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Effectiveness of Yoga Therapy on Pain and Related Depression, Anxiety, Perceived Stress, and Quality of Life

Karen Romani
Walden University

Walden University

College of Social and Behavioral Sciences

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Karen Romani

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Review Committee
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Dr. Jill Barton, Committee Member, Psychology Faculty
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Sue Subocz, Ph.D.

Walden University
2019

Abstract

Effectiveness of Yoga Therapy on Pain and Related Depression, Anxiety, Perceived Stress, and Quality of Life

by

Karen Romani

MS, Nova Southeastern University, 2012

BA, Humboldt University, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Individuals are becoming more dependent on medication for conditions such as chronic-pain, anxiety, and depression. It is reported that patients are often overprescribed medication while health outcomes do not improve. The medicalization of society is distracting attention from the possibility of other therapies such as complementary or alternative medicine (CAMs) that can improve health outcomes if they were as supported as pharmacological research and better received by the medical community. Yoga and meditation, the components of Mindfulness Based Stress Reduction (MBSR) and yoga therapy, have been shown as effective CAMs for cases of anxiety and depression related to chronic illness or chronic pain. There is little agreement in research, among yoga practitioners, and in the medical community on how to prescribe the delivery of yoga therapy interventions to reduce pain, depression, or anxiety. The purpose of this quantitative study and, to address this gap in the literature, is to provide the medical community protocols for the delivery of yoga therapy and to discover a "dose response" for yoga therapy among 6 individuals suffering pain and related affective disorders such as anxiety and depression. The findings of this study showed no significant difference among individuals who practice yoga therapy at the rate of one or three times per week on reported levels of depression, anxiety, pain, perceived stress or quality of life depending on the rate of practice. This study could impact the over-prescription of medication and reduce the dependence on psychopharmacology for management of affective disorders

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Dedication

This dissertation is a culmination of patience, support, and acceptance of my truest and closest chosen family who allowed me to desert them periodically while they all remained steadfast in their belief in me. "Are you done yet?" Yes, and thank you for continuing to ask me!

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To my dissertation committee, I would like to express huge gratitude for your flexibility, support, and guidance throughout the dissertation process. I would not be the researcher and psychologist I am now, without you. Thank you so much.

I would also like to thank Nina's Soulful Yoga for providing me with the data that was used in this dissertation. Everyday you provide the community with opportunity to heal in ways we are still attempting to quantify. Namaste!

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Chapter 1: Introduction to the Study

Introduction

Individuals are becoming more and more dependent on medication for conditions such as chronic-pain, anxiety, and depression (Angell, 2009; Frances & Nardo, 2013). It is reported that patients are often overprescribed medication while health outcomes do not improve (Fisher & Kalbaugh, 2012; Healy & Thase, 2003). The medicalization of society is distracting attention from the possibility of other therapies such as complementary or alternative medicine (CAMs). CAMs can improve health outcomes only if they are as supported as pharmacological research and better received by the medical community (Angell, 2009; Fisher & Kalbaugh, 2012; Frances & Nardo, 2013; Healy & Thase, 2003; McHenry, 2006).

Wolsko, Eisenberg, Davis, and Phillips (2004) conducted a U.S. survey and found that between 15% and 20% of Americans have used a CAM to address chronic pain and psychological conditions. Approximately 6.3 million people are turning to CAMs for anxiety and approximately 3 million people use CAMs for depression and pain (Wolsko et al., 2004). Of the CAMs identified, yoga and meditation are the top two CAMs utilized (Wolsko et al., 2004).

A common misconception is that all yoga or meditation treatments are equal or that all treatments are therapeutic and administered the same; they are not, yoga and meditation can be delivered at different intensities and rates (International Association for Yoga Therapists [IAYT], 2015). However, gentle and restorative yoga can become therapeutic with the correct delivery and rate, which is determined by the patient, his or

her diagnoses, behavioral symptoms and degree of pain (IAYT, 2015). Meditation can be included along with gentle and restorative yoga specifically addressing the patient, in the operationalized form of Mindfulness Based Stress Reduction (MBSR) (Kabat-Zinn, Lipworth, & Burney,1985; Kabat-Zinn et al., 1992; Ludwig & Kabat-Zinn, 2008). MBSR is comprised of the yoga-based components of diaphragmatic-breathing, body-scanning, relaxation, and guided imagery for stress reduction. When therapeutic based restorative yoga and MBSR are combined, the treatment becomes yoga therapy (IAYT, 2015; Kabat-Zinn et al, 1985; 1992; Ludwig & Kabat-Zinn, 2008; Ramacharaka, 1905).

Background

Much of the theory behind the interventions for this study is derived from ancient Buddhist and Yogic traditions brought to America by Ramacharaka in the early 20th century. (Ramacharaka, 1905). Hatha yoga provides the basis for what is referred to now as mindfulness or what is previously known as the yogi philosophy of physical and mental wellbeing (Kabat-Zinn et al, 1985; Ramacharaka, 1905). This type of yoga addresses the care of the physical body and the leading principle of the Yogi teachings, which are largely considered by Yogis in the simplest acts of their lives. Gentle to moderate yoga instruction from the Hatha yoga tradition is provided including the structure of MBSR. This includes breath work such as diaphragmatic breath integrated with the gentle to moderate yoga movement and guided mindfulness meditation using relaxation with a full body scan, visualization of healing using various guided imagery, and use of intention (IAYT, 2015; Kabat-Zinn et al, 1985; 1992; Ludwig & Kabat-Zinn, 2008; Ramacharaka, 1905).

History of Yoga and Meditation Entering the Medical Model

The practice of mindfulness meditation was pioneered in a 10-week Stress Reduction and Relaxation Program to train chronic pain patients in self-regulation (Kabat-Zinn, 1982). During the program, the meditation facilitated an attentional stance towards proprioception known as detached observation (Kabat-Zinn, 1982; Ramacharaka, 1905). According to Kabat-Zinn (1982) data were presented on 51 chronic pain patients who had not improved with traditional medical care. At 10 weeks, 65% of the patients showed a reduction of 33% in the mean total Pain Rating Index (Melzack, 1983) and 50% showed a reduction of 50%. Similar decreases were recorded on other pain indices and in the number of medical symptoms reported. Large and significant reductions in mood disturbance and psychiatric symptomatology accompanied these changes and were relatively stable on follow-up. Key features of the program structure, and the limitations of the present uncontrolled study are discussed.

Yoga and Meditation Becomes Mindfulness Based Stress Reduction

Kabat-Zinn et al. (1992) continued with designs to determine the effectiveness of a group stress reduction program based on mindfulness meditation for patients with anxiety disorders. The 22 study participants who were screened with a structured clinical interview met criteria for generalized anxiety disorder or panic disorder with or without agoraphobia. Assessments, including self-ratings and therapists' ratings, were obtained weekly before and during the meditation-based stress reduction and relaxation program and monthly during the 3-month follow-up period. According to a repeated measures analyses of variance, significant reductions in anxiety and depression scores was shown

after treatment for 20 of the participants, and the number of participants experiencing panic symptoms was also substantially reduced (Kabat-Zinn et al., 1992).

Previously, Baddeley and Hitch (1974) proposed a three-component model of working memory and attention (as cited in Baddeley, 2000). Conscious awareness is assumed to be the principal mode of retrieval, and the focusing of attention on the processes of integrating information is in isolation of the subsystems. This model of working memory and attention provides this study with a theoretical framework for the examination of the intervention of mindfulness and yoga as integral to day-to-day well-being as it provides a better basis for tackling the more complex aspects of attention and executive control in working memory. Theory and evidence for the role of mindfulness in curtailing negative functioning and enhancing positive outcomes in several important life domains, including mental health, physical health and behavioral regulation was previously explored and will provide theoretical support to this proposed study. Brown, Ryan, and Creswell (2007) discussed the processes through which mindfulness is theorized to have its beneficial effects, along with proposed directions for theoretical development and empirical research.

Measuring Yoga, Meditation, and Mindfulness for Application

The state of research on a variety of meditation practices has been synthesized and researched to find that there is a need for a dose response (Bond et al., 2007). Yoga and MBSR are highly rated interventions lacking a dose response model. Comprehensive searches were conducted in 17 electronic databases. A Delphi method was used to develop a set of parameters to operationally define meditation practices. Sixty-five

intervention studies examined the therapeutic effect of meditation practices and showed Zen Buddhist meditation significantly reduced blood pressure, also that yoga helped reduce stress (Bond et al., 2007). Also yoga was found to be no better than MBSR at reducing anxiety in patients with cardiovascular diseases (Bond et al., 2007). A theoretical and empirical examination of the role of mindfulness in psychological wellbeing using the Mindful Attention Awareness Scale (MAAS), has been described by Brown and Ryan (2003), showing an experience-sampling study indicating that both dispositional and state mindfulness predict self-regulated behavior and positive emotional states. Finally, a clinical intervention study with cancer patients demonstrated that increases in mindfulness over time relate to declines in mood disturbance and stress (Bond et al., 2007)

More measures can be utilized in this study to measure the effect of yoga therapy for well-being. For example, stress is presented using the nine-item Psychological Stress Measure (PSM-9). This tool is aimed directly at the state of feeling stressed, is suited for assessing stress clinically in the general population and serving as an outcome measure. The tool is valid and reliable and easy to administer in health care settings; it is based on a normal distribution, which makes it a very sensitive-to-change instrument in repeated measures to document progress (Lemyre & Lalande-Markon, 2009).

Delgadillo et al. (2014) measured the effect of early symptom changes in levels of anxiety and depression in brief low intensity psychological interventions by using the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder-7 (GAD-7). Delgadillo et al. (2014) collected clinical records for 1,850 patients who screened

positive for depression and/or an anxiety disorder to find reliable and clinically significant improvement (RCSI) or simply a reduction in symptoms. Outcome measures after treatment were examined to find that attrition rates were significantly associated with poor outcomes. Delgadillo et al. found that at least four therapy sessions are necessary to achieve more than 50% RCSI rates, and the dose–response effect appeared to decline in treatments longer than six sessions.

The previously discussed intervention models presented by Kabat-Zinn et al. (1985; 1992) and Delgadillo et al. (2014) suggested a 6 to 8-week experimental model to mitigate the decline in RCSI with longer treatments and the use of linear regression to find a dose response. For example, Ford and Hawke (2012) modeled the effects of emotional regulation in participants in detention with exposures to trauma and violence. They provided a milieu intervention of up to 10 sessions over the course of 19 weeks to mitigate detention and negative attention. Linear regression was used to show that every session of intervention received in the first seven days was associated with 54% fewer disciplinary incidents and 72 fewer minutes of disciplinary seclusion ($p < .001$) for each individual during the modal stay (14 days) in detention. Therefore, in this study, the brief low intensity intervention of yoga therapy was the rate of practice either one time or three times per week to avoid attrition. The proposed eight-week model proved to be difficult to complete making attrition high.

Problem Statement

Yoga and meditation have been shown as effective CAMs for cases of anxiety and depression related to chronic illness and/or chronic pain (Kabat-Zinn et al., 1985;

1992; Wolsko, Eisenberg, Davis, & Phillips, 2004). How to prescribe it as a medical treatment remains unclear (Bond et al., 2007; Dimidjian & Segal, 2015). Approaching the medical community with evidence-based material has been shown to lead to greater acceptance and endorsement of CAMs for the treatment of patients suffering from such disorders as chronic pain, depression, and anxiety (Bond et al., 2007; Dimidjian & Segal, 2015). However, there is confusion about how to operationalize effects of yoga and meditation for specific illnesses (Bond et al., 2007; Dimidjian & Segal, 2015; Ludwig & Kabat-Zinn, 2008). There is little agreement in how to operationally define the delivery of yoga and meditation interventions. Also, evidence-based protocols and algorithms for the delivery of yoga and meditation interventions do not currently exist (Bond et al., 2007; Dimidjian & Segal, 2015).

Purpose of the Study

I this study I attempt to operationalize yoga therapy by defining the terms of therapeutic yoga and meditation, providing protocols for its delivery as intervention, and examining the differences in the rate at which yoga therapy is practiced in relation to measures of pain, anxiety, depression, perceived stress, and quality of life, more simply stated, finding the dose. The rate of practice between one time per week and three times per week will be compared to find the more beneficial dose of yoga therapy for improvement of symptoms among participants suffering pain and affective disorders such as anxiety and depression (Bond et al., 2007, p. 209). A dose response model may be determined by measuring the rate or how often a patient practices yoga and meditation as indicators for minimum beneficial exposures to yoga therapy interventions for

improvement in symptoms, that medical providers can then reference in order to better prescribe yoga therapy as an alternative treatment.

Research Questions and Hypotheses

The rate in which a participant practices yoga therapy, will be the independent variable (IV). There will be two levels of the independent variable, once per week and three times per week. The dependent variables (DVs) will be the reported levels of pain, anxiety, depression, perceived stress, and quality of life.

Research Question 1: To what extent does rate of practicing yoga therapy relate to depression?

$H_0$1: Participants who practice yoga three times per week are predicted to report the same number of symptoms of depression as those who practice once per week.

$H_1$1: Participants who practice yoga three times per week are predicted to report fewer symptoms of depression than those who practice once per week.

RQ 2: To what extent does rate of practicing yoga therapy relate to anxiety?

$H_0$2: Participants who practice yoga three times per week are predicted to report the same number of symptoms of anxiety as those who practice once per week.

$H_1$2: Participants who practice yoga three times per week are predicted to report fewer symptoms of anxiety than those who practice once per week.

RQ 3: To what extent does rate of practicing yoga therapy relate to pain?

$H_0$3: Participants who practice yoga three times per week are predicted to report the same number of symptoms of pain as those who practice once per week.

$H_1$3: Participants who practice yoga three times per week are predicted to decrease symptoms of pain more than those who practice once per week.

RQ 4: To what extent does rate of practicing yoga therapy relate to perceived stress?

$H_0$4: Participants who practice yoga three times per week are predicted to report the same number of symptoms of perceived stress as those who practice once per week.

$H_1$4: Participants who practice yoga three times per week are predicted to report fewer symptoms of perceived stress than those who practice once per week.

RQ 5: To what extent does rate of practicing yoga therapy relate to quality of life?

$H_0$5: Participants who practice yoga three times per week are predicted to report the same degree of quality of life as those who practice once per week.

$H_1$5: Participants who practice yoga three times per week are predicted to report a higher quality of life more than those who practice once per week.

Theoretical Framework

To provide a framework for this study, it is important to use operational definitions and a strong theoretical base to produce strong empirical research on which the medical community can rely (Bond et al., 2007). To address operational definitions, in 2007 a panel of experts participated in a Delphi study to reach a consensus definition of meditation (Bond et al., 2007). The consensus reached the recommendation to future researchers that a meditation practice

(1) uses a defined technique (2) involves logic relaxation, and (3) involves a self-induced state/mode. These criteria were considered essential. Participants also

> agreed that a meditation practice may (1) involve a state of psychophysical relaxation somewhere in the process; (2) use a self-focus skill or anchor; (3) involve an altered state/mode of consciousness, mystic experience, enlightenment or suspension of logical thought processes; (4) be embedded in a religious/spiritual/philosophical context; or (5) involve an experience of mental silence. (Bond et al., 2007, p. B-2)

Using a rating scale of 1 to 7 the panel unanimously concluded that MBSR is one of the strongest operationally defined modes of meditation awarding it the highest rating of 7. The panel also rated yoga and yogic breathwork with a high score of 6. MBSR, yoga, and yogic breathwork are the main components of yoga therapy in this study (IAYT, 2015, Kabat-Zinn et al., 1985; 1992) adhering to the 2007 consensus and providing strong operational definition of its delivered intervention. This should strengthen internal validity of the study and lend a higher credibility to the outcomes (Bond et al., 2007).

Theoretical frameworks are based on the Baddely (2000), Orenstein, Basilakos, and Marshall (2012), and Dickensen, Berkman, Arch, and Lieberman (2013) works on perception and attention, self-regulation, and emotional control, which supports the operational definition and basic tenets of yoga therapy. Within yoga therapy (IAYT, 2015, Kabat-Zinn et al., 1985; 1992) there are strong elements of attention and attentional control (Baddeley, 2000), which alter or shape self-regulation, perception and emotional control (Dickenson et al., 2013). Attention, perception, and self-regulation may shape an individual's commitment to the practice (Orenstein et al., 2012). This allows the

expectation that there may or may not be a relationship between the frequency or dose of yoga therapy (IV) and the physical and affective symptoms perceived by the individual; depression, anxiety, pain, components of mindfulness and attrition (DVs).

Baddeley (2000) discusses a model of perception, which informs and shapes an individual's understanding of oneself and the world. If perception can be shaped negatively by distractions, reducing those distractions can shape perception positively (Baddeley 2000). Shifting attention away from a compilation of distraction, of increased physiological and affective symptoms, then focusing on the present moment can allow attention to optimize perceptions of health and wellbeing of the individual (Baddeley, 2000). Baddeley's model of perception is parallel to the operational definition of yoga therapy where the individual is trained to relax and oxygenate the body, delivering a shift in the central nervous system where mental silence is achieved and current thought processes are suspended so that perception can shift (Bond et al., 2007; IAYT, 2015, Kabat-Zinn et al., 1985; 1992).

Dickenson et al. (2013) supported Baddeley's model of attention and suggested that the neural mechanisms of mindfulness are related to the attentional processes in mindfulness practitioners, even at the novice level. Also, Dickenson et al. suggested trait mindfulness, that which an individual already possesses rather than cultivates, positively moderates attentional activation. These theories served as a basis for the relationship between rate of yoga therapy and the participant's perceived stress, quality of life, pain, depression, and anxiety. Dickenson's theories parallel the operational definition of yoga therapy in that it trains one to develop and practice a self-focus skill during an altered

state of attention and consciousness (Bond et al., 2007; IAYT, 2015, Kabat-Zinn et al., 1985; 1992).

Orenstein et al. (2012) added that an inaccurate perception of task demand, or lacking a sense of effort, may also misdirect the available attentional resources of an individual. Redirection of attentional resources should increase the ability to recognize improvements in physical, emotional and mental health by increasing focus and developing attention onto the present moment rather than ruminate, perseverate, worry, or focus on distress. This redirection is parallel to the operational definition of yoga therapy as the individual is trained to alter such misdirection by cultivating nonjudgmental awareness, higher self-regard, and the ability to recognize specific shifts in consciousness (Bond et al., 2007; IAYT, 2015, Kabat-Zinn et al., 1985; 1992).

Nature of the Study

The nature of this study was quantitative. A yoga therapist who provides yoga therapy at a wellness center, specializing in gentle Hatha yoga, collected the data. Data was subsequently provided to this student researcher for secondary analyses. Similar to previous yoga and meditation research, a single subject multiple baseline across participant approach was operated by the yoga therapist. The therapist from the wellness center utilized the Psychological Stress Measure (PSM-9), Beck Depression Inventory (BDI), Generalized Anxiety Disorder-7 (GAD-7), McGill Pain Questionnaire (MPQ), Quality of Life Survey (QoL-2)

Operational Definitions

Yoga Therapy; Because there are so many different types and deliveries of yoga,

it is important to specify the specific modality referred to as yoga therapy in this study. Yoga therapy is described as "the practical application of Yoga principles for people with special physical, emotional, or spiritual needs or challenges " (IAYT, 2012, pg. 14). This description includes appropriate applications of the yogic principles of self-investigation, self-transformation, and self-realization by practicing yoga postures, and mindfulness meditation in a therapeutic context (IAYT, 2012). Yoga therapists prescribe specific regimens of postures, breathing exercises, and relaxation techniques to suit individual needs (IAYT, 2016). Yoga therapy practiced consistently has been shown to increase self-awareness and will assist an individual in reaching his or her therapeutic goals and change his or her identification and relationship with his or her health issues (IAYT, 2012). Individual therapeutic goals can be spiritual, psychological, or physiological in nature. Yoga therapy is used to manage, reduce, and eliminate suffering and the underlying cause of illness as well as the symptoms that may or may not reoccur. Richard Miller (IAYT, 2016) defined yoga therapy using the following principles based on Indian health science, known as Ayurveda, which dates back to the origins of yoga.

The application of yoga therapy is from one or more of three perspectives:

1. The use of yoga to gain a sense of power, i.e., to develop muscular power, the power to concentrate, the power to do difficult postures, the ability to work over and extended period of time.
2. The use of yoga to heal specific problems, such as eliminating impurities in the organs or energy centers and channels of the body.
    - If sickness is present, it needs to be cured.

- If sickness is not present, protection is necessary.
- If sickness is not present and one has learned how to protect oneself, training is necessary.

3. The use of yoga to go beyond the physical to understand what is beyond the limited sense of self; to know one's true self as unchanging, witnessing presence of all that is changing.

The main principles of yoga therapy are:

1. Teach what is appropriate to the individual.
2. Differences in different people must be respected.
3. Teachings must consider the situation, place, or country from which the student comes.
4. Each person needs to be taught according to his or her individual constitution, age, disposition, etc.
5. The method of instruction depends on the time of year, the seasons, etc.
6. Depending on the occupation of the student, he or she will need to be taught different things (e.g., a runner would be taught differently than a philosopher).
7. One must understand the capacity of the student, how much endurance he or she has, how much memory, how much time to study or practice.
8. The teaching must conform to the direction of the mind (i.e., it must take a person's interests into account, such as exercise, devotion, God,

chanting, etc.) (IAYT, 2016).

Because yoga is applied in therapeutic contexts, one-to-one administration is optimal for addressing the specific goal of the individual. However, yoga therapy is administered to groups and can be adapted to each individual in attendance (IAYT, 2016).

Ramacharaka (2010) was responsible for bringing yoga to the western world at the turn of the 20th century. His discussion and description of gentle to moderate yoga stemming from the Indian Hatha tradition and the principles of Ayurveda provides the structure upon which yoga therapists base their practice and provide care to those suffering with pain or pain related disorders (IAYT, 2017). The meaning of the word Hatha implies "balance" and in his seminal work, originally in 1901, Ramacharaka (2010) described in great detail through a philosophical lens the importance of understanding balance from a physical or body and a mental or mind perspective. He prescribes breathing and relaxation exercises now used by yoga therapists and in MBSR to build body awareness and develop intrinsic intelligence to manipulate the nervous system into a parasympathetic response to aid healing both physically and mentally. He also provides detailed yoga postures and movements used by yoga therapists and in MBSR to address the client's specific physical and mental health challenges.

In 1979 Jon Kabat-Zinn began the pioneering work of empirical research at the University of Massachusetts by infusing his medical training and his yoga practice. By utilizing the proparasympathetic components of yoga therapy to formulate MBSR and its effect on relieving physical and emotional pain experienced by cancer patients, Kabat-

Zinn introduced to Western medicine the importance of considering alternatives to analgesic, narcotics, and surgery to treat physical and emotional pain associated with chronic illness (as cited in Kabat-Zinn et al., 1985; Kabat-Zinn et al., 1992).

Kabat-Zinn (1985) recruited participants with cancer and in an eight week course of practicing diaphragmatic breathing, gentle movement, and full body scan of the Yoga Nidra approach, demonstrated a consistent reduction in pain and a consistent increase in mental well-being. He revisited his participants in a follow up in 1992 showing longevity of reduced pain and increased wellbeing. This landmark research on the healing effects of mindfulness meditation on physical conditions had a significant effect on improving mental health and has evolved into MBSR, which includes the yoga therapy interventions of restorative yoga and meditation to reduce pervasive stress, chronic pain, and improve health outcomes. This coincided with a surge of interest in alternative health and healing in the 1990's and more individuals interested in learning or teaching yoga therapy (IAYT, 2016).

Mindfulness; is defined by Kabat-Zinn et al. (1985) who continued to study the physical effects of MBSR. He also provided landmark research on the lasting effects of mindfulness meditation on psychological conditions and significant effect on improving mental health. This has evolved into Mindfulness Based Stress Reduction (MBSR) and includes yoga therapy interventions of restorative yoga and meditation to reduce pervasive stress, chronic pain, and improve health outcomes. In his 10-week mindfulness meditation study of 90 chronic pain patients, results showed a significant reduction of mood disturbance, anxiety, and depression, along with a decrease in drug utilization. The

comparison group who received traditional pain treatment did not show significant improvement in these areas. Also, 15 months post-study, a majority of the participants reported high compliance with the mindfulness meditation practice learned to maintain their wellbeing (Kabat-Zinn, et al., 1985).

After finding that the chronic pain related affective disorders were improved using MBSR, Kabat-Zinn (1992) continued to research the lasting effects of mindfulness meditation on participants without chronic physical pain. Kabat-Zinn (1992) conducted a study to see if MBSR was an effective group intervention for subjects with anxiety disorders. The findings showed that 20 of the 22 participants had significant reductions in anxiety and depression scores and that panic symptoms were substantially reduced. In addition, 91% of subjects at a 3-month follow-up were found to have maintained their MBSR practice (Kabat-Zinn et al., 1992). These findings perpetuate the idea that there are alternatives to managing psychological suffering in addition to chronic pain.

Dose Response; as cited in Bond et al. (2007) dose response was defined by the Agency for Healthcare Research and Quality who contracted a board of investigators to look at the evidence pertaining to the impact yoga and meditation has on public health to improve the quality of health care in the United States. The conclusion was made that scientific research on meditation practice lacked a common theoretical perspective and included poor quality methodology (Bond et al., 2007). The board determined that no firm conclusions could be drawn on how to integrate mind-body approaches into medical care. The question was raised with regard to MBSR, meditation, and yoga, of the dose necessary before successful health outcomes are realized (Bond et al., 2007).

In the following year, Ludwig and Kabat-Zinn (2008) concurred that even though in 2007 there were 70 scientific articles published on mindfulness, the available research suffered limitations. Limitations such as the need for larger participant groups, the lack of an active control group, the inclusion of subjective end points and participant characteristics, poor protocol adherence, confounding variables, and lack of consensus on working definitions of interventions all continued to contribute to the difficulty of creating scientific evidence for a dose response.

Dimidjian and Segal (2015) conducted a meta-analysis study and found that throughout the previous 15 years of growing research, among the diversity of populations studied, and the variations among the methods and interventions used, the only question answered was that mindfulness-based interventions (MBIs) seem to have some effect among many different physical and mental illnesses and no firm confirmation of a dose response was evident. Dimidjian and Segal (2015) recommended enhancement to future studies by using the scientific methods included in the framework of clinical psychological research to build out the evidence that MBIs have a public health impact. One major way public health could be impacted by evidence-based research on MBIs would be to move the field closer to finding a personalized medicine framework based on patient presentation to determine the appropriate MBI.

To contribute needed evidence for medicalization of MBIs, seven recommendations are provided by Dimidjian and Segal (2015).

1. Specify intervention targets and populations
2. Do not conflate promise with efficacy

3. Consider clinical training to better operationalize the delivery of an MBI
4. Use a randomized design to specify the specific effects of an MBI
5. Conduct tests of efficacy in a well-controlled, internally valid study in a community setting with community therapists and providers
6. Find effectiveness by comparing the MBI to a rigorous active control group
7. Beware of developing orphan interventions that do not reach to the context of need. (Dimidjian & Segal, 2015)

These recommendations echo the findings of the Bond et al. (2007) investigation and the Ludwig and Kabat-Zinn (2008) article implicating that research had not adopted recommendations that analytic and evidence-based methodology are needed to inform western medicine how to prescribe meditation and yoga, or to find a dose-response for the purpose of improving American healthcare.

Scope and Delimitations

This study will focus on adult individuals from the general population interested in relieving symptoms of depression, anxiety, stress or pain. All the participants will come from the same geographical location and would begin new yoga practices to address their issues. Because this single subject design's sample size will be small and the sample derived will be from one geographical area, generalizability will be limited (Kazdin, 1982). However, the single subject design is often used in medical research to investigate drug therapy, family medicine and nutrition (Janosky, 2005). Because the medical community utilizes single subject research design, this study should be valuable

to its target audience (Angell, 2009; Frances & Nardo, 2013; Healy & Thase, 2003; Janosky, 2005). Individuals who have explored psychological or medical options such as therapy or pharmacology for relief of affective symptoms often complain they are not experiencing the expected results and continue looking for other methods (Angell, 2009; Frances, & Nardo, 2013; Healy & Thase, 2003). If therapy or pharmacology does not provide the relief individuals require, daily life functioning can be challenging.

Limitations

One limitation of this research will be that the participants are all adults between the ages of 18 and 35 years. Each participant may or may not have a history of trials of different pharmacological solutions for their symptoms. Participants may or may not have attempted psychological counseling. These differences may limit the generalization of the results. As mentioned above, generalizability, as defined for research study is important and should be strong (Kazdin, 1982). However, this single subject design's sample size will be small and the sample is derived will be from one geographical area therefore limiting generalizability. The single subject design is often used to investigate drug therapy, family medicine and nutrition (Janosky, 2005). Because the medical community utilizes single subject research design, this study should be valuable to its target audience (Angell, 2009; Frances & Nardo, 2013; Healy & Thase, 2003; Janosky, 2005).

Other limitations will include factors beyond the research site's control, which could potentially influence results. Each participant may have different stressors outside of their practice or other habits or coping strategies to relieve their stress such as a regular diet, regular exercise regime or family support. To limit the possibility of environmental

differences, participants will be instructed not to introduce anything new into their daily functioning outside of the yoga therapy intervention.

Significance

Operationalizing yoga therapy and researching the rate of yoga therapy sessions per week may assist the medical community in prescribing yoga therapy more effectively as an alternative to medication (Bond et al., 2007; Ludwig & Kabat-Zinn, 2008). Prescribing yoga therapy effectively could alleviate the problem of overprescribing drugs with serious side effects (Angell, 2009; Frances & Nardo, 2013). Liability and ethical issues may be reduced for some practitioners relying on pharmaceutical interventions for physical or psychological pain (Angell, 2009; Healy & Thase, 2003). Quality of life may improve for patients, while quality of care may improve for practitioners (Fisher & Kalbaugh, 2012).

Summary

Chapter 1 provided an introduction to this research project which included background information about the problem, the purpose of the study, the theoretical basis, the research hypotheses, the scope, the significance, and a definition of the important terms. The chapter identified the need for additional research to offer a dose response to better inform the medical community in prescribing yoga therapy to address affective disorders related to pain. Because of the increase in the over-prescribing of pharmaceuticals to address affective disorders (Bond et al., 2007), this study sought to identify and specify a useful type and rate of yoga to be used as a complementary alternative medicine for pain related affective disorders.

Chapter 2: Literature Review

Introduction

Individuals are becoming more dependent on medication for conditions such as chronic-illness, fibromyalgia, anxiety, and depression (Angell, 2009; Frances & Nardo, 2013). Patients are often overprescribed medication when health outcomes do not improve (Fisher & Kalbaugh, 2012; Healy & Thase, 2003). Yoga and meditation, the components of MBSR, or yoga therapy, have been shown as effective CAMs for cases of anxiety and depression related to chronic illness or chronic pain (Kabat-Zinn, 1987). However, a gap in the literature exists, as there is confusion about how to operationalize yoga therapy to address the symptoms of specific illnesses such as chronic pain, depression, or anxiety (Bond et al., 2007; Dimidjian & Segal, 2015; Ludwig & Kabat-Zinn, 2008).

There is little agreement in research, among yoga practitioners, and in the medical community, on how to prescribe the delivery of yoga therapy interventions to reduce pain, depression, or anxiety (Bond et al., 2007; Dimidjian & Segal, 2015; Ludwig & Kabat-Zinn, 2008). Approaching the medical community with evidence-based material has been shown to lead to greater acceptance and endorsement of these modalities for treatment of patients suffering from such disorders as chronic pain, depression, and anxiety (Bond et al., 2007; Dimidjian & Segal, 2015).

A common misconception is that all yoga is therapeutic and administered the same (Bond et al., 2007). Yoga is often delivered in different rates, settings, and styles. For example, some yoga is gentle and restorative and practiced for an hour once or twice

a week, some are longer or shorter in duration or more physically vigorous and practiced every day (IAYT, 2015). However, the purpose of this study is to explore the rate in which gentle and restorative yoga can be therapeutic and to examine which rate of practice best impacts depression, anxiety, stress, and quality of life. The delivery in this study includes; gentle and restorative yoga movements, specifically addressing the patient's symptoms along with diaphragmatic-breathing, body-scanning, relaxation, and guided imagery for stress reduction. This structure is known as yoga therapy (IAYT, 2015; Kabat-Zinn, 1985; Ramacharaka, 2010). Often medical providers referring patients to yoga or patients seeking yoga to address pain or affective disorders are not aware of the importance of differentiating yoga therapy from other forms of yoga (Bond et al., 2007). Therefore, the purpose of this study is to provide protocols for the delivery of yoga therapy as an intervention and to discover a "dose response" to yoga therapy among participants suffering pain and relative affective disorders such as anxiety and depression (Bond et al., 2007 p. 209).

Measuring the effectiveness of yoga therapy by defining the delivery of yoga for this research as yoga therapy (IAYT, 2015), and examining the effects it may have on anxiety, depression, stress, and quality of life, and whether these effects vary along the number of sessions per week may assist the medical community in prescribing yoga therapy more effectively as an alternative to medication (Bond et al., 2007; Ludwig & Kabat-Zinn, 2008). Prescribing yoga therapy effectively could alleviate the problem of overprescribing drugs with serious side effects (Angell, 2009; Frances & Nardo, 2013). Liability and ethical issues may be reduced for some practitioners relying on

pharmaceutical interventions for physical or psychological pain (Angell, 2009; Healy & Thase, 2003). Quality of life may improve for patients, while quality of care may improve for practitioners (Fisher & Kalbaugh, 2012).

Literature Search Strategy

Accessed library database and search engines used include: All databases in Ebcohost via the Walden University Library and Google Scholar limiting for scholarly journals within the last 5 to 10 years. Reference list of key articles was used to located seminal works from earlier years. Key search terms used include "Yoga," "Yoga therapy," "Meditation," Mind-body Techniques," "Mind-body Therapies," "Relaxation," "Alternative Medicine," "CAM," "dose-response," Combination search terms include "Yoga and mindfulness," Yoga therapy and mindfulness," Yoga therapy and chronic pain," "Yoga therapy and depression," "Yoga therapy and Anxiety."

Articles were found to differ in type of yoga implemented and to address a variety of conditions, and very few indicated the use of yoga therapy as intervention (Doria, de Vuono, Sanlorenzo, Irtelli, & Mencacci, 2015; Obas et al., 2013;). Comparative studies were found to explore the use of yoga against another CAM to determine effectiveness rather than a prescriptive dose and not aimed for the medical community but more for the holistic practitioner. Doria et al., (2015) used Sudarshan Kriya Yoga (SKY), which included no physical yoga movement. Rather, it focused on specific breathing and chanting techniques to induce a hyperventilation mechanism that affects the parasympathetic system to illicit a sustained relaxation response and thus improve depressive or anxiety symptoms. Obasi et al., (2013) compared meditation against

traditional exercise to find an increase immune function and improved overall quality of life.

The need for further study to provide more evidence-based research was frequently recommended (Bond et al., 2007; Dimidjian & Segal, 2015; Doria et al., 2015; Obasi et al., 2013). The elusive component was finding multiple research studies consistently defining the same practice, using a consistent and effective method for assessment, and producing a determinate rate of practice that produced a significant effect on pain, depression, anxiety, stress and quality of life.

Literature Review Related to Key Variables and Concepts

The diagnostic and statistics manual fifth edition (DSM-5) describes depressive disorders as the presence of a sad, empty or irritable mood with somatic complaints, and cognitive changes in the individual that significantly impact an individual's functioning and impairment in over all quality of life (APA, 2013). The Center for Disease Control (CDC, 2012) corroborates that eight percent of people between the ages twelve to sixty years experience depression. Females in every age group have higher rates than males. Generalized anxiety is described as a persistent and excessive worry, usually stress-related, across various domains that is difficult to control and may include physical symptoms (APA, 2013). The CDC agrees that anxiety and depression co-occur (CDC, 2012). The high prevalence of depression and anxiety related to stress in association with impairment on quality of life warrants more research on alternative treatment rather than relying heavily on the prescription of medication (Healy& Thase, 2003; Fisher & Kalbaugh, 2012). Bond et al. (2007) recommends researchers operationalize their

alternative treatment and find a dose response so that the medical community can be informed to prescribe alternative therapy with confidence. Richard Usatine, who co-authored Yoga Rx with Larry Payne offering the framework for yoga therapy and this study is also a practicing physician who prescribes yoga therapy to his clients, recognizes yoga therapy as a professional discipline, and suggests that yoga therapists become recognized in the medical community for the standard of practice and care it provides (Usatine, 2007).

Major Sections or Themes

Yoga Therapy

IAYT (2015), Payne and Usatine (2009), Ramacharaka (1905), and Engel et al. (2007) provide theory and framework for restorative and gentle to moderate yoga instruction from the Hatha yoga tradition, the structure for yoga therapy and MBSR, including diaphragmatic breath, restorative yoga movement, and guided mindfulness meditation tools of relaxation. Aspects of the traditional yoga practice as applied to yoga therapy include full body-scan, visualization of healing using various guided imagery, and provide specification between the many different types and deliveries of yoga. Yoga therapy is client-centered in that his or her diagnoses, physical limitations, and subjective experience of symptoms are case conceptualized and specifically addressed with appropriate yoga breathwork, guided visualization, and restorative yoga movement, in order to administer yoga therapy effectively (IAYT, 2015).

Differentiating Yoga Therapy from Yoga

Larry Payne is the co-founder of IAYT and a pioneer in differentiating yoga

therapy from yoga. He is also instrumental in bringing yoga therapy to the western medical model by integrating yoga therapy into medical school curriculum with the help of Dr. Richard Usatine who co-directed the family medicine training program for interns and residents at UCLA (Payne & Usatine, 2009). In 1989, Payne and Usatine began defining the difference between yoga and yoga therapy for Western yoga practitioners driving the idea that the main difference between the two modalities is that Hatha yoga itself is a generalized set of instruction regardless of the individual, whereas yoga therapy addresses the specific and unique needs of the client depending on his or her physical pain, illness or psychological struggle. Yoga Rx (Payne & Usatine, 2009), call for practitioners to train in yoga therapy to differentiate themselves as yoga therapists from other types of yoga practitioners without the therapeutic focus and become accessible to those suffering and in need of alternative therapy to the western medical models.

Richard Miller is also a co-founder of IAYT who participated in a study with Englel et al. (2007), performed at the Walter Reed Army Hospital using active duty military personnel who met criteria for post-traumatic stress disorder (PTSD) to examine the effects of yoga therapy as a PTSD treatment. The main component of yoga therapy called Yoga Nidra, was administered through classes and a take home practice CD set. This component of yoga therapy is a type of meditation utilizing deep breathing and body scan techniques to reduce physical and emotional suffering by engaging the parasympathetic nervous system to achieve the relaxation response to facilitate physical and emotional relief. The study showed a trend of decreased PTSD symptoms and anecdotal feedback from participants that indicated increased length and quality of sleep,

better mood management, and greater feelings of empowerment. These contributions began the movement toward mindfulness in psychology and alternative medicine.

Mindfulness

Kabat-Zinn et al. (1985) and Kabat-Zinn et al. (1992) provide landmark research on the healing effects of mindfulness meditation on physical conditions and significant effect on improving mental health. This has evolved into Mindfulness Based Stress Reduction (MBSR) and includes yoga therapy interventions of restorative yoga and meditation to reduce pervasive stress and chronic pain and improve health outcomes.

Several researchers provide replications of mindfulness studies with various populations who report less aggravation and more comfort. For example, Ashcroft et al. (2012), explored mindfulness interventions with two groups of participants experiencing their first episode of psychosis or anxiety or a combination of both psychosis and anxiety. All participants had never practiced mindfulness before and were invited to practice mindfulness for sixty minutes per week over the course of twenty weeks. The participants reported improvements over four domains; using mindfulness, making sense of mindfulness and coping, relating to people differently, and increased self-understanding and acceptance. The authors suggested yoga and mindfulness could be a stand-alone intervention or integrated into Acceptance/Commitment Therapy (ACT) or Cognitive Behavioral Therapy (CBT) that are commonly used psychological interventions for this population (Ashcroft et al., 2012).

Early Studies

In an effort to build out the dearth of mindfulness meditation and yoga research over two and a half decades, several researchers both qualitative and quantitative provide replications of mindfulness meditation and yoga studies. Subjects with a wide range of physical or mental illnesses were studied and found to report less aggravation and more comfort. Many researchers used restorative yoga and mindfulness meditation similar to the MBSR model of Kabat-Zinn and yoga therapy model of IAYT. However, due to differences in their designs, similar outcomes were revealed for different populations but provided little insight into a clearly recommended prescription of yoga therapy for specific issues.

In the interest of examining the correlation between mindfulness and wellbeing empirically, Brown and Ryan (2003) offered a reliable and valid instrument, the MAAS, which measures the presence or absence of attention to and of what is momentarily occurring to assess differences and variation in mindfulness states. Mood, emotion, implicit and explicit psychological processes, and self-regulation can be measured. The MAAS provides support for the recommendation to cultivate mindfulness to enhance self-regulation and facilitate wellbeing outcomes.

Mindfulness studies began to use the MAAS for pre- and post-testing for other types of MBSR inspired pilot studies. Collard and Walsh (2008) offered Sensory Awareness Mindfulness Training (SAMT) as a method for balancing cognitive and emotional states of the brain. The study offered subjects who were not in pain or crisis an intervention for a better life/work balance. Subjects were coached for an hour, once per

week for 8 weeks, using sound meditation, breathing techniques, and a full body-scan. The MAAS results indicated a significant 16.8 % increase in mindfulness, which correlated with a significant decrease in stress at the end of 8 weeks.

A randomized control trial researched using traditional Kripalu or heart centered yoga, including mindfulness meditation, for an 8-week long intervention for 53 female subjects with fibromyalgia. Each intervention was practiced in a group one time per week for 120 minutes. This program included 40 minutes of gentle yoga stretches, 25 minutes of mindfulness meditation, 10 minutes of breathing techniques, 20 minutes of education on the applications of yoga, and 25 minutes of group discussion. The findings suggested a significant difference between the yoga and control groups in pain, depression, and anxiety (Carson et al., 2010). Hennard (2011) also explored the effects of yoga therapy on eleven participants with fibromyalgia over the course of 8 weeks to find a medium effect size in improvements on fibromyalgia symptoms overall but provided no control group or follow up.

Leymre and Lalande-Markon (2009) and Woodyard (2011) provide information on pervasive stress effects on cognitive faculties of distraction, rumination, and/or anxiety. Also, the effect of pervasive stress on the physical body is discussed. This includes somatic issues, illness, disease and/or pain. Behavioral capacities guiding decision-making is an associated factor. This includes maladjustment, impatience, frustration, and/or aggression. These effects on emotional balance is related to depression, negative world-view, negative thinking and/or unhappiness. This can also be associated with attrition rates common in the research across the literature.

The Hennard (2001) study suffered a 36% attrition rate in participants that was associated with fibromyalgic flare-ups hindering participant compliance. Naik et al. (2009), discusses dysfunctional decision and executive autonomy as the difficulties individuals face when pain or illness effects the internal decision making process as in adherence to treatment plans, interventions or coping. Delgadillo et al. (2014) discuss attrition factors as related to self-perceived improvement, which may either motivate or discourage an individual toward his or her goal. This could contribute to attrition rates in any research and certainly within this proposed study. Considering the influence of perception and self-regulation discussed by Baddeley (2000), Dickenson et al. (2013) and Orenstien et al. (2012) and smaller participant populations, attrition seems to have a relationship to the difficulty in finding a dose response.

As the literature grew, mindfulness and yoga studies spread to heterogenous psychiatric populations as in Bos et al. (2013). This study included 143 outpatients with five different diagnostic categories including, depressive disorder, bipolar disorder, anxiety disorder, adjustment disorder, and "other," which included psychotic disorder, personality disorder, and a mix of other diagnoses. All groups were trained in MBSR combined with MBCT for 8 weekly sessions each lasting 2½ hours. After each training session, subjects were given homework to practice their training for 45 minutes to an hour everyday. This included breathing, body scan, and gentle yoga movement adherent to the MBSR model but also included MBCT exercises such as integrating mindfulness into everyday activities and completing workbook activities including journals and written daily action plans. Results showed improved outcomes in all mixed subject

groups including increases in physical health, psychological health, social relationships, environment, mindfulness, and quality of life.

The literature continues to show multiple studies over multiple decades of different styles of yoga and meditation does have some effect on the physical and mental symptoms related to various types of pain and illness. However, the research continues to fail in providing a standard style of yoga and rate of practice to experience relief of symptoms and the medical community remains uninformed (Usatine, 2009).

Dose Response

Bond et al. (2007), Dimidjian and Segal (2015) and Ludwig, and Kabat-Zinn (2008) provide a strong recommendation for definitions of alternative interventions and more quantitative yoga and meditation research offering empirical evidence for an accurate dose response model. No clear path toward integrating CAMs into medical care have yet been found, which Usatine (2009) also suggests. Recommendations included researchers use larger participant groups, active control groups, better protocol adherence, and stronger definitions of interventions, in order to provide an evidence-based dose response.

Theoretical Foundation

Theory based on the Baddeley (2000), Orenstein, et al. (2012), and Dickensen, et al. (2013) on perception and attention, self-regulation, and emotional control, support the operational definition and basic tenets of yoga therapy. Brown, Rya,n and Creswell (2007) defined mindfulness as a meta-cognitive skill and correlates of mindfulness with attention and awareness including attentional flexibility, clarity, and stability. Discussion

of attention and attentional control (Baddeley, 2000), and its ability to alter or shape self-regulation, supports not only the concept of mindfulness inherent in yoga therapy but also the single subjects design in the collection of self-reports before, during and after the intervention. Discussion of perception and emotional control (Dickenson et al., 2013) lends support to the process of self-assessment, self-awareness and the objectivity or detachment included in yoga therapy (IAYT, 2015). Attention, perception, and self-regulation may shape an individual's commitment to the practice (Orenstein et al., 2012).

Conceptual Framework

The earliest seminal work dates to 1905 by Ramacharaka who brought the practice of yoga and mindfulness to the west (Ramacharaka, 1905). For the next 112 years his work would be reprinted and practitioners in the west began to see physical and emotional benefits though academic study; however, it did not gain a scientific audience until 75 years later with the work of Jon Kabat-Zinn who conducted cancer research using yoga and mindfulness to reduce pain in cancer patients (Kabat-Zinn et al., 1985; Kabat-Zinn et al., 1992). These studies discovered that yoga and mindfulness groups reported reduced stress, anxiety, and depression compared to control groups.

Jon Kabat-Zinn (1985) pioneered the concept of MBSR in the early 1980's. MBSR is based in Buddhist and Yogic traditions of developing consciousness, body awareness, and relaxation using meditation, breathwork, and gentle or restorative yoga (Kabat-Zinn et al., 1985; Kabat-Zinn et al., 1992). The International Association of Yoga Therapists was co-founded by Richard Miller and Larry Payne in the mid 1980s as a forum for yoga therapy education and certification, practice, and research (IAYT, 2015).

Yoga therapy is based on principals of Ramacharaka (1905) who brought therapeutic yoga to America. Connecting the work of these pioneers, offers the definition of yoga therapy, the continuing research efforts in support of the efficacy of yoga therapy, and the framework needed to proceed with further research to operationalize yoga therapy.

Measurement

A single subject multiple-baseline approach allows researchers to study participants in-depth across time. There are multiple-baselines that allow for scientific experimentation by adding and removing the treatment condition to determine significant changes in behavior (Creswell, 2013). Single-subject research is quantitative and a quasi-experimental method that allows the researcher to observe the behavior of a very small number of participants at multiple points across time (Creswell, 2013). By observing the participant at a pre-intervention point, a baseline can be established, which can then compare fluctuations in behavior before and after the intervention is implemented. A multiple baseline design introduces the intervention after different numbers of baseline sessions across participants at different points in time (Kazdin, 1982). By introducing the intervention at different points in time across participants, any resultant changes can be directly attributed to the intervention rather than to extraneous circumstances. When using a multiple baseline design, the researcher does not need to withdraw treatment in order to show treatment efficacy, thus removing many of the ethical concerns associated with other designs (Kazdin, 1982). This study hopes to contribute to the scientific body of knowledge by increasing the findings related to yoga therapy, and influence the medical community.

Summary and Conclusions

Overall, the literature shows that there is confusion about how to operationalize yoga therapy to address the symptoms of specific illnesses such as chronic pain, depression or anxiety (Bond et al., 2007; Dimidjian & Segal, 2015; Ludwig & Kabat-Zinn, 2008). There is a high prevalence of depression and anxiety (APA 2013; CDC 2012) causing impairment in quality of life to warrant attention to alternative therapy to overprescribed medication (Healy& Thase, 2003; Fisher & Kalbaugh, 2012). Evidently, there are numerous yoga and meditation studies that cover a wide and diverse population with various presenting issues using varying frameworks and methodologies (Ashcroft et al., 2012; Bos et al., 2013; Brown & Ryan, 2003; Carson et al., 2010; Collard & Walsh, 2008; Ford, & Hawke, 2012). The literature offers insight into the benefits of these alternative therapies but there is little empirical evidence to inform medical practitioners on the best practices for the prescription of yoga and meditation for specific illnesses.

Because there remains little agreement in research, among yoga practitioners, and in the medical community, on the operationalization and prescription of yoga therapy (Bond et al., 2007; Dimidjian & Segal, 2015) this study attempts to provide protocols for the delivery of yoga therapy, and a dose-response model to gain more clarity into how much yoga and meditation is needed for a clinical effect, particularly for subjects suffering from pain and related affective disorders. This study attempts to provide evidence that more frequent yoga therapy (three times per week) may help to better alleviate pain, depression and anxiety, stress, and increase quality of life than less frequent yoga therapy (once per week).

Chapter 3: Research Method

Introduction

The purpose of this study was to examine whether practicing yoga three times per week results in lower reported pain, depression, anxiety, stress and increase quality of life than when practicing yoga one time per week. A single subject design was used to analyze data provided by a wellness center specializing in yoga therapy treatment for individuals suffering from chronic pain and related depression and anxiety. Wellness center staff implemented a single-subject multiple baseline across participants design to evaluate treatment effects. All procedures were implemented by the wellness center's primary yoga therapist during standard operating procedures. Data were collected by the wellness center staff before, during, and after the intervention, and were provided to me for secondary analyses.

Participants included four adults dealing with pain and related affective symptoms. Dependent variables will consist of self-ratings from the *McGill Pain Questionnaire* (*MPQ*), *Beck Depression Inventory* (*BDI*), *Generalized Anxiety Disorder-7* (*GAD-7*), *the Psychological Stress Measure* (*PSM-9*) and Version 2 of the *Quality of Life Survey* (*QoL-2*). This chapter explains the research design, participants, setting, instrumentation, data collection, and analysis procedures that were utilized for this study. The study included two levels of the independent variable and the five dependent variables referenced above. The two levels of independent variable (IV) were the rate or dose of yoga therapy (once or three times per week) necessary to produce a difference in physical and affective symptoms experienced by the subject. The physical and affective

symptoms perceived by the individual; pain, depression, and anxiety, stress, and quality of life are the dependent variables (DVs).

Research Design and Rationale

Secondary data originally collected at a wellness center located in the western United States were analyzed. The wellness center utilized a multiple baseline across participants design to evaluate the efficacy of yoga therapy program for the treatment of pain-related depression and anxiety among patients with chronic pain. The data were collected independently by the wellness center and therefore contained less than optimal elements of single subject design methodology. Multiple Baseline/Parallel Treatment design across a four participants (two each at two levels of intervention intensity) is a type of single case design that involves multiple observations of two or more small groups of participants who begin treatment at various points in time. Weng and Lachenbruch (1996) suggested using multiple baseline designs to find a dose-response with multiple surveys at different intervals during treatment to track baselines and varying dosages until a maximum efficacy is determined. Because yoga therapy is not a drug measured in milligrams, the rate with which yoga therapy was practiced served as the independent variable. In this study the yoga therapy treatment, X, had two levels: X_1 = practiced yoga therapy once a week, X_2 = practiced yoga therapy three times a week. Single-subject design methodology is the most logical approach to study yoga therapy. This is because the number of individuals with chronic pain choosing yoga therapy for the treatment of pain-related depression and anxiety is limited. Multiple baseline research is widely used for intervention for demonstrating improvements within clinical

and educational settings (Gast & Leford, 2014). Horner et al. (2005) wrote that single-subject designs usually involve three to eight participants within a single study. Parallel Treatment design (Holcolmbe, Wolery, & Gast, 1994; Wolery & Gast, 1988) has been used for studies comparing the effects of two or more intervention strategies. For example, Leaf et al. (2013) used a parallel treatment design to compare discrete trials teaching one-to-one and small group formats with three participants per group. This study used similar strategies to interpret the data as Leaf and colleagues.

Population and Sample

The primary yoga therapist at the wellness center chose the selected sample. The sample was drawn from a population of adults ages 18 and over who were experiencing pain and pain related affective disorders. To qualify for the study, each participant completed survey measures to indicate his or her levels of , depression, anxiety, pain, perceived stress, and quality of life. Participants with the highest levels of depression, anxiety, pain, perceived stress and lowest quality of life were selected to participate. It was expected that two participants would practice yoga once per week while another two participants would practice three times per week. The sample consisted of those participants who have never before used yoga or meditation regularly to relieve their pain and affective symptoms.

Setting

The research site for this study was a yoga specific wellness center specializing in the administration of yoga therapy to adults with pain related affective disorders; depression, and anxiety in Las Vegas, Nevada. The wellness center treats approximately

100 people on a daily basis. Participants attended the wellness center for approximately 1 to 3 hours per week, depending on the severity of their symptoms, personal availability, and current treatment needs. All intervention procedures occurred during the course of normal treatment hours and were implemented by the primary yoga therapist at the center. All data collection occurred on site by the wellness center staff. The wellness center is a traditional Hatha yoga studio located in a commercial plaza in Las Vegas. For this intervention, the participants attended yoga therapy sessions with the primary yoga teacher who specializes in yoga therapy one to three times per week.

Instrumentation and Materials

Staff at the research site used measures to collect data on depression, anxiety, pain, perceived stress, and quality of life. By using the *Beck Depression Inventory* (*BDI*) data on levels of depression were collected. By using the *Generalized Anxiety Disorder-7* (*GAD-7*) data on anxiety levels were collected. By using the *McGill Pain Questionnaire* (*MPQ*), data on pain levels were collected. By using *The Psychological Stress Measure* (*PSM-9*) data on perceived stress were collected. By using Version 2 of the *Quality of Life Survey* (*QoL-2*) data on quality of life were collected. All baseline data were collected before treatment for seven days before the first yoga therapy intervention or the baseline phase, during the treatment phase at 4 weeks after the first yoga therapy intervention, and after treatment or the post-treatment phase at 8 weeks after the full intervention was completed.

Measurement

Beck Depression Inventory (*BDI*)

Beck, Steer, Ball, and Ranieri (1996) discussed that the *BDI* has undergone two revisions since its inception in 1961but has maintained its validity and reliability. The *BDI* was adapted once in 1983 adding items to assess the domains of sleep and eating and again in 1996 by adding items to assess psychomotor coordination and agitation, which accommodated the DSM revisions from the third to the fourth editions. Throughout the fifty-seven years the BDI has been used, it has always had adequate validity and reliability, showing Cronbach's alpha of .89 and .91, respectively for each revision, and continues to be the standard measure in clinical practice to assess depression in patients.

The *BDI* utilizes a Likert scale from zero to three to assess twenty-one items based on DSM criterion. Therefore, a score of 0 to 63 is possible. Scores of 0 to 13 indicates *minimal depression*. Scores of 14 to 19 indicate *mild depression.* Scores of 20 to 28 indicate *moderate depression*, and 29 to 63 indicate *severe depression*.

Generalized Anxiety Disorder-7 (*GAD-7*)

Spitzer, Kroenke, Williams, and Lowe (2006) created the *GAD-7* between 2004 and 2005 offering a faster more efficient measure to identify generalized anxiety in individuals. The *GAD-7* was developed using criterion from the Diagnostic and Statistics Manual fourth edition (DSM-IV) (2000), and items from the *PHQ-8* and *PHQ-9*, the Medical Outcomes Study Short form General Health Survey (SF-20) used by mental health practitioners to assess six dimensions of wellbeing, in addition to the *Symptoms Checklist-90*, a 12-item anxiety subscale, and the *BDI*. The seven items chosen for the

GAD scale were selected in order of rank using the correlations of each item assessed by 2739 patients. Analysis of covariance was used to assess construct validity, confirmatory analysis was used to assess factorial validity, and test-retest reliability was assessed using intraclass correlation. The *GAD-7* has excellent internal consistency with Cronbach's alpha of .92. Test-retest reliability is good with intraclass correlation of .83, which also indicates good procedural validity.

Each of the seven items on the *GAD* uses a Likert scale scored from 0 to 3; therefore, the score ranges are from 0 to 21. The seven items surveyed are nervousness, worry, rumination, relaxation, restlessness, irritability and fear. A score of 0 to 4 indicates *minimal anxiety*. A score of 5 to 9 indicates *mild anxiety*. A score of 10 to 14 indicates *moderate anxiety.* A score of 15 to 21 indicates *severe anxiety.*

***McGill Pain Questionnaire* (*MPQ*)**

The McGill Pain Questionnaire (MPQ) was developed in the mid 1970 nervousness, worry, rumination,Dallenbach in the 1930n . The initial *MPQ* used a list of 44 words describing pain to classify its different varieties, qualities, dimensions, and aspects (Melzack, 1983). The *MPQ* is currently a list of 102 words related to pain, compiled from clinical documentation of hospitalized patients with pain. The *MPQ* is divided into three classes and 16 subclasses to distinguish the differences in the pain experienced by the patient. The classes are sensory, with subclasses temporal, spatial, four types of pressure, thermal, brightness, dullness, miscellaneous; affective, with subclasses tension, fear, punishment, autonomic, miscellaneous and evaluative, with subclasses of the intensity of total pain experience (Melzack, 1983).

A numeric scale from 0 to 5 or least to worst is used to rate pain. The classes and subclasses of pain are described as 0 = none 1 = mild, 2 = discomforting, 3 = distressing, 4 = horrible and 5 = excruciating to indicate intensity. Present pain intensity (PPI) is determined by adding the mean value scores of the words and the number of words chosen. Pain rating index (PRI) is obtained by the rank value of the words, and number of words chosen, added up within each class and subclass. Earlier studies showed strong correlations between PRI scores based on rank and scale values so the rank value procedure became the standard procedure used. Summing the rank order intensity value and dividing by the total possible score of the given dimension yields values ranging from 0 to 1. Zero indicates the patient used no words to describe pain and 1 indicates the patient used all the highest-ranking descriptors (Melzack, 1983).

This scale, when administered before and after a pain management intervention, can offer a strong gauge of change in the experience of pain by calculating a pain ratio. The pain ratio can be determined by dividing the post session rating by the sum of the pre and post session ratings. The *MPQ* has been used consistently until the present day, offering strong validity and reliability (Melzack, 1983). The questionnaire can be completed in 5 minutes, has a visual drawing of the body, and is simple and accessible to patients. For this studyTh purposes of dividing participant groups by their levels of pain, the *MPQ* provides easy differentiation among the participant pool.

***Psychological Stress Measure* (*PSM-9*)**

The *Psychological Stress Measure* (*PSM-9*) (Lemyre & Lalande-Markon, 2009) will be used to measure clients' level of pervasive stress giving an indication into their level of wellbeing before, during, and after treatment. The *PSM-9* is a validated tool used to measure stress and to evaluate the effectiveness off the intervention. It was derived from the need to approach the whole client from a biopsychosocial perspective during physical therapy sessions to broaden the existing medical model, which left out the psychological factors during diagnosis and intervention. Lemyre and Lalande-Markon (2009) provided content validity by quantitative analysis of items selected as the best indicators of stress, also provides tests for internal consistency, retaining the indicators that had inter-item and item-total correlations of between .35 and .85 and a Cronbach's alpha of .95, in addition to showing test-retest reliability of .68 to .80. Also, Lemyre and Lalande-Markon validated the *PSM-9* by comparing groups from different socioeconomic status, during different times of year, and with various health prognoses.

Finally, classic depressive and anxiety scales are used to establish convergence validity and distinct factorial scores from those scales were used to find divergence validity and the *PSM-9* has been used internationally to provide data on client stress for clinical practice.

Quality of Life Survey (*QoL-2*)

Gill et al. (2011) created the *QoL-2* as a measure for positive health promotion programs such as this yoga therapy study. Quality of life is defined by Gill et al., based on the World Health Organization's (WHO) broad model of "subjective multidimensional integrative construct that reflects optimal well-being and positive health" (p. 185). Gill et al., also break down WHO's general model into specific components including five assessment items of physical, emotional, social, spiritual, mental health, and well-being. Item development, statistical analyses, and confirmatory factor analyses confirm clear multidimensionality and that the *QoL-2* has sufficient psychometric properties for use in research (p. 201). Internal consistencies for all measures have a Cronbach's alpha of .85 and total item correlations were .60. Gill et al's research took 4 years and was completed in three phases, taking a top down approach, narrowing and adapting a broad seventy question model into the integrated thirty-question survey. Both the *PSM-9* and the *QoL-2* utilize self-report via Likert scales.

Data Collection

Establishing the Baseline

Similar to previous dose response research, the research site utilized a multiple baseline across participants design; therefore, baseline data were collected for each

participant over separate weeks with no two students starting or ending at the same time. According to the studio, each participant started baseline at different times during a 2-month period. The intervention phase for each participant began upon completion of baseline and therefore began at different times for each participant. For example if participant 1 collected baseline data between January 8th and 14th, they began their first class the week of January 15th and continued either once or three times per week for the following 8 weeks, ending March 5th. All data were collected by the wellness center staff. No data were provided to me by the wellness center prior to gaining approval from Walden University's Institutional Review Board (IRB).

Following Walden IRB approval, the wellness center allowed me access to information on the measures of depression, anxiety, pain, perceived stress, and quality of life. Baseline data were collected for 7 days before the first yoga therapy intervention to ensure a stable baseline had been established. The two levels of the independent variable were conducted via two participant groups, one or three sessions per week during the treatment phase of the study. Data for all phases of this study were collected during the course of the wellness center's standard operating procedures.

During the baseline phase, the primary yoga teacher specializing in yoga therapy issued each above described measure and ratings were collected to establish an average score on depression, anxiety, pain, perceived stress, and quality of life. Averages were calculated across participants and graphs were created for each participant individually to evaluate patterns. For each group there were two participants per group (one session per week versus three sessions per week) that were compared once the data were presented to

this student researcher for secondary analysis. Treatment phase sessions occurred at a regular time each week that was convenient to each participant.

Treatment Phase

The treatment phase for this study included the period of time when the participants were exposed to yoga therapy intervention. Immediately following completion of the baseline, data collection for the yoga therapy treatment phase began. All participant's treatment sessions began after 7 days of baseline collection and regular yoga therapy instruction continued for 1 or 3 days per week for each participant group.

During the treatment phase, the primary yoga teacher specializing in yoga therapy administered the yoga therapy intervention for each session. The yoga therapy intervention ran for 60 minutes. The primary yoga therapist guided the participants verbally in a series of restorative yoga movements or poses and in guided imagery to illicit a relaxation response. The primary yoga teacher specializing in yoga therapy only provided prompts to redirect the client's precision at executing the yoga movements or poses as necessary (i.e., "activate your right heel by flexing your foot…good, there you go."). The treatment phase continued in this way for 8 weeks. Scores were collected on the *BDI*, *GAD-7*, *MPQ*, *PSM-9*, and *QoL-2*, measures at the fourth week of practice and at the end of eight weeks, posttreatment, and were documented.

Research Questions and Hypotheses

Treatment Phase Research Questions and Hypotheses

Research Question: How often does one need to practice yoga therapy to decrease pain, depression, anxiety or stress and to increase quality of life?

The treatment phase data is presented in Chapter 4 and used to determine if hypotheses 1 through 5 were accepted.

RQ 1: To what extent does rate of practicing yoga therapy relate to depression?

$H_0$1: Participants who practice yoga three times per week are predicted to report the same number of symptoms of depression as those who practice once per week.

$H_1$1: Participants who practice yoga three times per week are predicted to report fewer symptoms of depression than those who practice once per week.

RQ 2: To what extent does rate of practicing yoga therapy relate to anxiety?

$H_0$2: Participants who practice yoga three times per week are predicted to report the same number of symptoms of anxiety as those who practice once per week.

$H_1$2: Participants who practice yoga three times per week are predicted to report fewer symptoms of anxiety than those who practice once per week.

RQ 3: To what extent does rate of practicing yoga therapy relate to pain?

$H_0$3: Participants who practice yoga three times per week are predicted to report the same number of symptoms of pain as those who practice once per week.

$H_1$3: Participants who practice yoga three times per week are predicted to decrease symptoms of pain more than those who practice once per week.

RQ 4: To what extent does rate of practicing yoga therapy relate to perceived stress?

$H_0$4: Participants who practice yoga three times per week are predicted to report the same number of symptoms of perceived stress as those who practice once per week.

$H_1$4: Participants who practice yoga three times per week are predicted to report fewer symptoms of perceived stress than those who practice once per week.

RQ 5: To what extent does rate of practicing yoga therapy relate to quality of life?

$H_0$5: Participants who practice yoga three times per week are predicted to report the same degree of quality of life as those who practice once per week.

$H_1$5: Participants who practice yoga three times per week are predicted to report a higher quality of life more than those who practice once per week.

Secondary data were provided by the wellness center's primary yoga teacher specializing in yoga therapy and provided to me who analyzed the data following the conclusion of the intervention. These data were intended to inform future research and potentially improve internal validity.

The wellness center's primary yoga teacher specializing in yoga therapy indicated that the goal of the baseline phase had been to achieve a stable baseline that fell within 10-20% of the mean. Graphs were provided allowing for a visual representation of the impact of the intervention both within and across treatment phases. The effect sizes of these changes were measured using a confidence interval of 95%. Cohen's *d,* was used to evaluate effect size, and was calculated by subtracting two means and then dividing them by the sum of their standard deviations (Kazdin, 1982). Cohen's *d* was identified between the participant's baseline and treatment phases, as well as between the baseline and post-treatment phase. Cohen's *d* and other measures of standard mean difference are considered to be an appropriate statistic to use in single subject research (Olive, & Franco, 2008).

According to the agreement, all the wellness center protocol forms were provided by the primary yoga teacher specializing in yoga therapy. In addition, the wellness center owned, protected, stored, and maintained all completed protocols and all written reports. The wellness center provided permission to utilize the data for this study. All participant, identification was removed. Participants received a unique numerical identification for data coding.

All data were collected during the course of standard operating procedures, meaning that the participants did not endure any additional expenditure of treatment time. All procedures were conducted at the wellness center, to ensure that participants did not incur any additional travel time or expense.

The staff at the research site was provided with the contact information of all the individuals on the research committee in order to facilitate communication between the research site and research committee. No compensation was offered to the participants within this research. As requested, a copy of the final dissertation will be provided to the participants, so that information regarding the final outcome of the intervention could be potentially incorporated into future intervention plans.

Research Limitations

One limitation of this research is that the participants were adults between the ages of 18 and 69 years. Each participant may or may not have had a history of trials of different pharmacological solutions for their symptoms. Participants may or may not have had attempted psychological counseling. These differences may or may not have limited the generalization of the results.

Other limitations include factors beyond the research site's control, which potentially influenced results. Each participant may have had different stressors outside of their practice or other habits or coping strategies to relieve their stress such as a regular diet, regular exercise regime or family support. To limit the possibility of environmental differences, participant were instructed not to introduce anything new into their daily functioning outside of the yoga therapy intervention.

Protection for Participants and Privacy

In order to maintain the highest level of rights and protection, this study obtained permission from the Institutional Review Board of Walden University. All data are archival and no participant was or can be identified. All data were coded and stored securely. All hard copies provided to this researcher were destroyed once coded. All test databases were expunged at the end of each corresponding school year. Original protocols (paper records) were secured by the wellness center. Consistent with legal and regulatory requirements, as well as ethical standards (e.g., Ethics Code, Standard 6.02; HIPAA Privacy and Security Rules), procedures were in place to limit access of records to me.

Data were stored indefinitely in a password protected computer program. In order to safeguard the archived data and address concerns of confidentiality and protection from harm, the above procedures were closely followed.

Summary

Chapter 3 delineated the specific procedures of this research. This study analyzed de-identified secondary data provided by the wellness center that specializes in yoga

therapy for clients with chronic pain and related depression or anxiety. All data were collected by staff at the wellness center. A single subject multiple baseline design were utilized by the wellness center staff with two participants in each level of the independent variable, practicing yoga therapy one or three times per week. The wellness center primary yoga teacher specializing in yoga therapy selected appropriate participants based on the inclusion criteria described above. Treatment occurred within the course of standard operating procedures and was fully implemented by the wellness center staff members. A baseline of behavior was established for the first 7 days before the first yoga therapy intervention, during the baseline phase, followed by the implementation of a treatment phase that included a yoga therapy intervention for the two levels of independent variable comprised of two groups, one group practicing yoga therapy one time per week and one group practicing yoga therapy three times per week. A pretest/posttest evaluation was given to both participants and raters to measure potential improvement following the study. Cohen's *d* was used to establish effect sizes, and graphs were provided as a visual representation of changes that occurred throughout baseline, treatment, and post treatment phases. Participants provided assent and consent, respectively, and precautions were taken to protect all parties involved. Data were provided to me by the wellness center staff following the conclusion of the yoga therapy treatment program for analyses of secondary data. Findings from the research were provided to the wellness center, so that future clients may benefit from any positive treatment effects that may be established. The results of this research will be discussed in Chapter 4.

Chapter 4: Results

Introduction

Yoga and meditation have been shown as effective CAMs for cases of anxiety and depression related to chronic illness and/or chronic pain (Kabat-Zinn et al., 1985; 1992; Wolsko, Eisenberg, Davis, & Phillips, 2004). However, there is little agreement in how to operationally define the delivery of yoga and meditation interventions, evidence-based protocols and algorithms for the delivery of yoga and meditation interventions do not currently exist (Bond et al., 2007; Dimidjian & Segal, 2015), and there is confusion about how to operationalize effects of yoga and meditation for specific illnesses (Bond et al., 2007; Dimidjian & Segal, 2015; Ludwig & Kabat-Zinn, 2008). How to prescribe yoga and meditation as a medical treatment remains unclear (Bond et al., 2007; Dimidjian & Segal, 2015) and providing the medical community with evidence-based material has been shown to lead to greater acceptance and endorsement of CAMs for the treatment of patients suffering from such disorders as chronic pain, depression and anxiety (Bond et al., 2007; Dimidjian & Segal, 2015)

The purpose of this research was to define the terms of therapeutic yoga and meditation, providing protocols for its delivery as intervention, and examine the differences in the rate at which yoga therapy is practiced in relation to measures of pain, anxiety, depression, perceived stress, and quality of life. This study attempted to operationalize yoga therapy by finding the optimal dose. Specifically, the goal was to identify the rate of practice, either one time per week or three times per week, to find the more beneficial dose of yoga therapy for improvement of symptoms among participants

suffering pain and affective disorders such as anxiety and depression (Bond et al., 2007). Secondary data collected by a wellness center were analyzed after the conclusion of the 8-week treatment. Surveys were collected for a week to establish baseline before treatment, again mid- and posttreatment. It was hypothesized that participants who practiced yoga three times per week would report less symptoms of depression, anxiety, pain, and perceived stress, in addition to report a higher degrees of quality of life, than those who practice once time per week.

Split plot ANOVA or mixed-design analysis of variance was utilized to observe repeated measures or within-subjects and between-subjects factors among each participant, across both groups and across each independent variable. The surveys provided for secondary analysis included incomplete data sets provided by several participants, therefore split plot ANOVA could account for this and did not produce any significant findings. In addition, data were graphed and patterns of data presented.

This chapter will summarize the findings of these data. Methods of data collection will be detailed, including the time frame for data collection and response rates. Descriptive and demographic characteristics of the sample will be examined. A summary of the results will follow, including tables and figures to provide pictorial representation of the findings.

Description of Sample

The yoga therapist providing the treatment chose middle age to older female adults to participate whom were new to the clinic and had not used yoga therapy before to

address depression, anxiety, pain, stress, or quality of life. Participants received services between June and December of 2018. The three participants chosen for each group had to: (a) be willing to commit to practice yoga therapy once or three times per week; (b) have been experiencing symptoms of either depression, anxiety, pain, stress or seeking a better quality of life; and (c) be willing to participate in multiple self assessments over the course of 8 weeks.

The sample selected included six Caucasian, female adults all between the age of 33 and 69 years. The sample demographics of participants are provided in Table 1. All six participants agreed to the criterion above. All six participants received yoga therapy with the same yoga therapy provider at the same wellness center.

Table 1:

Participant Demographics

Participant	Gender	Age	Ethnicity
Participant 1	Female	41	Caucasian
Participant 2	Female	46	Caucasian
Participant 3	Female	33	Caucasian
Participant 4	Female	69	Caucasian
Participant 5	Female	42	Caucasian
Participant 6	Female	38	Caucasian

Analysis of the Data

Variables

The aim of this research was to identify baselines before and differences in levels of depression, anxiety, pain, perceived stress, and quality of life after yoga therapy treatment in a sample of six individuals in two groups, one practicing yoga therapy once per week and one group practicing three times per week. The independent variable was the yoga therapy treatment with two levels, practicing one or three times per week. The five dependent variables were depression, anxiety, pain, perceived stress, and quality of life based on participant self-rating surveys. The participant's raw scores were statistically analyzed using split plot ANOVA or mixed-design analysis of variance to find significant differences among repeated measures of within-subjects and between-subjects factors for each participant, across both groups and across each independent variable. The split comparisons of baseline means with midpoint means within each independent variable are provided in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, and Figure 6.

Depression

The first research question examined whether yoga therapy had an effect on the participant's reported symptoms of depression. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of depression as those who practice once per week as measured by The Beck Depression Inventory. Averages of baselines for both groups,

Group 1 (*n* = 2, *m* = 23.98, *SD = 2.0)* and Group 2 (*n* = 3, *m* = 18.34, *SD* = 13.28) were compared with mid-intervention data points were compared with mid-intervention means, Group 1 (*n* = 2, *m* = 29.5, *SD* = 17.67) Group 2 (*n* = 3, *m* = 11.6, *SD* = 5.5). The graph depicts a decrease in depression for both groups. Group 1, the blue line indicates the participant group practicing yoga once per week. Group 2, the red line indicates the participant group practicing yoga therapy three times per week. The at the end of the 8-week treatment, there is a downward trend indicating lower levels of reported depression symptoms. This is in alignment with the existing literature, however, these differences between the two groups were found to be non-significant in a test of within subjects effect (*F* = 2.15, *p* = .239). Nonsignificance of the decrease in depressive symptoms over the course of 8 weeks between the two groups can be associated with the small number of participants.

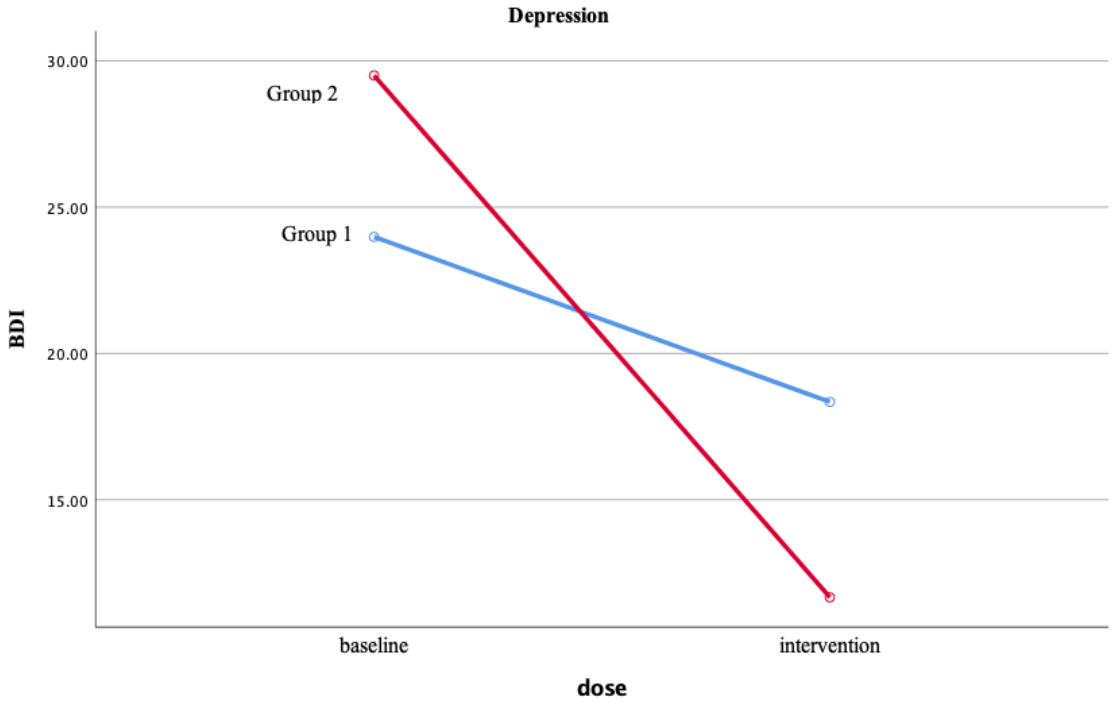

Figure 1. Comparison between two groups depression symptoms.

Anxiety

The second research question examined whether yoga therapy had an effect on the participant's reported symptoms of anxiety. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of anxiety as those who practice once per week as measured by The General Anxiety Disorder-7. Averages of baselines for both groups, Group 1 (n = 2, m = 14.32, SD = *2.15)* and Group 2 (n = 1, m = 19.57, SD = 0) were compared with mid intervention means, Group 1(n = 2, m = 13, SD = 7) and Group 2 (n = 1, m = 7, SD = 0). The graph shows group 1, the blue line indicating the group of participants that practiced yoga therapy once per week, depicts an upward trend illustrating an increase in anxiety.

Group 2, the red line indicating the group of participants that practiced yoga therapy three times per week depicts a downward trend illustrating a decrease in reported level of anxiety in data collected at the end of the 8-week treatment. However, these differences were found to be non-significant in a test within subjects effect (F = .004, p = .958). This was most likely due a small number of participants, having incomplete comparison data provided from participants in both groups, attrition, or other uncontrollable factors.

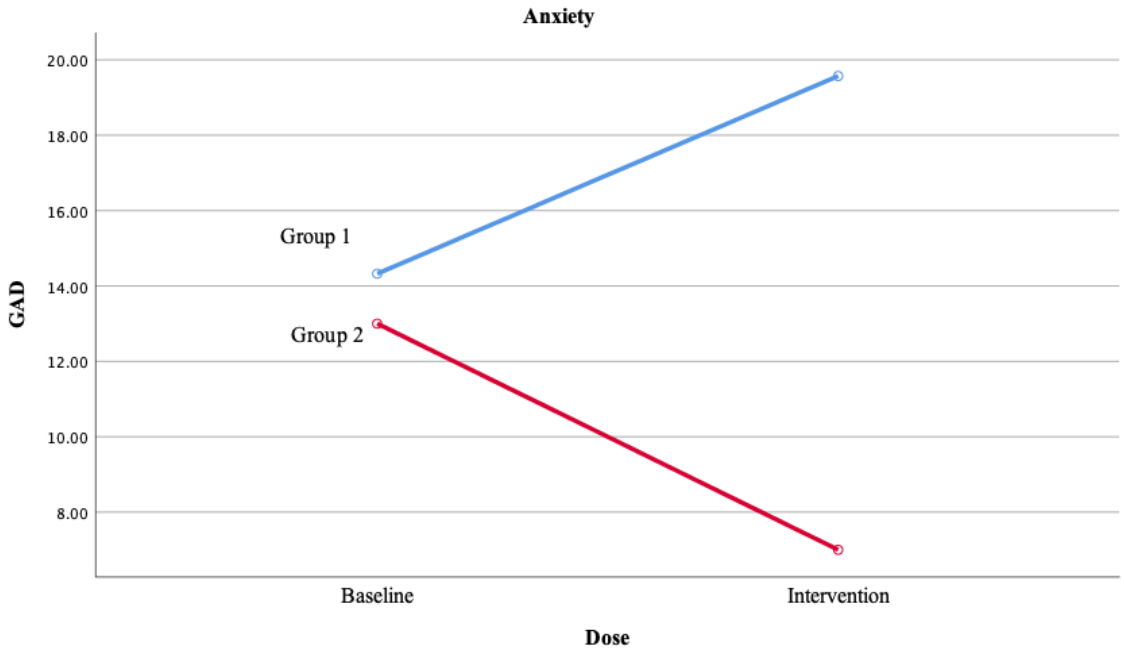

Figure 2. Comparison between two group's anxiety symptoms.

Pain

The third research question examined whether yoga therapy had an effect on the participant's reported symptoms of pain. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of pain as those who practice once per week as measured by The

McGill Pain Questionnaire. Averages of baselines for both groups, Group 1 (*n* = 2, *m* = 11.60, *SD* = *.85)* and Group 2 (*n* = 1, *m* = 18.71, *SD* = 0) were compared with mid-intervention means, Group 1 (*n* = 2, *m* = 11.5, *SD* = 4.94*)* and Group 2 (*n* = 1, *m* = 7, *SD* = 0) . The graph depicts an upward trend or increase in pain in Group 1 the red line indicating the group of participants practicing yoga therapy once per week. The graph depicts a downward trend illustrating a decrease in pain in Group 2, the red line indicating the participant group practicing three times per week from data collected at the end of the 8-week treatment. However, these differences were found to be non-significant in a test within subjects effect (*F* = .270, *p* = .695). This was most likely due to the small number of participants, having incomplete comparison data provided from participants in both groups.

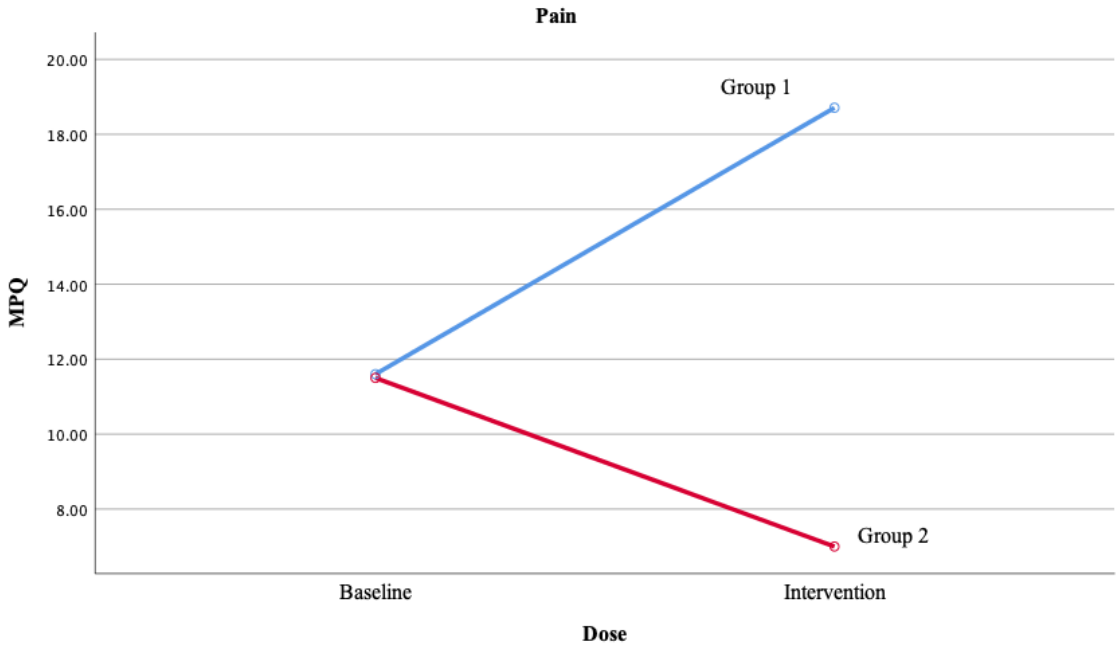

Figure 3. Comparison between two group's pain symptoms.

Perceived Stress

The fourth research question examined whether yoga therapy had an effect on the participant's reported symptoms of perceived stress. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of perceived stress as those who practice once per week as measured by The Psychological Stress Measure-9. Averages of baselines for both groups, Group 1 (*n* = 2, *m* = 50.5, *SD* = .70*)* and Group 2 (n = 2, *m* = 53, *SD* = 4.24) were compared with mid-intervention means, Group 1 (*n* = 2, *m* = 27.5, *SD* = 27.5*)* and Group 2 (*n* = 2, *m* = 36, *SD* = 18). The graph depicts an upward trend or an increase in perceived stress in Group 1, the blue line indicating the group of participant practicing yoga therapy once per week and in Group 2, the red line indicating the participant group practicing yoga therapy three times per week from data collected at the end of the 8-week treatment. However, these differences were found to be non-significant in a test within subjects effect (*F* = .184, *p* = .709). This was most likely due to the small number of participants, having incomplete comparison data provided from participants in both groups.

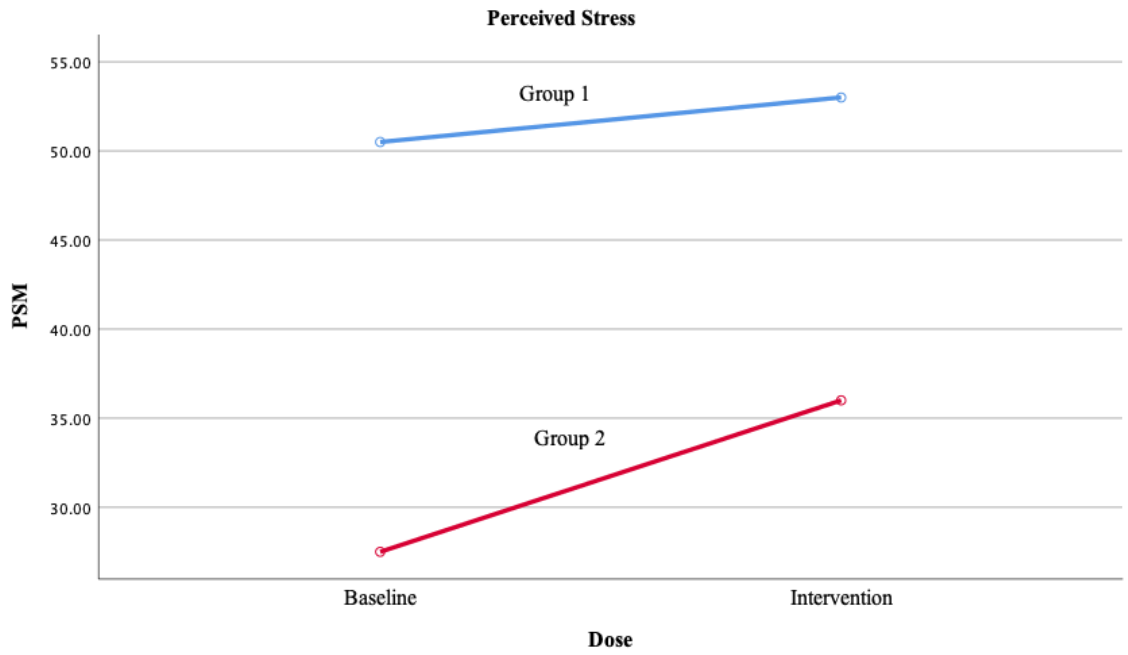

Figure 4. Comparison between two group's perceived stress symptoms.

Quality of Life

The fifth research question examined whether yoga therapy had an effect on the participant's reported degree of quality of life. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower degree of quality of life as those who practice once per week as measured by The Quality of Life-2. Averages of baselines for both groups, Group 1 (n = 2, m = 90.5, SD = .70*)* and Group 2 (n = 3, m = 81, SD = 10.5) were compared with mid-intervention means, Group 1 (n = 2, m = 70.5, SD = 13.4*)* and Group 2 (n = 2, m = 88.3, SD = 3.5). The graph depicts Group 1, the blue line indicating the group of participants practicing yoga therapy once per week, showing a down ward trend or decrease in quality of life. Group 2, the red line indicating the group of participants practicing yoga therapy three

times per week illustrates an increase in quality of life in from data collected at the end of the 8-week treatment. However, these differences were found to be non-significant in a test within-subjects effect (F= .597, p = .496). This was most likely due to the small number of participants, having incomplete comparison data provided from participants in both groups.

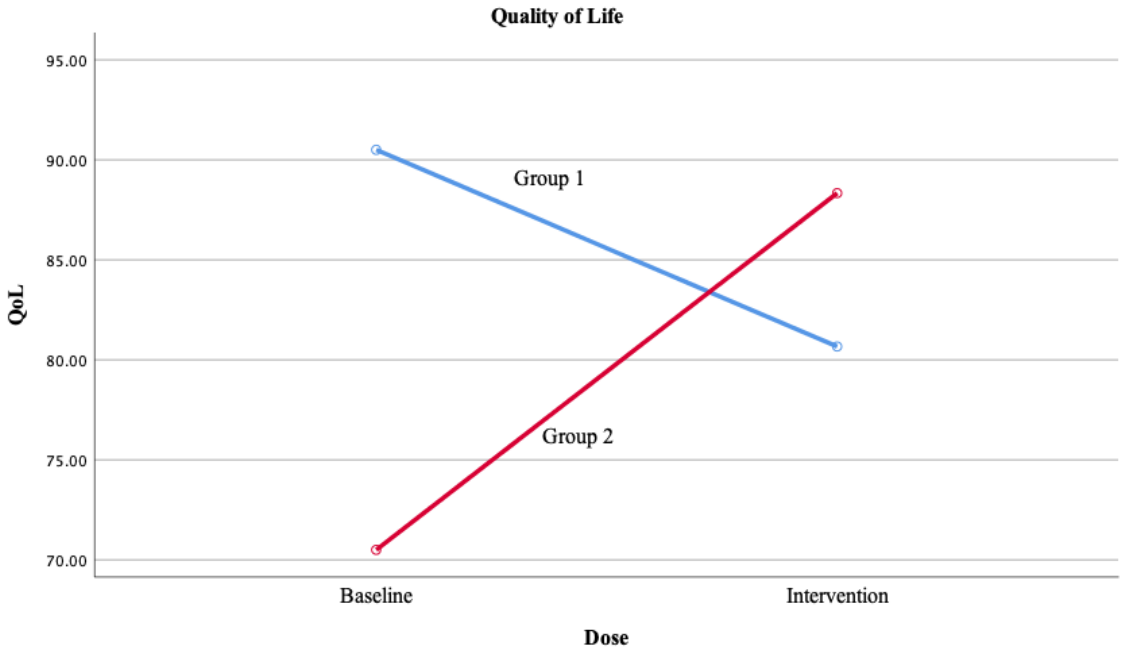

Figure 5. Comparison between two group's quality of life levels.

Conclusion

Secondary analyses of data provided to the student researcher contained within this chapter did not supported the research questions and hypotheses that were identified for this research project. The results for all six participants displayed varying levels of depression, anxiety, pain, perceived stress and quality of life with non-significant differences. Therefore no conclusions on recommended dosage of yoga therapy can be made.

Chapter 5 will summarize the entire research project, outline the limitations of the study, and provide recommendations for future research within in the fields of psychology and complementary alternative medicine.

Chapter 5: Discussion

Introduction

The two objectives of this study were to operationalize yoga therapy and to provide protocols for its delivery as intervention for reducing pain, anxiety, depression, perceived stress, and increasing quality of life of an individual. Another objective was to find a dose response by examining the differences in the rate at which yoga therapy is practiced in relation to measures of pain, anxiety, depression, perceived stress, and quality of life it has on the individual. To meet these objectives, operational definitions were developed and secondary data obtained from a yoga therapist who provided yoga therapy at a wellness center, specializing in providing therapeutic yoga, and who collected the data. Data were subsequently provided to me for secondary analyses where a single subject multiple baseline across participant approach was utilized to observe repeated measures or within-subjects and between-subjects factors among each participant, across both groups and across each independent variable. The therapist from the wellness center utilized the Psychological Stress Measure (PSM-9), Beck Depression Inventory (BDI), Generalized Anxiety Disorder-7 (GAD-7), McGill Pain Questionnaire (MPQ), Quality of Life Survey (QoL-2).

Chapter 5 provides a summary of the results presented in the previous chapter, including the demographics of six Caucasian, female adults all between the age of 33 and 69 years who were willing to commit to practice yoga therapy once or three times per week and who had been experiencing symptoms of either depression, anxiety, pain, stress or seeking a better quality of life. Also included are baselines and differences between

the two groups in reported levels of depression, anxiety, pain, perceived stress, and quality of life before and after yoga therapy treatment were implemented among the six individuals in the two groups, one practicing yoga therapy once per week and one group practicing three times per week. Interpretations of the effect of yoga therapy on depression, anxiety, pain, perceived stress, and quality of life for each participant are discussed and limitations of the study identified. Areas of future research that may address these limitations are also included. Finally, the chapter concludes with an exploration of the impact of the social change possible utilizing yoga therapy on individuals with depression, anxiety, pain, perceived stress, and a reported lower quality of life as an alternative or complementary therapy to the current medical approach.

Summary of Results with Interpretations

Overview of Results

Multiple surveys provided by the wellness center were further analyzed by this researcher utilizing split plot ANOVA, or mixed-design analysis of variance, to observe repeated measures or within-subjects and between-subjects factors among each participant, across both groups and across each independent variable. The surveys provided for secondary analysis included incomplete data sets provided by several participants, split plot ANOVA could account for this and did not produce any significant findings. Therefore, no conclusions on recommended dosage of yoga therapy can be made, however the figures generated indicate there were differences between the groups.

Figure 1 indicates that both groups reported decreases in depression symptoms practicing yoga therapy both once and three times per week. Figure 2 indicates an increase in reported anxiety symptoms within group 1 who practiced once per week, but a decrease in anxiety symptoms within group two who practiced yoga therapy three times per week. Figure 3 indicates that Group 1 reported an increase of pain practicing yoga therapy one time per week while Group 2 practicing three times per week reported a decrease in pain. Figure 4 indicates an increase of perceived stress reported by both groups 1 and 2. Figure 5 indicates that Group 1 who practiced yoga therapy once per week reported a decrease in quality of life while Group 2 who practiced three times a week reported an increase in quality of life. These differences are discussed further in the limitations section of the chapter. Though the tables provided in this chapter illustrate a decrease in reported depression symptoms after the 8-week intervention, the results indicate no statistically significant difference between the groups across all variables. This will be discussed later in the chapter.

The yoga therapist providing the treatment chose middle age to older female adults to participate who were new to the clinic and had not used yoga therapy before to address depression, anxiety, pain, stress, or quality of life. Participants received services between June and December of 2018. The three participants chosen for each group had to: (a) be willing to commit to practice yoga therapy once or three times per week; (b) have been experiencing symptoms of either depression, anxiety, pain, stress or seeking a better quality of life;and (c) be willing to participate in multiple self-assessments over the course of 8 weeks.

The sample selected included six Caucasian, female adults all between the age of 33 and 69. Data were collected daily during the first week before yoga therapy practice commenced so a baseline was achieved. For each participant, the intervention was implemented after 7 days of baseline data collection for each participant. Only two of the six participants provided a full set of baseline data across all independent variables.

The intervention phase lasted 8 weeks each participant participating in an hour of yoga therapy either once or three times per week. The intervention data were collected at week 4 of the 8 weeks once the baseline data were completed. These scores determined each participants level of depression, anxiety, pain, stress, or quality of life and are discussed further below.

Depression

The first research question examined whether yoga therapy had an effect on the participant's reported symptoms of depression. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of depression as those who practiced once per week as measured by The Beck Depression Inventory. Results indicated a decrease in depression for both groups at the end of the 8-week treatment. This is in alignment with the existing literature, however, these differences between the two groups were found to be non-significant and may be associated with the small number of participants and other limitations discussed further in the Limitations section of this chapter.

Anxiety

The second research question examined whether yoga therapy had an effect on the participant's reported symptoms of anxiety. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of anxiety as those who practice once per week as measured by The General Anxiety Disorder-7. Results indicated an increase in anxiety in Group 1 who practiced yoga therapy once per week and a decrease in anxiety in Group 2 who practiced yoga three times per week. These results were also found to be non-significant and most likely due a small number of participants, having incomplete comparison data provided from participants within both groups, attrition, or other uncontrollable factors discussed in the Limitations section of this chapter.

Pain

The third research question examined whether yoga therapy had an effect on the participant's reported symptoms of pain. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of pain as those who practice once per week as measured by The McGill Pain Questionnaire. Results indicated an increase in pain in Group 1 who practiced yoga therapy one time per week and a decrease in pain in Group 2 who practiced yoga therapy three times per week from data collected at the end of the 8-week treatment. Non-significant results for pain measures are too, likely due to the small number of participants, having incomplete comparison data provided from participants in both groups discussed further in the Limitations section of this chapter.

Perceived Stress

The fourth research question examined whether yoga therapy had an effect on the participant's reported symptoms of perceived stress. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower number of symptoms of perceived stress as those who practice once per week as measured by The Psychological Stress Measure-9. Results indicated an increase in perceived stress in Group 1 and in Group 2 from data collected at the end of the 8-week treatment. These results are also non-significant, likely due to the small number of participants, having incomplete comparison data provided from participants in both groups further discussed in the Limitations section of this chapter.

Quality of Life

The fifth research question examined whether yoga therapy had an effect on the participant's reported degree of quality of life. In order to reject the null hypotheses for the treatment phase research question, the participant must have indicated a higher or lower degree of quality of life as those who practice once per week as measured by The Quality of Life-2. The results indicated a decrease in quality of life in Group 1 who practiced yoga therapy once per week and an increase in quality of life in Group 2 who practiced three times per week from data collected at the end of the 8-week treatment. These results were also found to be non-significant, most likely due to the small number of participants, having incomplete comparison data provided from participants in both groups further discussed in the Limitations section of this chapter.

Implications of Results

Taking the results summarized thus far as a whole, it seems reasonable to conclude that data showed non-significant changes from baseline to treatment phase. This study aimed to contribute to the scientific body of knowledge regarding the use of yoga therapy, specifically within a population with higher degrees of depression, anxiety, pain, stress, or a lower degree of quality of life. These differences observed in this research study is not consistent with previous research, which has also shown a significant reported decrease in depression, anxiety, pain, and perceived stress symptoms (Angell, 2009; Fisher & Kalbaugh, 2012; Frances, & Nardo, 2013; Healy, & Thase, 2003; Kabat-Zinn et al, 1985; McHenry, 2006). Yoga, meditation, and other CAMs have been shown to improve depression, anxiety, pain, stress, or quality of life. The discrepancies between this research study and previous studies are associated with the limitations discussed in the upcoming section, including homogenic versus hetrogenic sampling, differences in delivery according to yoga therapy recommendation, attrition, test taking fatigue, and other extrinsic factors that cannot be controlled.

Limitations

Several significant limitations were found within this research. First, internal validity could have been stronger with a more symptomatically homogenous sample. The ethnic background, age, and gender of each participant was not at all diverse potentially hindering the external validity or generalizability of the results. Second, the focus of the study was multifaceted in attempting to operationalize yoga therapy and explore dosage utilizing a small group of participants that did not adhere to all the requirements. This

brings us to the topic of the instrumentation used to collect data and deliver the intervention. This included five daily surveys to be filled out over the course of 7 days, then again at week 4 and again at week 8, totaling 45 surveys for each participant to take by the end of a fully completed study. This presented many opportunities for extrinsic factors such as test taking fatigue, personal scheduling, conflicts over the course of 8 weeks, personal attention and perception challenges to maintain a practice, attrition or developing an at-home practice or engaging in other habits or coping skills could potentially have impacted results. Also, the group setting with dissimilar cases of depression, anxiety, pain, perceived stress, and low quality of life may not have allowed for the specific tailoring of the yoga therapy to address each participants specific needs as recommended. These limitations will be discussed individually below.

Participant Similarity

Because the three participants in this research sample were all drawn from one wellness studio in one community, there was noted background homogeneity. Many similarities could be found among them including gender, age, and ethnicity. Participants 1, 2, and 4 were females in their early to mid-forties, participants 3 and 6 were in their mid to late thirties, though participant 4 was in her sixties, lending more age diversity to the study, she exited the study before the baseline week was complete due to unspecified health issues. All participants were Caucasian, a limitation that may be attributed to the marketing, location or brand of the wellness center within the community. This could also potentially indicate a socio-economic imbalance of access to or of knowledge of yoga therapy as CAM.

Symptoms however, were heterogeneous in that none of the participants were pre-screened for meeting threshold criteria for clinical levels of depression, anxiety, pain, perceived stress or a low quality of life. Hence, the majority of participants providing only partially completed survey across all variables and potentially skewing significant results. Future research might address this issue by replicating research procedures with a broader diversity and range of participants who are prescreened for meeting clinical threshold criteria for depression, anxiety, pain, perceived stress and low quality of life, to increase both internal and external validity and allow for stronger generalizability of potentially stronger results.

Multifaceted Focus

A second potential limitation noted in this research was multifaceted focus attempting to operationalize yoga therapy and explore dosage while utilizing a small group of participants that did not adhere to all the requirements. One of the largest challenges in CAM research is to create an experimental model that can easily be implemented and accessible to the individual participants. The intervention must be operationalized in order to be replicated, which this study addressed in great detail, but the length of the study depending on the commitment of individuals is challenging at best to guarantee as each individual is asked to participate in something that may be logistically and personally challenging. Future area of study may explore if significant differences can be determined among groups utilizing shorter duration for baseline and intervention along with more convenient instrumentation to be discussed in the upcoming section.

Instrumentation

A third potential limitation of this research was related to the chosen instrumentation. While reliable and valid instruments were chosen including BDI, GAD-7 PSM-9, MPQ, and the QoL-2. Combined, all the measures require the individual to consider and rate 92 aspects of their health and well-being on a daily basis the first 7 days during the baseline phase, then once again at the 4 week intervention phase, and once again at 8 weeks at the post intervention phase. Many of the participants provided partially completed data across all three phases lending to the resultant non-significant differences between the groups and across all independent variable.

Participant 1 completed the full study and provided a complete set of data. Participant 2 provided five of the seven-day baseline data period but all other data points. Participant 3 provided full set of data on the BDI measure only. Participant 4 provided one day of seven baseline data for BDI but provided intervention data points for BDI, QoL, and PSM before exiting the study due to unspecified health reasons. Participant 5 provided a complete data set for all measures though omitted one day of baseline data for BDI only. Participant 6 provided five of the seven-day baseline data points for BDI and GAD, full data set on QoL and PSM but omitted the intervention data point on the GAD. The demanding nature of the multiple surveys to comprehensively address the whole person seemed to negatively influence the ability to determine significant differences specific to finding dosage and offering that data to the medical community as intended. Future research may benefit from finding or constructing a shorter assessment tool or model so as to not overwhelm, fatigue, or confuse participants.

Instrumentation or the delivery of the yoga therapy itself could be attributed to results atypical to the existing literature. Yoga therapy while can be administered in a group setting, is to be tailored for each participant depending on their symptoms and level of discomfort and may be optimized in an individual setting to address specific symptoms, physical limitations, experience levels, and pain thresholds (IAYT, 2012; Payne & Usatine, 2009). Future researchers might consider prescreening individuals and forming groups of those with similarly matched criteria levels, or focus on single case studies administering tailored yoga therapy to an individual who meets the criteria for clinical levels in one of each variable; depression, anxiety, pain, perceived stress, or low quality of life to find an effect.

Extrinsic Factors

There were potential influences of extrinsic factors during this study. As discussed above, test taking fatigue most likely occurred possibly interfering with objectivity or subjectivity of the individual participant as they self-assessed. Personal scheduling, time management conflicts or confusion regarding the instructions over the course of 8 weeks were likely, given the amount of incomplete data provided over the course of all three phases of treatment. Personal attention and perception challenges to maintain a practice or the opposite, developing an at-home practice, could have potentially have impacted results but could not be controlled by the researcher. Each participant may have had different stressors outside of their yoga therapy practice or other habits or coping strategies to address their depression, anxiety, pain, stress and quality of life such as diet, adherence to an outside regular exercise regime or utilizing psychopharmacology. These

factors may influence volition, mood or fatigue. To limit the possibility of environmental differences, participants were instructed not to introduce anything new into their daily functioning outside of the yoga therapy intervention though remained outside the researcher's control.

Attrition also affected this study. The collection method was informal, word of mouth and the design originally included three participants per group. Three participants exited at different times during each phase of the data collection and were not replaced though others could have been recruited. This made typical analysis of single-subject data difficult. The number of participants did not provide adequate power to get statistical significance. Due to constraints imposed by Walden policy this researcher was not allowed to collect the data personally, therefore relying on the secondary data collected by an independent source, not necessarily specifically trained in evidence-based research methods, posed several difficulties that could have been avoided had this researcher conducted the study on behalf of the wellness center.

Recommendations for Future Research

Future research suggestions involve finding ways to improve upon this research and address the limitations discussed above. Utilizing a larger and more diverse sample could strengthen the external validity of the research. Prescreening individuals and matching groups based on levels of criteria met for each variable could strengthen internal validity. Providing participants easier, more user-friendly assessment tools that are less lengthy but still reliable and valid surveys to address depression, anxiety, pain, perceived stress and quality of life could increase the odds of producing more complete

sets of viable data and possibly finding significant differences between the groups to make accurate dosage recommendations. This would also promote greater internal and external validity, more generalizability of better quality, statistically significant results which could contribute to the existing literature and better inform medical practitioners how to prescribe yoga therapy as CAM. These suggestions would likely create useful data. Perhaps focusing on a more qualitative approach to determine the rate or "dose" of yoga therapy would be more pragmatic. For example, the number of days yoga therapy is practiced could be calculated until individual differences are noted by the participant may alleviate the instrumentation and extrinsic limitations yet still offer the medical community at least a framework from which they can recommend a healthy dosage of yoga therapy to improve symptoms related to depression, anxiety, pain, stress, or quality of life.

Positive Social Change

This research intended to operationalize yoga therapy by defining yoga therapy and researching dose response or the rate of practicing yoga therapy in order to assist the medical community in prescribing yoga therapy more effectively as a complementary alternative therapy to medication. With stronger implementation, instrumentation, larger numbers and more diverse participants, a dose response could continue to be researched to prescribe yoga therapy effectively. This could alleviate the problem of overprescribing drugs with serious side effects and reduce liability or ethical issues for some practitioners relying on pharmaceutical interventions for physical or psychological pain. Quality of life may improve for patients, while quality of care may improve for practitioners.

To address the issue of operationalizing yoga therapy for future research, looking to the pioneers of the field of therapeutically applying yoga, meditation and mindfulness, cited in this study, should continue to be the prime resource so that this requirement can be easily and clearly met regardless of the number of times the research is attempted. This should provide the standard required for the medical community to become more informed and engaged in yoga therapy as a possible alternative to current medical approaches for depression, anxiety, pain, perceived stress, and quality of life.

To address the issue of finding a dose, it may be beneficial for researchers to find or create a more user-friendly assessment tool for participants to more effectively assess their wellbeing and increase the diversity of their participant groups as well as the number of participants in general to provide more significant results congruent to the existing literature and aiding in medical professionals to become more clinically informed on prescribing yoga therapy as an intervention.

Conclusion

The intention of this study was driven by the knowledge that individuals are becoming more and more dependent on medication for conditions such as chronic-pain, anxiety, and depression, often suffering effects of being overprescribed medication while health outcomes do not improve. It was also driven by the concern that medicalization of society is distracting attention from the possibility of other therapies or CAMs such as yoga therapy, that can improve health outcomes, if only they were as supported as pharmacological research and better received by the medical community.

Operationalizing yoga therapy in this research utilized the combination of yoga and meditation, and MBSR to address cases of depression, anxiety, pain, perceived stress and quality of life in order to form agreement in research, among yoga practitioners, and in the medical community on how to administer and then prescribe delivery of yoga therapy as intervention to reduce depression, anxiety, pain, perceived stress and increase quality of life. Though this study did not produce any significant differences among the participant groups created to find a recommended dose, the figures indicated there were some non-significant improvements in depression, anxiety, and pain symptoms as well as an increase in quality of life.

The social contribution of future studies with larger numbers and more diverse participants utilizing more efficient assessment methods could better provide the medical community with the evidence they require to prescribe a specific rate of weekly yoga therapy practice. This perhaps could alleviate the over-prescription of medication and reduce the dependence on psychopharmacology for management of affective disorders. Clear evidence is still required to illustrate the effectiveness of properly prescribed yoga therapy as CAM for improving health outcomes.

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