An Investigation of the Effect of a Combined Physical Exercise and Counseling as a Therapeutic Approach to Reducing Anxiety Symptoms

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Department of Community Care and Counseling, Liberty University

A Dissertation Presented in Partial Fulfillment

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Abstract

Mental health issues are on the rise as the increase in emotional, psychological, and social well-being affects how people think, act, or feel toward themselves and others. The topic of physical exercise and mental health services has been researched to show a strong relationship between physical activity and positive mental health outcomes. Anxiety is the most common mental health concern in the United States (Goodwin et al., 2020). This study aims to investigate and quantify the impact and explore the relationships of the combined intervention approach of physical activity and counseling in reducing symptoms of anxiety. This research will utilize a correlational design analysis to examine the efficacy of this combined intervention. The findings of this study may have significant effects on the development of an anxiety intervention that incorporates both exercise and counseling as a potential treatment option.

Keywords: Exercise, counseling, anxiety symptoms, anxiety, relationship

Acknowledgments

Proverbs 27:17 tells us, “As iron sharpens iron, so one person sharpens another.” This is a quote I hold dear to my heart. When I began this program, I knew my end goal was to accomplish the impossible. I was naïve in thinking that I could do this process myself, but I was wrong. Along the way, I have fallen, taken a year off, and recouped from life events, but I got back to finish. Had it not been for the people around me to lift me up, encourage me, and ‘sharpen’ me, I would not have made it. The people around me have been the greatest supports as we have sharpened one another. I dedicate this to those who lifted me up along the way (Kenny, The Nobles, Ginger, and my wonderful daughters). To Dr. Packer-Williams, whose genuine patience, kindness, and support kept me going during times when I didn’t think I had it in me to finish. Anyone with the opportunity to have Dr. PW as their chair has truly won the lottery jackpot.

Table of Contents

List of Tables

List of Figures

.

List of Abbreviations

Association of Christian Schools International (ACSI)

National Center for Education Statistics (NCES)

Biopsychosocial model (BPSM)

Regular physical activity (PA)

Chapter One: Introduction

Overview

Anxiety is a widespread mental health issue with a significant global impact (Yang et al., 2021). Although the overall age-standardized burden rate of anxiety disorders remained stable over the past three decades, the latest absolute number of anxiety disorders increased by 50% from 1990 (Yang et al., 2021). According to the World Health Organization (2017), the total estimated number of people living with anxiety disorders in the world is 264 million. In 2015, data reflected a 14.9% increase since 2005 as a result of population growth and aging, making it the most prevalent mental health disorder globally (Vos et al., 2016). In 2019, the globally estimated newly diagnosed anxiety disorders in patients increased to 45.82 (95% UI: 37.14, 55.62) million (Yang et al., 2021). In 2020, the COVID-19 pandemic triggered another health crisis where there was a 25% increase in the prevalence of anxiety and depression worldwide (Haines, 2023). Anxiety is usually characterized by elevated emotions of fear, worry, or unease that are frequently accompanied by physical symptoms of trembling, sweating, and an accelerated heartbeat (Chand & Marwaha, 2023). Fear is an automatic neurophysiological state of alarm characterized by a fight or flight response to a cognitive appraisal of present or imminent danger, real or perceived (Chand & Marwaha, 2023). Chand and Marwaha (2023) state that anxiety is linked to fear and manifests as a future-oriented mood state that consists of a complex cognitive, affective, physiological, and behavioral response system associated with preparation for the anticipated events or circumstances perceived as threatening. Anxiety disorders are among the most common psychiatric diagnoses and present in patients as excessive fear and worry and can lead to a fight-or-flight fear response (Brahmbhatt et al., 2021). The use of medication is typically used to treat anxiety. In addition, a large amount of research has accumulated on the efficacy and effectiveness of cognitive-behavioral therapy (CBT) for anxiety disorders (Kaczkurkin & Foa, 2015). However, counseling combined with exercise is beginning

to be recognized as an effective method to help individuals alleviate symptoms of anxiety. Physical health is closely related to an individual's mental health. It has been stated that a healthy mind comes from a healthy body (Cai, 2022). There are strong calls from many national and international bodies for a 'holistic' and integrated approach to understanding and managing psychological and physical health needs (Shafran et al., 2017). Some of these holistic approaches are characterized by treating the whole person, considering mental and social factors rather than just the symptoms of a disease (Shafran et al., 2017). In addition, Shafran et al. (2017) report that holistic approaches can impact mental and physical health and are cost-effective.

Exercise can be an effective intervention for mental health clinicians to facilitate positive therapeutic outcomes (Salmon, 2001). Exercise offers a specific psychological treatment that may be particularly effective for patients for whom more conventional psychological interventions are less acceptable (Salmon, 2001). Results of cross-sectional and longitudinal studies are more consistent in indicating that aerobic exercise training has antidepressant and anxiolytic effects and protects against harmful consequences of stress (Salmon, 2001). Herring (2010) reports that patients with chronic illness often go undiagnosed or untreated for anxiety and that exercise training can potentially alleviate anxiety symptoms. Recent research showed that combining physical activity with psychological therapy consistently engendered positive effects on outcomes compared with treatment as usual (Thomas et al., 2020). In addition, Thomas et al. (2020) reported that similar improvements in psychological outcomes were observed in most groups receiving physical activity alone, and increased physical activity levels were observed in psychologically-informed interventions. However, this effect was unrelated to changes in psychological outcomes (Thomas et al., 2020). Herring (2010) reports that patients with chronic illness often go undiagnosed or untreated for anxiety and that exercise training can potentially alleviate anxiety symptoms. Furthermore, attention has recently turned to maladaptive

and persistent expressions of anxiety, with a growing body of evidence indicating promise for exercise as an effective treatment for some of the anxiety disorders (Asmundson et al., 2013).

The present study intends to address the gap in literature and practice for support for mental health services that combines traditional counseling and physical exercise. Chapter One will present an overview of the study that will include a background, the problem, and the purpose of the study. In addition, the research's significance is laid out, along with the research questions. Chapter One will conclude with a succinct restatement of the problem and purpose of the study.

Background

Anxiety is a common mental health condition that impacts millions daily. In 2019, 1 in every eight people, or 970 million people worldwide, were living with a mental disorder, with anxiety being one of the most common (World Health Organization, 2022). In addition, the World Health Organization (2022) also states that the number of people living with anxiety rose significantly because of the COVID-19 pandemic. Initial estimates show a 26% and 28% increase, respectively, for anxiety disorder in just one year (World Health Organization, 2022). Anxiety disorders are characterized by excessive fear and worry and related behavioral disturbances (World Health Organization, 2022). Anxiety disorders are among the most common psychiatric conditions, with an estimated 19.1% of U.S. adults experiencing anxiety in the past year. At the same time, nearly one-half of people diagnosed with depression will also experience comorbid anxiety (Saeed et al., 2019). Although psychopharmacology and counseling have shown positive results as effective treatments for anxiety, there is a rising interest in using physical exercise combined with counseling as a more effective intervention to reduce symptoms of anxiety (Wipfli et al., 2008).

Common treatments for anxiety disorders are similar to those for clinical depression; it has been shown that 75% of people who are affected by clinical depression are also affected by anxiety disorder (Myers et al., 1984). Wipfli et al. (2008) state that the two most common treatments for these disorders are various drug treatments (antidepressants) and psychotherapy. In keeping with its status in society, medicine always had a paternalistic culture (Jacob, 2015). The prevalent paternalistic culture within the medical profession often dismisses patient perspectives and does not take kindly to objections or different points of view (Jacob, 2015). In addition, Wipfli et al. (2008) say the use of drugs and psychotherapy to treat anxiety disorders has drawn criticism because of the side effects that accompany antidepressants. Some of these side effects include weight gain, hyperglycemia, sexual dysfunction, and elevated blood pressure (Gardner et al., 2005). Antidepressant drugs classified as selective serotonin reuptake inhibitors have been linked to increased risk for suicide or suicidal thoughts in both children and adults (Ludwig & Marcotte, 2005). This is the reason why Andrews et al. (2000) have described the need for more treatments for anxiety. These criticisms have prompted the discussion of finding new methods of treatment for anxiety disorders that are effective and lack unwanted side effects. One potential method of treatment that has generated a large amount of research is exercise (Blumenthal et al., 1999). Research indicates exercise is effective in treating and preventing anxiety and depression and in enhancing cognitive function (Budde & Wegner, 2018). As side effects continue to affect individuals taking medication, research is showing that many people with depression or anxiety are turning to non-pharmacologic and nonconventional interventions, including exercise (Saeed et al., 2019).

Additionally, there have been links that show a correlation between exercise and positive mental health. Regular physical activity improves the functioning of the hypothalamus-pituitary-adrenal axis (Mahindru et al., 2023). Anxiety appears to be influenced by physical exercise;

therefore, exercise therapy is recommended to combat these challenges and preserve mental wellness (Mahindru et al., 2023). Evidence also supports resistance exercise's mental and cognitive-enhancing benefits, suggesting that muscle-strengthening activities should be incorporated into a well-rounded exercise routine (Budde & Wegner, 2018). For those with less severe forms of mental illness, such as anxiety, regular physical exercise may be a crucial part of their treatment and management (Mahindru et al., 2023). Mahindru et al. (2023) also state that exercise and physical activity might improve mental health symptoms in a way comparable to, if not more effective than, traditional antidepressants. Exercise helps ease anxiety because engaging in exercise diverts the thoughts of what is causing anxiousness, and moving your body decreases muscle tension, lowering the body's contribution to feeling anxious (Ratey, 2019). Furthermore, getting your heart rate up changes brain chemistry, increasing the availability of critical anti-anxiety neurochemicals, including serotonin, gamma-aminobutyric acid (GABA), brain-derived neurotrophic factor (BDNF), and endocannabinoids (Ratey, 2019). In addition, exercise activates frontal regions of the brain responsible for executive function, which helps control the amygdala, our reacting system to real or imagined threats to our survival.

Counseling, on the other hand, helps individuals recognize, evaluate, and correct thoughts that help alleviate worries and manage the underlying causes or 'triggers' of anxiety (Beck & Clark, 2011). Techniques taught are designed to target maladaptive thoughts and behaviors that maintain anxiety over time (Curtiss et al., 2021). Counseling delivered in primary care is associated with significant improvements in anxiety and depression symptoms among participants with anxiety disorders (Bogucki et al., 2021). The power of counseling lies in its focus on the automatic, distressing thoughts that fuel anxiety (Beck & Clark, 2011). Fear and anxiety are part of living and are often helpful as they warn us of impending dangers; however, for some, they can become excessive and persistent (Beck & Clark, 2011). By participating in

counseling, individuals can learn coping mechanisms, stress-management techniques, and even mindfulness practices that will aid them in reducing their anxiety levels. A cognitive-behavioral conceptualization of anxiety disorders includes the identification of dysfunctional thinking patterns, distressing feelings or physiological experiences, and unproductive behaviors (Bogucki et al., 2021). When each of these three components interact and mutually reinforce one another, distressing and impairing levels of anxiety can be maintained over time (Bogucki et al., 2021). Thus, counseling appears to be effective in routine clinical care for worry and depressive symptoms, with particular benefits associated with altering negative metacognitions (Krzikalla et al., 2023).

Literature on combined exercise and counseling was prevalent in the past, but around 2007, studies on this combined approach dropped while the pharmaceutical industry studies increased (Austin & Hayford, 2021). Between 2010 and 2019, the number of new drugs approved for sale increased by 60% compared with the previous decade, with a peak of 59 new drugs approved in 2018 (Austin & Hayford, 2021). Actual (inflation-adjusted) pharmaceutical revenues increased sharply from the mid-1990s until around the mid-2000s, when patents on several blockbuster drugs expired and lower-cost generic equivalents were introduced (Austin & Hayford, 2021). Austin and Hayford (2021) explain that revenues then declined slightly from the mid-2000s through the mid-2010s due to those patent expirations and the 2007–2009 recession. However, revenue growth returned with the introduction of some expensive new drugs.

Today, individuals seek alternative methods, particularly physical exercise, to support their well-being. A study conducted by Helgadóttir et al. (2015) revealed that individuals who experience anxiety are more likely to engage in sedentary behaviors and participate in less rigorous forms of physical activity, if any at all. Ratey (2019), a psychiatrist who studies the effects of exercise on the brain, states that he has not only seen the science but has witnessed

firsthand how physical activity affects his patients. According to Ratey (2019), research shows aerobic exercise is especially helpful, and that activity as simple as a bike ride, dance class, or even a brisk walk can be a powerful tool for those suffering from chronic anxiety; he argues that getting out and moving may be the single best nonmedical solution we have for preventing and treating anxiety. As individuals continue to struggle with anxiety and mental health issues, a better understanding of the relationship between exercise and counseling in reducing anxiety symptoms is key.

Problem Statement

One in every eight people, or 970 million people, around the world, were living with a mental disorder, with anxiety being one of the most common (World Health Organization, 2022). This significantly impacts individuals' well-being and overall quality of life. Research has explored different therapeutic approaches to address symptoms of anxiety. One of these therapeutic approaches includes exercise interventions and counseling. Although there is a growing interest in combining these approaches, the literature fails to provide sufficient research to show the effectiveness of a combined physical exercise and counseling therapeutic approach. This research aims to identify gaps in the existing literature to highlight the need for further research to enhance our understanding of this combined therapeutic approach.

Currently, there is insufficient research on a therapeutic combined approach as several studies have examined these two approaches separately, but the combination of exercise and counseling remains relatively unexplored. With existing literature presenting a limited number of studies, the results have been inconclusive or mixed, creating controversy about the effectiveness of these approaches. Multiple studies have reported conflicting results regarding the efficacy of a combined exercise and therapeutic approach for anxiety reduction. For instance, a study by DeBoer et al. (2012) highlights the potential of exercise as a stand-alone or complementary

intervention for anxiety disorders. However, future work should examine mediators to increase understanding of the mechanism of change of exercise intervention and, thus, enable the refinement of exercise intervention strategies (DeBoer et al., 2012). In addition, DeBoer et al. (2012) also state that identification of moderators, including possible exercise intervention parameters and person factors, will help clinicians in deciding how and for whom to prescribe exercise. Furthermore, many existing studies of a combined exercise and therapeutic counseling approach have focused on specific populations, such as college students, thus limiting the generalizability of research findings. Certain populations, such as children, older adults, or individuals with specific anxiety disorders, have not been adequately represented in the literature. In addition, there is a lack of understanding of how a combined therapeutic approach may affect different populations, which could hinder widespread implementation and evidence-based recommendations.

The problem lies with the insufficient research that is currently available to showcase the effectiveness of a combined exercise and therapeutic counseling approach in reducing symptoms of anxiety. Despite some studies showing positive outcomes, mixed results, unexamined populations, and limited generalizability hinder the founding of conclusive evidence. It is imperative to address these gaps by conducting further research that incorporates a diverse population and finding a pattern that shows people reporting lower levels of anxiety when they participate in both exercise and counseling.

Purpose Statement

The purpose of this study is to investigate the relationship between traditional counseling and physical exercise on anxiety. This research aims to explore the correlation between mental health intervention, physical activity, and anxiety levels among adults. By examining these variables, this study seeks to contribute to the existing knowledge and understanding of the

potential benefits of integrating mental health services with physical fitness activities in reducing anxiety. Given the wealth of research surrounding the advantages of either physical exercise or traditional counseling on mental health, it is likely that individuals who participate in both of these interventions would experience better overall mental health. Specifically, participants who engage in both counseling and regular physical exercise are likely to report lower levels of anxiety.

Significance of the Study

The present study is significant because the relationship between mental health outcomes, physical exercise, and counseling is well-established and associated with beneficial outcomes for those who participate in counseling and physical fitness interventions. While the current research base has covered each intervention separately and in various combinations, few have made a concerted effort to provide insight into the experiences of the general population. Historically, studies concerning the relationship between physical exercise and counseling have been performed but have primarily focused on specific subsets of the population (college students, parents, children, etc.) or those already formally diagnosed with anxiety or other mental health disorders. As such, the present study aims to provide a holistic image of the relationship between these two variables among a stratified national sample. By providing a holistic image, practitioners of counseling or other combined approaches may better understand each variable's impact, including accurately identifying the qualities vital for client success. Additionally, future researchers and academics in the field of counseling may be empowered to construct effective combined interventions that utilize each variable's key facets, maximizing the potential for positive client outcomes.

Research Question(s)

This study is designed to explore the following research question:

RQ1: Do individuals who engage in regular physical exercise and counseling interventions report lower levels of anxiety than those who only participate in counseling but do not engage in regular physical exercise?

Definitions

1. Anxiety - Anxiety is anticipation of future threats (Diagnostic and Statistical Manual of Mental Disorders: DSM-5-TR, 2022).
2. Fear - Fear is the emotional response to real or perceived imminent threat (Diagnostic and Statistical Manual of Mental Disorders: DSM-5-TR, 2022).
3. Physical Activity - Any body movement generated by the contraction of skeletal muscles that raises energy expenditure. It is characterized by its modality, frequency, intensity, duration, and context of practice. The energy expenditure can be measured in kilocalories. Physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities (Vancini et al., 2021).
4. Physical Exercise - A subset of physical activity that is planned, structured, and repetitive and has as a final or an intermediate aim the improvement or maintenance of physical fitness (Vancini et al., 2021).
5. Traditional Counseling – It is conceived as a process concerned with helping normally functioning or healthy people to achieve their goals or to function more appropriately (Jones-Smith, 2019).
6. Psychotherapy – It is usually described as reconstructive, remedial, in-depth work with individuals who suffer from mental disorders or who experience serious coping deficiencies (Jones-Smith, 2019).

Summary

Anxiety is a predominant mental health issue that has a significant global impact, with the number of people living with anxiety disorders increasing over the years. The COVID-19 pandemic has further exacerbated the prevalence of anxiety worldwide. Anxiety is characterized by elevated emotions of fear, worry, and unease, often accompanied by physical symptoms. Anxiety is linked to fear and manifests as a future-oriented mood state associated with perceived threats against the individual. Anxiety can lead the individual to enter a fight-or-flight fear response and cause mental health issues. Traditional treatment approaches for anxiety disorders involve medication and counseling. However, there is a growing recognition that counseling combined with physical exercise can be effective in alleviating symptoms of anxiety. Physical health is closely related to mental health, and a holistic approach that considers both mental and physical factors has been advocated. Exercise has been shown to have antidepressant and anxiolytic effects, protect against stress, and improve overall mental health. Counseling aims to help individuals recognize, evaluate, and correct thoughts that contribute to anxiety and teaches coping mechanisms and stress-management techniques. A combined approach of exercise and counseling has been explored in the past, but research on this approach has been limited, with inconclusive or mixed results. The existing literature lacks sufficient evidence to establish the effectiveness of a combined therapeutic approach for anxiety reduction.

The purpose of this study is to investigate the relationship between traditional counseling and physical exercise on anxiety by examining the correlation between mental health intervention, physical exercise, and anxiety levels among adults. This study aims to contribute to existing knowledge on the benefits of integrating mental health services with physical exercise activities. It is hypothesized that individuals who engage in both counseling and regular physical exercise will report lower levels of anxiety. The problem statement highlights the insufficiency

of research on the combined therapeutic approach of exercise and counseling for anxiety. The existing studies have provided inconclusive or mixed results, and certain populations have been unrepresented. This study will address these gaps in the literature and examine the effectiveness of a combined approach in a diverse population. The research findings may contribute to evidence-based recommendations and improve our understanding of the potential benefits of integrating exercise and counseling for anxiety reduction.

Chapter Two: Literature Review

Overview

Mental health issues are on the rise as the increase in emotional, psychological, and social well-being shapes how individuals think, feel, and behave (Gross et al., 2019). Many mental illnesses are associated with the misevaluation of maladaptive regulation strategies (Gross et al., 2019). Studies show that mental health concerns have increased the number of attempted and completed suicides or self-harm thoughts, making suicide a significant health problem as the global suicide mortality rate amounts to 1.4% of all deaths worldwide (Brådvik, 2018). Globally, more than 817,000 suicides occur annually, and the number of non-fatal or self-harm (SH) episodes is likely to be 20 times higher as rates of SH tend to peak during adolescence and young adulthood (Erlangsen et al., 2020). Among the mental health concerns most individuals face, anxiety seems to be the most prevalent (Goodwin et al., 2020). Anxiety is associated with more significant mortality and may be a stronger predictor of adverse health consequences than self-reported illness (Goodwin et al., 2020). People with generalized anxiety disorder view worry as a strategy with negative consequences (Gross et al., 2019). For example, they may think worrying helps them prepare and avoid adversities or that worrying means they care (Gross et al., 2019).

Anxiety is a widespread mental health issue with a significant global impact that affects an estimated 19.1% of U.S. adults and 10% experiencing depression. At the same time, nearly one-half of people diagnosed with depression will also experience comorbid anxiety (Saeed et al., 2019). Anxiety disorders include disorders that share features of excessive fear and anxiety and related behavioral disturbances, with fear being the emotional response to a real or perceived imminent threat. In contrast, anxiety is anticipating future threats (Diagnostic and Statistical Manual of Mental Disorders: DSM5-TR, 2022). Individuals with anxiety disorders are excessively fearful, anxious, or avoidant of perceived threats in the environment or internal to

themselves (Craske & Stein, 2016). The response is disproportionate to the actual risk or danger that an individual perceives. Fear occurs due to a perceived imminent threat, whereas anxiety is a state of anticipation about perceived future threats (Craske & Stein, 2016). Anxiety disorders are among the most common psychiatric diagnoses and present in patients as excessive fear and worry and can lead to a fight-or-flight fear response (Brahmbhatt et al., 2021). These feelings of fear can occur when faced with threatening or stressful situations. It is a normal response when confronted with danger, but it could be regarded as an anxiety disorder if it is overwhelming or the feeling persists (Dean, 2016). The Diagnostic and Statistical Manual (DSM5-TR) of Mental Disorders (2022) states that each anxiety disorder is diagnosed only when the symptoms are not attributable to the physiological effects of a substance or another medical condition or are not better explained by another mental disorder.

Medication is typically used to treat anxiety. First-line drugs are the selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors (Bandelow et al., 2017). While benzodiazepines are not recommended for routine use, other treatment options include pregabalin, tricyclic antidepressants, buspirone, moclobemide, and others (Bandelow et al., 2017). Exercise such as aerobic training of jogging five km three times a week has been studied in panic attacks, and results state that it can be recommended as adjunctive treatment to standard treatments (Bandelow et al., 2017). Exercise is effective for treating and preventing anxiety and depression and enhancing cognitive function (Budde & Wegner, 2018). Physical health is closely related to an individual's mental health. It has been stated that a healthy mind comes from a healthy body (Cai, 2022). Although medication and psychotherapy have been successful for some individuals, clinicians continue to find new modalities and holistic approaches that can help those struggling with anxiety disorders.

Scientific studies have confirmed that reasonably arranging the contents and methods of physical exercise according to their health level and psychological state can enhance the physique of individuals and cultivate their excellent personalities (Cai, 2022). In addition, individual or group counseling has preventive and remedial aims (Corey, 2023). Counseling offers understanding and support, which foster the members' willingness to explore problems they have brought with them to the counseling session (Corey, 2023). As side effects continue to affect individuals taking medication, research shows that many people with depression or anxiety are turning to non-pharmacologic and nonconventional interventions, including exercise (Saeed et al., 2019).

Furthermore, other researchers have reported that by using translational science that focuses on accelerating treatment progress, practitioners are building on findings from basic science to develop and improve interventions for people with mental illnesses (Gordon, 2023). Studies have shown promising evidence in individuals with low initial levels of well-being, such as clinically depressed or anxious patients, who participated in exercise programs (Rethorst et al., 2009; Wipfli et al., 2008). Randomized controlled trials demonstrated that structured physical exercise could serve as an effective treatment option for reducing symptoms in individuals with depressive disorders (Babyak et al., 2000; Blumenthal et al., 2007). According to Budde and Wegner (2018), these studies report beneficial psychological effects of exercise that match or exceed those of pharmacological treatment.

In addition, recent research on the associations between the intricacies of the brain and mental health is developing as new information provides data to help pinpoint new interventions for mental health support. Emerging evidence also supports resistance exercise's mental and cognitive-enhancing benefits, suggesting that muscle-strengthening activities should be incorporated into a well-rounded exercise routine (Budde & Wegner, 2018). Furthermore,

counseling helps individuals recognize and manage their underlying causes or ‘triggers’ for their anxiety. By participating in counseling, individuals can learn coping mechanisms, stress-management techniques, and even mindfulness practices that will aid them in reducing their anxiety levels. Thus improving their overall well-being and positive state of mind.

Theoretical Framework

The theoretical framework for this study is based on the biopsychosocial model. George Engel introduced this model in 1977; a biopsychosocial model (BPSM) considers how individuals perceive their environment and its subsequent effect on their health and biology (Adler, 2009). Biological factors include genetics, physical health, and psychological processes, including hormones and neurotransmitters. Thomson (2019) reports that health outcomes result from the interaction of biological, psychological, and social factors. Physical activity and counseling are interventions that address multiple aspects of this model. The biopsychosocial model employs an integrative approach to understanding mental health disorders practitioners and researchers (Thomson, 2019). Thomson (2019) also states that the biopsychosocial model is a holistic framework that recognizes that health is not determined by one single factor but by the result of a complex interplay of different factors.

A biopsychosocial model for anxiety disorders includes an individual’s genetics, brain structure, environment, and general thinking patterns to explain the etiology, effects on thinking, behaviors, and development of an anxiety disorder (Jokinen & Hartshorne, 2022). This model suggests that anxiety is not simply the result of a chemical imbalance in the brain but rather a complex interaction between biological, psychological, and social factors.

Physical activity and traditional counseling are two interventions that address multiple aspects of the biopsychosocial model. Physical activity has been shown to positively impact the model's biological aspect, as it can lead to changes in brain chemistry and reduce inflammation, both of

which can contribute to the development of anxiety (John et al., 2020). By targeting biological, psychological, and social factors, a combined intervention approach can potentially be more effective in reducing anxiety symptoms than interventions that only address one aspect of the model. A BPSM may combine treatments that include individual, group, or any specific intervention method that best serves the client (Griffith et al., 1999). Exercise interventions have become a complementary and alternative method for relieving anxiety (Lin & Gao, 2023). Mind-body exercises are increasingly used as adjunctive and alternative therapies to manage psychological stress as studies have suggested exercise as a possible option for treating anxiety symptoms and anxiety disorders, playing a dual role in adjunctive therapy (pharmacotherapy or psychotherapy) and exercise (Lin & Gao, 2023).

Meanwhile, physical activity has been shown to impact anxiety positively. A study by Stubbs et al. (2017) found that exercise had a significant effect on reducing symptoms of anxiety. Consequently, exercise might be an alternative for people with anxiety disorder who are unwilling to initiate medication or psychotherapy or for participants from regions where frontline resources are unavailable (Stubbs et al., 2017). The study also found that the intensity and duration of exercise were essential factors in determining the effectiveness of the intervention. Similarly, a meta-analysis by Schuch et al. (2016) found that exercise moderately reduced anxiety symptoms. The health benefits of regular physical activity and exercise are undisputed in the literature (Herbert et al., 2020). Moreover, studies show that basic psychological needs are closely related to anxiety, depression, and life satisfaction and can enhance happiness and promote the healthy growth of individual mental health (Gunnell et al., 2013; Sheldon et al., 2001; Van den Broeck et al., 2016). The study by Herbert et al. (2020) found significant effects of aerobic exercise on mental and physical health indicators using quasi-experimental between-subjects and within-subject designs. The results revealed that only moderate- to high-intensity

aerobic exercise had significantly changed self-reported anxiety symptoms (Herbert et al., 2020). In addition, population-based studies have shown an inverse relationship between physical activity and depression or depressive symptoms; individuals with high activity levels report less depression (Janney et al., 2008).

Similarly, counseling is another intervention that is effective in reducing anxiety. McEvoy and Erceg-Hurn (2016) found that cognitive-behavioral therapy (CBT) was an effective intervention for reducing anxiety symptoms. The study found that CBT significantly reduced anxiety symptoms, and the effect size was more significant than the psychological interventions (McEvoy & Erceg-Hurn, 2016). In addition, it was also found that CBT had a significant effect on reducing anxiety symptoms, and the effect size was more significant than that of other psychological interventions (McEvoy & Erceg-Hurn, 2016). Moreover, Powers et al. (2017) conducted a systematic review that identified 25 studies that examined the threat reappraisal mediation hypothesis in panic disorder, social anxiety disorder, acute stress disorder, and specific phobia, and one study with a mixed population that there was substantial evidence of the association between threat reappraisal and symptom reduction (Powers et al., 2017).

Consequently, several studies have investigated the impact of a combined intervention approach on anxiety. A meta-analysis by Bourbeau et al. (2020) investigated the effect of exercise combined with behavioral therapy on depression and anxiety. The study supports using exercise as an effective adjunct treatment for depression across a range of comorbidities (Bourbeau et al., 2020). Specifically, adding moderate-intensity exercise to behavioral therapy may yield superior improvements in depression symptoms (Bourbeau et al., 2020). Another randomized controlled trial by LeBouthillier and Asmundson (2017) investigated the impact of a combined intervention approach on anxiety in patients with chronic pain. The study found a significantly reduced effect on reducing anxiety symptoms compared to the control group

(LeBouthillier & Asmundson, 2017). Additionally, LeBouthillier and Asmundson (2017) studied the efficacy of different types of exercise on anxiety-related disorders and related constructs using a randomized controlled design. The study found that the intervention had a significant effect on reducing anxiety symptoms.

Related Literature

Anxiety and Mental Health

Anxiety and a person's mental health are intricately related, and both may have a negative impact on a person's physical and mental well-being. Anxiety is defined by continuous and excessive concern, fear, or dread that does not diminish with time and may adversely influence day-to-day functioning. Anxiety can also be described as a feeling of dread or dreadfulness. Diagnoses are based on the severity, frequency, and persistence of a specific set of symptoms that occur together and are associated with significant psychological distress and/or impairment in social, occupational, or other important areas of functioning (Szuhany & Simon, 2022). There are many distinct varieties of anxiety disorders, each characterized by its particular collection of signs and symptoms. The symptoms of generalized anxiety disorder, sometimes known as GAD, include persistent concern, restlessness, trouble focusing, and somatic symptoms such as headaches or muscular pains. The experience of sudden and intense panic episodes, accompanied by bodily symptoms such as a racing heart or shaking, is characteristic of someone who has panic disorder (Saha et al., 2021). An extreme fear of being regarded adversely by others in social circumstances is one of the key components of social anxiety disorder, often referred to as social phobia. Phobia-related illnesses are characterized by an unreasonable and overwhelming dread of certain items or circumstances, which results in actions that seek to avoid those triggers. After enduring a terrible experience, a person may acquire post-traumatic stress disorder (also known as PTSD), which may cause them to have flashbacks, nightmares, and increased anxiety.

The symptoms of obsessive-compulsive disorder (OCD) include the need to engage in compulsive rituals, whether they entail thoughts, actions, or desires (Horenstein & Heimberg, 2020).

Anxiety can manifest as intrusive and maladaptive thought patterns concerning behavioral patterns, debilitating somatic issues, panic attacks, intense emotional responses, phobias, situational triggers, and more (Jokinen & Hartshorne, 2022). Zhou et al. (2020) have revealed that anxiety can adversely affect an individual's physical and mental health. Feeling worried is a natural part of life, as individuals will feel some worry throughout the day. Worrying turns into anxiety when it is chronic (occurring more days than not), causes significant impairment, and appears in many if not most, situations in an individual's daily life (Ruscio, 2002). Anxiety disorders differ in the types of objects or situations that induce fear, anxiety, or avoidance behavior and the associated cognition threat (DSM5-TR, 2022). According to the DSM5-TR (2022), individuals with anxiety may be more likely to have suicidal thoughts, attempt suicide, and die by suicide than those without anxiety. As mentioned earlier, there are differential types of anxiety diagnoses in addition to generalized anxiety disorders. The DSM5-TR (2022) manual includes additional differential diagnoses: panic disorder, agoraphobia, social anxiety disorder, posttraumatic stress disorder, and illness anxiety disorder.

Anxiety disorders are among the most frequent mental health illnesses, as shown by the research conducted by Syed Fahad Javaid and colleagues (2023). The researchers estimate that anxiety disorders impact around 4.05% of the world's population, corresponding to approximately 301 million individuals. Between 1990 and 2019, the number of people who meet the criteria for anxiety climbed by more than 55% (Javaid et al., 2023). It is essential to keep in mind that this prevalence is based on instances that have been identified, and a sizeable percentage of people who experience symptoms of anxiety disorders may be neither diagnosed

nor treated for their condition (Javaid et al., 2023). The research reveals important information on the prevalence of anxiety disorders throughout the world and how they are distributed geographically. It brings to light the fact that the prevalence of anxiety disorders is more significant in areas with high incomes, in particular in nations such as Portugal, Brazil, Iran, and New Zealand (Javaid et al., 2023). Additionally, it suggests that women have a 1.66 times higher risk than males of being afflicted by anxiety disorders (Javaid et al., 2023). However, regardless of the high prevalence and growing number of people experiencing clinical anxiety, research also demonstrates that the age-adjusted rates of anxiety disorders have remained steady over the last three decades even though the rates of anxiety disorders have increased over the previous several decades (AlShamlan et al., 2020). This stability may be attributable to changes in the fundamental population structure, given that the overall number of people impacted has grown due to population growth and aging (AlShamlan et al., 2020).

These findings pose several serious concerns, one of the most significant being the possibility that a considerable number of people who suffer from anxiety disorders are not being identified and, as a result, are not getting the therapy they need (Javaid et al., 2023). In some areas, the stigma surrounding mental health, a lack of understanding, and restricted access to mental health care may all be contributors to the underdiagnosis and undertreatment of anxiety disorders. It is essential to spread knowledge about anxiety disorders, encourage the promotion of mental health literacy, and enhance access to mental health services worldwide to address this problem and minimize the number of undetected cases. In addition, there is a need for screening and assessment techniques that are both more thorough and culturally appropriate in order to detect persons who suffer from anxiety disorders. This need is especially prevalent in countries with a scarcity of mental health services (Javaid et al., 2023).

Understanding the prevalence of anxiety disorders and the burden they place on society as a whole is necessary to develop effective solutions for their prevention and treatment. We may work toward enhancing the overall well-being and quality of life for persons whose lives are negatively impacted by anxiety disorders by addressing the obstacles that stand in the way of proper diagnosis and treatment.

Causes and Risk Factors

Anxiety disorders are complicated conditions that can be brought on by a number of different factors, one including genetics. Genes play a significant role in the growth of anxiety conditions (Meier & Deckert, 2019). If anxiety or other mental health problems run in the genetic makeup of a family, there may be a higher chance of having an anxiety disorder or other mental health concerns (Meier & Deckert, 2019). In addition, Meier and Deckert (2019) state that there are specific genes that may be linked to different kinds of anxiety conditions. Another factor includes external triggers. Although individuals are likely to have anxiety due to their genetic makeup, external factors can also impact their anxiety and severity. Anxiety disorders can be caused by stressful life events like trauma, abuse, the death of a loved one, or significant changes in your life (Meier & Deckert, 2019). Anxiety can also be caused by long-term worry, such as living in an uncertain or dangerous setting (Meier & Deckert, 2019). In addition, anxiety disorders are linked to changes in brain chemistry, especially in the amygdala and hippocampus, which are parts of the brain that handle fear and danger reactions (Martin et al., 2009). Anxiety has also been linked to imbalances in chemicals like serotonin and dopamine (Martin et al., 2009). Van Dalen et al. (2020) state that life events can be a risk factor for anxiety for individuals because events that happen early in life can have a long-term effect on mental health. Additionally, trauma or abuse that occurs in childhood can make it more likely to have anxiety

issues as adults because these events can change how people think about and react to worry and danger (Van Dalen et al., 2020).

Additional causes and risk factors include personality traits, the use of alcohol, drugs, or other substances, and medical conditions. Recently, many emotional diseases, such as anxiety and depression, have prevailed, and it is expected that emotional diseases will be the leading cause of social and economic burden in 2030 (Dong et al., 2022). These emotional diseases may be due to certain personality traits, which could be the reasons for the development of mental illness (Dong et al., 2022). Dong et al. (2022) explain that anxiety disorders are a group of mental disorders that are manifested clinically as anxiety syndrome, and individuals suffering from an anxiety disorder excessively avoid and fear perceived threats in the environment (such as social occasions or unfamiliar places) or from their mind (such as unusual physical feelings). A high risk of developing anxiety disorders is associated with the anxious personality trait (Weger & Sandi, 2018), which is a stable and fundamental behavioral tendency supported by biological mechanisms (Savic et al., 2015). Future research could discuss the neural mechanisms of anxiety personality traits, such as brain imaging mechanisms and electroencephalographic mechanisms (Dong et al., 2022).

Moreover, the use of drugs, alcohol, and/or other substances can also be a risk factors. Anxiety sensitivity (AS) is a promising intervention target due to its relevance to harmful health behaviors broadly and substance use, specifically (Knapp et al., 2020). Research by Knapp et al. (2020) demonstrated that AS was indirectly associated with a greater likelihood of using alcohol, cigarettes, and electronic nicotine delivery systems through anxiety symptoms. Regarding cannabis, AS was directly related to an increased likelihood of cannabis use; however, the indirect relation between AS and the likelihood of past-month use via anxiety symptoms was not significant (Knapp et al., 2020). Anxiety disorders constitute wide-ranging symptoms, from

hyperarousal to difficulties with concentrating (Robinson et al., 2013). Each person's experience can be very different, and early diagnosis and treatment are of great significance for those affected by anxiety (Gerogianni et al., 2018).

A panic disorder is where panic attacks occur unexpectedly and are usually accompanied by fears of dying or going crazy (DSM5-TR, 2022). Individuals with agoraphobia are anxious about being trapped or incapacitated in situations from which escape is perceived as problematic in the event of panic-like symptoms or other incapacitating symptoms (DSM5-TR, 2022). Social anxiety disorder is due to fear of being judged negatively by others rather than due to worries about being separated from attachment figures (DSM5-TR, 2022). Posttraumatic stress disorder is the fear of separation from loved ones that is common after a traumatic event such as a major disaster, particularly when periods of separation from loved ones are experienced during the traumatic event (DSM5-TR, 2022). Individuals with illness anxiety disorder worry about specific medical illnesses they may have, not about them being separated from their close attachments (DSM5-TR, 2022). Since individuals with anxiety disorders typically overestimate the danger in situations they fear or avoid, the clinician makes the primary determination of whether the fear or anxiety is excessive or out of proportion, taking cultural contextual factors into account (DSM5-TR, 2022). While anxiety disorders tend to be highly comorbid with each other, they can be differentiated by close examination of the types of situations that are feared or avoided and the content of the associated thoughts or beliefs (DSM5-TR, 2022). Anxiety disorders can manifest in a variety of ways, and individuals may experience a combination of physical, emotional, and cognitive symptoms. Barberio et al. (2021) state that common symptoms of anxiety disorders include people's physical and mental responses to worry might vary widely. They may have physical symptoms such as a rapid heartbeat and palpitations if they feel anxious, tense, or restless. In addition to sweating and shakiness, hyperventilation (quick or shallow breathing)

may occur (Barberio et al., 2021). Digestive tract illnesses, such as fatigue or weakness, may also be present (Barberio et al., 2021). In addition, anxiety may present itself emotionally as emotions of extreme dread, concern, or trepidation, as fear and illogical thinking are common reactions to a pervasive feeling of imminent danger (Barberio et al., 2021). Barberio et al. (2021) also add that due to mental turmoil, an individual may also have feelings of being on edge or alert all the time.

In addition to physical symptoms, anxiety may also cause mental and behavioral changes. Fear of losing control, fear of physical injury or death, fear of "going crazy," frightening thoughts, mental images or memories, and perception of unreality or detachment are some cognitive symptoms that can be affected by anxiety (Chand & Marwaha, 2023, p.11). Physiological symptoms include increased heart rate, palpitations, shortness of breath, rapid breathing, and chest pain or pressure (Chand & Marwaha, 2023). Furthermore, anxiety may also cause affective symptoms that can include nervousness, tension, wound up, frightened, fearful, terrified, edgy, jumpy, jittery, impatient, and/or frustrated (Chand & Marwaha, 2023). Lastly, anxiety can also affect behavioral symptoms. These symptoms can include avoidance of threat cues or situations, escape, flight, the pursuit of safety, reassurance, restlessness, agitation, pacing, hyperventilation, freezing, motionless, and difficulty speaking (Chand & Marwaha, 2023).

Diagnosis of anxiety disorders is an important step completed by a mental health expert. When the history and examination do not suggest the symptoms as arising from any other medical disorder, the initial laboratory studies may be limited to the following: complete blood cell count chemistry profile, thyroid function tests, urinalysis, and urine drug screen (Chand & Marwaha, 2023). If the individual is experiencing atypical anxiety symptoms, more detailed evaluations may be indicated to identify or exclude underlying medical conditions (Chand & Marwaha, 2023). These evaluations can include electroencephalography, brain computed

tomography (CT) scan, electrocardiography, tests for infection, arterial blood gas analysis, chest radiography, and thyroid function tests (Chand & Marwaha, 2023). Once a thorough evaluation is completed, the mental health professional will provide a diagnosis and discuss appropriate treatment options. Treatment for anxiety disorders may include therapy, medication, or a combination of both, depending on the severity and specific subtype of anxiety. Acute anxiety may require treatment with a benzodiazepine, while chronic anxiety treatment consists of psychotherapy, pharmacotherapy, or a combination of both (Chand & Marwaha, 2023). In addition to pharmacological therapy and cognitive-behavioral therapy, regular exercise and relaxation techniques, such as Benson's relaxation method and intradialytic exercise training programs, positively affect patients' physical and psychological functioning (Gerogianni et al., 2018). In brief, early diagnosis and intervention can lead to better outcomes and improved overall well-being, as documented by Johnson (2019).

Exercise as an Intervention for Anxiety

Regular physical activity (PA), sufficient for one’s age, has been identified as a potential therapeutic tool to reduce the risk of mental health problems in young adults (Denche-Zamorano et al., 2022). It is established that the neurobiological effects of exercise influence an increase in levels of chemicals in the brain, such as serotonin, stress hormones, endorphins, and neurotrophic factors, whose role is vital in the reduction of depressive and anxiety disorders (Czenczek-Lewandowska et al., 2022). Research trials examining the effects of physical activity (PA) on depression, anxiety, and psychological distress suggest that PA may have similar effects to psychotherapy and pharmacotherapy (Singh et al., 2023). In addition, research has shown numerous advantages over psychotherapy and pharmacotherapy in terms of cost, side effects, and ancillary health benefits (Singh et al., 2023), as more significant amounts of physical activity are associated with higher ratings of perceived health (Dostálová et al., 2021). Thus, physical

activity is critically important for physical and mental health (Czenczek-Lewandowska et al., 2022). Physical activity has a robust anti-inflammatory effect and a positive influence on behavioral and metabolic resilience (Czenczek-Lewandowska et al., 2022). In addition, regular physical exercise improves neuroplasticity and stimulates the production of neurotrophic factors (De Sousa Fernandes et al., 2020). Czenczek-Lewandowska et al. (2022) state that all of these processes undoubtedly affect the improvement of mood, motivation, self-esteem, memory function and the slowing down of cognitive decline, consequently, delaying the onset of mental problems. One study by Jayakody et al. (2013) evaluated the effects of exercise versus no intervention. It compared patients with panic disorder and generalized anxiety disorder who participated in aerobic and non-aerobic exercises versus individuals who did not exercise. Results showed that exercise group quality of life was more prominent (Jayakody et al., 2013).

Furthermore, regular physical activity is one of the most effective non-pharmacological treatments for noncommunicable diseases (NCDs), including mental disorders such as depression and anxiety (Czenczek-Lewandowska et al., 2022). Physical activity is highly beneficial for improving symptoms of depression, anxiety, and distress across a wide range of adult populations, including the general population, people with diagnosed mental health disorders, and people with chronic disease (Singh et al., 2023). In addition, physical activity should be a mainstay approach in managing depression, anxiety, and psychological distress (Singh et al., 2023). Findings from a meta-analysis indicate that exercise is an effective intervention for depression and anxiety compared with various types of controls (Kvam et al., 2016). Furthermore, Kvam et al. (2016) suggest that exercise may serve as an alternative for patients who do not respond to the given treatment, patients who are awaiting treatment, or those who, for different reasons, do not receive or want traditional treatment. Further, physical activity has shown positive in the following areas of concern:

Anxiety and Depression:

Physical activity has been utilized as a treatment for specific health issues, specifically depression and anxiety. Kandola and Stubbs (2020) report the positive effects that exercise has on mood and mental well-being. Physical activity has been shown to release endorphins, neurotransmitters that promote pleasure and reduce pain perception (Kandola & Stubbs, 2020). Regular exercise can also increase the production of brain-derived neurotrophic factor (BDNF), a protein that supports brain health and is associated with improved mood and reduced symptoms of depression and anxiety (Kandola & Stubbs, 2020).

Post-Traumatic Stress Disorder (PTSD):

Physical activity has been integrated into treatment programs for PTSD. The impact of PTSD is multi-faceted, and according to the DSM-5, the diagnosis of PTSD is characterized by four broad symptom clusters that include intense reliving of the traumatic event through disruptive memories and nightmares, avoidance of reminders of the event, negative cognitions and mood, and hyperarousal (Zhu et al., 2021). Engaging in physical activity can help individuals manage stress, reduce hyperarousal, and improve sleep quality, symptoms commonly experienced by those with PTSD (Zhu et al., 2021). As a way to promote physical and psychological health, mind-body exercise has received recent attention in the scientific literature (Zhu et al., 2021). Mind-body exercise focuses on mind, body, psychology, and behavior, including breathing, physical exercise, and meditation (Zhu et al., 2021). Thus, Zhu et al. (2021) conclude that mind-body exercise can potentially have a positive impact on PTSD, depression, and anxiety symptoms and may have high utility as an adjunctive/complementary treatment.

Binge Eating Disorder:

Incorporating exercise into the treatment of binge eating disorder (BED) has shown promising results (Galasso et al., 2020). Specifically, physical activity can ensure broad beneficial results relating to eating disorders, depression, and body mass index (BMI) in bulimia (Galasso et al., 2020). Galasso et al. (2020) conducted a study aimed to investigate the effects of specific training as an addition to conventional treatment of eating disorder symptoms, anthropometric characteristics, and physical performance. After medical examination, ten women carried out Combined Aerobic and Anaerobic Exercise Training in addition to conventional treatment (CAAET group). In contrast, the remaining nine followed the conventional treatment alone in the CTRL group (Galasso et al., 2020). Of the two groups, results suggest that women in both intervention groups achieved significant improvements in anthropometric measures, eating disorder symptoms, and exercise capacity, and both interventions similarly improved BED symptoms (Galasso et al., 2020). Furthermore, a more significant improvement in aerobic performance was observed in the CAAET group compared to women in the CTRL group (Galasso et al., 2020). Physical activity can contribute to weight management and overall health, which can be essential for individuals struggling with binge eating (Kandola & Stubbs, 2020).

Exercise and Cognitive Function

Exercise has a long history of recognition for its myriad health benefits, such as cardiovascular health, reducing the risk of chronic illness, and maintaining healthy body weight and function. In recent years, a growing body of information has revealed that exercise is an essential element for physical health, enhancing cognitive functioning, and promoting mental health. Numerous studies have demonstrated that regular exercise positively affects cognitive functions, including memory, attention, and decision-making abilities. Much evidence shows that

physical exercise is a strong gene modulator that induces structural and functional changes in the brain, which significantly benefits cognitive functioning and well-being (Mandolesi et al., 2018). Evidence has demonstrated that physical exercise affects brain plasticity, influencing cognition and well-being (Mandolesi et al., 2018).

Fernandes et al. (2017) state that abundant evidence supports the action of exercise in sharpening cognitive abilities throughout the lifespan. Exercise is perceived as an indispensable aspect of daily routine to maintain overall body and brain health (Fernandes et al., 2017). In addition, exercise has played a crucial action in shaping the modern brain through thousands of years of evolution (Fernandes et al., 2017). Eukaryotic cells have developed a sophisticated cell-to-cell communication system throughout evolution, which facilitates efficient coordination among different cell types and tissues (Fernandes et al., 2017). This system is instrumental in controlling susceptibility to a wide range of neurological and metabolic disorders, some of which have the potential to be inherited, emphasizing the vital role that exercise plays in maintaining health and well-being (Fernandes et al., 2017). Physical exercise plays a vital role in counteracting normal and pathological aging. Furthermore, it has positive biological and psychological effects that affect the brain and cognitive functioning and promote well-being. (Mandolesi et al., 2018).

Neuroprotective Effects. Sleiman et al. (2016) state that physical exercise has been shown to have neuroprotective effects by promoting the production of brain-derived neurotrophic factor (BDNF). BDNF is a protein that supports the growth and maintenance of nerve cells and is vital for cognitive function (Miranda et al., 2019). The brain-derived neurotrophic factor (BDNF) belongs to a family of neurotrophins that have a crucial role in the survival and differentiation of neuronal populations during development (Huang & Reichardt, 2001). Exercise induces beneficial responses in the brain, accompanied by an increase in BDNF,

a trophic factor associated with cognitive improvement and the alleviation of depression and anxiety (Sleiman et al., 2016). A study conducted by Intlekofer and Cotman (2013) found that exercise leads to increased BDNF levels in the brain, which can protect against age-related cognitive decline and neurodegenerative diseases.

Brain-derived neurotrophic factor is a crucial protein that plays an integral part in the brain's growth, maintenance, and plasticity of nerve cells, or neurons (Miranda et al., 2019). BDNF is essential in various processes, such as synapse formation, long-term potentiation (a process associated with learning and memory), and neuroplasticity, the brain's ability to adapt and recognize itself (Bathina & Das, 2015). Exercise has been shown to profoundly affect the production and release of BDNF (Di Liegro et al., 2019). Muscles release substances called myokines When engaging in aerobic exercises or strength training (Di Liegro et al., 2019). These myokines, including irisin and cathepsin B, have been found to stimulate the production of BDNF in the brain (Di Liegro et al., 2019). This process is often called exercise-induced neurogenesis and is critical for maintaining healthy brain function (Di Liegro et al., 2019).

The increased BDNF through exercise profoundly impacts cognitive function and has many associations with several cognitive processes. These processes include learning and memory, neuroplasticity, protection against cognitive decline, and neurodegenerative diseases.

Learning and Memory. BDNF is a key player in synaptic plasticity, which is the basis for learning and memory (Miranda et al., 2019). BDNF contributes to the brain's ability to store and retrieve information effectively by promoting growth and strengthening the synapses. This is why increased BDNF levels resulting from exercise can improve memory and cognitive performance (Vecchio et al., 2018).

Neuroplasticity. BDNF supports neuroplasticity, the brain's ability to reorganize its structure and function. Neuroplasticity, also known as neural plasticity or brain plasticity, is a

process that involves adaptive structural and functional changes to the brain (Puderbaugh & Emmady, 2023). This is vital for adapting to new information, learning new skills, and recovering from brain injuries (Puderbaugh & Emmady, 2023). Synaptic plasticity can be positively influenced by several things, including, but not exclusively, exercise, the environment, repetition of tasks, motivation, neuromodulators (such as dopamine), and medications/drugs (Puderbaugh & Emmady, 2023).

They are protecting Against Cognitive Decline. Puderbaugh and Emmady (2023) state that aging and neurodegenerative diseases have been associated with a decrease in neuromodulators and may contribute to a reduction in the ability of synaptic plasticity. One of the most significant implications of BDNF's role in neuroprotection is its potential to guard against age-related cognitive decline and neurodegenerative diseases (Azman & Zakaria, 2022). Azman and Zakaria (2022) also state that age-related cognitive decline often results from neuronal loss and synaptic dysfunction. BDNF, by promoting the growth and survival of neurons and the maintenance of synaptic connections, can counteract these processes, thus helping to preserve cognitive function in older individuals (Azman & Zakaria, 2022).

Neurodegenerative Diseases. Alzheimer's disease is a progressive neurodegenerative disorder characterized by memory loss and multiple cognitive disorders (Azman & Zakaria, 2022). In addition, changes in BDNF levels and activities have been associated with a variety of neurodegenerative diseases, including Alzheimer's disease, Parkinson's disease, Huntington's disease, and ALS (Azman & Zakaria, 2022). The neuroprotective effects of exercise-induced BDNF production have particular relevance for neurodegenerative diseases (Vecchio et al., 2018). In Alzheimer's disease, there is a progressive loss of neurons and synaptic connections, leading to memory and cognitive deficits (DeTure & Dickson, 2019). By elevating BDNF levels, exercise may mitigate these effects, slowing down the progression of the disease. In addition,

Parkinson's disease is characterized by the degeneration of dopamine-producing neurons in the brain (Sidorova et al., 2019). BDNF has been shown to promote the survival of these neurons, making exercise a potential means of delaying the onset and progression of Parkinson's disease (Sidorova et al., 2019).

Exercise and Sleep

Studies have shown that people who engage in regular exercise experience more profound and more restorative sleep. Despite the overwhelming consensus that sufficient sleep and adequate exercise are pivotal in maintaining health, these behaviors are often deprioritized within a typical lifestyle (Dolezal et al., 2017). A meta-analysis by Kredlow et al. (2015) found that exercise reduces the time it takes to fall asleep and increases the overall duration of sleep. In addition, exercise can also help individuals reach the deeper stages of sleep, known as slow-wave sleep, which is essential for memory consolidation and mental restoration (Kredlow et al., 2015). Another study by Herbert et al. (2020) found that individuals who engage in regular physical activity had a lower likelihood of experiencing symptoms of depression and anxiety. Regular exercise helps reduce stress, which can contribute to sleep disturbances (Kline, 2014). A meta-analysis of six studies found that exercise training improved subjective sleep quality in middle-to older adults with sleep problems (Kline, 2014). Furthermore, the release of endorphins during exercise acts as a natural stress reliever, helping individuals to unwind and relax, further promoting better sleep and mental health (Mahindru et al., 2023).

Exercise and Counseling Combined

Exercise and counseling are two essential factors when striving for a healthy lifestyle that can positively impact physical and mental health outcomes. The combination of these two interventions has been suggested to have synergistic effects. Cognitive Behavior Therapy (CBT) is an evidence-based psychosocial practice initially developed for the treatment of adult

depression that has been extended to many other areas, including the treatment and primary prevention of anxiety in typically developing children, adolescents, and adults (Perihan et al., 2020). A randomized controlled trial conducted by Luty et al. (2007) found that a 12-week program of supervised exercise combined with cognitive-behavioral therapy (CBT) was more effective than exercise alone in reducing symptoms of depression in adults. A systematic review conducted by Stonerock et al. (2015) and evidence from 12 randomized clinical trials suggested the benefits of exercise. They concluded that exercise may be a valuable treatment for anxiety (Stonerock et al., 2015). Another study by Goodwin (2003) found that 8,094 participants exercising regularly had a reduced risk of being diagnosed with anxiety. Findings from the present review suggest that exercise could be a good, affordable, and accessible treatment for anxiety (Stonerock et al., 2015). According to Xie et al. (2021), it is necessary to seek alternative therapies for depression because the side effects of medications lead to poor adherence, and some patients do not achieve a clinical treatment effect. In addition, Thomas et al. (2020) systematically analyzed 22 studies that met the inclusion criteria, seven of which were rated methodologically strong. They concluded that physical activity interventions may be a viable alternative to psychological therapies, provided psychological approaches are incorporated into the implementation design (Thomas et al., 2020). Combining physical activity with psychological therapy consistently engendered positive effects on outcomes compared with treatment as usual (Bourbeau et al., 2020). Counseling has been a standard treatment for anxiety and depression, while physical exercise has emerged as an efficacious treatment for symptoms of anxiety and depression (Bourbeau et al., 2020). A meta-analysis by Bourbeau et al. (2020) examined the effect of exercise combined with counseling on depression and anxiety. Their findings concluded that this meta-analysis supported the use of exercise as an effective adjunct treatment for depression across a range of comorbidities (Bourbeau et al., 2020). Research specifically showed that adding moderate-intensity exercise to counseling may yield superior

improvements in depression and anxiety symptoms (Bourbeau et al., 2020). Exercise may provide an inexpensive, practical addition to traditional behavioral therapy (Bourbeau et al., 2020). Examination of the literature linking exercise to mental health suggests that exercise training benefits a broad array of mental health outcomes. However, the strength of treatment benefits appears to vary across populations and training modalities (Smith & Merwin, 2021). The following are new approaches available for individuals who struggle with anxiety.

Walk-and-talk therapy is an innovative approach involving conducting therapy sessions outdoors. Long-distance walking has been practiced through the ages and across many cultures, and today, walking has become widely popular. Its popularity has been motivated by various reasons related to mental, physical, or spiritual health (Mau et al., 2021). This approach capitalizes on the benefits of exercise for mental health while providing a natural and less intimidating environment for clients to share their thoughts and feelings. Walking can promote relaxation, stimulate creativity, and create a sense of openness in clients, leading to more productive therapy sessions (Clark, 2019).

Additionally, exercise therapy focuses on helping individuals regain normal physical functioning after suffering an injury or during recovery from a disease. Bricca et al. (2020) state that exercise therapy appears to be safe and beneficial to physical and psychosocial health. Their research concluded that the most significant benefits from exercise therapy were observed for depression, followed by anxiety, health-related quality of life, and objectively measured physical function (Bricca et al., 2020).

Factors Influencing the Effectiveness of Combined Interventions

Two factors influencing the effectiveness of combined interventions are individual and contextual. Individual factors include initial levels of anxiety symptoms and adherence to interventions. The initial severity of anxiety symptoms plays a pivotal role in the effectiveness of

combined interventions; those suffering from higher baseline anxiety typically need more intensive or tailored therapies to experience significant improvements. Further research should investigate which combination of therapies provides maximum comfort to individuals with various levels of baseline anxiety (Thomas et al., 2020). The second one is adherence to interventions. Compliance is integral for successful outcomes of prescribed interventions, from following protocols to attending therapy sessions and engaging in recommended practices outside therapy sessions. Clinicians must monitor and support adherence to maximize benefits from combined interventions; future research must explore methods of increasing treatment adherence while investigating its relationship to outcomes.

Moreover, the discussion of contextual factors includes the duration of interventions and frequency of sessions**.** The duration of interventions and the length of time multiple interventions take to implement can dramatically impact their efficacy. Longer implementation times typically provide for more comprehensive treatments and consolidate therapeutic gains more successfully. It is vital that when creating effective programs to address mental health conditions, treatment duration and other practical considerations like cost or resource availability be balanced out against each other to create optimal solutions explicitly tailored for specific illnesses (Ho et al., 2020). Further research must examine optimal intervention durations explicitly tailored for specific ailments. Regarding the frequency of sessions, therapy session frequency can tremendously impact treatment outcomes, offering ongoing support and therapeutic work opportunities. In contrast, less frequent sessions could hinder progress. Individual needs and preferences must also be considered; future research must assess optimal frequency sessions across populations and conditions (Ho et al., 2020).

The Outcome of Implications for Future Research and Clinical Practice

Personalization and tailoring: Combined interventions may benefit from considering individual characteristics like baseline anxiety levels. Treatment plans that meet an individual's needs often yield better results; future research must explore how best to match interventions according to an individual's characteristics, preferences, and treatment goals.

Adherence Support: For maximum outcomes from combined interventions, clinicians should prioritize and support treatment adherence through psychoeducation, regular check-ins, and collaborative goal-setting strategies. Future research should explore interventions designed to increase treatment adherence and their effects on treatment outcomes (Thomas et al., 2020).

Location of an Ideal Intervention Length: Striking a balance between treatment duration and practical considerations is paramount, so future research must investigate optimal durations for combined interventions targeting various mental health conditions or populations. Long-term follow-up studies provide invaluable insight into maintaining treatment effects over time (Ho et al., 2020).

Individualized Session Frequency: Interventions should consider individual needs and preferences when designing effective integrated interventions, including selecting an optimal session frequency to improve treatment results and finding an optimum intensity/frequency balance. Future research could investigate this relationship by exploring its effect on treatment results and any scheduling flexibility-related impacts on treatment effectiveness.

Mechanisms of Action

Exercise and counseling have both been demonstrated to decrease anxiety effectively. Although each uses distinct mechanisms for its effects on anxiety reduction, combining the two may bring synergistic benefits that further alleviate it. This review will investigate potential ways

that exercise and counseling might interact or influence each other for this effect based on neurotransmitter regulation, cognitive restructuring, and emotion regulation, amongst other influences, as evidenced both theoretically and empirically (Ho et al., 2020).

Exercise can reduce anxiety by altering neurotransmitter activity. Physical activity also stimulates endorphin release - natural painkillers and mood enhancers. Endorphins work by binding to opioid receptors in the brain and leading to feelings of euphoria while decreasing anxiety symptoms. Exercise increases serotonin production and availability for mood regulation purposes. Serotonin is essential in reducing anxiety, with low levels linked to higher anxiety. Physical exercise also boosts GABA release - an inhibitory neurotransmitter known to reduce neuronal excitability and facilitate relaxation, so modulating these neurotransmitters through physical activity may alleviate anxiety symptoms (Ho et al., 2020).

Counseling interventions, such as cognitive-behavioral therapy (CBT), target cognitive restructuring. CBT seeks to identify and challenge maladaptive thought patterns while trying to replace them with more rational, realistic thoughts. Individuals can reduce anxiety levels by addressing cognitive distortions related to anxiety. Empirical evidence supports Cognitive-Behavioral Therapy's (CBT's) effectiveness at alleviating anxiety symptoms; studies have proven it can bring lasting improvement for some anxiety sufferers. When combined with exercise counseling sessions, people may experience improved cognitive restructuring; exercise has been proven to boost brain power while supporting neuroplasticity - further amplifying its effects as counseling interventions are undertaken (Carter et al., 2021).

Emotion regulation is another essential element of anxiety reduction. Exercise has significantly strengthened emotion regulation skills, helping individuals control and regulate their emotions. Regular physical activity increases self-awareness and emotional regulation skills, allowing individuals to cope more easily in anxiety-provoking situations. Furthermore,

regular physical activity promotes the release of endocannabinoids, which play a significant role in managing stress responses and emotions, thus encouraging more robust emotion regulation strategies for reduced anxiety levels (Thomas et al., 2020).

Counseling interventions provide individuals with tools and strategies for effective emotion regulation. Therapists can assist individuals in recognizing emotional triggers, developing coping skills, and employing relaxation techniques. When exercise is combined with counseling interventions, individuals may experience greater self-efficacy as they gain control of their emotions, leading to lessened anxiety levels (Carter et al., 2021). Studies suggest that exercise and counseling combined may have an additive or complementary effect in relieving anxiety symptoms. Aylett et al. (2018) investigated this phenomenon by looking at its impact on adults diagnosed with generalized anxiety disorder; their study demonstrated how aerobic exercise was influential in the treatment of raised anxiety compared to waiting list control groups. They additionally determined that high-intensity exercise programs showed more significant effects than low-intensity programs (Aylett et al., 2018).

Exercise and counseling both play critical roles in helping reduce anxiety through various mechanisms. Exercise regulates neurotransmitters such as endorphins, serotonin, and GABA, which all play vital roles in mood regulation and anxiety reduction. Counseling interventions focus on cognitive restructuring and emotion regulation to overcome maladaptive thought patterns and provide individuals with useful coping mechanisms. Combining exercise and counseling may enhance cognitive restructuring and emotion regulation, leading to synergistic effects in anxiety reduction (Carter et al., 2021). There is empirical support for both interventions separately; together, they promise to improve anxiety-related processes.

Strengths and Limitations of Existing Research

Current research into combined exercise and counseling interventions for decreasing anxiety levels has provided valuable insight into their efficacy; however, specific strengths and limitations must be considered when assessing these findings.

Strengths

Our review included many Randomized Controlled Trials (RCTs), considered the gold standard for measuring intervention efficacy. RCTs involve randomizing participants between treatment groups to control for confounding variables and enable researchers to draw causal inferences about outcomes (Hariton & Locascio, 2018).

Large Sample Sizes: Several studies included in this review had large sample sizes that improved the generalizability of findings and reduced Type II errors, making their results more robust and reliable. These larger sample sizes contributed significantly to generalizability by increasing statistical power and decreasing Type II error risk; larger sample sizes provided additional statistical power and more robust results overall.

Diverse Populations: The reviewed studies encompassed various age groups, genders, and clinical populations, adding external validity and suggesting that combined exercise-counseling approaches might apply across diverse communities experiencing anxiety (Soares & Woods, 2020).

Longitudinal Designs: Some studies included multiple assessments at multiple time points to explore the long-term outcomes of interventions, providing more nuanced insights into sustained benefits while pinpointing possible contributors that influence treatment outcomes over time (Soares & Woods, 2020). Longitudinal designs also help uncover any factors affecting these

outcomes over time that might contribute to improved treatment results and help identify any factors influencing treatment results over time.

Limitations

In the area of mental health, using exercise and therapy together to help people with worry has shown positive results. But, as with any kind of therapy, there are some problems that need to be recognized and dealt with. This introduction talks about the main problems with the current research. It focuses on the differences between intervention protocols, the lack of consistency in outcome measures, the short follow-up periods, the lack of active control groups, and the gaps in the literature (Galvez-Sánchez et al., 2020). Researchers and practitioners can make exercise and therapy more successful for reducing worry if they understand and try to fix these problems.

One big problem is that the intervention methods used in the papers we looked at were all different. It is challenging to compare and draw conclusions from different studies because they use so many different kinds of exercise and coaching methods. Future studies should attempt to make things more consistent so that we can do more thorough comparisons and get a better idea of which parts of interventions work best (Galvez-Sánchez et al., 2020). Also, the fact that result measures are not always the same makes it difficult to figure out how well the treatments work as a whole. Different studies used different ways to measure worry, which makes it hard to compare them directly. By standardizing how academics measure outcomes, they can make it easier to compare results and learn more about this field, which leads to more solid conclusions about how exercise and therapy affect worry reduction.

Intervention Protocol Heterogeneity

The reviewed studies differed considerably with respect to their choice of exercise and counseling interventions used, including various exercise types (aerobic, resistance training, and yoga) as well as counseling approaches such as cognitive-behavioral therapy or psychodynamic therapy - making a comparison between studies difficult as future research should aim for greater standardization to facilitate comparative analyses more easily.

Lack of Consistency in Outcome Measures

Studies employed various outcome measures to assess anxiety levels, such as self-report questionnaires, clinical interviews, and physiological measures. With uniform measures in each study's outcome measures for comparison purposes and overall effectiveness determination purposes, it becomes easier to compare them against each other accurately; standardizing outcome measurements would increase comparability and knowledge accumulation within this field.

Short Follow-Up Periods

While specific studies included follow-up assessments, their duration was relatively brief. Additional extended follow-up periods would give researchers more of an understanding of sustained effects from interventions and help determine the potential recurrence of anxiety disorder symptoms.

Literature Disconnect

There remain inconsistencies and gaps within the literature that warrant attention. Despite overall positive findings, some inconsistencies and gaps were present within the existing literature on combined exercise and counseling interventions for anxiety reduction. These inconsistencies might be related to variations in study designs, sample characteristics, or

intervention protocols used. Furthermore, gaps could potentially be filled through future investigations.

The dosage and intensity of exercise and counseling to alleviate anxiety remain unclear. However, several studies reported positive effects with low-intensity exercises and brief counseling sessions, while others demonstrated more significant gains with higher-intensity activities and longer counseling durations. Additional research must be completed to ascertain which combination of exercises, counseling components, frequency, and duration intensity can best reduce anxiety in any particular patient population.

Mechanisms of Change

Although exercise and counseling reduce anxiety in various ways, not all underlying mechanisms remain fully understood. It is widely known that exercise has beneficial effects on depressive symptoms and body functions (Xie et al., 2021). However, more research is needed into the mechanisms underlying the antidepressant effects of exercise because a better understanding might result in the design of further intervention protocols and targeted treatment (Xie et al., 2021). Future research should explore potential mediators and moderators such as neurobiological markers, processes, and emotion regulation. Regulation can also play a part in outcome improvements.

Specific Populations

Although studies on specific populations, clinical populations or older adults exist, more research should focus on subgroups like adolescents, those living with co-morbidities or marginalized communities for whom combined exercise and counseling interventions might provide tailored treatment recommendations and potentially address disparities in anxiety treatment (Soares & Woods, 2020).

Summary

Existing literature on mixed intervention approaches of traditional talk therapy and physical exercise to reduce anxiety shows a positive relationship between physical activity and counseling. Studies have shown that these interventions, when combined, are effective in reducing anxiety symptoms. Furthermore, the biopsychosocial model provides a theoretical framework for understanding how physical activity and counseling address multiple aspects of the model, thereby improving health outcomes. Studies show that vigorous physical activity and high levels of physical fitness are most important for achieving substantive health gains (Eather et al., 2016). There are some inconsistencies in the literature regarding the optimal duration and intensity of the intervention. Several studies did not report the intensity of exercise (n = 6), potentially masking or skewing the intensity-dependent effect of exercise on depression and anxiety (Bourbeau et al., 2020). There is literature that states short, low interventions are more effective than longer and more intensive. This could be due to different study designs, participant choice, or measurement tools used.

Although there are promising results in a combined approach, some gaps should be addressed. Literature shows that most studies focus on specific populations such as anxiety or depression, but it is unclear whether interventions have the same effects in other populations. Additional research is needed to better understand the impact between combined intervention approaches on anxiety reduction. Moreover, further research is needed to fill in the gaps for the effectiveness of interventions in different population groups, investigating the long-term effects of interventions, and identifying potential barriers to implementation. Equally important is additional research needed to examine the effects of physical activity on social factors. This is important to see how anxiety and factors interact with the psychosocial and biological factors of the model. This additional research can help advance the understanding of the psychosocial

model and support clinicians in developing effective interventions that specifically target the reduction of anxiety symptoms. Overall, data suggest that exercise is an effective intervention in improving anxiety symptoms in people with anxiety and stress-related disorders (Stubbs et al., 2017). Future studies should provide inclusive methodological descriptions of the exercise intervention's type, duration, and intensity (Bourbeau et al., 2020).

Chapter Three: Methods

Overview

This chapter details the proposed methodology for the study. First, the research design is discussed, including the research questions and the independent and dependent variables. Secondly, the intended research procedure is described, including the selection of participants, the proposed measures, the intervention protocols, and the projected plan for statistical analysis. Finally, validity aspects will be considered.

Design

Following approval by the Institutional Review Board (IRB), the proposed study will utilize a correlational design with participants randomly gathered through an online surveying program. Participants will be selected randomly without pre-assignment to a specific group. Specifically, the study will be provided online via Survey Monkey, a popular and widely available survey service that maintains a large user base. Purposive and reverse snowball sampling will be used to target participants. Utilizing purposive sampling involves specifically selecting participants from social media platforms focused on physical fitness and mental health. Additionally, the study will incorporate snowball sampling, where initial participants are encouraged to refer others within their social networks who meet the study's criteria. According to Creswell and Creswell (2023), purposive sampling allows for a targeted and intentional selection of participants, ensuring relevance to the research objectives. Reverse snowball sampling is where researchers ask target participants to recruit participants (Marcus et al., 2016). Through the integration of reverse snowball and purposive sampling techniques, the research endeavors to leverage established social connections while retaining command over participant characteristics. This strategic methodology is designed to facilitate a thorough examination of the advantages arising from the combined intervention, thereby enhancing both inclusivity and depth

in the targeted population. The survey will be made available to users over the age of 18 years old who provide their informed consent and voluntary participation. Participants will self-report their use of mental health interventions, engagement with physical activity, and levels of anxiety.

The study employs a correlational design to investigate associations between variables without manipulation. Correlational studies aim to find out if there are differences in the characteristics of a population depending on whether or not its subjects have been exposed to an event of interest in the naturalistic setting (Lau, 2017). Correlational studies are different from comparative studies in that the evaluator does not control the allocation of subjects into comparison groups or the assignment of the intervention to specific groups (Lau, 2017). The chosen design is in-line with the study's objective of exploring the effect of a combined intervention approach on self-reported anxiety levels. The correlational design is the most suitable for this research as it enables the examination of natural relationships in a real-world setting. The design has practical benefits such as facilitating data collection through online surveys and enabling efficient analysis of large datasets (Herbert et al., 2020). This study aims to investigate the potential decrease in anxiety symptoms resulting from the combination of mental health interventions and physical fitness activity.

The data will be statistically analyzed to investigate the associations among mental health intervention, physical fitness activity, and self-reported anxiety. Correlation coefficients, including Pearson's, will be calculated to assess the magnitude and direction of associations. Data analysis enables researchers to establish a significant correlation between the combined intervention approach and reduced anxiety levels. Specifically, statistical analysis of these variables will enable the researchers to determine the strength of the relationship between counseling interventions and physical activity regarding their impact on reducing anxiety symptoms.

Research Question(s)

This study is designed to explore the following research question:

RQ1: Do individuals who engage in regular physical exercise and counseling interventions report lower levels of anxiety than those who only participate in counseling but do not engage in regular physical exercise?

Hypothesis

The alternate hypothesis for this study is:

H1: There will be a statistically significant difference between individuals who regularly participate in both counseling and physical exercise and will produce lower self-reported anxiety levels than those who participate in counseling but do not engage in regular physical exercise.

Participants and Setting

This study's sample is comprised of Survey Monkey users over the age of 18 who regularly engage in mental health services and who may or may not engage in regular physical exercise. This sample was chosen to provide a view of the relationship between counseling and physical exercise across the general adult population.

The estimated sample size for the study is 50-100 individuals. Despite the limited sample size, it is customary for correlational studies to employ smaller samples, especially when investigating particular populations or when the research design emphasizes comprehensive investigation over generalizability (Stubbs et al., 2017). In the present study, the broad nature of the sample ensures a greater likelihood for generalizability and future research. For various reasons, the chosen population is appropriate for addressing the research topic and aims. The study focuses on regular engagement with physical fitness and consistent engagement with counseling to quantify the combined effect of each in producing low self-reported anxiety levels.

Instrumentation

Online survey questions and Anxiety Likert Scale

The study will utilize several methods of measurement when assessing participant engagement with counseling, physical fitness, and present levels of anxiety symptoms. Specifically, participants' level of engagement with counseling and physical fitness will be measured via multiple-choice survey questions developed by the researcher. While questions concerning engagement with counseling will be used, only participants who respond "yes" to these questions will be included in the sample. By comparison, survey questions examining the format and intensity of physical fitness will be used across all participants within the sample. Finally, participants will provide self-reported ratings of their anxiety within the last six months using a Likert scale (see Appendix A).

Procedures

Consent for Participation

Explicit consent for the treatment of participation is not required in this study as it does not involve administering any form of treatment. Participants must provide informed consent for their voluntary participation in the study (see Appendix B). The consent process will provide participants with information regarding the study's purpose, their involvement, data confidentiality and anonymity, and the option to withdraw at any point (Li et al., 2019).

Data Analysis

Statistical Analysis

The statistical analysis in this study aims to assess the temporal changes in anxiety levels across participant groups. The study will utilize self-ratings of anxiety as the key performance indicator to compare individuals who engage in physical fitness activities and receive mental

health care (group and/or individual) with those who do not (Siedlecki, 2020). Additional comparisons will be made between various levels of engagement with physical activity and counseling.

ANOVA

The use of an analysis of variance (ANOVA) is proposed to compare the covariance of variables across different groups. The application of ANOVA in this research is important in scrutinizing the correlation between physical activity, counseling, and anxiety levels. The ANOVA statistical method enables the evaluation of mean anxiety ratings across distinct groups, thereby offering valuable insights into the potential effects of the combined intervention on anxiety reduction (Li et al., 2019).

The ANOVA analysis findings will enhance comprehension of the possible advantages of utilizing a combined intervention strategy in mitigating anxiety. The detection of statistically significant variations in anxiety ratings among the groups would imply that the amalgamation of mental health intervention and physical fitness activity could potentially result in reduced anxiety self-assessments compared to solely engaging in physical activity without mental health assistance (Siedlecki, 2020).

Furthermore, the utilization of ANOVA analysis facilitates the identification of additional contributing factors that may influence anxiety levels. By analyzing demographic variables, including age, gender, race/ethnicity, education level, and current employment status, the researcher can investigate potential interactions between these factors and the intervention regarding their impact on anxiety outcomes. This data has the potential to contribute to future studies and augment comprehension of variances among individuals in their reactions to the intervention (Walliman, 2021).

This investigation's results can considerably influence the advancement of anxiety treatments that integrate physical activity and psychotherapy. Should the combined intervention approach exhibit greater efficacy in reducing anxiety compared to alternative groups, it may furnish validation for adopting integrated treatment methodologies that attend to both physiological and psychological welfare. This may hold significant relevance for individuals who exhibit reluctance towards commencing medication or psychotherapy or those who reside in areas with restricted availability of primary mental health resources (Ishtiaq, 2019).

The present study provides strong empirical evidence concerning the correlation between physical activity, counseling, and anxiety mitigation by utilizing meticulous quantitative data analysis techniques, such as ANOVA. The statistical results will make a valuable addition to the current body of literature regarding the efficacy of the intervention approach that combines multiple methods. These findings will have significant implications for clinical practice, policy formulation, and the general welfare of individuals who suffer from anxiety symptoms (Siedlecki, 2020).

Threats to Validity and Addressing Attrition

When designing the study, the researcher identified the possibility of attrition as a significant threat to the validity of the findings. It is common for individuals to disengage from physical activity and mental health services over time, which could impact the study's outcomes. To address this concern, the researcher decided to utilize the Survey Monkey online survey platform, which provides access to a large and diverse pool of potential participants (Siedlecki, 2020).

By utilizing the Survey Monkey platform, the study can ensure an appropriately sized and properly stratified sample. The online survey allows for efficient data collection and minimizes attrition, as participants can conveniently complete the survey at their convenience. Furthermore,

participants will be targeted using purposive and reverse snowball sampling techniques. These sampling techniques allow the research to tap into existing social connections while maintaining control over participant characteristics. This approach is intended to enable a comprehensive exploration of the benefits of the combined intervention, enhancing inclusivity and depth within the targeted population. Additionally, the random assignment of participants to different conditions helps mitigate potential bias and confounding variables, further enhancing the internal validity of the study (Rahman, 2017).

Statistical Validity

Statistical validity pertains to the precision and consistency of the statistical analyses performed in the research. Appropriate statistical methods will be used based on the research questions and data collected to ensure statistical validity. Descriptive statistics summarize demographic characteristics to provide a profile of the study sample. ANOVA can compare anxiety levels among groups, identifying differences related to mental health support and physical fitness activity. The statistical significance of the results will be determined using reliable software and appropriate significance levels (Li et al., 2019).

Clinical Significance

In addition to assessing statistical significance, the purpose of the study is to evaluate the clinical effectiveness of the findings. Clinical significance refers to the relevance or practical importance of the results in real-world settings. The study's findings will be evaluated in light of their impact on individuals' self-assessed anxiety levels and their potential implications for mental health interventions and physical fitness activities. Evaluation of the study's clinical significance will consider the effect sizes, the practical value of any observed differences, and the potential implications for clinical practice. This study aims to shed light on the potential

benefits of combining mental health support with physical fitness activities in reducing anxiety levels by investigating both statistical and clinical significance (Siedlecki, 2020).

Chapter Four: Findings

Overview

The purpose of this study was to explore how a combined intervention approach of physical activity and counseling affects the reduction of symptoms of anxiety. The research aimed to investigate if there was a correlation between mental health intervention, physical activity, and anxiety levels among adults. Chapter Four also includes a discussion of how the analysis conducted was consistent with grounded theory methodology and how the analysis ties back to the research questions. In addition, this chapter comprises of the research question, hypothesis, and descriptive statistics for the sample (i.e., frequencies, means, and standard deviations). Additionally, this chapter includes sample demographics, using tables to complement the summary. This chapter contains the presentation of the findings of the study to address the following research question and hypothesis:

RQ1: Do individuals who engage in regular physical exercise and counseling interventions report lower levels of anxiety than those who only participate in counseling but do not engage in regular physical exercise?

H1: There will be a statistically significant difference between individuals who regularly participate in both counseling and physical exercise and will produce lower self-reported anxiety levels than those who participate in counseling but do not engage in regular physical exercise.

Descriptive Statistics

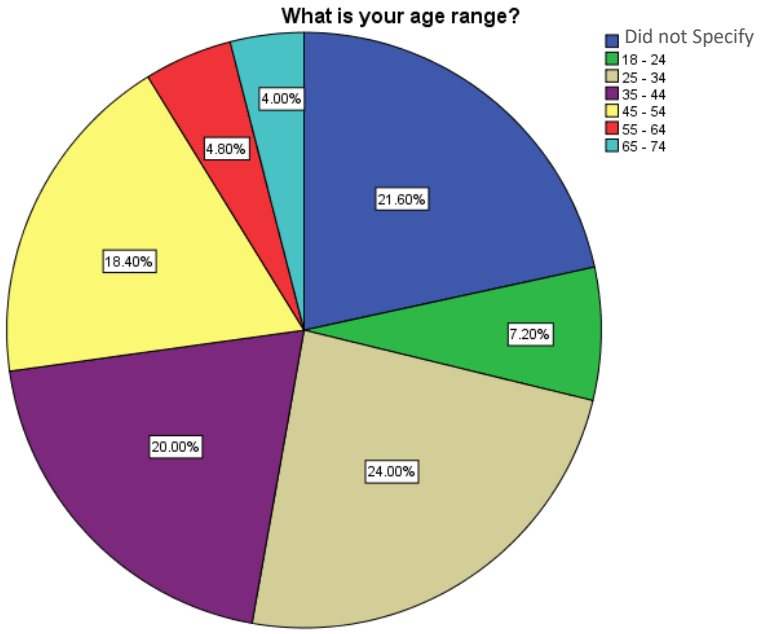
Descriptive statistics was performed to understand the demographic characteristics of the study sample. This involved analysis of sample distribution by age range, ethnicity, gender and education level.

Distribution by Age

Most participants in the study sample were between the age of 25–34 representing 24.0% (n = 30) of the sample. This was then followed by participants within the age range of 35–44 (20.0%, n = 25) then those between the age range of 45–54 (18.4%, n = 23). Those who were in the age range of 18–24 represented 7.2% (n = 9) while those between 55–64 represented 4.8% (n = 6). Participants between the age range of 65–74 represented 4.0% (n = 5) of the sample as shown in Figure 1 below. This shows that most participants included in the study were within the age range of 25–54 years as they represented the largest proportion of the sample. Figure 1 below shows the findings.

Figure 1

Distribution by Age Range



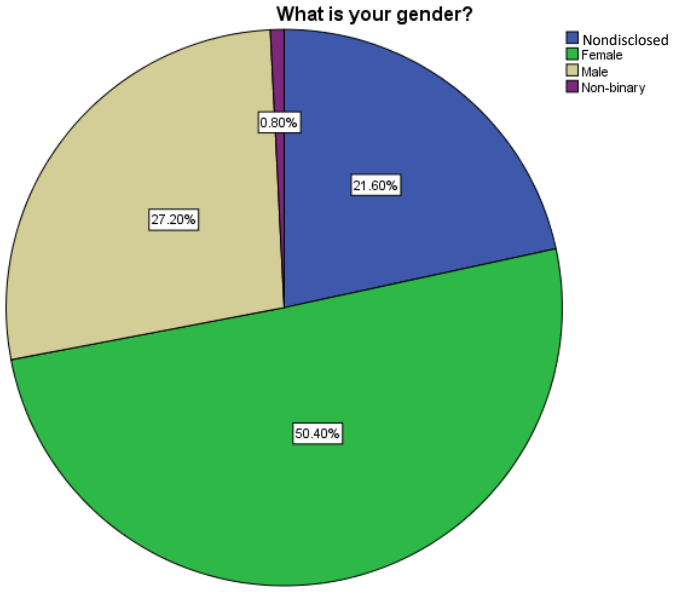
Distribution by Gender

Of the 125 sample, 50.4% (n = 63) were female participants while 27.2% (n = 34) were male participants. Only 0.8% (n = 8) were non-binary participants in accordance to gender. Non-

binary participants in this case were considered not to belong to either gender (male or female). Accordingly, 21.60% (n = 27) declined to disclose their gender. The findings are shown in Figure 2 below.

Figure 2

Distribution by Gender

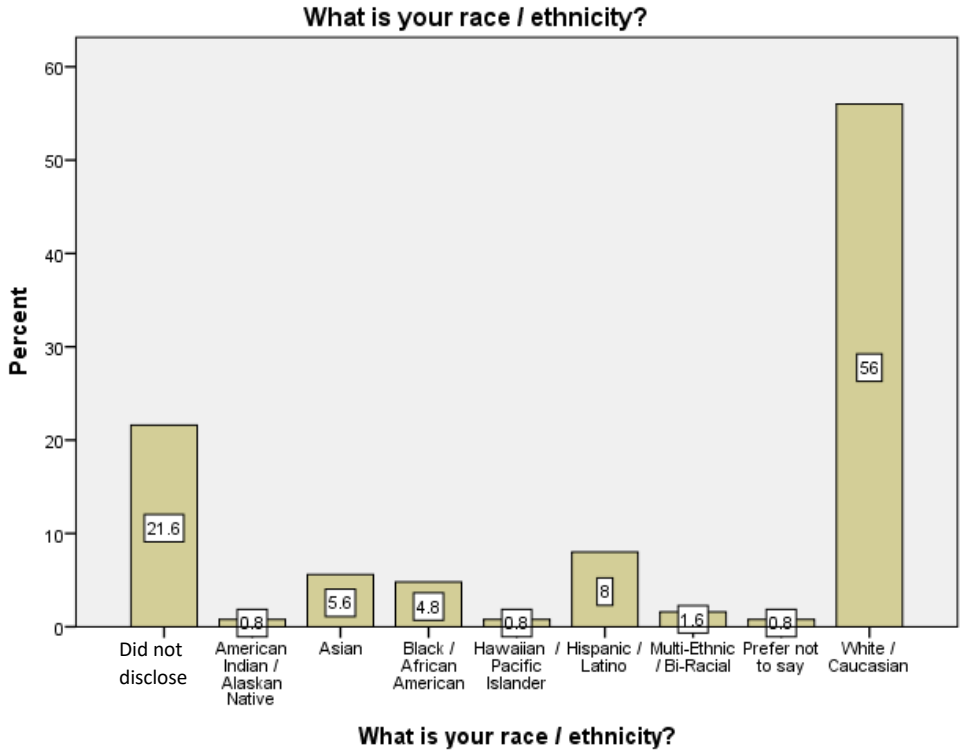


Distribution by Ethnicity

Analysis was further performed to determine participants' distribution by ethnicity. It was noted that the largest proportion of participants in the sample were white/Caucasian representing 56.0% (n = 70) of the sample. Hispanic/Latino in the sample represented 8.0% (n = 10) and Asians represented 5.6% (n = 7). Black/African Americans represented 4.8% (n = 6), Multi-ethnic/Bi-racial were 1.6% (n = 2), Hawaiian/Pacific Islander were 0.8% (n = 1) and American Indian/Alaskan Native were 0.8% (n = 1). 0.8% (n = 1) of the participants preferred not to disclose their ethnicity. The results are shown in Figure 3 below.

Figure 3

Distribution by Ethnicity

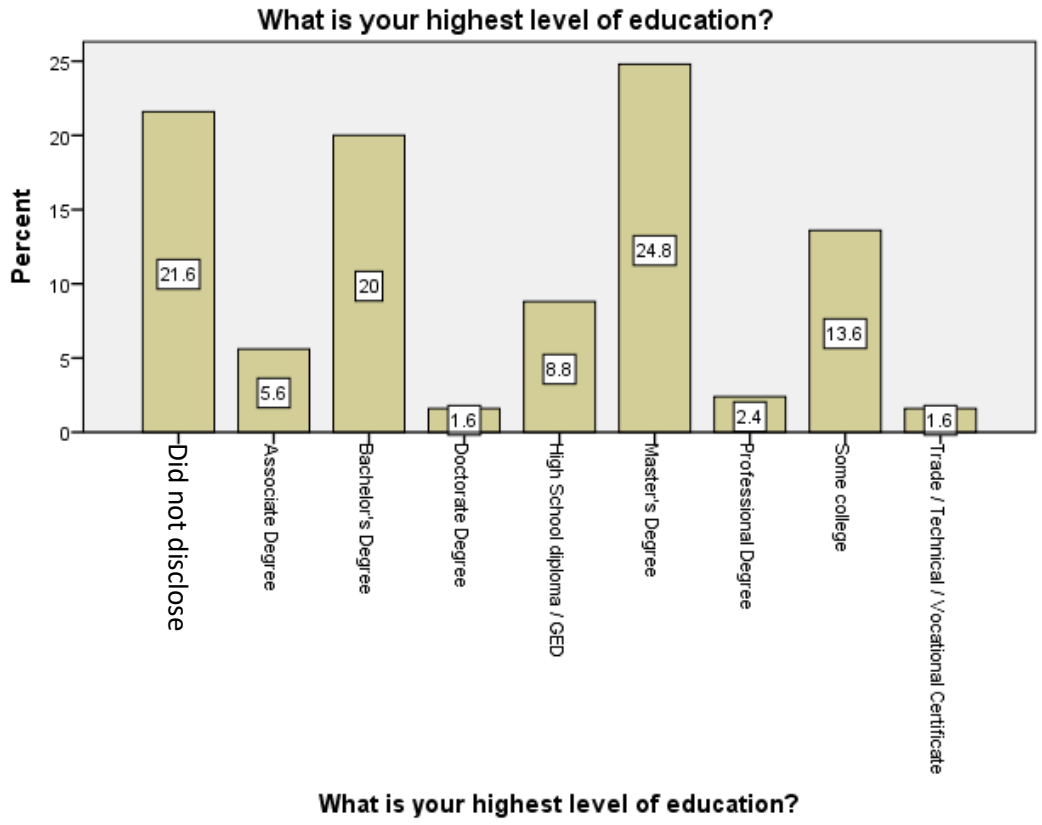


Distribution by Education Level

Participants included in the study varied in accordance to their education level. Most participants (24.8%, n = 31) had reached master's degree followed by those who had reached bachelor's degree level of education (20.0%, n = 25). Those who had reached some college level of education represented 13.6% (n = 17) of the sample, and those who had high school diploma/GED were 8.8% (n = 11). Other participants in the sample included those who had attained associate degree (5.6%, n = 7), professional degree (2.4%, n = 3), doctorate degree (1.6%, n = 2) and trade/technical /vocational certificate (1.6%, n = 2) as shown in Figure 4 below.

Figure 4

Distribution by Education Level



Participation in Counseling and Mental Health Services

More than three-quarter of participants (81.6%, n = 102) in the study indicated to have participated in counseling or mental health services. Only 17.6% (n = 22) indicated to have not participated in any counseling or mental health services. Of those who had participated in counseling or mental health services, more than half (59.2%, n = 72) had participated in mental health counseling or therapy in the last 6 months. However, 19.2% (n = 24) had not participated in mental health counseling or therapy in the last 6 months. As shown in table 1 below.

Table 1

Participation in Counseling and Mental Health Services

Participated in counseling and mental health services	n	%	Valid %
No	22	17.6%	17.6
Yes	102	81.6%	81.6
No, I have not participated in counseling in the last 6 months.	24	19.2	19.2
Yes, I have participated in counseling in the last 6 months.	74	59.2	59.2

Frequency of Participation

Most participants who had participated in counseling and mental health services indicated that they often attend mental health counseling or therapy 1–2 times a month (37.6%, n = 47) while those who attend 3–4 times per month were 13.6% (n = 17). Those who attend the counseling or therapy 5–6 times a month were 7.2% (n = 9), and those who attend 9 times or more in a month were only 1.6% (n = 2). Table 2 below shows the findings.

Table 2

Frequency of Participation in Counseling or Therapy

Frequency of participation	n	%	Valid %	Cumulative %
1-2 times per month	47	37.6	37.6	77.6
3-4 times per month	17	13.6	13.6	91.2
5-6 times per month	9	7.2	7.2	98.4

9 or more times per month	2	1.6	1.6	100.0

Format of Counseling or Therapy

Participants were also asked to indicate the format of mental health counseling or therapy they have attended. Close to half (49.6%, n = 62) of those who had attended counseling and mental health therapy went for an individual format. 16.8% (n = 21) attended counseling in small group, and another 16.0% (n = 20) attended as a family/couple or marriage. Additionally, 0.8% (n = 1) attended as telemed psychiatrist. The findings thus show that those who attend counseling mostly go in the format of individual as illustrated in Table 3 below.

Table 3

Format of Attending Counseling or Therapy

Format of attendance	N	%	Valid %	Cumulative %
Individual	62	49.6	49.6	100
Small Group	21	16.8	16.8	100.0
Marriage/Couples/Family	20	16.0	16.0	100.0
Telemed Psychiatrist	1	.8	.8	100.0

The findings further showed that those who attended counseling or therapy did the same in different ways. However, majority of those who had attended counseling and therapy went in person (40.0%, n = 50). Other participants attended through online/video/telehealth (28.8%, n = 36), phone (12.8%, n = 16), text-line/text therapy (11.2%, 14), crisis counseling / emergency services (5.6%, n = 7) and inpatient / hospitalization (4.0%, n = 5).

Table 4

Ways of Attending Counseling or Therapy

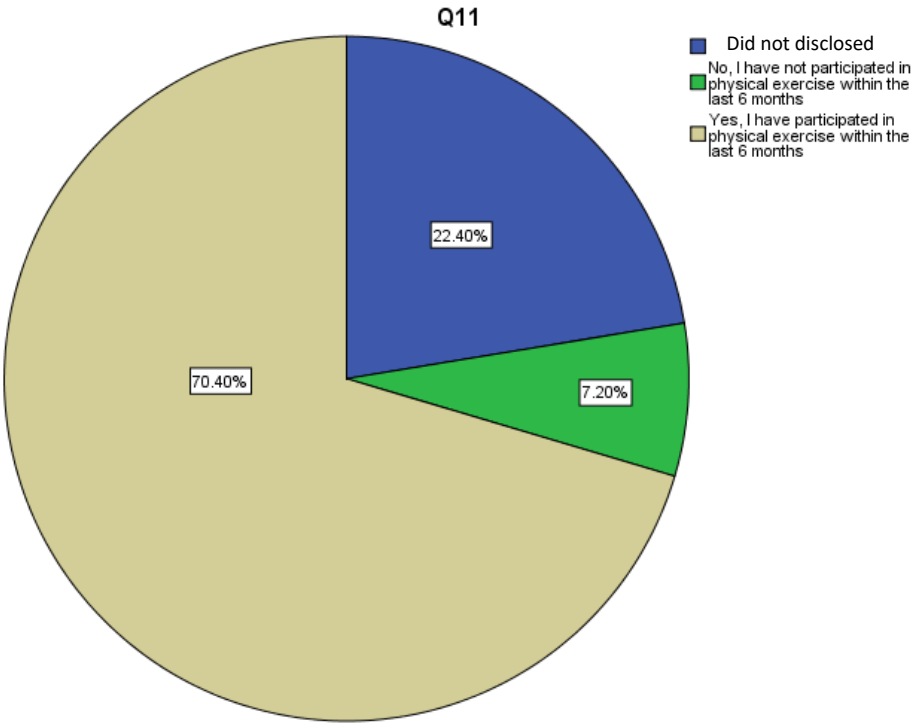
Approaches of attending therapy	n	%	Valid %	Cumulative %
In-person	50	40.0	40.0	100.0
Online/telehealth/video	36	28.8	28.8	100.0
Phone	16	12.8	12.8	100.0
Text-line/text therapy	14	11.2	11.2	100.0
Crisis counseling/ Emergency Services	7	5.6	5.6	100.0
Inpatient/Hospitalization	5	4.0	4.0	100.0

Participation in Physical Exercise

Aside from participation in counseling and therapy, participants were further asked if they had participated in physical exercise. Accordingly, 70.4% (n = 88) of the participants indicated to have participated in physical exercise while only 7.2% (n = 9) had not participated in physical exercise as shown in Figure 5 below.

Figure 5

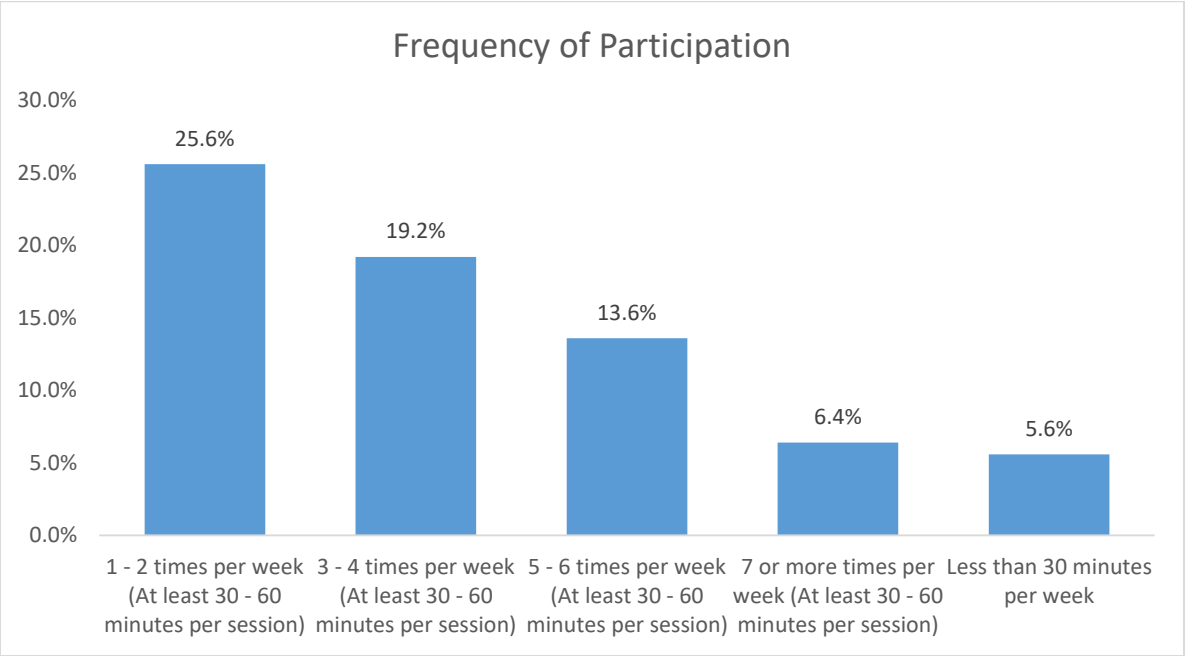
Participation in Physical Exercise



Among those who had participated in physical exercise, 25.6% (n = 32) did that 1–2 times per week for at least 30–60 minutes. 19.2% (n = 24) engaged in physical exercise 3–4 times a week for the same duration while 13.6% (n = 17) engaged in physical exercise 5–6 times a week. Those who engaged in physical exercise for more than 7 times a week were 6.4% (n = 8) while those who engaged in exercise for less than 30 minutes per week were 5.6% (n = 7). Figure 6 shows the findings below.

Figure 6

Engagement in Physical Exercise



Types of Physical Exercise

Participants were also engaged in different physical exercise. The findings showed that most participants who participated in physical exercise engaged in Endurance (Running, Walking, Biking, Swimming, Hiking, Sports, Aerobics, etc.) (59.2%, n = 74). Additionally, a significant 36.8% (n = 46) engaged in Strength (Weight Lifting, Resistance Exercises, Body Weight Exercises, etc.) and 26.4% (n = 33) performed Flexibility type of physical exercise such as Yoga, Tai Chi, Mobility Work, etc. 19.2% (n = 24) of participants engaged in Balance (Gymnastics, Surfing, Skateboarding, Pilates, etc.). Those who engaged in dance type workouts, walking and work represented 0.8% (n = 1) respectively. Table 5 shows the findings below.

Table 5

Types of Physical Exercise

Types of physical exercise	n	%	Valid %	Cumulative %
Endurance (Running, Walking, Biking, Swimming, Hiking, Sports, Aerobics, etc.)	74	59.2	59.2	100.0
Strength (Weight Lifting, Resistance Exercises, Body Weight Exercises, etc.)	46	36.8	36.8	100.0
Balance (Gymnastics, Surfing, Skateboarding, Pilates, etc.)	24	19.2	19.2	100.0
Flexibility (Yoga, Tai Chi, Mobility Work, etc.)	33	26.4	26.4	100.0
Dance type workouts (Zumba, Just Dance, etc.)	1	.8	.8	98.4
Walking	1	.8	.8	99.2
Work	1	.8	.8	100.0

In addition, more than half of those who had participated in physical exercise indicated to have done so individually (55.2%, n = 69). 24.8% (n = 31) participated in small groups, 20.8% (n = 26) engaged in instructor directed physical activity lessons (in-person) while 10.4% (n = 13) engaged in instructor directed lesson (live/virtual) physical activity lessons. Table 6 shows the findings below.

Table 6

Format of Physical Activities

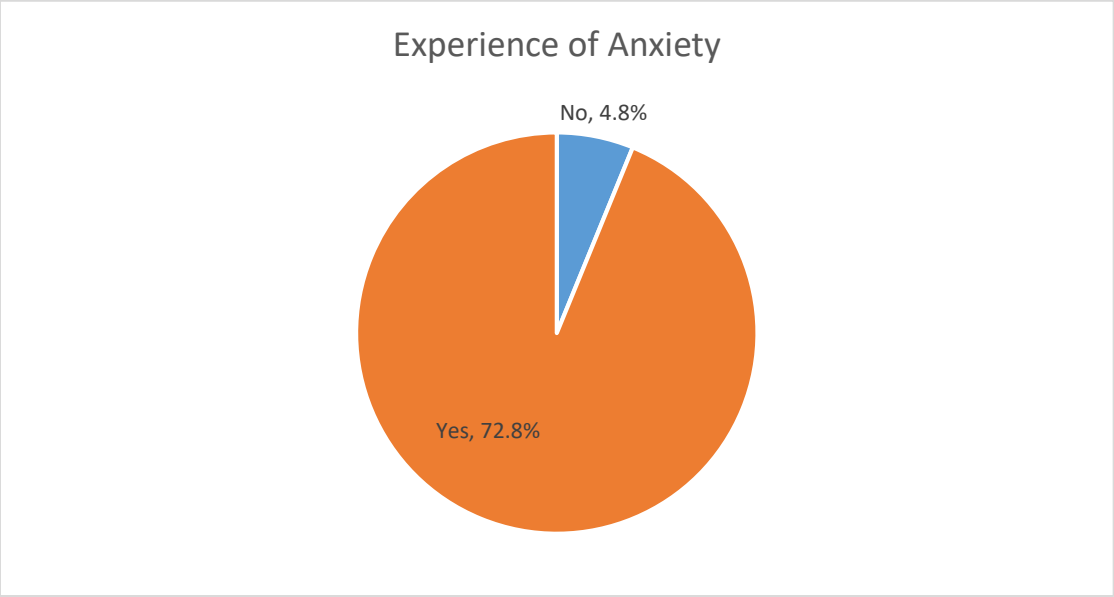
	n	%	Valid %	Cumulative %
Individual	69	55.2	55.2	100.0
Small Group	31	24.8	24.8	100.0
Instructor Directed Lesson (In Person)	26	20.8	20.8	100.0
Instructor Directed Lesson (Live/Virtual)	13	10.4	10.4	100.0
Total	125	100.0	100.0	

Feelings of Anxiety

Almost three-quarter of participants in the study (72.8%, n = 91) indicated to have experienced feelings of anxiety in the last 6 months. Only 4.8% (n = 6) had not experienced anxiety in the last 6 months as shown in Figure 7 below.

Figure 7

Experienced Feeling of Anxiety in the Last 6 Months



Accordingly, participants reported a difference in anxiety symptoms felt in the last 6 months. The main anxiety experienced by most participants was excessive worry and restlessness or feeling on edge represented by 46.6% (n = 62) respectively. Difficulty controlling feelings of worry was another form of anxiety felt by a significant number of participants (44.0%, n = 55) as well as irritability (40.8%, n = 51), difficulty falling asleep, staying asleep, or unrestful sleep (40.0%, n = 50) and easily fatigued (39.2%, n = 49). Other forms of anxiety reported included muscle tension (28.0%, n = 35), difficulty functioning in social scenarios (20.8%, n = 26), difficulty completing work related responsibilities (13.6%, n = 17), issues with appetite, not wanting to eat (0.8%, n = 1) and inability to work due to depression and anxiety (0.8%, n = 1). Table 7 shows the findings below.

Table 7

Types of Anxiety

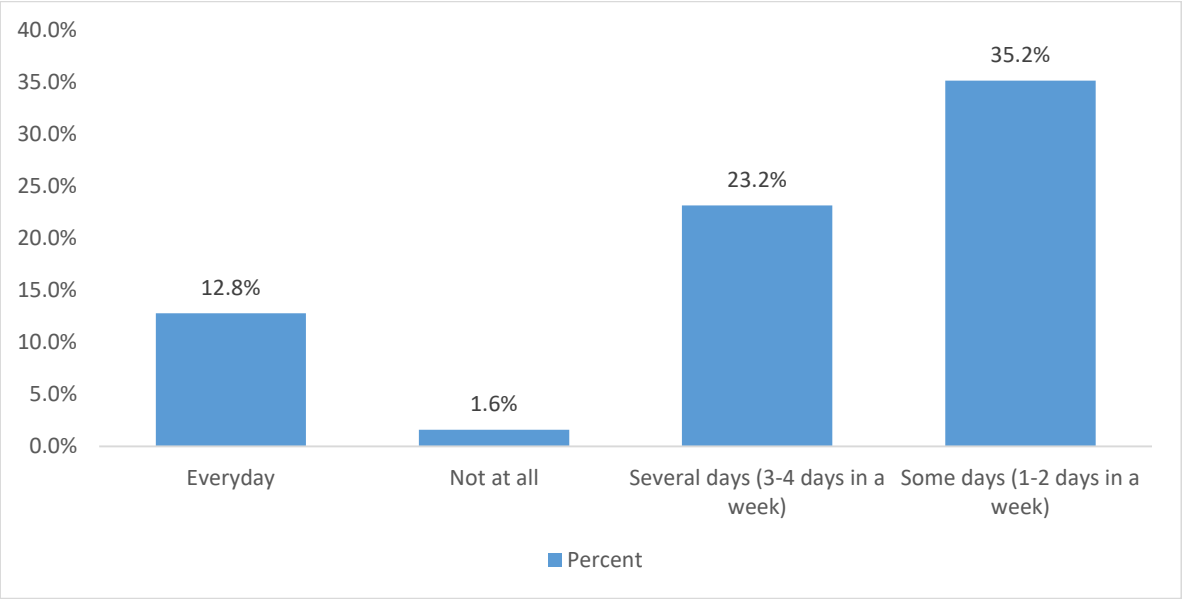
Types of Anxiety	n	%	Valid %	Cumulative %
Excessive worry	62	49.6	49.6	100.0
Difficulty controlling feelings of worry	55	44.0	44.0	100.0
Restlessness or feeling on edge	62	49.6	49.6	100.0
Easily fatigued	49	39.2	39.2	100.0
Difficulty concentrating or mind frequently going blank	43	34.4	34.4	100.0
Irritability	51	40.8	40.8	100.0
Muscle tension	35	28.0	28.0	100.0

Difficulty falling asleep, staying asleep, or unrestful sleep	50	40.0	40.0	100.0
Difficulty functioning in social scenarios	26	20.8	20.8	100.0
Difficulty completing work related responsibilities	17	13.6	13.6	100.0
I am currently unemployed and unable to work due to depression and anxiety. Completing any task whatsoever is a challenge.	1	.8	.8	99.2
Issues with appetite, not wanting to eat	1	.8	.8	100.0

The study also noted that in the last 6 months, 35.2% (n = 44) had experienced anxiety for 1–2 days in a week while another 23.2% (n = 29) had experienced anxiety for 3–4 days in a week. However, 12.8% (n = 16) experienced anxiety almost every day while only 1.6% (n = 2) had never experienced anxiety. Figure 8 shows the findings below.

Figure 8

Frequency of Anxiety



Results

Hypothesis

Anova Analysis was performed to determine whether there was a significant mean difference in anxiety severity between those who had engaged in combined physical activity and counseling therapy and those who engaged in counseling alone. Using descriptive statistics, it was noted that the mean anxiety severity among those had participated in combined physical activity and counseling was 3.29 (SD = 1.083) while those who participated in counseling and therapy alone had a mean anxiety severity of 3.22 (SD = 1.202) as shown in Table 8.

Table 8

Descriptive Statistics

Q11*Q20	N	Mean	Std. Deviation
No, I have not participated in physical exercise within the last 6 months	9	3.22	1.202
Yes, I have participated in physical exercise within the last 6 months	82	3.29	1.083
Total	91	3.29	1.088

However, the mean severity in anxiety between those in combined physical activity and counseling as well as those engaged in counseling alone was found not to be statistically significant (P>0.05) as shown in Anova table below. In this case, the null hypothesis was upheld and the alternative hypothesis developed for the study was not supported.

ANOVA Table

			Sum of Squares	Df	Mean Square	F	Sig.
Q20 * Q11	Between Groups	(Combined)	.040	1	.040	.034	.855
	Within Groups		106.531	89	1.197		
	Total		106.571	90			

Chapter Five: Conclusion

Overview

The last segments of this chapter encompass limitations and recommendations for future research, each empowering the researcher to steer future endeavors toward the most productive path. This research aimed to compare anxiety severity between individuals undergoing combined physical activity and counseling therapy as opposed to those solely engaged in counseling. Contrary to expectations, the mean anxiety severity between the two groups was not significantly different ($p > 0.05$), as per the ANOVA analysis. Despite a slight numerical difference, statistical insignificance suggests that both treatment methods yielded similar outcomes in managing anxiety levels.

Discussion

The purpose of this study was to examine whether individuals who engage in regular physical exercise alongside counseling interventions report lower levels of anxiety compared to those who only participate in counseling without regular exercise. This study sought to investigate the potential benefits of combining these two interventions for anxiety management. By analyzing the data and integrating findings from the literature, this section explores each research question in light of the study's results and relevant theoretical frameworks.

RQ1: Do individuals who engage in regular physical exercise and counseling interventions report lower levels of anxiety than those who only participate in counseling but do not engage in regular physical exercise?

H1: There will be a statistically significant difference between individuals who regularly participate in both counseling and physical exercise and will produce lower self-reported anxiety levels than those who participate in counseling but do not engage in regular physical exercise.

The results of the study did not support the alternative hypothesis. Contrary to the expectations, there was no statistical difference in self-reported anxiety levels between individuals who engaged in both counseling and regular physical exercise compared to those who only participated in counseling without regular physical exercise. This finding contradicts some previous research suggesting that combining physical exercise with counseling could lead to lower levels of anxiety. However, it aligns with other studies indicating that exercise interventions may not consistently reduce anxiety severity. The discrepancy in findings may stem from differences in sample characteristics, intervention protocols, or outcome measures across studies.

The lack of significant difference in anxiety levels between the two groups raises questions about the underlying mechanisms through which physical exercise may contribute to anxiety management when combined with counseling interventions. Theories proposing the beneficial effects of exercise on mental health, such as the neurobiological and psychological mechanisms, may need to be re-evaluated in the context of combined interventions. Future research could explore potential moderators or mediators of treatment outcomes to elucidate the conditions under which physical exercise enhances the effectiveness of counseling for anxiety management.

From a practical standpoint, the findings suggest that while physical exercise has numerous health benefits, its additive effect on anxiety alongside counseling may not always be evident. Counselors and healthcare providers may need to reconsider the integration of exercise into anxiety treatment approaches and prioritize individualized treatment plans based on client preferences and needs. Additionally, clinicians should remain vigilant in monitoring treatment responses and adapting interventions accordingly to optimize outcomes for clients with anxiety disorders. The results of this study contrast with some previous research suggesting a significant

reduction in anxiety levels with combined exercise and counseling interventions. However, they align with other studies indicating mixed findings regarding the effectiveness of exercise interventions for anxiety. Discrepancies across studies may reflect variations in sample characteristics, intervention designs, and outcome measures. By comparing and contrasting findings from existing literature, this study contributes to the ongoing dialogue on the optimal integration of exercise into anxiety treatment options.

In conclusion, this discussion section provides a comprehensive analysis of the study's findings to the research question, drawing on the existing literature to contextualize and interpret the results. While the study did not find support for the hypothesized difference in anxiety levels between groups, it underscores the complexities of treatment outcomes and emphasizes the importance of nuanced approaches to anxiety support.

Implications

The results bear implications for both theory and practical application. From a theoretical standpoint, they highlight the necessity for further research into the underlying mechanisms of combined therapeutic methods. In practical terms, clinicians may consider these findings when formulating treatment plans, acknowledging that while exercise may offer various health benefits, its additive effect on anxiety management alongside counseling may not always be pronounced. Moreover, integrating physical activity into anxiety treatment alongside counseling may not consistently yield significant additional benefits thus prompting counselors to reconsider its incorporation based on individual client requirements and preferences. Furthermore, the research underscores the importance of evidence-based practice, urging counselors to rigorously assess intervention effectiveness based om empirical evidence.

From a Christian worldview perspective, these findings prompt reflection on the universal nature of human well-being. While physical activity is valued for prompting health and

stewardship of the body, its integration into counseling practices should be approached with discernment and consideration of individual needs. Christians may view anxiety management through the lens of faith, recognizing the role of spiritual practices, community support, and reliance on God's guidance in navigating life's challenges. The study's results underscore the complexity of addressing anxiety within a comprehensive framework that acknowledges the physical, psychological, and spiritual dimensions of human experience. Additionally, the study highlights the importance of humility and openness to revising therapeutic approaches based on empirical evidence, aligning with principles of stewardship and responsible caregiving within the Christian worldview.

Limitations

Internal Validity. One potential limitation of the study relates to the measurement of anxiety severity. While the study used standardized measures to assess anxiety, self-report measures are subject to response biases such as social desirability or recall bias. Participants may have provided responses they deemed socially acceptable or may have difficulty accurately recalling their anxiety experiences. This could introduce measurement error and affect the internal validity of the study by inaccurately reflecting participants' true anxiety levels. To mitigate this threat, future research could incorporate multiple methods of assessment, such as clinician-administered interviews or physiological measures, to provide a more comprehensive understanding of anxiety severity.

External Validity. External validity limitations of the study may arise from the specific context in which the research was conducted. For example, if the study was carried out within a controlled clinical or academic setting, the findings may not fully generalize to real-world or community-based settings where factors such as access to resources, socioeconomic status, and cultural norms could influence treatment outcomes differently. This context-specific limitation

could restrict the applicability of the findings to broader populations and settings. Furthermore, the recruitment method used in the study may introduce selection bias, as participants who volunteer or are referred to participate in research studies may differ from those who do not. This could impact the external validity of the findings by limiting the representativeness of the sample and potentially skewing the results towards certain demographic or clinical characteristics.

To address these external validity limitations, future research could employ more diverse sampling methods, including community-based recruitment strategies or collaboration with healthcare providers in various settings. Additionally, conducting multi-site studies across different geographic locations and cultural contexts can enhance the generalizability of the findings and provide a more comprehensive understanding of the effectiveness of combined interventions for anxiety management.

Recommendations for Future Research

In considering the findings of this study and aiming to enhance the applicability of future research, several recommendations are suggested as follows. First, it is recommended that future studies conduct a higher power analysis by increasing the sample size. This adjustment could provide a more comprehensive understanding of the effectiveness of the combined counseling and physical exercise intervention. With a larger sample size, the study's results may be more generalized to broader populations and yield more statistically significant findings. Additionally, there is a suggestion to explore gender-specific settings in such interventions. Given that gender can influence preferences, attitudes, and responses to therapy and physical activity, tailoring interventions to the specific needs and preferences by gender could potentially enhance their effectiveness. A gender-specific approach might involve differentiating counseling or exercise types based on gender-specific needs and preferences.

Further, the correlation between specific types of counseling and corresponding physical activities should be researched. This could involve examining how different types of counseling (i.e. cognitive-behavioral therapy vs. mindfulness-based therapy) paired with specific forms of exercise (i.e. yoga vs strength training) optimizes outcomes. Understanding these correlations could guide the development of more tailored and effective interventions for individuals with anxiety symptoms. Additionally, future studies might delve into the effectiveness of evidence-based counseling approaches versus non-evidence-based approaches when paired with physical activity. Understanding which types of counseling interventions yield the most significant benefits when combined with exercise can guide practitioners in selecting the most appropriate treatment.

Moreover, the educational background of participants should also be considered. This study noted a well-educated sample, which contrasts with research suggesting that individuals with lower educational attainment are less likely to engage in counseling and exercise. Future research could explore how educational level influences participation rates and the effectiveness of interventions. Social media platforms could serve as avenues to reach out to a more diverse population, including those who might not traditionally seek counseling or engage in physical exercise activities. Considering the potential disparity in access to social media, future studies could explore how the use of social media platforms might impact the effectiveness and reach of interventions. For instance, if this study were conducted through a community mental health center instead of an online format, several differences could arise. Conducting the study in a community mental health center could lead to different participant pool due to recruitment of face-to-face interactions and partnerships with local organizations. In-person engagement may foster trust, potentially increase willingness to participate. In-person data collection could offer

more nuanced insights, especially for interventions directly implemented and monitored by mental health professionals.

Another avenue for exploration is the impact of relationship status on engagement and outcomes. Research should look for correlations between relationship status (single, partnered, married) and health behaviors. Investigating how relationship status interacts with participation in combined counseling and physical activity interventions could provide valuable insights into tailoring interventions for specific populations.

Although future research could continue to delve into individual differences to identify subgroups that might benefit more from combined interventions, another option could be to investigate the long-term effects of combined physical activity and counseling therapy on anxiety management. This longitudinal study could track participants over an extended period to assess whether the initial lack of significant difference in anxiety severity between groups persists over time or if there are delayed or cumulative effects that emerge. By examining the sustainability of treatment effects and potential differences in outcomes over time, researchers can provide valuable insights into the effectiveness and durability of combined interventions for anxiety. Additionally, exploring factors that may moderate or mediate treatment outcomes, such as adherence to treatment protocols, coping strategies, or changes in lifestyle behaviors, could further elucidate the mechanisms underlying the observed effects. This research could inform the development of tailored interventions that optimize long-term anxiety management outcomes for diverse populations.

Conclusion

In summary, this study aimed to investigate the impact of exercise alongside counseling interventions on anxiety levels. It compared to individuals who exercised and participated in counseling versus those who only attended counseling. Despite the hypothesis proposing a

significant difference, the findings did not support this assertion, indicating any statistically significant difference in anxiety levels between the two groups. This discrepancy emphasizes the need for further research to understand the mechanisms underlying combined interventions for anxiety. Theoretical implications suggest a reevaluation of existing theories regarding the additive effects of exercise on anxiety management within the context of counseling. From a practical standpoint, clinicians should consider individualized treatment plans and remain vigilant in monitoring treatment to optimize outcomes for clients with anxiety disorders. By comparing and contrasting findings with existing literature, this study contributes to the ongoing discussion on the optimal integration of exercise and anxiety treatment approaches. Overall, while the study did not find support for the hypothesized difference, it highlights the importance of distinct approaches and individualized care in anxiety treatment.

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Appendix A

Consent

Title of the Project: An Investigation of the Effect of a Combined Physical Exercise and Counseling as a Therapeutic Approach to Reducing Anxiety Symptoms.

Principal Investigator: Andrea Beltran, Student Doctoral Candidate, School of Behavioral Sciences, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be 18 years of age or older, who engages regularly in mental health services, and who may or may not participate in regular physical exercise. Participants will be asked to utilize self-ratings of anxiety as the key performance indicator to compare individuals who engage in physical fitness activities and receive mental health care (group and/or individual) compared to those who do not. Next, participants will answer questions about engagement with counseling and physical fitness. Finally, participants will provide self-reported ratings of their anxiety within the last six months using a Likert scale. This should take about 10-15 minutes to complete. If you would like to participate and meet the study criteria, please click here. A consent document is provided on the first page of the survey. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

The purpose of the study is to investigate the relationship between counseling, physical exercise, and their combined effect on reducing feelings of anxiety.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following:

1. Participants will be asked to utilize self-ratings of anxiety as the key performance indicator to compare individuals who engage in physical fitness activities and receive mental health care (group and/or individual) compared to those who do not. (3-5 minutes to complete)

2. Next, participants will answer questions of engagement with counseling and physical fitness. (3-5 minutes to complete)

3. Finally, participants will provide self-reported ratings of their anxiety within the last six months using a Likert scale. (4-5 minutes to complete)

4. This should take about 10-15 minutes total to complete.

How could you or others benefit from this study?

- No Direct Benefits Participants should not expect to receive a direct benefit from taking part in this study:

- Benefits to society include: The purpose of this study is to investigate the relationship between traditional counseling and physical exercise on anxiety. By examining the correlation between mental health intervention, physical exercise, and anxiety levels among adults. This study aims to contribute to existing knowledge on the benefits of integrating mental health services with physical exercise activities. The findings of the research may benefit society by contributing to evidence-based recommendations and improving our understanding of the potential benefits of integrating exercise and counseling for anxiety reduction.

What risks might you experience from being in this study?

Minimal risk: The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be anonymous.
- Data will be stored on a password-locked Survey Monkey database. After three years, all electronic records will be deleted

How will you be compensated for being part of the study?

Participants will not be compensated for participating in this study.

Is the researcher in a position of authority over participants, or does the researcher have a financial conflict of interest?

No

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time prior to submitting the survey.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Andrea Beltran. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted] You may also contact the researcher's faculty sponsor, Dr. Catherine Packer-Williams at [redacted]

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA, 24515; our phone number is 434-592-5530, and our email address is irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. You can print a copy of the document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

__Andrea Beltran _____
Printed Subject Name

_[redacted]_____10/10/2023_____
Signature & Date

Appendix B

ATTENTION SURVEY MONKEY USERS: I am conducting research as part of the requirements for a Doctorate in Community Care in Counseling and Trauma at Liberty University. The purpose of my research is to investigate the relationship between counseling, physical exercise, and their combined effect on reducing feelings of anxiety. To participate, you must be 18 years of age or older, who engages regularly in mental health services, and who may or may not participate in regular physical exercise. Participants will be asked to utilize self-ratings of anxiety as the key performance indicator to compare individuals who engage in physical fitness activities and receive mental health care (group and/or individual) compared to those who do not. Next, participants will answer questions of engagement with counseling and physical fitness. Finally, participants will provide self-reported ratings of their anxiety within the last six months using a Likert scale. This should take about 10-15 minutes to complete. If you would like to participate and meet the study criteria, please click here. A consent document is provided on the first page of the survey. In addition, if you would be willing to pass along the enclosed information to friends and/or family members who may also be interested in learning about this research study, please share this post or this link with them. You are under no obligation to share this information.

ATTENTION LINKEDIN USERS: I am conducting research as part of the requirements for a Doctorate in Community Care in Counseling and Trauma at Liberty University. The purpose of my research is to investigate the relationship between counseling, physical exercise, and their combined effect on reducing feelings of anxiety. To participate, you must be 18 years of age or older, who engages regularly in mental health services, and who may or may not participate in regular physical exercise. Participants will be asked to utilize self-ratings of anxiety as the key performance indicator to compare individuals who engage in physical fitness activities and receive mental health care (group and/or individual) compared to those who do not. Next, participants will answer questions of engagement with counseling and physical fitness. Finally, participants will provide self-reported ratings of their anxiety within the last six months using a Likert scale. This should take about 10-15 minutes to complete. If you would like to participate and meet the study criteria, please click here. A consent document is provided on the first page of the survey. In addition, if you would be willing to pass along the enclosed information to friends and/or family members who may also be interested in learning about this research study, please share this post or this link with them. You are under no obligation to share this information.

ATTENTION FACEBOOK FRIENDS: I am conducting research as part of the requirements for a Doctorate in Community Care in Counseling and Trauma at Liberty University. The purpose of my research is to investigate the relationship between counseling, physical exercise, and their combined effect on reducing feelings of anxiety. To participate, you must be 18 years of age or older, who engages regularly in mental health services, and who may or may not participate in regular physical exercise. Participants will be asked to utilize self-ratings of anxiety as the key performance indicator to compare individuals who engage in physical fitness activities and receive mental health care (group and/or individual) compared to those who do not. Next, participants will answer questions of engagement with counseling and physical fitness. Finally, participants will provide self-reported ratings of their anxiety within the last six months using a Likert scale. This should take about 10-15 minutes to complete. If you would like to participate and meet the study criteria, please click here. A consent document is provided on the first page of the survey. In addition, if you would be willing to pass along the enclosed information to friends and/or family members who may also be interested in learning about this research study, please share this post or this link with them. You are under no obligation to share this information.

Appendix C

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The Effect of Combined Physical Exercise and Counseling in Reducing Anxiety

You are invited to participate in a research study that investigates the relationship between counseling, physical exercise, and their combined effect on reducing feelings of anxiety. To participate, you must be 18 years of age or older, who engages regularly in mental health services, and who may or may not participate in regular physical exercise.

As a participant, you will be asked to provide a self-assessment of your anxiety levels, which will serve as the primary measure to compare individuals who actively participate in physical fitness activities and receive mental health support (either in group or individual settings) against those who do not. In addition, you will respond to questions regarding your own engagement with counseling and physical fitness. Lastly, you'll be asked to rate your own anxiety levels over the past six months using a Likert scale. This survey is expected to take approximately 10-15 minutes to complete.

1. Please take time to read this entire form and ask questions before deciding whether to take part in this research.

- ◯ I consent to participate in this study
- ◯ I do not consent to participate in this study

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The Effect of Combined Physical Exercise and Counseling in Reducing Anxiety

2. What is your age range?

- ◯ 18 - 24
- ◯ 25 - 34
- ◯ 35 - 44
- ◯ 45 - 54
- ◯ 55 - 64
- ◯ 65 - 74
- ◯ 75 - 84
- ◯ 85 +

3. What is your gender?

- ◯ Male
- ◯ Female
- ◯ Non-binary
- ◯ Prefer not to say
- ◯ Other (Please Specify)

4. What is your race / ethnicity?

- ◯ American Indian / Alaskan Native
- ◯ Asian
- ◯ Black / African American
- ◯ Hispanic / Latino
- ◯ White / Caucasian
- ◯ Hawaiian / Pacific Islander
- ◯ Multi-Ethnic / Bi-Racial
- ◯ Other (Please Specify)
- ◯ Prefer not to say

5. What is your highest level of education?

- ◯ Some High School
- ◯ High School diploma / GED
- ◯ Some college
- ◯ Trade / Technical / Vocational Certificate
- ◯ Associate Degree
- ◯ Bachelor's Degree
- ◯ Master's Degree
- ◯ Professional Degree
- ◯ Doctorate Degree
- ◯ Other (Please Specify)
- ◯ Prefer not to say

6. In the last 6 months, have you participated in mental health counseling or therapy?

- ◯ Yes, I have participated in counseling in the last 6 months
- ◯ No, I have not participated in counseling in the last 6 months

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The Effect of Combined Physical Exercise and Counseling in Reducing Anxiety

7. In the last 6 months, how frequently have you attended mental health counseling or therapy?

- ◯ 1 - 2 times per month
- ◯ 3 - 4 times per month
- ◯ 5 - 6 times per month
- ◯ 7 - 8 times per month
- ◯ 9 or more times per month

8. What formats of mental health counseling or therapy have you attended?

- ☐ Individual
- ☐ Small Group
- ☐ Marriage / Couples / Family
- ☐ Other (please specify)

9. How did you attend counseling or therapy? Choose all that apply

- ☐ In-person
- ☐ Online/telehealth/video
- ☐ Phone
- ☐ Rehabilitation/Other (Please Specify)
- ☐ Text-line/text therapy
- ☐ Crisis counseling / Emergency Services
- ☐ Inpatient/Hospitalization

10. In the last 6 months, have you participated in regular physical exercise?

Physical Exercise: Physical exercise means doing activities that help improve or maintain your physical fitness. It can include things like playing sports, working out, or doing repetitive activities that aim to make you healthier. Whether you are running or walking around outside, playing sports with friends, or doing exercise classes at the gym, all of that is physical exercise!

- ◯ Yes, I have participated in physical exercise within the last 6 months
- ◯ No, I have not participated in physical exercise within the last 6 months

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The Effect of Combined Physical Exercise and Counseling in Reducing Anxiety

11. In the last 6 months, how frequently have you participated in physical exercise?

- ◯ Less than 30 minutes per week
- ◯ 1 - 2 times per week (At least 30 - 60 minutes per session)
- ◯ 3 - 4 times per week (At least 30 - 60 minutes per session)
- ◯ 5 - 6 times per week (At least 30 - 60 minutes per session)
- ◯ 7 or more times per week (At least 30 - 60 minutes per session)
- ◯ Other (Please Specify)

12. What types of physical exercise do you do? (Check all that apply)

- ☐ Endurance (Running, Walking, Biking, Swimming, Hiking, Sports, Aerobics, etc.)
- ☐ Strength (Weight Lifting, Resistance Exercises, Body Weight Exercises, etc.)
- ☐ Balance (Gymnastics, Surfing, Skateboarding, Pilates, etc.)
- ☐ Flexibility (Yoga, Tai Chi, Mobility Work, etc.)
- ☐ Other (please specify)

13. What formats of physical exercise have you participated in? (Check all that apply)

- [ ] Individual
- [ ] Small Group
- [ ] Instructor Directed Lesson (In Person)
- [ ] Instructor Directed Lesson (Live/Virtual)
- [ ] Other (please specify)

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The Effect of Combined Physical Exercise and Counseling in Reducing Anxiety

14. In the last 6 months have you experienced frequent feelings of anxiety?

- ◯ Yes.
- ◯ No.

15. Share the anxiety symptoms you experienced at any time during the past six months. (Check all that apply)

- [ ] Excessive worry
- [ ] Difficulty controlling feelings of worry
- [ ] Restlessness or feeling on edge
- [ ] Easily fatigued
- [ ] Difficulty concentrating or mind frequently going blank
- [ ] Irritability
- [ ] Muscle tension
- [ ] Difficulty falling asleep, staying asleep, or unrestful sleep
- [ ] Difficulty functioning in social scenarios
- [ ] Difficulty completing work related responsibilites
- [ ] Other (please specify)

16. In the last 6 months, how frequently have you experienced feelings of anxiety each week?

- ○ Not at all
- ○ Several days
- ○ More than half the days y every day

17. Have you ever been formally diagnosed with an anxiety disorder by a mental health clinician or primary care physician?

- ○ Yes.
- ○ No.

18. In the last 6 months, have you taken prescribed medication for anxiety?

- ○ Yes.
- ○ No.

19. Please rate the severity of your anxiety in the past six months below. Low ratings correspond to less feelings of anxiety, while higher ratings correspond to more feelings of anxiety.

(1: Very Low 2: Low 3: Moderate 4: High 5: Very High)

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