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Guided Imagery and Deep Breathing: Minimizing Anxiety Experienced by Pediatric Cancer Patients

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GUIDED IMAGERY AND DEEP BREATHING: MINIMIZING ANXIETY EXPERIENCED BY PEDIATRIC CANCER PATIENTS

A Master's Thesis

Presented to

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In Partial Fulfillment

Of the Requirements for the Degree

Master of Science, Child Life Studies

By

Bethany Grace Aney

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Childhood Education and Family Studies

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ABSTRACT

This particular research study examined the impact of guided imagery and deep breathing as coping tools to reduce the anxiety levels experienced by pediatric cancer patients ages 6-12 years of age at a children's hospital in Central Pennsylvania. This quantitative study utilized a pretest-posttest design, in addition to utilizing the State-Trait Anxiety Inventory for Children (STAIC™) as the baseline and post-treat assessment. The STAIC™ is a questionnaire tool that assesses individuals' state and trait anxiety through a total of 40 questions. This particular study had a total of five patients, two male and three female that consented to undergoing three training sessions with the researcher, who practiced guided imagery and deep breathing techniques with the participants. Following the conclusion of the interventions, the researcher utilized a paired t-test to compare the pre-test and post-test scores to find that there was a statistically significant difference and that the participants had lowered levels of anxiety over the course of three training interventions. An independent sample t-test did not indicate that gender influenced coping. Current research and the noted gaps in this area of study led to the development and successful completion of this study.

KEYWORDS: anxiety, certified child life specialist, diaphragmatic breathing, guided imagery, non-pharmacological interventions, one-group pretest-post-test design, progressive muscle relaxation, state anxiety, trait anxiety

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CHAPTER I

OVERVIEW OF THE STUDY

Stress surrounds individuals on a daily basis; be it stress from work, difficult circumstances, finances, or poor health. Regardless of where the stress stems from there are a multitude of responses that can occur from a physical, mental, spiritual, and emotional perspective. The main patient population that receives treatment in the pediatric outpatient infusion clinic in a children's hospital in central Pennsylvania are children and adolescents with oncology hematology diagnoses. Given the nature of a cancer diagnosis, many of the patients and families are surrounded by immense levels of stress that make it difficult for them to navigate caring for their sick child and balancing the daily stressors.

Additionally, pediatric patients with a cancer diagnosis are undergoing a multitude of procedures such as venous access through peripheral IVs or mediports, dressing changes, lumbar punctures, and nasal gastric tube placement. These stressful medical events can cause children and adolescents to respond in a variety of reactions. Because these procedures are required for the patient to receive the necessary treatment, it is critical that the patients are being equipped with meaningful and long-lasting coping tools. Consequently, if the patients are ineffectively coping with their stressful situations, this can result in even greater issues and lead to post-traumatic-stress disorders.

Coping skills that promote relaxation and calming, and that can be used throughout their whole lifetime during other stressful situations, are referred to as long-term coping techniques. Some of these techniques are guided imagery and deep breathing. Panda (2014) defines guided imagery as the use of the listener's five senses that allows for exploration of the world around

them leading to a state of relaxation. Guided imagery engages the participant's view of symbolic images according to their current life state or situation that they are in.

When deep breathing is intentionally practiced, this allows the individual to lower the levels of activity that is occurring in their amygdala (Jarath et al., 2015), which leads to a state of relaxation. When practicing deep breathing, it takes time to develop an awareness of how one's body responds and to find the state that is most calming when the excitatory state is inhibited. By incorporating guided imagery and deep breathing into the repertoire of coping tools that pediatric patients can utilize, this creates opportunities for them to utilize these whenever presented with a stressful situation, whether that is an IV placement, a lost friendship, or an upsetting day. Because these are coping tools that only require the use of one's imagination and body, there are no limits concerning where and how they can be used.

Rationale for the Study

In knowing the high levels of stress pediatric oncology patients are exposed to, it is critical to provide them with long-term coping skills that can be generalized to a plethora of stressful situations. Such long-term coping skills that can be taught to reduce stress and anxiety are guided imagery and deep breathing. Much of my interest in this began when I was a student observing child life specialists facilitate patient interventions, and then, as I became a practicing child life specialist, I felt the tension of wanting to provide my patients with the most successful and meaningful coping skills.

Once I became a certified child life specialist and began working full-time in the infusion clinic, I found that many of the patients were taught to cope playing games or watching videos on an iPad. I observed on many occasions when patients would then be uncertain and unable to

implement a different coping mechanism when the iPad was not able to be utilized or offered. This is when I truly began digging deeper into methods of guided imagery, deep breathing, and relaxation.

It was onerous to challenge my patients to try something new and something that was not technology based. For many, there was initially push back when I would walk into a room empty-handed without the iPad. But with some encouragement and explanation many patients were receptive and began to fully embrace these techniques I was teaching them. Before too long, I had many patients that were implementing these approaches for coping during procedures, and staff began to recognize the increase in patients' levels of coping and cooperation during procedures. Nurse specialists have commented that they use lower levels of moderate anesthesia medicine during consciously sedated lumbar punctures because the patients are calmer and more relaxed when I am present providing guided imagery and relaxation methods.

Guided imagery has been researched in a variety of settings, and there has been found a statistically significant relationship between guided imagery interventions and lowered stress levels, which will be further expanded upon below. Because oncology patients have to undergo innumerable procedures, about "8 to 15 invasive procedures in the first month of induction therapy" alone (Shockey, et al., 2013), it is valuable to conduct further research. Venna and Alvi (2016) conducted a study with eighth grade students and found that the experimental group, which received the guided imagery intervention, had lower levels of anxiety compared to the control group, which did not receive any additional interventions.

While the use of guided imagery and deep breathing have been studied in a variety of medical and non-medical settings, there have been few studies completed specifically on

pediatric cancer patients. One study that will be further reviewed utilized children with Crohn's disease, so while some of those findings could be generalized to the cancer population, there are still many aspects that are missing. With the information that this study reveals, it can be replicated in other hospital settings to provide holistic and non-pharmacological care to patients with cancer who are dealing with high levels of stress and anxiety. Hence why this study would provide insightful and meaningful perspectives into this population of children affected by cancer.

Purpose of the Study

The purpose of my study is to utilize guided imagery and deep breathing interventions to significantly lower the anxiety levels experienced by pediatric cancer patients ages 6-12 years of age.

Research Questions

1. Is there a statistically significant difference between pre-test and post-test anxiety scores?
2. Are there gender differences between participants' pre-test and post-test anxiety scores?
3. Are there significant differences in anxiety scores following completion of the interventions?

Research Hypothesis

It is hypothesized that with the implementation of guided imagery and deep breathing interventions, pediatric cancer patients will have lower levels of anxiety.

Research Design

In order to most effectively capture the information needed to fulfill the purpose of my study, an experimental research design will be utilized to study the impact of guided imagery and deep breathing on the reduction of stress in pediatric oncology hematology patients. A one-group pre-test post-test design will be utilized to assess the levels of anxiety prior to the intervention trainings, followed by a post-test to reassess anxiety levels following the completion of the interventions. The participants will engage in three training sessions during scheduled visits to the infusion clinic. During this time, the intervention will include introduction and exposure to guided imagery scripts and practice of deep breathing techniques.

The participants will then be given a recommended list of a guided imagery videos to listen to for approximately ten minutes three times a week until the completion of the study, while practicing their deep breathing at the end of listening to the audio. The participants will then be administered the anxiety assessment once the three training sessions have ended. Once the data is analyzed, it will indicate if there is a correlation between lower anxiety levels when exposed to deep breathing and guided imagery interventions and if there are differences of scores with gender as a factor.

Significance of the Study

The results and information extracted from this study will be useful in indicating new methods for anxiety and stress reduction that are non-pharmacological. Because many patients with a cancer diagnosis are known to experience high levels of anxiety, this could prove to not just be an effective way to reduce and minimize stress but could also be a cost-effective measure. Additionally, by training staff members of a psychosocial team, child life specialists, or social

workers, these guided imagery interventions could be implemented by other disciplines to target the needs of pediatric cancer patients.

Assumptions

Below are potential assumptions that the researcher created for this research study:

1. Patients' anxiety levels will be reduced through guided imagery and deep breathing interventions.
2. Patients will adhere to committing time outside of training interventions at home to listen to guided imagery scripts and practice deep breathing.
3. Parents will be involved and help facilitate opportunities for the participants to practice these tools.
4. Participants will attend all training sessions and complete the post-test at the completion.

Limitations

Below are potential limitations that could arise from the study while it is being conducted:

1. The researcher does not have control over the number of informed consent forms that will be completed, which will dictate the number of participants.
2. The researcher cannot control the participants completing the homework that will be provided.
3. The participants are from a large age range; therefore, several developmental stages will be represented.
4. The researcher cannot control if a participant should decide to drop-out of the study, which could impact the results and generalization.

Definition of Terms

The following glossary contains words or techniques that will be further utilized below as they are relevant to the study. By being familiar with these definitions below, it will enhance the readers' understanding of the topics discussed.

1. Anxiety is when an individual has an experience that threatens their inner emotional state consisting of feelings of tension and uneasiness that affects their autonomic arousal (Mizrahi et al., 2012).

2. Certified Child Life Specialist (CCLS) is a trained individual in the field of development who implements therapeutic play and intervention opportunities for children, adolescents and teenagers to increase coping, mastery of skills, understanding of the environment, and address misconceptions (Thompson, 2009).
3. Diaphragmatic breathing is also known as belly breathing or deep breathing. When implementing diaphragmatic breathing, the individual is focusing on the contracting of the muscles in the abdomen, as well as focusing on inhaling and exhaling deeply to decrease one's heart rate and blood pressure to experience a sense of relaxation or calmness (Ma et al., 2017).
4. Guided imagery (GI) is the use of descriptive words and one's sense to facilitate an individual experience of mental images for a sensory perception that leads to relaxation (Panda, 2014).
5. Non-pharmacological interventions are methods that do not utilize medicine to manage pain or anxiety levels (Coelho, Parola, Fernandes et al., 2018).
6. One-group pretest-posttest design involves one group of individuals who meet the criteria for the study and then receive a pre-test prior to the treatment, which is then concluded with a post-test. The pre-test and post-test scores are then compared to assess the success of the treatment (Mills and Gay, 2019).
7. Progressive muscle relaxation is practice of consecutively tensing and relaxing muscles to achieve a state of reduced stress and anxiety (Panda, 2014).
8. State anxiety is a temporary disturbance that leads to disequilibrium in a person's emotional state (Veena and Alvi, 2016).
9. Stress is a state in which a person experiences a state or perception of being threatened; therefore, their homeostasis is disrupted causing a reaction of behavioral and physiological changes that can impede function (Panda, 2014).
10. Trait anxiety is a level of anxiety that is already pre-established, which will manifest as an individual has a rise in their state anxiety (Veena and Alvi, 2016).

CHAPTER II

REVIEW OF RELATED LITERATURE

Creating a comprehensive study that meaningfully examines guided imagery and deep breathing techniques on anxiety reduction is best done by having a foundation of what other research studies have contributed to this topic. In this next section, guided imagery and deep breathing will be reviewed to see the effectiveness of utilizing these tools in hospital settings with children and adults, in addition to in the community. The results yielded in these studies, as well as the limitations, help to shape the structure of this study.

Studies Completed with Use of Adult Medical Participants

The studies that will further be reviewed examined the use of relaxation techniques with patients in preoperative areas (Shamekhi et al., 2019), oncology units (Barre et al., 2018), palliative care units (Coelho et al., 2018), and chronic illness (Mizrahi et al., 2012).

Barre et al. (2018) and Mizrahi et al. (2012), both utilized quality of life (QoL) assessments in addition to their anxiety tools. Barre et al. (2018) studied adult cancer patients and Mizrahi et al. (2012) studied adults with inflammatory bowel disease (IBD). Both of these conditions have debilitating effects and require treatment for either an extended period of time or for life. Both of these populations have levels of anxiety surrounding the adjustments in their lifestyle and disease-related, which ultimately affects their QoL. In both of these studies, guided imagery interventions were provided over a period of time. Barre et al. (2018) provided guided imagery intervention in conjunction with psychoeducation and cognitive therapy for six weeks, while Mzrahi et al. (2012) provided three sessions with at-home work in between. Both of these

studies produced statistically significant results for lowered anxiety levels and increased QoL scores at the conclusion of the study.

In contrasting to the structure of the two studies above, Shamekhi et al. (2019) exposed their participants, who were undergoing an endoscopy, to either a guided imagery audio recording for twenty minutes or a ten-minute preparation video for the procedure. The purpose of assigning the participants to one of the above groups or to the control group, with no exposure to GI or video preparation, was to assess levels of pre and post anxiety. Once the results were analyzed using ANOVAs and Tukey's post-test, there was no significant difference of anxiety levels between the GI group and the video group (Shamekhi et al. 2019).

The results of Shamekhi et al. (2019) might be better understood in light of Mizrahi et al. (2012) and Barre et al.'s (2018) studies. Because Shamekhi et al.'s (2019) participants were exposed to the GI only one time for twenty minutes prior to a procedure, this might not have been enough time for it to have had similar effects upon Mizrahi et al.'s (2012) and Barre et al.'s (2019) participants, who had interventions and training with GI over multiple sessions or months. It seems to be clear that GI requires practice and multiple interventions for it to yield significantly different results when compared to other means of anxiety reduction.

A significant draw-back to implementing guided imagery techniques with patients is the perceived effort that it might require for the development of these programs, staff acceptance, and time. However, Coelho et al. (2018) assessed the feasibility of this on a palliative care unit. The team of researchers tested the usefulness and effectiveness of guided imagery with patients admitted to the palliative care unit (Coelho et al., 2018). This study had three phases that: compiled the current evidence and research related to guided imagery, developed the theory for the study, and created the modeling process. The researchers used field testing of their guided

imagery scripting with patients, who were currently admitted to the unit, and then followed-up by surveying staff members on the palliative unit about their feedback of the effectiveness of the GI (Coelho et al., 2018). After the testing phase, it was concluded using a Likert scale that guided imagery would in fact be able to be easily implemented amongst patients admitted to the palliative unit and that it would effectively reduce levels of anxiety (Coelho et al., 2018). Overall, the time involvement for the patients in this study was fairly minimal because the principal investigator for this study conducted each session in thirteen minutes (Coelho et al., 2018).

Studies Completed with Use of Child and Adolescent Medical Participants

While there are fewer studies focusing on the use of guided imagery with children and adolescents undergoing medical procedures, there are a couple that help to provide insight into how this can be an effective coping tool for chronic and potentially terminal illnesses (Dobson and Byrne, 2014; Shockey et al., 2013) and in preoperative settings (Vangoli et al., 2018; Shockey et al., 2013). Because of ethical factors surrounding involving children in research, this can present itself a challenge in not causing any harm or undue stress to a participant who is a minor. However, in order to continue providing effective and meaningful anxiety reduction interventions to children and adolescents, research is essential to indicate the best approaches.

Researchers Dobson and Byrne (2014) examined the use of cognitive behavioral therapies upon the pain levels experienced by children with sickle cell disease. The overall objective of the study was to "test the effects of guided imagery training on school-age children who had been diagnosed with sickle cell disease" (Dobson and Byrne, 2014). Through a quantitative approach of utilizing a quasi-experimental time-series design, 20 children, ages six

to 11 who had been treated for sickle cell disease for at least one year, were enrolled in the study. The study required the participants to complete a pain diary daily for two months. The participants were initially assessed for baseline levels of pain along with their imaging ability and self-efficacy (Dobson and Byrne, 2014).

For the first month, the participants completed a diary of their pain. One of the pages had questions that needed to be answered in regard to level of pain, location of pain, and how the pain affected them. For example, a prompt read, "Did you stay home from school?" (Dobson and Byrne, 2014). Upon the completion of the first month, a child life specialist taught the study participants guided imagery. The training sessions varied in length from 15 to 45 minutes. The participants were then sent home with a CD recording of guided imagery and were told to initiate the use of GI five to 10 minutes daily at a minimum of three times each day (Dobson and Byrne, 2014). For another month, the participants continued to record results in their daily pain log while implementing guided imagery. A post-test survey was then completed to analyze the results after the second month.

The results of the impact of guided imagery upon pain intensity were analyzed using a t-test of the mean interval-levels scores of the FACES Pain Rating Scale that the participants utilized in the pain diary and revealed that the study yielded significant results in the reduction of pain (Dobson and Byrne, 2014). While this study's main objective was not to minimize anxiety, it did conclude that GI is an effective tool for minimizing pain, which is often times associated with anxiety.

Shockey et al. (2013) researched the impacts of preprocedural distress in pediatric cancer patients. This particular study had twelve participants who were currently receiving active treatment for their diagnosis. Once the researchers conducted the pre-test phase, the participants

completed four one-hour long sessions of guided imagery and deep breathing interventions prior to an invasive procedure of a venous access or lumbar puncture. In this study, biofeedback equipment was utilized to give the participants a visualization of their bodies' physiological responses to the interventions. Following the completion of this study, it was found that the participants produced high coherence scores, which reflected "alignment of the mind, body, and spirits and the balance between sympathetic and parasympathetic branches of the autonomic nervous system" (Shockey et al., 2013, p. 139).

Both Shockey et al., (2013) and Dobson and Byrne (2014) engaged their participates in GI scripting and interventions during multiple encounters. Because these studies had significant reductions in anxiety levels of their participants, it important to note that time again is a factor in the effectiveness of the GI to make a lasting difference.

Similar to Shockey et al. (2013) study, Vagnoli et al. (2019) focused on providing GI to pediatric patients during induction to minimize preoperative anxiety and postoperative pain in six to twelve-year-old patients. Vagnoli et al. (2019) utilized an experimental and control group to compare the effects of the GI using the Yale Preoperative Anxiety Scale and the Face, Legs, Activity, Cry, and Consolability Scale for postoperative pain. The research investigator initially introduced the GI to the experimental group participants one hour prior to induction and then repeated the same GI scripting to the patient during induction in the operating room (Vagnoli et al., 2019). All of the patients in the control group received standard care, so they did not have any exposure to GI.

Following the analysis of the data from the assessment tools, it was found that the relaxation-guided imagery as a whole significantly reduced both the preoperative anxiety and postoperative pain in the experimental group (Vagnoli et al., 2019). The GI in this experiment

provided the child and parents with an overall "sense of control, improves cooperation, enhances recovery and improves long-term emotional and behavioral adjustment in patients and their parents (Vagnoli et al., 2019).

A number of studies (Vagnoli et al., 2019; Shockey et al, 2013; Dobson and Byrne, 2014) indicated that utilizing GI with children in medical settings does significantly decrease anxiety and stress. Because of the successfulness in these studies, it supports the use of GI as non-pharmacological methods for treating anxiety and improving reactions to hospitalizations and treatments.

Studies Completed in Community and Educational Settings

While there is a plethora of studies examining the correlation of guided imagery in reducing stress during medical events, there are many that look at the effectiveness of guided imagery reducing test anxiety (Henslee and Klein, 2017), increasing wanted behaviors (Guerrego et al., 2014) and minimizing overall state and trait anxiety (Veena and Alvi, 2016).

Veena and Alvi (2016) examined the impact of guided imagery in aiding in anxiety reduction with adolescents in school. The two types of anxiety studied were state and trait. State anxiety refers to a temporary disturbance in an individual's emotional equilibrium, whereas trait anxiety refers to pre-set level of stress that is manifested as a behavior due to the impact of increasing state anxiety (Venna and Alvi, 2016). The four hypotheses examined were that 1) guided imagery intervention (GII) leads to a lesser state anxiety in participants in the experimental group, 2) GII will lead to lesser trait anxiety scores in the experimental group, 3) GII will show a reduction in state anxiety post-intervention at a one month follow-up, and 4) GII

will show a reduction in trait anxiety post-intervention at a one month follow-up (Venna and Alvi, 2016).

The experimental and control group were each compiled of 29 boys and 21 girls, with the mean age of 12.6. The subjects, who were students in eighth grade, were randomly allotted to be in the experimental or control group (Veena and Alvi, 2016). Using a pre-test post-test design, the experimental groups received GII, whereas the control group did not receive any additional interventions.

The study was conducted by first taking a pre-test to assess the individual's state and trait anxiety for both the experimental and control group. Then, the experimental group was given recorded scripts for a GII to listen to for seven sessions (Veena and Alvi, 2016). At this time, interim testing was completed again for state and trait anxiety, before another seven sessions were completed. A post-test for state and trait anxiety was again administered, and lastly a one-month follow-up test was given before analyzing the results (Veena and Alvi, 2016).

For each of the hypotheses, the mean and standard deviation scores were computed for state and trait anxiety for each of the pre-tests, interim tests, post-test, and follow-up tests. The results indicated that each of the tests had statistically significant t-scores or F-scores to indicate acceptance of each of the hypotheses in showing the effectiveness of GII on the reduction of state and trait anxiety in adolescents.

Henslee and Klein (2017) investigated to see if "brief guided imagery could provide short-term reduction in math anxiety and improve math performance." Due to the importance of math for many undergraduate students to pass their degrees, the researchers were curious to know what factors play into math performance anxiety and how it can be alleviated (Henslee and

Klein, 2017). Students who have high math anxiety scores are proven to perform poorer on math tests, regardless of their mathematics knowledge and understanding.

This study was designed to further assess that if math anxiety levels were decreased, would higher scores be the result. The following hypotheses were outlined by the researchers to further examine: (1) Math anxiety would by decreased by the use of guided imagery and that the math performance would be improved compared to the control group; (2) participants with high math anxiety scores would decrease their anxiety and improve their performance compared to the individuals with the low math anxiety; (3) individuals who had high visual working memory capacity would have a decrease in their math anxiety in addition to an increase in their math performance; (4) participants with high math anxiety and low visual working memory capacity would have slower math problem-solving time (Henslee and Klein, 2017).

There was a total of 58 participants selected for this study, all of whom were undergraduate college students. The mean age of the participants was 20 years old. The participants were randomly assigned to a guided imagery group or a control group at the start of the study. Prior to any interventions beginning each of the participants completed a math anxiety measure to assess their levels of anxiety, in addition to completing a math performance measure and a visual working memory capacity measure (Henslee and Klein, 2017). The interventions were then received via single-participant sessions that lasted 60 minutes. The guided imagery group listened to pre-recorded imagery scripts, while the control group sat in a recliner chair (Henslee and Klein, 2017).

Each of the participants were pre-tested to assess if there were any changes in the interventions. Math anxiety scores decreased following the intervention, meaning they were found to be statistically significant (Henslee and Klein, 2017). While there were not statistically

significant findings in the other areas, this study displays the effectiveness that GII has on reducing anxiety. And perhaps, if the guided imagery interventions had been offered multiple times over a longer course of time, the other areas might have seen correlations.

In the study by Guerrego, Tobin, Munroe-Chandler, and Hall (2015), the use of guided imagery upon increasing children's levels of active play was evaluated. The researchers sought to answer whether or not guided imagery could effectively increase and improve the activity level of children in Canada. The impacts of this study can be used to argue that if guided imagery can increase the levels of active play in children, then a multitude of other things could be targeted and result from following guided imagery interventions.

This study utilized a quantitative approach. There was a total of 59 participants that were recruited for this study and completed the intervention. There was a total of 23 males and 36 females, all between the ages of 9-11 (Gurrego et al., 2015). The participants were recruited from two elementary schools in Canada and were then randomly selected to the imagery group or the control group. Each of the children's levels of intrinsic motivation was assessed in addition to their baseline active play and the imagery ability (Gurrego et al., 2015).

Over the course of the six weeks that the study was conducted, each of the participants were instructed to wear a pedometer as a means of tracking levels of activity. The treatment group then received multiple interventions with imagery scripts specific to enhancing intrinsic motivation toward basic movements like running, jumping, throwing, etc. The control group listened to two pre-recorded stories that needed to be listened to over the course of the six weeks (Gurrego et al., 2015).

Following the completion of the study, once the results were analyzed, it was found that there was an increase in the activity levels of the children in the imagery group. The results

showed that the p-value equaled 0.005, meaning the results were statistically significant (Gurrego et al., 2015). Additionally, when the mediation analysis was conducted to examine the impact upon levels of increase of intrinsic motivation following the completion of the guided imagery intervention. It was found that guided imagery did in fact increase the intrinsic motivation of the participants and the p-value equaled 0.021. Between the two groups, there was a statistically significant difference in higher levels of reported active play in the treatment group as opposed to the control group (Gurrego et al., 2015).

Studies Completed Utilizing Deep Breathing

In a quantitative research study that used a quasi-experimental approach, the researchers Manpreet, Anil, and Kumar (2016) examined the impact of deep breathing and muscle relaxation upon the stress levels of individuals who had undergone amputations. This particular study utilized 60 participants, who were selected using convenient sampling with randomization for assigning to the experimental and control groups.

The researchers began by utilizing two tools for data collection. The first tool in the study examined and asked participants to provide information in regard to socio-demographics. There were 14 variables that participants answered in order to provide the researchers with a well-rounded understanding of any outside factors that would have a relationship to the stress levels (Manpreet et al., 2016). Next, the participants completed a stress scale, which included 10 items. Both of these tools had to be completed prior to beginning the data collection.

The participants in the experimental group then completed twice daily treatment interventions for two weeks while the control group did not receive any interventions. Each of the interventions provided training on how to implement deep breathing and the progressive

muscle relaxation technique (PMRT) (Manpreet et al., 2016). Upon the completion of the interventions, a post-assessment was given to the participants two weeks later.

The researchers compiled the data and analyzed it through descriptive and inferential statistics for examining the effectiveness of the intervention upon the participants' levels of stress. The t-test and the ANOVA resulted the p-value to be less than 0.05, meaning the results were statistically significant.

Jarath et al. (2015) review the impact of breathing as a means of treating anxiety. They hypothesized that "reversing homeostatic alterations with mediation and breathing techniques rather than targeting neurotransmitters with medication may be a superior method to address the whole-body changes that occur in stress, anxiety, and depression" (Jarath et al., 2015).

This article further examines the impact that methods of relaxation have upon one's cardiorespiratory synchronization, which leads to a decrease in stress levels. For instance, during mediation, mindfulness, or guided imagery, neurons are inhibited from firing to the cerebral cortex (Jarath et al., 2015). This in return can also lead to decreased levels of stress, since as the neurons are not reaching the amygdala, which is responsible for the fight or flight response. When there is an increase in anxiety that occurs in the amygdala, an individual will most likely experience an increase in their stress levels and even depression (Jarath et al., 2015). This excitatory response can be inhibited by deep breathing techniques and forms of meditation, which have resulted in lower levels of activity in the amygdala (Jarath et al., 2015).

When the emotional processing areas of the brain are inhibited through forms of meditation, a shift occurs to a parasympathetic response (which is when the heart rate is lowered) that indicates the effectiveness of deep breathing and guided imagery (Jarath et al., 2015). In knowing the physical response that the body has to forms of relaxation, these are helpful

resources to utilize in highly stressful situations to minimize and decrease the levels of stress that are being experienced.

Similarly, Khng (2017) would also reflect comparable results for her study of 122 fifth grade students who utilized deep breathing prior to a math test. The practice of deep breathing before the test ultimately had a statistical trend toward reduction in self-reported feelings of anxiety in addition to improvements in math test scores (Khng, 2017). Overall, Khng (2017) did correlate deep breathing to being able to create "better state-of-mind by enhancing the regulation of adaptive-maladaptive thoughts during the test, allowing for better performance." Because deep breathing is able to help shift an individual's focus from negative to positive thoughts, this can be an effectual tool for reducing anxiety in children undergoing treatment for cancer.

CHAPTER III

METHODOLOGY

This chapter focuses on the methodology that was utilized for examining the hypothesis and how the data were meaningfully analyzed. Additionally, having a deeper understanding of the participants, the location of the study, and ethical considerations helped to give meaning to this study and why it was implemented. The role of the researcher will be expanded on to provide perspective and eliminate any bias. Ultimately, by utilizing a one-group pretest-posttest design, this helped to evaluate the success of the treatment that was provided to the participants (Mills and Gay, 2019 p. 290).

Research Design

Conducting research on the anxiety levels experienced by pediatric cancer patients is important as this can impact their quality of life. The results of this study are influential in the type of non-pharmacological interventions that are can be provided to cancer patients as a means of reducing stress and anxiety. Although there were many approaches that could have been used for this study, a one-group pretest-posttest design eliminated some of the ethical considerations when conducting research with children; however, this will be further reviewed in the ethical considerations. By utilizing a quantitative experimental approach, the numerical data results provided insight into the success of the interventions.

Experimental research design allowed for the researcher to manipulate "at least one independent variable, controls other relevant variables, and observes the effect on one or more dependent variables" (Mills and Gay, 2019 p. 272). The effectiveness of the experimental

research design for this specific study allowed for the researcher to work with a single group of participants, while utilizing two independent variables—deep breathing and guided imagery interventions—all the while analyzing its effectiveness in reducing the dependent variable: anxiety scores. The pre and post-test revealed the changes that the participants experienced over the duration of the study as a result of completing the trainings and at-home work.

Population and Sample

Site of the Study. The location of this particular study took place in a children's hospital in Central Pennsylvania. Due to being one of the largest children's hospital in the central Pennsylvania area, many families travel over two hours to receive treatment. Therefore, the demographics are not specific to the location of the hospital, but rather fluctuate depending on who is undergoing treatment for cancer. Because of this, the results of the study are specific to the participants' population based upon diagnosis, rather than ethnicity or cultural practices. The enrollment and training sessions occurred when patients were in clinic for treatment appointments. Each of the participants completed three intervention sessions over the course of approximately three months.

Participants. The participants were selected from the pediatric oncology hematology patients between the ages of six to 12 years-old, who were still actively undergoing treatment for cancer. In the case of this study, convenience sampling was utilized. Convenience sampling allowed for the use of a sample of individuals that were available to volunteer to participate in the study (Mills and Gay, 2019 p. 158). The use of convenience sample allowed the researchers to include whomever met the criteria for the study and wanted to voluntary participate. The final number of participants for the study was dependent on the number of informed consents that

were signed and completed. A total of five patients elected to volunteer as a part of this study. Two were male and three were female, with the mean age of nine years-old (Table 1).

Ethical Considerations

In order to produce a well-rounded and meaningful research study, ethical considerations were examined closely. The anxiety assessment, guided imagery and deep breathing interventions, in addition to the at-home work, posed minimal threat to participants psychologically, sociologically, and physically throughout the entirety of the study. Each of the participants in this study were given the opportunity to voluntarily participate in this study. The researcher reviewed the study protocol and expectations with the participant and legal guardian. Consent forms (Appendix A) were then completed, releasing that they were aware that the information gathered will be utilized for a research study but that the participants' information will be confidential and secured.

The primary research investigator completed all required Collaborative Institutional Training Initiative (CITI) prior to the beginning of the research in addition to obtaining Institutional Research Board (IRB) approval through Missouri State University (Appendix B) for study IRB-FY2020-331 was obtained in November 2019 and Penn State Health (Appendix C) for STUDY00014385 was obtained April 2020.

The demographic information and the documents utilized to track data for participants were kept in a secure location that was locked to minimize threat to violation of someone's privacy and identity. Additionally, in the analysis of the results, the participants' names were not utilized.

The most significant reasoning for this study being designed and conducted without two

groups (experimental and control) is that the control group would not be receiving any intervention, which when working with children poses an ethical question: Are they then being withheld from receiving an intervention that is beneficial to their coping and overall well-being? This is largely why a one-group design was selected to minimize these ethical threats to the study.

Instruments

State Trait Anxiety Inventory for Children (STAIC™). For this one-group pretest-posttest design, the assessment tool that was utilized was the State-Trait Anxiety Inventory for Children (STAIC™). The STAIC™ is a tool that consists of a 20-item scale. The questions measure the state and trait anxiety levels of children. The measure is geared toward children ages 9-12; however, it can be utilized with younger children who have above average reading skill (Spielberger, 1973). The participants are prompted to rate the statements from "hardly ever true" to "often true" (Spielberger, 1973). Two separate scores were then produced for both state and trait anxiety, which allowed for targeted interventions based upon the child's score (Cognitive Centre, n.d.). The scores for both the state anxiety and trait anxiety subscales can be anywhere from 20 to 60. The lower the score the lower level of stress experienced by the participant, and the higher the score is to 60, the greater amount of stress that the participant is subject to.

When Spielberger (1973) assessed the internal consistency and validity of the STAIC™ assessment tool after it was developed, it was found to score highly for both when compared to other similar tools such as the *Children's Manifest Anxiety Scale* Castaneda in 1956 and *General Anxiety Scale for Children* by Sarason in 1960.

Guided Imagery. The guided imagery scripts and audios came from writings in the book *Imaginations 2: Relaxation Stories and Guided Imagery for Kids* by Carolyn Clarke (2014). During the training sessions, the researcher chose two to three scripts that were read aloud to the participants.

Deep Breathing. Secondly, the researcher taught diaphragmatic breathing (Appendix D) to the participants. This is when the individual practicing is intentionally focusing on utilizing their diaphragm for breathing (Cleveland Clinic Foundation, 2005). Below in the appendix is step-by-step instructions of teaching. The researcher spent time teaching the participant how to implement deep breathing, in addition to practicing it before the end of the training session.

Procedure

Training that Occurred Prior to Research. The researcher of this study has been a practicing child life specialist for four years. During these four years of clinical work, the researcher has implemented guided imagery interventions with patients for teaching of coping skills and to assist with coping during medical procedures. Whether that has been through script forms or more of a spontaneous approach, the researcher has taken the time to develop the skillset of engaging others in guided imagery. Online training videos, websites, research articles, and podcasts have all helped to develop the skillset, in addition to practicing it with patients. Additionally, the researcher has taken the time to learn how to effectively teach deep breathing techniques. Again, training videos and research articles have all helped to provide depth of knowledge and understanding to be able to teach others how to use this coping skill.

Role of the Researcher. At the beginning of the study, the researcher's goal was to ensure that each participant had properly completed the consent forms prior to any of the

interventions beginning. Once the consent forms had been obtained, the researcher had a prevalent role and presence in interacting with the participants while conducting the three training interventions. With many of the participants, there was already a relationship established, as these patients and the researcher interact in the hospital setting while receiving treatment. As a result, there was a relationship of trust that was previously established. A potentially significant benefit in the on-going success of these interventions was that the researcher would be able to continue to implement teaching new coping methods and interventions to continue reducing stress once the study is completed. Additionally, because the researcher collected and analyzed the data, they gained a perspective into which patients have higher scores of anxieties and at the conclusion of the study had the opportunity to continue checking in and assessing their anxiety levels.

During the first and last intervention when the STAIC™ was administered, it was the role of the researcher to help the participants understand beforehand that they could pass any questions if they would like and that they could ask for clarification about the pronunciation of a word. Parents were able to be present during the interventions and were allowed to help their child read the questions but did not indicate what the child's responses or reactions should be to the STAIC™ questions.

Following the completion of the three interventions and the final administration of the assessments, the researcher focused on interpreting and analyzing the data into a meaningful manner to evaluate if the null hypothesis will be accepted or rejected.

Throughout the duration of the study, the researcher upheld and conducted all research according to the standards and expectations of CITI, while reflecting the values of the two institutions that provided approval for the IRB protocols. The researcher's current position as a

child life specialist did not negatively influence or hinder the ability to examine this topic closely.

Data Collection

Once the participants were identified who met the criteria of the study and the researcher explained the purpose of the study, the participants and parents had the opportunity to review the consent paperwork with the researcher. All of the contents of the consent forms were thoroughly reviewed, and the family had the opportunity to ask any questions or clarifications. Once the parents consented to their child voluntarily participating in the study, the researcher then discussed the guided imagery and deep breathing homework for the participants to work on in-between the sessions. The homework included listening to YouTube videos of guided imagery scripts, geared toward children and adolescents. The participants were instructed to listen to the videos approximately three times a week until the completion of the study, followed by practicing deep breathing at the end of listening to the audio.

Then the participants were asked to fill out and complete a "How I feel right now" questionnaire. The researcher discussed how the participant was supposed to complete both sides of the form. The researcher remained present to help answer questions as they arose, in addition to the parents being present. It took each participant anywhere from 10-14 minutes to complete both sides of the STAIC™ tool.

Once completed, the researcher spent the remainder of the time introducing the participants to guided imagery. Some of the participants had previous exposure, so their understanding was already strengthened, whereas others needed more time to understand. The participants then selected three scripts from *Imaginations 2: Relaxation Stories and Guided*

Imagery for Kids by Clarke (2014) to read.

Prior to reading the scripts, the researcher explained and practiced deep breathing skills with the participants. The researcher encouraged patients to practice the sitting up position, as exemplified in Appendix D by Cleveland Clinic Foundation (2005). Once participants were given the opportunity to practice this form of deep breathing and feel an increased comfort level, the researcher began reading the guided imagery scripts. Simultaneously, when prompted in the scripts, the participants accordingly practiced deep breathing.

At the beginning of the second intervention, the researcher spent time reviewing with the participants their deep breathing skills. Again, participants were encouraged to practice the sitting up form, which is when the individual places one hand on their chest and one on their diaphragm. The researcher asked the participants to select two scripts, which were read aloud to the participants all the while being encouraged to practice the deep breathing throughout as prompted in the scripts.

During the third and final intervention, the researcher spent time reviewing with the participants their deep breathing skills before asking the participant to select two more scripts from Clarke's (2014) book. During these final two guided imagery interventions, the participants continued to practice deep breathing throughout. Before the session concluded, each participant was re-administered the STAIC™. The participants were encouraged to answer each question accordingly to how they felt in the moment. The researcher and parent remained present to help answer any questions as they arose. Once the participant completed both sides of the form, this concluded their involvement in the study.

Data Analyses

Data analysis is one of the most crucial steps to the successful completion and accurate results of a research study. According to Mills and Gay (2019), inferential statistics are used for determining the likelihood of the results being generalized to the general population. Because of the nature of this study and the quantitative approach, inferential statistics were used to produce data that was helpful in supporting the null hypothesis.

In the above-mentioned instrumentation section, the assessment tool that was utilized produced two numbers per participant. One was the trait anxiety score and the other was the state anxiety score. Because there was a pre and post-test design study that utilized a rating scale, a t-test for non-independent samples was a useful way to analyze the data (Mills and Gay, 2019). A t-test was used to determine if there was a significant difference between the scores from two groups. Ultimately, the mean scores of each data set were compared to one another. In this case, the scores were compared from start to finish to assess the change in anxiety levels. Because the assessment tool produced both a state and trait anxiety score, these were analyzed utilizing a paired sample t-test to assess for a significant change.

Gender was analyzed through the use of an independent sample t-test. The difference between a participant's pre and post-test was computed for both the state and trait scores. Once the differences were calculated, gender differences were analyzed using an independent sample t-test to assess if there was or was not a statistically significant relationship between gender and anxiety scores for the participants.

Through the use of a paired t-test, independent t-test, and analyzing the data thoroughly, the data were helpful in indicating if the null hypothesis was accepted or rejected, if gender was an indicator of coping levels, and if there was statistically significant difference seen upon

lowered anxiety scores as a result of the interventions.

Table 1.

Descriptive Statistics of the Participants' Ages

	N	Minimum	Maximum	Mean
Age	5	6.00	12.00	9.0000
Valid N (listwise)	5			

CHAPTER IV

RESULTS

The purpose of this quantitative research study was to assess if teaching and practicing guided imagery and deep breathing techniques is helpful for reducing anxiety experienced by children between the ages of six to 12 years old undergoing treatment for cancer at a children's hospital in Central Pennsylvania. Data were collected through the utilization of the STAIC™ assessment to 1) indicate a statistically significant difference between pre-test and post-test anxiety scores; 2) assess if there are gender differences between scores; 3) determine if there is a significant difference in anxiety scores following completion of the interventions.

Through the use of convenience sampling, a total of six patients were offered to participate in the study of which five signed consent forms. Of the five participants, two were male and three were female. The mean age of the patients was analyzed utilizing descriptive statistics, and it was found that it was nine years of age (Table 1).

Coincidentally, all of the patients that fit the criteria and signed consent forms at the time of the study were actively undergoing treatment for acute lymphoblastic leukemia (ALL). All participants began their first intervention during April and the last interventions were concluded in June. There was no further information gathered in regard to the participants' demographics.

Each of the participants completed the three training sessions successfully, with each of them reporting minimal to moderate compliance with the homework portion. This will further be reviewed in the discussion section to identify some themes that arose in conversations with the participants.

Once all of the interventions had been finalized following participants' completion of the pre and post assessments, the data were collected and analyzed using Statistical Package for Social Sciences (SPSS). Following this, the researcher began to analyze the scores for significant differences. Each of the scores were appropriately categorized in either the "Pre-State Anxiety Score," "Post-State Anxiety Score," "Pre-Trait Anxiety Score," or "Post-Trait Anxiety Score."

Pre-Test and Post-Test Anxiety Scores

To test the first research question about assessing for a statistically significant difference from pre-test to post-test scores, the research used a paired sample t-test (Mills and Gay, 2019) to compare the data, which can be seen in Table 2. The participants had lowered levels of state anxiety (M=2.4, SD=1.52) and trait anxiety (M= 4.8, SD= 1.30) scores from the pre to post intervention. With the p-value being significant at 0.05 or below, both the state and trait anxiety scores had significant differences as seen in Table 2. For state anxiety, there was a significant difference $t(5) = 3.53$, $p > 0.024$, two-tailed. Trait anxiety also experienced a significant difference $t(5) = 8.23$, $p > 0.001$, two-tailed. Therefore, the null hypothesis (i.e. *With the implementation of guided imagery and deep breathing interventions, pediatric cancer patients will not have lower levels of anxiety*) was rejected.

Gender Differences Between Scores

Once it was identified that there was a significant difference between the pre and post-test assessment scores and that the null hypothesis was rejected, the researcher sought to measure if there were gender differences amongst the scores. Using the calculated difference between the

pre-state score versus post-state score and pre-trait score versus post-state score, these difference values were then utilized in an independent samples t-test (Mills and Gary, 2019) for gender, where the difference was the independent value and gender was the dependent value.

The results for state anxiety (M = -1.00, SD = 1.49) and trait anxiety (M = 0.33, SD = 1.36) in Table 3 did not reveal a statistically significant interaction between gender being a predictor for levels of anxiety. State anxiety was not significant $t(5) = -0.67$, $p < 0.55$, two-tailed, similarly trait anxiety was $t(5) = 0.245$, $p < 0.82$, two-tailed. Therefore, gender in this study did not influence either a higher or lower score of anxiety as assessed in the STAIC™ tool (Shamekhi et al., 2019).

Outcome Following Intervention

Following the completion of the study, the results indicated that there was a statistically significant difference that the guided imagery and deep breathing interventions had upon the levels of anxiety experienced by the patients (State Anxiety $t(5) = 8.23$, $p > 0.024$, two-tailed; Trait Anxiety $t(5) = 8.23$, $p > 0.001$, two-tailed). These results rejected the null hypothesis which stated that that study would be unable to significantly lower anxiety levels of the participants.

Descriptive statistics were used to assess the frequencies of scores from the STAIC™ for participants. Table 4 and Table 5 below reveal the mean, median, and mode for each of the data sets. The pre-state anxiety score dropped from a median of 25 to 23, while the pre-trait anxiety score dropped from a median of 36 to 32. Keeping in mind that the STAIC™ is scored from a range of 20-60, with 20 being lower levels of anxiety experienced compared to 60 which would indicate high levels of anxiety, the participants began at relatively low levels of anxiety when

interpreted through the STAIC™. However, they did have significant levels of anxiety reduced following the completion of the interventions.

Summary of Results

The results from this present study indicated that guided imagery and deep breathing were effective means for reducing anxiety that is experienced by children between the ages of 6-12 years of age undergoing treatment for cancer. Although, there did not appear to be any indication that gender is a factor or determinant in the effectiveness of these coping techniques. Similar to other studies, it was revealed that guided imagery and deep breathing were useful coping skills for pediatric patients undergoing stressful courses of treatment (Vagnoli, 2019; Shockey et al., 2013; Dobson and Byrne, 2014).

Table 2.

Paired Samples t-Test of Pre and Post STAIC Scores

					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre State Anxiety Score - Post State Anxiety Score	2.40000	1.51658	0.67823	0.51692	4.28308	3.539	4	0.024
Pair 2	Pre Trait Anxiety Score - Post Trait Anxiety Score	4.80000	1.30384	0.58310	3.18107	6.41893	8.232	4	0.001

Table 3.

Independent Samples t-Test for Gender Differences

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
State Difference	Equal variances assumed	0.600	0.495	-0.671	3	0.550	-1.00000	1.49071	-5.74411	3.74411
	Equal variances not assumed			-0.707	2.667	0.536	-1.00000	1.41421	-5.83628	3.83628
Trait Difference	Equal variances assumed	0.046	0.844	0.245	3	0.822	0.33333	1.36083	-3.99743	4.66409
	Equal variances not assumed			0.250	2.427	0.822	0.33333	1.33333	-4.53771	5.20438

Table 4.

Frequency Statistics for STAIC Pre-Scores

	Pre-State Anxiety Score	Pre-Trait Anxiety Score
Mean	26.2000	36.0000
Median	25.0000	36.0000
Mode	22.00[a]	36.00[a]
Range	10.00	3.00
Minimum	22.00	34.00
Maximum	32.00	37.00

a. Multiple modes exist. The smallest value is shown

Table 5.

Frequency Statistics for STAIC Post-Scores

	Post-State Anxiety Score	Post-Trait Anxiety Score
Mean	23.8000	31.2000
Median	23.0000	32.0000
Mode	21.00[a]	33.00
Range	6.00	5.00
Minimum	21.00	28.00
Maximum	27.00	33.00

a. Multiple modes exist. The smallest value is shown

CHAPTER V

DISCUSSION

Summary of Study

The development of this study came together after a thorough review of current studies in regard to the effectiveness of guided imagery and deep breathing techniques in minimizing anxiety in children. Shockey et al. (2013) identified that pediatric cancer patients have to undergo a significant number of stressful procedures within their first month of induction therapy. Because the literature appeared to be lacking the use of these coping skills with children undergoing treatment for cancer and rather focused upon either adults or pediatric patients undergoing surgery (Shamekhi et al., 2019; Vagnoli et al., 2019; Shockey et al., 2013), the researcher chose to focus on developing interventions that would provide an opportunity for pediatric oncology participants to learn these techniques.

The selection of the particular children's hospital in this study was due to the researcher already working full-time in the outpatient infusion clinic. Once the participant population and location were identified, the researcher sought to develop meaningful interventions that included guided imagery and deep breathing practice. The STAIC™ assessment was selected for the pre and posts tests since it is specifically designed to assess the state and trait anxiety levels of children. Additionally, guided imagery scripts were selected from *Imaginations 2: Relaxation Stories and Guided Imagery for Kids* by Clarke (2014), in conjunction with teaching deep breathing as exemplified in a handout from Cleveland Clinic Foundation (2005).

Consideration of Researcher Bias

The researcher of this quantitative study assessing effective coping techniques for minimizing anxiety in pediatric cancer patients is an employed certified child life specialist in the clinical unit that this study was conducted, in addition to pursuing a graduate degree in Child Life Studies. Throughout the development of this study, the researcher took the appropriate steps to minimize researcher bias that could impact the implementation of this study.

The researcher sought to identify which patients currently undergoing treatment for cancer fit criteria for enrollment through convenience sampling for the selection of participants. The interventions were conducted face-to-face in the infusion clinic during the patients' previously scheduled treatment appointments. All patients were exposed to the same questions in the STAIC™ assessment, the same guided imagery scripts by Clarke (2014), and consistent technique for learning diaphragmatic breathing (Cleveland Clinic Foundation, 2005).

Each of the participants in this study already had a therapeutic relationship previously established with the researcher, due to having child life interventions provided for education of diagnosis, preparation for tests and procedures, teaching of coping skills, and play or expressive interventions. Therefore, when conducting each of the intervention sessions, the researcher took appropriate steps to consistently conduct each of the sessions in the same manner as to not influence the outcomes or the results amongst the participants.

Each of the participants' parents chose to be present during the interventions. Although they might have actively participated in learning the coping skills, none of the parents interfered with the researcher being able to complete the session or distracted their child from engaging fully.

Overview, Interpretation, and Implication of the Results

The conclusions drawn from this study indicated that guided imagery and deep breathing interventions were useful in mitigating anxiety levels in children undergoing treatment for cancer. Each of the five participants in this study experienced a decrease of anxiety levels from baseline to the conclusion of the study. However, gender did not seem to be an indicator of one's reduction of anxiety levels in response to guided imagery and deep breathing interventions. Overall, guided imagery and deep breathing interventions were significantly effective coping means for reducing anxiety in children between the ages of six to 12 years old.

Lowered Anxiety Levels from Pre-Test to Post-Test

Once the analyses were run and interpreted, the findings indicated a statistically significant difference in the anxiety scores at the beginning of the intervention to the conclusion. Therefore, the null hypothesis, which stated that guided imagery and deep breathing interventions would not lower anxiety levels in individuals, was rejected.

Similarly, to Shockey et al.'s (2013) study that also utilized pediatric oncology patients in preoperative settings, this study yielded significant results following four one hour long guided imagery and deep breathing training sessions with a child life specialist. The participants in this particular study were undergoing treatment for their disease when their anxiety levels were assessed. Overtime, it was indicated that they were responsive to the interventions and had reduced levels of anxiety (Shockey et al., 2013).

Dobson and Byrne (2014) also successfully utilized guided imagery scripting and deep breathing interventions to help minimize pain and anxiety levels of their participants who had sickle cell disease, much like Vagnoli et al. (2019) whose study implemented guided imagery to

pediatric patients during induction for surgery to decrease levels of anxiety when compared to the control group.

This research study, along with the others, indicated the guided imagery and deep breathing were successful in reducing anxiety levels in pediatric patients and children. These findings were helpful in reinforcing the importance of their presence in the hospital setting, in addition to being indicative of their value as non-pharmacological measures for anxiety reduction.

The Relationship Between Anxiety and Gender

While this study was conducted and completed with a small sample size (two males and three females), the independent sample t-test did not indicate that gender was a factor of coping and reduction of anxiety scores. Similarly, Shamekhi et al. (2019) and Mizrahi et al. (2012) ran analyses to assess for gender influence in their studies, but none was indicated as having an impact upon the anxiety levels of the participants.

However, many studies did not include gender in their hypotheses or research questions (Veena and Alvi, 2016; Henslee and Klein, 2017; Felix et al., 2018; Ma et al., 2017). Because there are limited studies that exclusively examined if there was a relationship between gender and the use of coping skills to minimize anxiety, it would be helpful to have research that would indicate a more in-depth background of the lack of influence of gender.

While this study was certainly helpful in reinforcing the evidence for the value of guided imagery and deep breathing interventions for anxiety reduction in both males and females, it was difficult to know if there were underlying factors that impact and increase coping further. While there was no documentation of gender impacting results in studies, or very limited studies that

indicated no relationship, a dedicated study to looking at this further might be helpful in giving direction for how gender might influence certain aspects of utilizing guided imagery and deep breathing interventions to lower anxiety levels.

Significance of Guided Imagery and Deep Breathing Techniques

The lowered anxiety results from pre-test to post-test indicated that guided imagery and deep breathing were significantly able to lower anxiety levels in participants. Particularly with this study utilizing pediatric cancer patients, this evidence was important to shaping the future development of programs that seek holistic approaches to care. Barre et al. (2018) discussed the importance of utilizing psychological interventions to lower anxiety levels, as this then can positively impact one's physical state, their treatment process, and minimize disease-related symptoms.

Likewise, Veena and Alvi (2016) discussed in their significant findings that guided imagery has the ability to quicken one's healing process. In addition, it has the ability to instill in an individual a sense of calmness, while increasing their threshold to experiencing anxiety in the future (Veena and Alvi, 2016). Much like this, Ma et al. (2017) deduced the findings from their study to indicate that deep breathing has the ability to increase one's cognitive function, while simultaneously decreasing one's negative affect and physiological response to stress.

Limitations and Future Research

In follow-up conversation with the participants at the end of the study about what aspect of the homework was difficult to comply with, some shared that they forgot to continue doing the guided imagery and deep breathing practices at home. If the participants' parents were not

reminding them to set aside time at home to practice the coping techniques as designated per the study protocol, this could have impacted the amount of time devoted to the homework.

However, two participants did indicate that they were able to watch a few of the recommended videos and actively practiced their deep breathing skills multiple times between the intervention sessions. Of those two patients, one of them indicated that the deep breathing skill became most helpful in moments of stress or even when feeling upset with a family member. They indicated that when coupled with counting, deep breathing helped to create a moment to pause before responding in anger to a sibling or parent. While the results were significant for this study, perhaps with greater time devoted to practicing these coping skills at home there would have been a greater difference in the anxiety scores from baseline to post-intervention.

For future studies, to increase the efficacy of guided imagery and deep breathing, while knowing that there could potentially be minimal compliance with homework responsibilities, it could benefit the participants to engage in more training interventions. The increase in number of training interventions would give the participants a greater opportunity for learning how to implement these coping techniques and feel an increased mastery in being able to use them in moments when experiencing stress or anxiety.

Another limitation to this study was the researcher needing to balance the clinical needs and demands of the unit. This made it difficult for the researcher to devote a significant amount of time on patient enrollment which was a factor in the small sample size. Not to mention, at the time of the research being conducted, there was a smaller number of participants who actually met the criteria than previously assumed when the study was originally being designed.

The COVID-19 pandemic posed as an obstacle at times. The outpatient unit's census was reduced drastically for a limited time; therefore, the potential number of patients that could have been enrolled in the study was reduced to only patients absolutely requiring consistent treatment and clinic appointments. Because of this, there were fewer patients that met the criteria and were able to be enrolled at the time of the study being conducted.

Because this study had participants from various developmental stages, it could be difficult to generalize these results to all children undergoing treatment for cancer. If the study had a larger sample size and a higher number of participants from each represented developmental group, appropriate analyses might be utilized to better understand the efficacy of the results and their impact upon their levels of anxiety.

Another potential limitation to the study that could explain a reduction in the anxiety levels is that the participants were more familiar with the STAIC™ assessment the second time it was completed. The first time the participants were introduced to the assessment tool required more awareness in reading and responding to the questions. Whereas during the third intervention, the participants could have more of an increased level of comfort and familiarity with the questions.

Future studies could also benefit from examining the relationship between the participants' daily stressors to the effectiveness of the guided imagery and deep breathing coping techniques on minimizing anxiety. When visiting the outpatient clinic for an appointment, the participants could have been exposed to a variety of stressful events—venous access, lumbar punctures, scans, or difficult conversations with providers. Each of these could easily cause an increase in one's anxiety levels, which could result in them responding differently to the STAIC™ assessment. Therefore, it could prove beneficial to implement these coping techniques

either before or after the participants have completed one of the above-mentioned events to assess the results from the STAIC™ and to have consistency in what the participants are all experiencing.

Conclusion

Overall, the conduction of this study yielded not only positive results but a positive experience for learning more about the effectiveness of guided imagery and deep breathing. In the future, this study can act as a foundational basis for the development of studies that would include other factors like examining the impact of these coping skills upon lowering one's heart rate and blood pressure, the effectiveness of these coping techniques when utilized during medical procedures, and the pain management.

These coping skills are able to be applied to other situations beyond the stressful events surrounding treatment for cancer. Because of the generalizability of these results, this can allow for further support and evidence for the practice of utilizing these coping skills in place of pharmacological measures for anxiety reduction in children and adolescents. Additionally, the participants in this study also benefited from the extended practice of these coping skills which they can now feel more confident about utilizing themselves.

In the future, the researcher hopes that this study will be useful in continuing to educate staff and medical providers about the importance of engaging and teaching patients long-term coping skills that they can have accessible to them at all times. Guided imagery and deep breathing have indicated to be valuable coping tools to minimize anxiety in pediatric patients undergoing treatment for cancer.

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APPENDICES

Appendix A. Consent to Participate in Study

Consent to Participate in a Research Study
Missouri State University
College of Childhood Education and Family Studies
Guided Imagery and Deep Breathing: Minimizing Anxiety in Pediatric Cancer Patients
Bethany Aney

Introduction

Your child has been asked to participate in a research study. Before you agree to your child participating in this study, it is important that you read and understand the following explanation of the study and the procedures involved. The investigator will also explain the project to you in detail. If you have any questions about the study or your child's role in it, be sure to ask the investigator. If you have more questions later, Bethany Aney, the person mainly responsible for this study, will answer them for you. You may contact the investigator(s) at:

Investigator: Bethany Aney, aney916@live.missouristate.edu

Principle Investigator: Dr. Denise D. Cunningham, denisecunningham@missouristate.edu

You will need to sign this form giving us your permission for your child to be involved in the study. Taking part in this study is entirely you and your child's choice. If your child decides to take part but later changes their mind, your child may stop at any time. If your child decides to stop, you do not have to give a reason and there will be no negative consequences for ending participation.

Purpose of this Study

The reason for this study is to identify helpful techniques in minimizing anxiety that is experienced by pediatric patients who are receiving treatment for a cancer diagnosis. There will be approximately 5-15 patients who will be participating in this study.

Description of Procedures

If you agree to be a part of this study, your child will complete three one-on-one training sessions with the investigator during visits to clinic. The first session will require the participant to complete an anxiety assessment tool followed by the investigator introducing guided imagery and deep breathing techniques to the participant. The second and third sessions will be further instruction and development of these techniques. At the conclusion of the third session, the participant will complete a final anxiety assessment. In between each of the sessions, the participant will be provided with an audio guided imagery scripting

Appendix A. Consent to Participate in Study Continued

and instructions for deep breathing to be utilized at home. Each participant can anticipate to commit a total of three hours from the start of the first training session to the completion of the third one, which includes time at home for practicing the interventions.

What are the risks?
There are no known risks to your child in participating in this study.

What are the benefits?
Your child might benefit from learning new approaches to minimizing anxiety in their life. The information from this study will help identify useful techniques and interventions to minimize anxiety in individuals undergoing treatment for cancer.

How will your child's privacy be protected?
The results of this study are confidential and only the investigators will have access to the information which will be kept in a locked facility at the hospital. Your child's name or personal identifying information will not be used in any published reports of this research. All information gathered during this study will be destroyed three years after the completion of the project.

Consent to Participate
If your child wants to participate in this study, Guided Imagery and Deep Breathing: Minimizing Anxiety in Pediatric Cancer Patients, you will be asked to sign below:

I have read and understand the information in this form. I have been encouraged to ask questions and all of my questions have been answered to my satisfaction. By signing this form, I agree voluntarily to have my child participate in this study. I know that my child can withdraw from the study at any time. I have received a copy of this form for my own records.

_____ _____
Signature of Parent Date

_____
Printed Name of Parent

_____ _____
Signature of Person Obtaining Consent Date

Appendix B. Missouri State IRB Approval

IRB-FY2020-331 - Initial: Initial Approval

irb@missouristate.edu <irb@missouristate.edu>
Tue 11/5/2019 6:52 PM
To: Aney, Bethany G <Aney916@live.missouristate.edu>; Cunningham, Denise D <DeniseCunningham@MissouriState.edu>

To:
Denise Cunningham
Childhood Ed & Fam Studies
Bethany Aney

RE: Notice of IRB Approval
Submission Type: Initial
Study #: IRB-FY2020-331
Study Title: Guided Imagery and Deep Breathing: Minimizing Anxiety in Pediatric Cancer Patients
Decision: Approved

Approval Date: November 4, 2019

This submission has been approved by the Missouri State University Institutional Review Board (IRB). You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented. Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

Researchers Associated with this Project:
PI: Denise Cunningham
Co-PI: Bethany Aney
Primary Contact: Bethany Aney
Other Investigators:

Appendix C. Penn State Health IRB Approval

Institutional Review Board
Human Subjects Protection Office
Mail Code A115, Room 1140
90 Hope Drive
P.O. Box 855, Hershey PA 17033-0855

Tel: 717-531-5687
hspo@pennstatehealth.psu.edu

APPROVAL OF SUBMISSION

Date: April 2, 2020

From: Jennifer Crossen, IRB Analyst

To: Bethany Aney

Type of Submission:	Initial Study
Short Title:	Minimizing Anxiety in Pediatric Cancer Patients
Full Title of Study:	Guided Imagery and Deep Breathing: Minimizing Anxiety in Pediatric Cancer Patients
Principal Investigator:	Bethany Aney
Study ID:	STUDY00014385
Submission ID:	STUDY00014385
Funding:	Not Applicable
IND,IDE, or HDE:	Not Applicable
Documents Approved:	• Deep Breathing Handout 1 (0.01), Category: Other • Deep Breathing Handout 2 (0.01), Category: Other • Guided Imagery Script 1 (0.01), Category: Other • Guided Imagery Script 2 (0.01), Category: Other • Homework Diary.docx (0.01), Category: Data Collection Instrument • HRP-580 - HSPO Consent Form Template (6).pdf (0.04), Category: Consent Form • HRP591-HumanSubjects.pdf (0.03), Category: IRB Protocol • HRP-598 - Research Data Plan Review Form (22).pdf (0.02), Category: IRB Protocol • Meditation for Kids.docx (0.01), Category: Other • STAIC assessment.pdf (0.01), Category: Data Collection Instrument
Review Level:	Expedited

On 4/2/2020, the IRB approved the above-referenced Initial Study. This approval is effective through 4/1/2021 inclusive. You must submit a continuing review form

Appendix D. Diaphragmatic Breathing

The diaphragm is the most efficient muscle of breathing. It is a large, dome-shaped muscle located at the base of the lungs. Your abdominal muscles help move the diaphragm and give you more power to empty your lungs. Diaphragmatic breathing is intended to help you use the diaphragm correctly while breathing to:

- Strengthen the diaphragm
- Decrease the work of breathing by slowing your breathing rate
- Decrease oxygen demand
- Use less effort and energy to breathe

Diaphragmatic breathing technique

1. Lie on your back on a flat surface or in bed, with your knees bent and your head supported. You can use a pillow under your knees to support your legs. Place one hand on your upper chest and the other just below your rib cage. This will allow you to feel your diaphragm move as you breathe.

2. Breathe in slowly through your nose so that your stomach moves out against your hand. The hand on your chest should remain as still as possible.

3. Tighten your stomach muscles, letting them fall inward as you exhale through pursed lips. The hand on your upper chest must remain as still as possible.

When you first learn the diaphragmatic breathing technique, it may be easier for you to follow the instructions lying down, as shown on the first page. As you gain more practice, you can try the diaphragmatic breathing technique while sitting in a chair, as shown below.

Appendix D. Diaphragmatic Breathing

To perform this exercise while sitting in a chair:

1. Sit comfortably, with your knees bent and your shoulders, head and neck relaxed.

2. Place one hand on your upper chest and the other just below your rib cage. This will allow you to feel your diaphragm move as you breathe.

3. Breathe in slowly through your nose so that your stomach moves out against your hand. The hand on your chest should remain as still as possible.

4. Tighten your stomach muscles, letting them fall inward as you exhale through pursed lips. The hand on your upper chest must remain as still as possible.

Note: You may notice an increased effort will be needed to use the diaphragm correctly. At first, you'll probably get tired while doing this exercise. But keep at it, because with continued practice, diaphragmatic breathing will become easy and automatic.

How often should I practice this exercise?
At first, practice this exercise 5-10 minutes about 3-4 times per day. Gradually increase the amount of time you spend doing this exercise, and perhaps even increase the effort of the exercise by placing a book on your abdomen.