypotheses

This study showed a significant mean change in pre- to post-test scores on the MBS and the STAI (Form Y-I) questionnaires, as well as in the respiratory rate of patients with COPD. According to the Roy Adaptation Model (RAM), psychological and physiological adaptation occurs after deploying an acquired coping mechanism to reduce stimuli (Masters, 2015). This

was demonstrated in the present study with the patient adapting through the physiologic-physical and self-concept adaptive modes after practicing Benson's RR technique. The adaptations were shown through the physiological change of a reduction in dyspnea and respiratory rate, and in the psychological change of a decrease in anxiety, showing that the individual with COPD can adapt to the negative symptoms experienced.

The literature shows that dyspnea increases anxiety (Norweg & Collins, 2013), and anxiety exacerbates dyspnea (Chan, Giardino, & Larson, 2015). To combat the increased dyspnea, patients with COPD hyperventilate in hopes of taking in more air to reduce their breathlessness (Valenza et al., 2014). If dyspnea is responsible for the increase in anxiety and respiratory rate, improving patients' dyspnea through the implementation of Benson's RR may have been responsible for the significant reduction in anxiety and respiratory rates. Furthermore, if anxiety is responsible for the increase in dyspnea, reducing patients' anxiety levels may have led to the significant reductions in perceptions of breathlessness. However, when examining Pearson's *r* correlations of each of the dependent variables on the post-test, the only correlation among the dependent variables was between pulse and diastolic BP. These findings suggest that higher scores on the STAI (Form Y-1) do not guarantee that a patient also rates their breathlessness as high. These findings also suggest that, although a patient perceives their breathlessness as high, they may not be exhibit anxiety. Although the literature shows that patients with COPD exhibit more anxiety than patients without COPD (Norweg & Collins, 2013), not all patients with COPD have anxiety at all times. Furthermore, many patients with COPD do not exhibit dyspnea continuously, which could explain the lack of correlation among the dependent variables on the post-test. In addition, the findings of Person's *r* may also be

secondary to the sample size, with the possibility that a larger sample size may yield different findings.

Anxiety. The significant reduction in anxiety found after practicing Benson's RR is consistent with the literature. Nikbakht and colleagues (2005) reported a reduction in anxiety in both pre- and post-operative patients. Mahdavi and colleagues (2013) reported a reduction in anxiety in hemodialysis patients after practicing Benson's RR. Although there was a mean change in the reduction of anxiety among patients with COPD in this study, these results cannot be fully explained by practicing Benson's RR since the researcher cannot rule out the possibility of confounding variables that may have existed, such as the quiet and private setting where the intervention took place. Although the researcher was careful in the conduction of the intervention, many patients often talked during the administration of the pre- and post-tests and during the vital sign assessments, informing the researcher about their family or fondly reflecting on their vocation prior to retiring. It is uncertain if this influenced the reduction of their anxiety based on the STAI (Form Y-1) questionnaire. The significant reduction in anxiety within this research demonstrates that perhaps one way to reduce anxiety in a patient with COPD is through the presence of a nurse when implementing Benson's RR technique.

Perception of breathlessness. The significant reduction in MBS scores was a substantial finding as breathlessness is the chief complaint in patients with COPD. These findings could be secondary to Benson's RR reducing psychological distress by countering the sympathetic nervous system (SNS), resulting in a decreased respiratory rate and perception of breathlessness (Baraniak & Sheffield, 2001; Benson, 2000). However, the reduction in the stimulation of the SNS did not explain the non-significant change in HR or systolic and diastolic blood pressure, showing that countering the SNS may not reduce all elevated physiological responses. These

findings are consistent with the literature, which showed many mindfulness techniques do not affect all the psychological and physiological responses (Hyland et al., 2016; Nikbakht, Taghavi, Mahmoudi, & Taghlili, 2005). It is important to note that many patients with COPD did not experience an elevated BP or HR prior to the intervention, making a significant reduction in these two dependent variables unlikely. Much like the reduction in anxiety, the reduction in perception of breathlessness may also be secondary to the researcher's presence. Regardless, these findings demonstrate that a significant change occurred when the researcher implemented Benson's RR technique.

Blood pressure, heart rate, respiratory rate, & pulse oximetry. There was no significant change for HR, systolic and diastolic BP, or in oxygen saturation from pre- to post-test measurements. The lack of change in systolic and diastolic BP and HR could be the result of patients consuming anti-hypertensive medications (N = 16) the morning of the intervention. In addition, the majority of patients (N = 23) were not tachycardic nor hypertensive (N = 16) on the pre-test measurements, which could account for the non-significant change noted in the post-test measurements of HR and systolic and diastolic BP. These findings are inconsistent with the study of Dusek and colleagues (2008). They found that patients who practiced Benson's RR showed a significant reduction in systolic BP.

A mean change in oxygen saturation was also non-significant after practicing Benson's RR. This could be secondary to the disease process of COPD. The majority of patients are in stage 4 of the disease. As COPD progresses, lung tissue becomes inflamed or damaged, resulting in a decreased ability of the body to carry oxygenated blood leading to a reduction in oxygen saturation levels (Wagner & Hardin-Pierce, 2014). Practicing Benson's RR does not alter the pathophysiology of the lungs, nor does it reverse damage that has already occurred secondary to

the disease. This explanation may account for the lack of change in oxygen saturation from pre- to post-measurement levels.

Limitations

This study has several limitations. First, the sample size is small. There were multiple reasons why the desired sample size of N = 41 was not obtained. Originally, the pulmonary rehab clinic stated 8-10 new patients were admitted into the pulmonary rehab program weekly at that time. However, the number of new patients admitted to the program each week was roughly five, with at least 2-3 admitted for non-COPD-related conditions. In addition, many potential patients who lived in rural communities south of the clinic were admitted to the pulmonary rehab clinic, then referred to an affiliated clinic closer in proximity to the patients. This rural pulmonary rehabilitative clinic agreed to participate as a secondary site for recruitment but, due to the process of merging with a larger institution, recruitment was not possible.

A second limitation of this research is the single recruitment site. Using a single site for recruitment may not provide a representation of the sample population of patients with COPD. Furthermore, the homogeneity of the sample is also a limitation as 92% of patients were Caucasian. A third limitation is the possibility that findings may be the result of confounding variables that were not measured. A confounding variable is any variable not measured that may have some effect on the dependent variables (Field, Miles, & Field, 2012).

Considering the positive statistics found in the follow-up questionnaire, the findings must be interpreted cautiously since it is highly likely that those who answered or returned the call were biased and in favor of the technique (Stommel & Wills, 2004).

Study Feasibility and Nursing Implications

Benson's RR is cost-effective, quick, simple, and requires little training. In this study, the majority of patients attending the pulmonary rehab program were open to practicing Benson's RR, with many stating they were willing to try a mindfulness activity to achieve symptom relief. Patients who participated in this study appeared to enjoy practicing Benson's RR. For these reasons, continuing to implement this technique at a rehabilitative clinic is feasible and recommended.

The nursing implications from this study's findings is the importance of including Benson's RR technique in the management of patients with COPD. It is recommended that nurses who care for patients with COPD learn Benson's RR technique and incorporate the technique as part of the education provided to patients and their family members. This will allow the patient with COPD the ability to implement the technique earlier in their disease process. Benson's RR should also be included as a nursing intervention that may be deployed when a patient is feeling anxious or displaying dyspnea. This intervention can also be taught to nursing students as an intervention for dyspnea and anxiety management among various patient populations.

Future Recommendations

Benson's RR offered a significant reduction in the psychological response of anxiety and in the physiological responses of dyspnea and increased respiratory rate in the rehabilitative patient with COPD. These significant findings cannot be solely linked to the intervention itself unless a replicated study is conducted with the inclusion of a larger sample size and control group at a different setting. However, the detection of a mean change is the initial step in understanding the positive benefits of practicing Benson's RR. A randomized large-scale

research study is warranted to gain further understanding of the value of practicing Benson's RR to reduce the psychological and physiological responses commonly experienced by the patient with COPD. Additionally, future studies may focus on implementing this technique at the bedside of hospitalized patients with an exacerbation of COPD to ascertain if similar findings of a reduction in anxiety and dyspnea occur. Future studies could also examine the effectiveness of Benson's RR technique in the reduction of dyspnea and respiratory rate when implemented in hospitalized patients with other acute and chronic respiratory diseases such as sarcoidosis, pulmonary fibrosis, and pneumonia. Another area of exploration would be to investigate if there are any longitudinal effects such as a decrease in the number of COPD exacerbations and hospitalizations and an overall increase in quality of life among patients who practice the technique.

Conclusion

Chronic obstructive pulmonary disease (COPD) remains the third leading cause of death in the United States (National Center for Health Statistics, 2016) with billions of healthcare dollars expended to manage the disease (Lin, Shaya, & Scharf, 2010). The literature shows that patients with COPD have dyspnea, with many exhibiting anxiety secondary to the thoughts of being in respiratory distress, dying, slowly suffocating, and contemplations of what the future may bring (Strang, Ekberg-Jansson, & Henoch, 2014). Experiencing dyspnea and anxiety leads to a reduction in activity levels and overall quality of life (Akinci, Pinar, & Demir, 2012; Kim et al., 2000) in addition to creating high functional and symptom limitations (Blinderman, Homel, Billings, Tennstedt, & Portenoy, 2009). A cost-effective intervention that can be deployed when patients with COPD are exhibiting negative symptoms must be included in the patient with COPD plan of care. Benson's RR has been practiced over the past four decades and has been

found to be effective in the reduction of many psychological and physiological symptoms across a variety of patient populations. It was unknown if this relaxation technique would have similar findings in the patient with COPD. The current GOLD (2017) guidelines suggest patients with COPD incorporate mindfulness into their daily practice; however, the focus of providers has been on exercise through pulmonary rehab, and pharmacologic measures.

This initial research study aimed to determine if implementing Benson's RR resulted in a reduction of anxiety, perception of breathlessness, systolic and diastolic BP, HR, and respiratory rate, and increased oxygen saturation among patients with COPD. Roy's Adaptation Model was the theoretical framework guiding this study because it focuses on restoring balance along the health and illness continuum. It was determined that implementing Benson's RR produced a significant mean change in pre- to post-test scores on the STAI (Form Y-1) and on the MBS, and significantly reduced respiratory rates. These findings support the inclusion of Benson's RR in the twelve-week pulmonary rehabilitative program.

It is imperative for patients with COPD to have multiple tools they can deploy when dealing with the unwanted symptoms the disease brings. Nursing must empower patients with COPD to use Benson's RR to adapt to and cope with the adverse symptoms patients' experience. In addition to medication and pulmonary rehab, Benson's RR is a mindfulness intervention a patient with COPD can inexpensively incorporate into their daily routine when they find themselves caught in the negative feedback loop of anxiety and dyspnea. Incorporating Benson's RR assists the patient with COPD in achieving adaptation when facing health adversity. Adapting to and coping with anxiety and dyspnea through the implementation of Benson's RR may lead to a reduction in the number of COPD exacerbations and hospitalizations and an increase in patients' quality of life. The findings of this study offer a foundation for incorporating

this technique as a clinical practice in pulmonary rehabilitative clinics. In addition, the findings of this study contribute to understanding how nursing can assist the patient with COPD in adapting to the negative symptoms experienced to improve their psychological and physiological responses to distress.

Appendix A

Spielberger's (1983) State-Trait Anxiety Inventory (STAI) (Form Y-1)

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then write the number in the blank at the end of the statement that indicates how you feel right now; that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Patient #: _____

		Not at all	**Somewhat**	**Moderately so**	**Very much so**
1.	I feel calm.	1	2	3	4
2.	I feel secure.	1	2	3	4
3.	I am tense.	1	2	3	4

Note. Copyright prohibits the inclusion of the full 20-question questionnaire. This is a sample of items found on the STAI (Form Y-1). Permission to use the STAI (Form Y-1) for this research study was obtained by Crista Reaves from Mind Garden © 1977, published by Mind Garden, Inc. all rights reserved. www.mindgarden.com.

Appendix B

Modified 0–10 Borg Scale (MBS)

Patient ID:		
		Place a check in the box next to how you are currently feeling.
0	**No breathlessness at all**	☐
0.5	**Very, very slight (just noticeable)**	☐
1	**Very slight**	☐
2	**Slight breathlessness**	☐
3	**Moderate**	☐
4	**Somewhat severe**	☐
5	**Severe breathlessness**	☐
6		☐
7	**Very severe breathlessness**	☐
8		☐
9	**Very, very severe (almost maximal)**	☐
10	**Maximal**	☐

Reference: Reprinted from: Burdon, J. G., Juniper E. F., Killian K. J., Hargrave F. E., & Campbell E. J. M. (1982). The perception of breathlessness in asthma. *American Review of Respiratory Disease, 126*, 825-828. (Note: The term "breathlessness" was added to the Modified Borg scale by Kendrick and colleagues (2000) and is reprinted with permission from Elsevier from: Kendrick, K. R., Baxi, S. C., & Smith, R. M. (2000). Usefulness of the modified 0-10 Borg scale in assessing the degree of dyspnea in patients with COPD and asthma. *Journal of Emergency Nursing*, 26(3), 216-222.

Appendix C

Timeline for Proposed Study

Step	**Month**								
	Jan-Feb 2019	**March 2019**	**April 2019**	**May 2019**	**June 2019**	**July 2019**	**Aug 2019**	**Sept 2019**	**Oct 2019**	**Nov 2019**
IRB	X									
Data collection		X 8 patients	X 3 patients	X 3 patients	X 4 patients	X 3 patients	X 4 patients			
Data analysis							X	X		
Write-up findings								X	X	
Submit paper										X
Defense										X

Appendix D

Steps and Time Commitment from Patients

Activity	Time (in minutes)
Day 1	
Explanation of procedure and informed consent	6
Inclusion criteria screening	2
Appointment set-up	2
	Total Time Day 1: 10 minutes
Day 2	
Introduction, explanation of intervention, ask questions	5
Pre-intervention vital signs	4
Pre-intervention STAI (Form Y-1)	8
Pre-intervention MBS	2
Intervention	10
Post-intervention vital signs	4
Post-intervention STAI (Form Y-1)	8
Post-intervention MBS	2
Wrap-up	2
	Time Day 2: 45 minutes
	Total Time: 55 minutes

Appendix E

Waiting Room Poster

Join a Research Study to Learn a Relaxation Response Aimed at Adapting to Symptoms of COPD!

Crista Reaves, MSN, RN, PhD Student

What Does the Study Involve?

- Listening to a 10 minute pre-recorded audio of Herbert Benson's Relaxation Response technique
- Completing two questionnaires and having a nurse take your vital signs.

Who can Participate?

- Patients in stage 2-4 of COPD
- > 40 years old
- Patients attending the first month of Sparrow's Pulmonary Rehab program

When?

- At a time that is convenient for you!
- Complete the intervention with me before your next pulmonary rehab appointment!
  - No need to make an extra trip!

Where?

- Right here!
  - The intervention will take place in the private intake room on the third floor of Sparrow's Pulmonary Rehab Center.

Participate in this research study aimed at reducing:

Anxiety
Breathlessness
Blood Pressure
Heart Rate
Respiratory Rate

Interested in Participating? Contact Crista Reaves at 517-420-0660 or email her at reavec1@unlv.nevada.edu

Time Commitment?

- Research study will take roughly 55 minutes to complete.

What are the Benefits of the Study?

- Herbert Benson's Relaxation Response has been shown in many patient populations to reduce anxiety, lower blood pressure, and reduce heart rate!

Compensation?

- Yes! If you are eligible and complete the study you will be able to keep a new MP4 player and headphones!

UNLV School of NURSING

Appendix F

Recruitment Flyer

UNLV School of NURSING

Living with Symptoms of COPD?

Consider volunteering to participate in a research study aimed at reducing anxiety, breathlessness, blood pressure, heart rate, and respiratory rate by listening to a 10-minute relaxation recording.

- This research study will take place at Sparrow's Pulmonary Rehab center and will take approximately 45-55 minutes to complete.

- What does this research study involve?
  - A Registered Nurse will collect some information from you.
  - A Registered Nurse will take your vital signs and you will complete two questionnaires to assess anxiety and shortness of breath.
  - You will then listen to an audio recording of a relaxation technique for 10 minutes.
  - Once you have finished listening to the recording, the nurse will take a second set of vital signs and you will again complete the two questionnaires to assess anxiety and breathlessness.

- You may qualify to participate in this research study if you:
  - Are participating within the first month of Sparrow's Pulmonary Rehab program
  - Are diagnosed with COPD at a stage of 2–4
  - Are 40 years or older
  - Can read and speak in English

- Compensation will be provided in the form of an MP4 player and headphones!

If interested, please contact Crista Reaves, MSN, RN at:
(517) 420-0660 or at reavesc1@unlv.nevada.edu

Or contact Alona Angosta, PhD, RN at:
702-895-1218 or at Alona.Angosta@unlv.edu

Appendix G

Demographic Data

Patient ID:		
Age (please circle)	**Race (please circle)**	**Number of weeks in pulmonary rehab (please circle)**
40–49	White	Week 1
50–59	Black or African-American	Week 2
60–69	American Indian or Alaskan Native	Week 3
70–79	Asian	Week 4
80–89	Native Hawaiian or Pacific Islander	Week 5
90–100	Multiple Races	Week 6
Have you used (or are you currently using) any intervention that has helped you? If so, please explain:	Other (please specify): _____	Week 7 Week 8 Week 9 Week 10 Week 11 Week 12
Stage of COPD (please circle)	**Gender (please circle)**	**How long have you had COPD? (please circle)**
Stage 1	Male	1-5 years
Stage 2	Female	6-10 years
Stage 3	Other (specify)	11-19 years
Stage 4		>20 years

Medical History (please circle current medical conditions)		
Diabetes	Stomach ulcers	Anemia
High blood pressure	Pneumonia	Jaundice
High cholesterol	Asthma	Hepatitis
Hypothyroidism	Pulmonary embolism	Stroke
Hyperthyroidism	Cystic fibrosis	Seizures
Cancer (type)_____	Emphysema	Kidney disease
Angina	Crohn's disease	Kidney stones
Heart problems	Colitis	Tuberculosis

Appendix H

Medications Prescribed to Patients with COPD

Patient ID:	
Bronchodilators	
• Albuterol (ProAir HFA or Ventolin HFA)	☐
• Levalbuterol (Xopenex HFA)	☐
• Fenoterol	☐
• Ipratropium (Atrovent)	☐
• Tiotropium (Spiriva)	☐
• Olodaterol	☐
• Indacaterol (Arcapta)	☐
• Salmeterol (Serevent)	☐
• Formoterol (Foradil or Perforomist)	☐
• Aclidinium (Tudorza)	☐
Combination inhalers	
• Advair	☐
• Symbicort	☐
Inhaled steroids	
• Budesonide (Pulmicort)	☐
• Fluticasone (Flovent HFA or Flonase)	☐
Oral steroids	
• Prednisone (Deltasone)	☐
• Hydrocortisone (Cortef)	☐
• Dexamethasone (Decadron)	☐
• Prednisolone (Prelone)	☐
• Methylprednisolone (Medrol)	☐
Antibiotics	
• Azithromycin	☐

• Erythromycin	☐
Anti-anxiety	
• Xanax (alprazolam)	☐
• Klonopin (clonazepam)	☐
• Ativan (lorazepam)	☐
• Valium (diazepam)	☐
• Buspar (buspirone)	☐
Other medications	
•	☐
•	☐
•	☐
•	☐

Appendix I

Appointment Reminder Card

Appointment Reminder

UNLV School of NURSING

You have a scheduled appointment to meet with Crista Reaves to participate in a relaxation research project.

Date:

Time:

Location: Sparrow's Pulmonary Rehab Center (Meet me in the 3rd floor waiting room)

**If you are unable to attend or need to reschedule please call Crista Reaves at (517) 420-0660 or email her at reavec1@unlv.nevada.edu.*

Appendix J

Procedural Instructions Read to the Patient

I would like to thank you for being here and volunteering to participate. It is much appreciated. I'm going to spend a minute or so going over the procedure before we get started.

First, I will give you an anxiety questionnaire and then a perception of breathlessness questionnaire to complete. I will read the instructions with how to complete each questionnaire.

Once the two questionnaires are complete, I will then take your blood pressure, heart rate, respiratory rate, and oxygen saturation levels.

After I have measured your vital signs, I will provide you with a MP4 player and headphones and will read you your instructions. You will then listen to the recording for ten minutes.

Once the recording is over, I will give you the same anxiety and perception of breathlessness questionnaires to complete and re-read you the instructions on how to complete each form.

I will conclude the study by reassessing your blood pressure, heart rate, respiratory rate, and oxygen saturation levels. You may stop the intervention at any time.

Do you have any questions before we get started?

Appendix K

Questionnaire Instructions Read to Patient

STAI (Form Y-1) instructions

- This is an anxiety questionnaire for you to complete. Please read and answer each of the 20 statements with how you are currently feeling at this moment. You are to score each statement by circling a number 1-4, with a rating of 1 meaning *none* and a rating of 4 meaning *very much*. Once you are finished, please set your pencil down.

MBS instructions

- This is a perception of breathlessness questionnaire for you to complete. This questionnaire uses a scale of 0-10, with 0 meaning you have no breathlessness and 10 meaning you have maximal breathlessness. Place a check next to how you are currently feeling at this moment. Once you are finished, please set your pencil down.

Appendix L

Scripted Instructions for Intervention

I am now going to hand you the MP4 player and headphones. Please place the headphones on and let me know you are ready by giving me a "thumbs up."

Once you are ready, I will push play. You will hear a woman's voice on the headphones. She will be guiding you through a relaxation response for 10 minutes.

You are to follow the instructions on the recording.

Once the recording is over, please take off your headphones to signal you have finished.

As a reminder, you may stop the intervention at any time.

Appendix M

Script for Guided Relaxation Response

Hello. This audio will help you sit in meditation for 10 minutes.

Before you start, please find a comfortable place to sit. Make sure you are in a position that allows you to breathe freely and feel totally supported (pause for 5 seconds). Now that you are comfortable, I want you to select a focus word for this next 10 minutes. You can use any single word or short phrase. For example, you can use the word "one" or "calm", or you may select a word or short phrase that has some meaning for you. Whatever you choose, it needs to be something that helps you feel a sense of serenity and peace. I will ask you during the meditation to start with this focus word and to return to that singular focus throughout the 10-minute meditation. Repeating your focus word or phrase may also be used informally when you are not meditating to find a quick sense of peace in your day. Go ahead and choose that repetitive word or short phrase now (pause for 5 seconds).

Let's begin. Making your last few adjustments, I want you to settle into your chair and bring your attention to your breath. First focusing on the sensation of your breath as it enters and leaves your nose. You do not need to change how you are breathing – there is no need to purposely slow your breath. Just experience it. Perhaps you will feel comfortable closing your eyes at this time. If not, just soften your gaze. Look at your lap or off into the distance, but not on anything in particular. Allow yourself to connect with your breath. As you settle in more comfortably, perhaps you feel the movement of your chest or even the sensation of your abdomen rising and falling as you breathe calmly in and out.

Now, with every exhale, say the focus word or phrase you have chosen. Connect the focus word or phrase when exhaling. Create a rhythm…. like a gentle rocking motion such as the waves on a lake. Rather than on your breathing, I want you to place your focus on the one word or short phrase you have chosen.

Now as we are breathing at a pace comfortable for you, we will begin to focus on a different part of our body. On our in breath we will bring our attention to that specific part of the body, and on our out breath we will allow that part of our body to fully relax.

Start with your feet and slowly move upward, inhaling and bringing attention to our feet, and while exhaling allowing your feet to relax.

Now moving slowing up to our legs, relax your legs fully… let them dangle down and feel heavy. Now relax your hips, your abdomen, your back, your chest, your shoulders. Allow your shoulders to just release and drop, allowing them to sink deeper into your seat. Now your arms and hands, your neck, your head, and finally your face. Allowing your brows to unfurrow and the muscles around your mouth to relax. Allow yourself to feel a sense of presence and relaxation in your body.

Now continue to bring to mind your word, or phrase. Allow that word or phrase to resonate with you. Now, while saying your word or phrase with every breath, sit comfortably while breathing at a pace comfortable for you. Let's allow ourselves to sit together in peaceful silence for five minutes or so while you breath and say the word or phrase that resonates with you on your exhale.

Your focus may wander. Do not be concerned, that is your mind doing what it is meant to do – to think. When you notice your attention has wandered, just bring it back with joy, like calling to a child or a pet that you love to come to you.

Happily bringing ourselves back to our focus word or phrase when we have wandered away. (Silence for a minute or two).

While breathing, we are connecting with our word or phrase again and again. (Silence for a minute or so).

Now releasing your focus – continuing to sit with our eyes closed or softened not yet ready to stir – we release the focus of our word or phrase and sit in awareness of our whole selves. Just noting how we feel right now in this moment.

When you are ready – open your eyes and move your fingers and toes. Return gently to this day. Give yourself a moment to stretch before you get up and go about your day.

Thank you for spending this time in meditation.

Appendix N

One Month Follow-Up Questionnaire

Questions
1. Since I last saw you, have you been using Benson's RR technique? YES If yes, how often do you use Benson's RR technique in a day/week? _____times per week/day NO
2. How likely is it that you will continue to practice Benson's RR? 1 2 3 4 5 Not Likely Highly Likely
3. How difficult is it to practice Benson's RR? 1 2 3 4 5 Not Difficult Highly Difficult
4. How useful is practicing Benson's RR? 1 2 3 4 5 Not Useful Highly Useful
5. How burdensome is practicing Benson's RR? 1 2 3 4 5 Not Burdensome Highly Burdensome

6. Are you satisfied when practicing Benson's RR?

1 2 3 4 5
Not Satisfied Highly Satisfied

Other comments:

Appendix O

Take-Home Instructions

Instructions to Practice this Relaxation Intervention at Home
1. Find a quiet spot where there is limited noise and where you are away from distractions. 2. Turn on your MP4 player by sliding the white bar on the top of the player. 3. Once the screen comes on, it will say “music." Push the top arrow located in the middle of your MP4 player. 4. The meditation recording will be selected. If not, it is entitled “New Recording 2." 5. When you are ready, put the headphones on and press play. 6. Sit in a comfortable position and close your eyes or soften your gaze. 7. Remember to keep a passive and non-resistant attitude throughout the ten-minute guided relaxation response period. 8. You may perform the intervention as much as you would like; however, please strive to practice the intervention at least twice daily.

Appendix P

Patient Demographic Data

	N	Percent (%)
Gender		
Male	10	40
Female	15	60
Stage of COPD		
Stage 2	6	24
Stage 3	5	20
Stage 4	14	56
Race		
White	23	92
African American	1	4
Multiple Races	1	4
Age Groups		
50-59	4	16
60-69	10	40
70-79	10	40
80-89	1	4
Years of COPD		
1-5 years	7	28
6-10 years	10	40
11-19 years	6	24
> 20 years	2	8
Number of Weeks Attending Pulmonary Rehab		
Week 1	1	4
Week 2	4	16

Week 3	5	20
Week 4	6	24
Week 5	3	12
Week 7	1	4
Week 8	3	12
Week 11	1	4
Week 12	1	4

Note. N denotes sample size. Total N = 25.

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