A COMMUNITY-BASED TREATMENT FOR SURVIVORS OF SEXUAL VIOLENCE WITH POSTTRAUMATIC STRESS DISORDER UTILIZING COGNITIVE BEHAVIORAL THERAPY AND AEROBIC EXERCISE

by

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ABSTRACT

A COMMUNITY-BASED TREATMENT FOR SURVIVORS OF SEXUAL VIOLENCE WITH POSTTRAUMATIC STRESS DISORDER UTILIZING COGNITIVE BEHAVIORAL THERAPY AND AEROBIC EXERCISE

Erika Nicole Smith

This preliminary study examined the impact of an 8-week aerobic exercise treatment on symptoms of Posttraumatic Stress Disorder (PTSD) among adult women who have experienced sexual violence. Fourteen participants were recruited naturalistically through a Certified Rape Crisis Center in Pensacola, Florida. Participants received cognitive behavioral therapy (CBT) or CBT plus group aerobic exercise sessions (CBT+E). Measures included the Clinician Administered PTSD Scale for DSM-IV-Current and Lifetime Diagnostic Version (CAPS), the PTSD Checklist-Specific Version (PCL-S), and the Symptom Checklist-90-Revised (SCL-90-R). Results revealed that both groups improved on all measures: main effects for time were observed for the CAPS, PCL-S, and SCL-90-R. Clinical significance was also observed: more participants in CBT+E no longer met the criteria for PTSD at the conclusion of treatment when comparing CAPS Frequency > 1/Intensity > 2/Total Severity > 65 (F1/I2/TSEV65) scores. There was also a trend on most measures in favor of the CBT+E treatment group. Results suggest that aerobic exercise programs may be beneficial as an adjunct treatment for individuals diagnosed with PTSD and/or a history of having experienced trauma. This

study is the first known to compare aerobic exercise to an empirically validated form of treatment (CBT) for PTSD.

CHAPTER I

INTRODUCTION

An anxiety disorder, PTSD is characterized by the re-experiencing of a traumatic event accompanied by symptoms of increased physiological arousal with a general numbing response and avoidance of stimuli associated with the trauma (American Psychiatric Association [APA], 2000; Appendix A).Examples of traumatic events may include, but are not limited to, experiencing childhood sexual abuse or sexual assault; witnessing or experiencing domestic violence; and exposure to war, violence, or combat (Newman & Motta, 2007). The vast majority of individuals who survive a traumatic event will experience symptoms of PTSD in the early aftermath of the trauma (United States Department of Veterans Affairs, 2007). However, approximately 9% to 15% of the United States population will experience persistent symptoms and go on to develop PTSD (Foa, 1998).

Research indicates that some individuals experience a delayed onset, in which their symptoms of PTSD begin months or even many years following initial exposure to the trauma (APA, 2000; United States Department of Veterans Affairs, 2007). It is also common for a trauma survivor's symptoms of PTSD to "come and go" throughout life in response to life cycle transitions and/or new stressors (United States Department of Veterans Affairs, 2007). Victims of sexual assault, combat veterans, and survivors of genocide are at particularly high risk for developing PTSD (APA, 2000).

Importantly, servicewomen experience higher rates of sexual trauma than women in the general population and may therefore be exposed to multiple forms of traumatic stress during military service, including sexual violence and exposure to combat, thereby increasing their risk for developing PTSD (Lang et al., 2003).

Multiple interventions have been found to be efficacious in the treatment of PTSD. One such intervention, CBT, is an empirically validated form of treatment that involves the delivery by a clinician of specific interventions including normalizing common reactions to trauma; providing psychoeducation on PTSD symptoms; teaching breathing retraining exercises and relaxation skills; and utilizing cognitive restructuring techniques, thought stopping techniques, and guided self-dialogue. Historically, CBT has been considered the preferred mode of psychosocial treatment for individuals diagnosed with PTSD as a result of the numerous studies providing empirical support for this intervention (Foa, 1998). For example, Foa, Hearst-Ikeda, and Perry (1995) found that a CBT program consisting of 4 2-hour sessions involving psychoeducation, relaxation training, imaginal exposure, and cognitive restructuring, reduced symptoms of PTSD among a sample of recent victims of rape and aggravated assault.

Additionally, Cognitive Processing Therapy (CPT), developed by Resick and Schnicke (1996), has been found to be an effective treatment for rape victims experiencing PTSD. CPT combines elements of both exposure therapy and cognitive restructuring. The goal of CPT is to assist clients with integrating their sexual assault experience through processing emotions and confronting cognitive distortions and maladaptive beliefs related to the rape. The exposure component involves writing detailed narratives about the rape and reading them aloud both in session and for

homework. Clients are provided with psychoeducation about how self-dialogue affects emotions, and they are encouraged to identify "stuck points," or inadequately processed emotions, related to their trauma narrative. Specific cognitive restructuring strategies are also used to challenge maladaptive beliefs about the rape, such as self-blame. CPT is typically conducted in 12 weekly sessions, in either individual or group treatment formats. Resick and Schnicke (1992) revealed significant reductions in symptoms of PTSD and depression among female sexual assault victims who received CPT compared to those in the wait-list control group (Resick & Schnicke, 1996). For the CPT group, rates of PTSD decreased from 90% at pre-treatment to 0% at post-treatment. Rates of major depression also decreased from 62% to 42%.

Medication, specifically Selective Serotonin Reuptake Inhibitors (SSRIs), such as Celexa ™, Prozac ™, Paxil ™, and Zoloft ™, is another effective mode of treatment for PTSD. More recently, Eye Movement Desensitization and Reprocessing (EMDR) has gained some empirical support. EMDR combines the use of imagery exposure with saccadic eye movements, in which a client is asked to focus on an image or memory associated with the traumatic event while the therapist moves her finger across the client's visual field (Shapiro, 1995).

Additionally, several preliminary studies conducted over the past few years have provided support for aerobic exercise as an effective treatment for PTSD as well as co-occurring anxiety and depression (Manger & Motta, 2005; Newman & Motta, 2007). Manger and Motta (2005) found that aerobic exercise reduced the severity of PTSD symptoms and co-occurring anxiety and depression among a sample of adult participants. Newman and Motta (2007) conducted a similar study to extend the research on exercise

and PTSD to the child/adolescent population. The researchers found that children's symptoms of PTSD, depression, and anxiety were improved following an exercise intervention.

The theoretical framework for this study is based upon the work of Manger and Motta (2005) and Newman and Motta (2007). The purpose of this study is to examine the effects of aerobic exercise on symptoms of PTSD among a sample of adult women presenting for services at their local Rape Crisis Center. This study will compare the effects of CBT to CBT+E in the treatment of PTSD.

Research Hypothesis

HR1: Participants in CBT+E will display a greater reduction in PTSD symptoms, as measured by pre-treatment and post-treatment scores on the CAPS and the PCL-S, compared to individuals in the treatment group receiving CBT alone.

Significance of the Study

Research examining the effectiveness of exercise as a treatment for PTSD is warranted for many reasons. Survivors of trauma experience more negative health effects, including increased resting heart rate and higher rates of cardiovascular disease, compared to those who report that they have not experienced trauma (Bedi & Arora, 2007). Lauterbach, Vora, and Rakow (2005) found that a previous and/or current diagnosis of PTSD was associated with increased risk for developing a variety of stress-related health problems, including asthma, hypertension, and ulcers, as well as conditions that are not considered to be stress related, including visual/hearing impairment, diabetes, kidney/liver disease, lupus/thyroid/autoimmune diseases, epilepsy/neurological disorders,

and stomach/gall bladder disorders. Additionally, Weisberg et al. (2002) found that individuals with PTSD report a higher number of current and lifetime medical conditions.

Although numerous studies have revealed a link between chronic stress and poor health, the exact mechanisms of how stress impacts health are not yet fully understood. Epel et al. (2004) examined the hypothesis that stress impacts health by modulating the rate of cellular aging. By examining peripheral blood mononuclear cells from healthy premenopausal women between the ages of 20 and 50, the authors found that psychological stress, both perceived stress and chronic stress, is significantly associated with higher oxidative stress, lower telomerase activity, and shorter telomere length, all known determinants of cell senescence and longevity. Results revealed that "women with the highest levels of perceived stress have telomeres shorter on average by the equivalent of at least one decade of additional aging compared to low stress women" (Epel et al., 2004, p.17312).

Therefore, decreasing symptoms of PTSD would likely improve both the physical and mental health of trauma survivors, possibly increasing longevity/decreasing early mortality. While exposure to trauma is associated with increased use of health care facilities and substantial costs, individuals who develop PTSD often tend to use the health care system more frequently (Gray, Litz, Hsu, & Lombardo, 2004). Therefore, it has been hypothesized that both individuals and insurance companies would experience a decrease in the total costs of health care upon treating psychiatric conditions, particularly PTSD (Lauterbach et al., 2005). Moreover, exercise interventions could likely be implemented with minimal financial and staffing resources, making it a more viable option for communities with limited resources (Lawrence, De Silva, & Henley, 2010).

Some trauma survivors may be reluctant to seek formal treatment, including psychotherapy and/or psychiatric medication. Reasons for avoiding treatment may include social stigma, lack of information regarding available treatment, and concerns regarding cost and/or lack of health insurance. A diagnosis of PTSD is also characterized by the avoidance of reminders associated with the trauma. Therefore, a survivor's avoidance behavior and fear of discussing traumatic memories may interfere with her decision to seek formal treatment (Manger & Motta, 2005). In contrast, many forms of exercise can be completed virtually anywhere, at any time, and without the same perceived social stigma. There is relatively little financial cost associated with exercise when compared to traditional treatments, including psychotherapy and medication management.

With the United States currently involved in the longest combat operation since Vietnam, the wars in Iraq and Afghanistan, many members of the military have been deployed numerous times and exposed to prolonged traumatic stress. These extended deployments have led to an increased need for, and interest in, examining new and effective treatments for PTSD (United States Department of Veterans Affairs, 2007).

Assumptions

It will be assumed that all participants will have responded truthfully to items on the CAPS and PCL-S, which will be utilized to diagnose PTSD and to measure symptom severity. It will be further assumed that the Certified Personal Trainer delivering the exercise intervention will have reliably recorded attendance and reliably measured and recorded the target heart rate of each participant at every exercise session.

Operational Definition of Variables

CAPS. The CAPS is an assessment tool that can be utilized to make a current (past month) or lifetime diagnosis of PTSD. It is a 30-item structured interview that corresponds to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR) criteria for PTSD. The CAPS has excellent reliability, validity, diagnostic utility, and sensitivity to clinical change. It is considered the gold standard in PTSD assessment.

CBT. CBT is a form of psychotherapy that emphasizes the influence of one's cognitions on emotions and behavior. CBT is the general term for a classification of therapies with similar foci. CBT involves the delivery by a clinician of specific interventions, including normalizing common reactions to trauma; providing psychoeducation on PTSD symptoms; teaching breathing retraining exercises and relaxation skills; and utilizing cognitive restructuring techniques, thought stopping techniques, and guided self-dialogue.

PTSD. PTSD is classified in the DSM-IV-TR as an Anxiety Disorder (Appendix A). The essential feature of PTSD is the development of characteristic symptoms following exposure to an extreme traumatic stressor. For adults, the individual's response to the stressor involves intense fear, helplessness, or horror. The characteristic symptoms that develop following the trauma include persistently reexperiencing the traumatic event, persistently avoiding stimuli associated with the trauma coupled with a general numbing of responsiveness, as well as persistently experiencing symptoms of increased physiological arousal.

PCL-S. The PCL-S is a 17-item self-report measure that corresponds to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for PTSD. The PCL-S is used for screening individuals for PTSD, diagnosing PTSD, and monitoring symptom change both during treatment and following treatment. The PCL-S inquires about the presence of symptoms in relation to an identified potentially traumatic stressor. The PCL-S is particularly useful, as the symptoms endorsed are clearly linked to a specified stressful event.

SSRIs. SSRIs are a type of antidepressant medication used to treat symptoms of depression, anxiety, and PTSD. SSRIs work to increase the level of serotonin in the brain. These medications are also used to treat sleep problems that may be associated with PTSD. Examples of commonly prescribed SSRIs include Celexa ™, Prozac ™, Paxil ™, and Zoloft ™.

SCL-90-R. The SCL-90-R is a 90-item self-report scale used to measure overall psychological distress. The scale has nine subscales to assess Somatization, Obsessive-compulsive symptoms, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism.

CHAPTER II

REVIEW OF LITERATURE

An anxiety disorder, PTSD, affects 9% to 15% of the general population, including approximately 50% of women who have been raped (Foa, 1998). Symptoms of PTSD are divided into three clusters: reexperiencing the traumatic event through nightmares, flashbacks, intrusive thoughts; experiencing numbing and the avoidance of stimuli associated with the trauma; and experiencing symptoms of increased physiological arousal, such as disrupted sleep, irritability or outbursts of anger, difficulty concentrating, hypervigilance, and exaggerated startle response (APA, 2000; Appendix A). The features that most distinguish PTSD are the presence of nightmares, flashbacks, and numbing.

The vast majority of individuals will experience psychological distress following exposure to a potentially traumatic event. In fact, 95% of female rape victims experience severe reactions within the 2 weeks following a sexual assault. Approximately half of these women report significant improvements within 3 months of their rape. The remaining 50% of women recover more slowly, and many experience great difficulty recovering without treatment. Additionally, adult survivors of childhood sexual abuse, in both clinical and nonclinical samples, have been found to experience higher rates of anxiety disorders than those who do not report a history of having experienced sexual abuse during childhood. Furthermore, there is a particularly high incidence of PTSD

among adult survivors of childhood sexual abuse. As PTSD is a prevalent and debilitating medical condition, it is of critical importance that mental health professionals develop and provide effective treatment to individuals who experience persistent symptoms and develop PTSD (Foa, 1998).

Manger and Motta (2005) examined the effects of an aerobic exercise program on PTSD, anxiety, and depression among a sample of adults. Participants were recruited through advertisements and flyers seeking participants for a study examining the relationship between exercise and trauma-related stress. To be included in the study, participants must have obtained a score of at least 20 on the CAPS, have obtained written medical approval from a physician, and have not engaged in regular, physical activity more often than one time per week for 30 minutes for one month prior to the study. Participants agreed to participate in a 10-week exercise program and also agreed not to participate in any form of sustained exercise or additional treatments during the course of the study. Participants were also required to be between the ages of 18 and 65. They could not be actively suicidal or psychotic; they could not exhibit symptoms of severe mental illness, such as schizophrenia; and they could not be actively abusing substances.

Twenty-six adults (7 men and 19 women) met the criteria for participation in the study. Nine participants were fully compliant with the requirements of the study and were included in final analysis. Compliance was defined as exercising no fewer than 12 times during the 10-week course of the study. Measures included the Posttraumatic Diagnostic Scale (PDS) and the CAPS.

Participants were asked to exercise two to three times per week (walking or running on a treadmill), completing at least 12 sessions over ten weeks. Exercise sessions

lasted thirty minutes and were completed at moderate intensity, defined as 60% to 80% of each participant's maximum heart rate. Participants received training on how to monitor and maintain their target heart rate prior to beginning the exercise intervention. Target heart rate was monitored manually or by using a Polar Heart Rate Pacer Monitor, Model #1902061, depending upon each participant's preference. Participants were also asked to record the amount of time spent exercising with others in order to control for social contact.

Paired sample *t*-tests were conducted using both the CAPS and PDS scores. Results revealed significant differences when comparing beginning baseline scores with post-treatment and follow-up scores, indicating a reduction in posttraumatic stress. Additionally, significant reductions in posttraumatic stress were revealed when comparing ending pre-treatment and follow-up scores. No significant differences were found comparing post-treatment and follow-up scores.

At baseline, six of the study participants met the criteria for a diagnosis of PTSD while three did not. Post-intervention, only two participants met the full criteria for a diagnosis of PTSD, while seven did not. At a one month follow-up, four participants met the criteria for a diagnosis of PTSD, while five did not. It is important to note that social interaction did not appear to be a confounding variable in this study, as improvements were maintained at follow-up, after participants had stopped exercising at their local Young Men's Christian Association.

Newman and Motta (2007) examined the effects of aerobic exercise on childhood PTSD, anxiety, and depression. Participants in the study were recruited from an all-female residential treatment center. Participants were adolescent females between the

ages of 12 and 18. The treatment center provides services to adolescents from both Nassau and Suffolk County, New York, who had experienced difficulties in their home and/or school environments.

Fifteen adolescent females met the criteria for participation in the study. Measures included the Mental Health History Questionnaire (MHHQ), the Medical History Questionnaire, an exercise habits questionnaire, and the Children's Posttraumatic Stress Disorder Inventory. To be included in the study, adolescents must have obtained a score of at least 25 on the CAPS. Participants were required to be in good physical health, as measured by a physician using the MHHQ, and they agreed to not participate in any additional forms of exercise during the course of treatment, other than those required for their physical education courses in the state of New York. Participants were not actively suicidal or homicidal, psychotic or severely mentally ill, nor were they active substance users.

Participants were instructed to exercise three times per week for 40 minutes in a group exercise program led by the principal researcher. The exercise intervention included five minutes of warm-up activities, such as stretches, followed by five minutes of low-impact exercises, such as jumping jacks and running in place. The next 20 minutes consisted of structured group aerobic exercise, such as Tae Bo, walking, jogging, or dance. The final ten minutes involved cool down exercises such as jumping rope.

Prior to beginning the exercise program, participants completed an orientation and received instruction on how to monitor and maintain their target heart rate during exercise sessions. Individuals were instructed to exercise at moderate intensity, maintaining a target heart rate between 60% and 80% of their maximum heart rate during

each exercise session. The principal researcher also recorded each participant's target heart rate on two occasions during every exercise session: one time at the end of ten minutes and a second time at the end of 20 minutes. The target heart rate was achieved by all participants during each exercise session. The duration of the exercise program was eight weeks. Participants were required to complete no fewer than 12 exercise sessions during the course of the study. The mean number of exercise sessions completed by participants was 22.

A total of 11 participants completed the study. Results revealed a significant difference when comparing baseline and post-treatment scores, indicating a reduction in posttraumatic stress. At post-treatment, 10 of the 11 participants no longer met the full criteria for a diagnosis of PTSD. At a one month follow-up, two participants met the full criteria for PTSD while nine still did not. Although reductions were observed at mid-intervention (after four weeks of exercise), results suggest that PTSD symptoms were significantly further reduced at post-intervention (after eight weeks of exercise) compared to mid-intervention.

Diaz's (2007) unpublished doctoral dissertation also examined the effects of an aerobic exercise program on PTSD symptom severity in adolescents. Twelve adolescent females between the ages of 14 and 17 were recruited through a private residential facility in the New York metropolitan area. The adolescents completed a 5-week, 15-session aerobic exercise program consisting of walking at moderate intensity. Measures included the Child PTSD Symptom Scale (CPSS), Trauma Symptom Checklist for Children (TSCC), Multidimensional Anxiety Scale for Children (MASC), and the Children's Depression Inventory (CDI). However, only the MASC and CDI were

included in data analysis. Yarnold's (1988) ipsative z-score comparison method for single-case repeated measures designs was utilized for the purpose of this study for those participants who demonstrated stable levels of symptomatology across the extended baseline period. Results revealed that at post-treatment, 91% of those participants demonstrated a significant reduction in PTSD symptomatology on the CPSS. Additionally, 67% of the participants who demonstrated stable levels of trauma-related stress on the TSCC showed significant reductions in symptomatology following participation in the exercise program.

Additionally, Guerin's (1993) unpublished doctoral dissertation examining the use of sport and exercise training for adult women psychotherapy clients with PTSD was the first known work to formally examine PTSD and exercise. Participants included 17 adult women who were recruited naturalistically through an independent psychology practice in suburban Philadelphia, Pennsylvania. Participants self-selected participation in either the treatment or control group, with the treatment group participating for 24 weeks in an individually-determined exercise program. Participants in both the treatment and control groups also attended weekly individual therapy sessions, except for one participant from each group. However, treatment modality and therapeutic interventions were not uniform; and they ranged from supportive and problem-solving to crisis intervention, based upon the participant's needs.

Measures included the 16 Personality Factors Questionnaire, the SCL-90-R, the Body Cathexis Scale, and McKechnie's Leisure Activities Blank (LAB). The LAB was used to assist the therapist/researcher in developing recommendations for each member of the treatment group (n=9), to include a list of possible options for exercise. The

therapist and participant then conjointly selected the prescribed exercise activities. The selected activities consisted mostly of aerobic exercise interventions, such as walking, swimming, and step-aerobics. However, one participant took part in t'ai chi. Levels of frequency, duration, and intensity were also conjointly established for the duration of the program; however, they were not uniform and were not discussed. Results did not reveal a statistically significant difference between the two groups at post-treatment. One possibility for this occurrence was that only four participants in the treatment group adhered to their agreed-upon exercise program. This study had several limitations, including the small sample size, the lack of consistent delivery of therapeutic techniques, and the lack of a consistent exercise prescription. Perhaps most importantly, participants' adherence to the exercise intervention was not consistently monitored and many participants did not adhere.

The studies by Manger and Motta (2005) and Newman and Motta (2007) are the only known published studies to date examining the effectiveness of exercise as a treatment for PTSD. The author was unable to locate any studies comparing aerobic exercise to empirically validated forms of treatments for PTSD. In fact, Lawrence, De Silva, and Henley's (2010) literature review on sports and games for PTSD sought to assess the effectiveness of sports and games in alleviating and/or diminishing symptoms of PTSD when compared to traditional treatments. The authors searched the Cochrane Collaboration, Depression, Anxiety and Neuroses Controlled Trials Registers through June 2008, including the following databases: MEDLINE, EMBASE, CINAHL, and PsycINFO. Reference lists of relevant papers were searched and experts in the field were also contacted to inquire about the existence of additional studies. The authors were

unable to locate any studies in which all participants were both diagnosed with PTSD and randomly assigned to a treatment that examined one or more sports or games for alleviating or diminishing symptoms of PTSD.

Although very few studies have examined the impact of aerobic exercise on symptoms of PTSD, many studies have examined the effects of exercise on symptoms of depression. Mead et al. (2009) completed a meta-analysis of all available randomized controlled trials comparing exercise to either no treatment or to an established treatment for adults diagnosed with depression. Results from the 25 identified trials revealed that exercise reduces symptoms of depression; however, results were inconclusive regarding the exact effectiveness of exercise and which types of exercise were most effective for symptom reduction. Therefore, it has been recommended that additional studies be completed to address these gaps in the literature. Current evidence suggests that exercise may need to be continued over the long-term in order to maintain the benefits of improved mood and decreased depressive symptoms (Mead et. al., 2009).

Exercise has also been found to reduce symptoms of anxiety. For example, Broocks et. al (1998) conducted the first randomized, placebo-controlled study which compared exercise to medication (Clomipramine ™) in the treatment of panic disorder. Participants included 46 adults diagnosed with moderate to severe panic disorder, with or without agoraphobia. Participants were randomly assigned to a 10-week aerobic exercise group or to the Clomipramine ™/placebo group. Participants in the aerobic exercise group were instructed to walk and work toward running a four mile route three times per week, either alone or with a partner or partners. A group training session was also offered one day per week. Participants in the Clomipramine ™ group were instructed to take one

112.5 mg pill daily and participants in the placebo group were also instructed to take one pill per day.

Results revealed significant improvements in panic disorder among participants receiving both the aerobic exercise treatment and Clomipramine ™ in comparison with the placebo group, whose symptoms did not significantly improve. Although Clomipramine ™ improved symptoms of anxiety earlier and more effectively than aerobic exercise, both groups were found to have improved equally at the conclusion of the 10-week study. The authors conclude that aerobic exercise alone may be associated with significant improvement in panic disorder (Broocks et. al., 1998). Thus, prescribing an exercise regimen may be particularly important for those who are uninterested in, or unable, to take psychotropic medication for treatment of their symptoms of anxiety, or for those who do not appear to be responding to medication management. It is also important to note that many psychotropic medications are accompanied by multiple undesirable side-effects. Therefore, alternative treatments which lead to the same outcome should be further explored (Ratey, 2008).

Preliminary research examining the use of yoga as a therapeutic treatment for PTSD has sparked increased interest in exercise as a form of treatment for traumatic stress. The Trauma Center at Justice Resource Institute recently completed a pilot study to compare the effects of group yoga classes to group Dialectical Behavior Therapy (DBT) sessions. DBT is an empirically validated group-treatment intervention combining cognitive-behavioral techniques for emotion regulation and reality-testing with concepts of mindfulness, distress tolerance, and acceptance. Participants in the study included 16 adult women between the ages of 25 and 55 who were randomly assigned to either eight

sessions of 75-minute hatha yoga classes or to a DBT group. Upon completion of the 8-week treatment study, those who participated in yoga reported a greater reduction in the frequency of all PTSD symptoms, a greater reduction in PTSD related hyperarousal in particular, and greater gains in vitality and body attunement, compared to those who participated in the DBT group. Although results did not reach statistical significance, possibly due to the small sample size, yoga appears both to have positively affected participants' self-regulation and to have decreased symptoms of hyperarousal. These benefits may match or exceed those of the more commonly utilized DBT-skills intervention (Emerson et al., 2009). This research provides momentum for the study of exercise as a potentially efficacious method for the treatment of PTSD.

CHAPTER III

METHODOLOGY

There is an increasing interest in the treatment of PTSD at this time as a result of the wars in Iraq and Afghanistan. However, the need remains for empirically validated, short-term, and cost-effective treatments and interventions for individuals experiencing PTSD following any type of traumatic event. Aerobic exercise may be one such intervention. The psychological benefits of aerobic exercise in reducing symptoms of depression and anxiety have been well documented (Stitch, 1999). As PTSD is an anxiety disorder that commonly co-occurs with depression, aerobic exercise may also reduce symptoms of PTSD (Manger & Motta, 2005; Newman & Motta, 2007). However, there has been very limited research examining the effectiveness of exercise as a treatment for PTSD. One gap in the existing literature is the lack of a true experimental control group in previous studies examining PTSD and exercise. Studies utilizing a control group to compare exercise with other forms of empirically validated treatment may assist in determining the most effective methods for treating PTSD.

Participants

Participants in this study were recruited naturalistically through a Certified Rape Crisis Center in Pensacola, Florida. The participants were 14 adult women between the ages of 30 and 62 who were voluntarily receiving outpatient treatment at the Certified Rape Crisis Center. The women are survivors of sexual violence: adult survivors of

childhood sexual abuse and/or adult survivors of sexual assault. All of the women are also survivors of numerous other traumatic events such as domestic violence (Tables 1-4). All 14 participants self-identify as Caucasian.

The Rape Crisis Center is part of Lakeview Center, a large community-based mental health center serving Escambia and Santa Rosa Counties in Northwest Florida. The Rape Crisis Center is housed in a facility, separate from the main campus at Lakeview Center, providing added confidentiality for trauma survivors. The center is designated the Certified Rape Crisis Center for both Escambia County and Santa Rosa County by the Florida Council Against Sexual Violence.

Those who volunteered for the study elected to participate in one of two treatment groups: CBT or CBT+E. There were no age differences between the treatment groups. For the CBT alone treatment group, the mean age was 45 (Table 1). For the CBT+E treatment group, the mean age was 46 (Table 3).

In addition to PTSD, all of the study's participants were diagnosed with one or more additional mental health conditions, such as Major Depressive Disorder (Tables 1 & 3). This finding is consistent with research indicating that an estimated 88% of individuals diagnosed with PTSD have at least one other co-occurring psychological disorder (Emerson et al., 2009). Participants' mental health conditions were diagnosed by the primary author of this study, a Licensed Marriage and Family Therapist, and for those individuals who were also undergoing medication management, their psychiatrist confirmed the author's diagnosis/diagnoses. Many participants were also prescribed medication for one or more of their existing mental health conditions, including PTSD, and they were not required to discontinue these medications for the purposes of this study

Table 1
Summary of General Description of Participants in CBT

Pp	Age	LES Score	Diagnoses	Psychotropic Medications
1	42	8	PTSD, Chronic OCD	Prozac ™ 80 mg, Wellbutrin ™ 3000 mg, Risperdal ™ 2 mg, Klonopin ™ 1 mg, prn
2	55	9	PTSD, Chronic; DD, NOS	None
3	30	12	PTSD, Chronic MDD, Severe, with Psychotic Features, Provisional Psychotic Disorder, NOS	Abilify ™ 5 mg
4	50	10	PTSD, Chronic MDD, Recurrent, Moderate	Celexa ™ 40 mg, Remeron ™ 45 mg Xanax ™ .5 mg, prn
5	45	10	PTSD, Chronic; DD, NOS	Celexa ™ 20 mg, Seroquel ™ 50 mg
6	34	6	PTSD, Chronic; DD, NOS Polysubstance Dependence, in Early Full Remission	Zoloft ™ 200 mg, Seroquel ™ 50 mg BuSpar ™ 10 mg, Vistaril ™ 50 mg
7	62	10	PTSD, Chronic; DD, NOS	Zoloft ™ 100 mg, Risperdal ™ .25 mg

Note. Summary data represents each participant's status at pre-treatment. CBT=Cognitive Behavioral Therapy, Pp=Participant, LES Score=Life Events Checklist Score, indicating the number of potentially traumatic events experienced by each participant, PTSD=Posttraumatic Stress Disorder, OCD=Obsessive Compulsive Disorder, MDD=Major Depressive Disorder, DD, NOS=Depressive Disorder, NOS, NOS=Not Otherwise Specified

Table 2
Detailed Description of Participant's Trauma, Age at Time of Events, and Relationship to Offender for CBT

Pp	Nature of Trauma	Age at Time	Relationship to Offender
1	CSA	7-18	Father
	Father's Death	18	N/A
	Sexual Harassment	30-36	Supervisor
2	Hurricane/Flooding	18	N/A
	Rape	25	Husband
	Domestic Violence	22-25	Husband
3	Domestic Violence	3 or 4-10 or 11	Grandfather
	CSA	6 or 7	Friend's Father
	Hurricane	25	N/A
4	Domestic Violence	5-Teenage Years	Mother and Father
	Sexual Assault/Rape	17	Stranger
	Domestic Violence	18	Husband
5	Physical Abuse	4 or 5	Father
	Homicide in Family	44	Stranger
	CSA	12	Teenage Male Friend/Schoolmate
6	Car Accident	25	N/A
	Rape	34	Stranger
	Domestic Violence	29-32	Husband

(Table 2 continues)

Table 2 (continued)

Pp	Nature of Trauma	Age at Time	Relationship to Offender
7	CSA	9-12	Priest
	Father's Death	10	N/A
	Nephew's Death	62	N/A

Note. CBT=Cognitive Behavioral Therapy, Pp=Participant, Nature of Trauma=Three Events Identified by Participants in the CAPS, CAPS=Clinician Administered PTSD Scale, PTSD=Posttraumatic Stress Disorder, Age at Time=Age at Time of Trauma, CSA=Child Sexual Abuse, N/A=Not Applicable/No Identified Offender.

Table 3
Summary of General Description of Participants in CBT+E

Pp	Age	LES Score	Diagnoses	Psychotropic Medications
1	59	10	PTSD MDD, Recurrent	Cymbalta ™ 90 mg Trazodone ™150 mg, Klonopin ™ .5 mg prn
2	53	8	PTSD MDD, Single Episode	Wellbutrin ™ XL 300 mg, Xanax ™ .5 mg, Remeron ™ 30 mg
3	31	8	PTSD, Chronic Alcohol Dependence, Provisional	None
4	44	8	PTSD, Chronic	None
5	43	7	PTSD, Chronic	None
6	54	10	PTSD, Chronic MDD, Recurrent Alcohol Abuse, in Sustained Full Remission	Prozac ™ 40 mg BuSpar ™10 mg
7	41	11	PTSD, Chronic	None, Non-Adherent

Note. Summary data represents each participant's status at pre-treatment. CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, LES Score=Life Events Checklist Score, indicating the number of potentially traumatic events experienced by each participant, PTSD=Posttraumatic Stress Disorder, MDD=Major Depressive Disorder

Table 4
Detailed Description of Participant's Trauma, Age at Time of Events, and Relationship to Offender for CBT+E

Pp	Nature of Trauma	Age at Time	Relationship to Offender
1	Fire	55	N/A
	CSA	8 or 9	Neighborhood Teenager
	Domestic Violence	39-58	Husband
2	CSA	7-13	Father
	Exposure to Toxic Substance	52	N/A
	CSA/Fire	7	Perpetrator
3	CSA	5	Father
	Sexual Assault/Rape	24	Conductor of Job Interview
	Sexual Assault/Rape	17-18	"Adoptive" Father
4	Domestic Violence (Witnessed)	15 Months-2 Years	Father towards Mother
	CSA	10	Babysitter
	Rape	31	Friend
5	CSA	6.5	Neighborhood Milkman
	Childhood Neglect	Childhood Years	Mother and Father
	CSA (Experienced and Witnessed)	12-16	Uncle
6	Fire	5	N/A
	Rape/Domestic Violence	30-52	Husband
	Sexual Assault/Rape	18	Co-Worker

(Table 4 continues)

Table 4 (continued)

Pp	Nature of Trauma	Age at Time	Relationship to Offender
7	CSA	9-12	Family/Neighborhood Friend/Teacher
	Domestic Violence (Experienced)	Childhood Years	Father towards Mother
	Domestic Violence (Witnessed)	Adulthood Years	Father towards Mother

Note. CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, Nature of Trauma=Three Events Identified by Participants in the CAPS, CAPS=Clinician Administered PTSD Scale, PTSD=Posttraumatic Stress Disorder, Age at Time=Age at Time of Trauma, CSA=Child Sexual Abuse, N/A=Not Applicable/No Identified Offender

for ethical reasons (Tables 1 & 3). It is important to note that, of those individuals who had participated in counseling services prior to seeking treatment at the Rape Crisis Center, their previous treatment had not included delivery of specific CBT interventions and had instead focused on interventions that were mostly supportive in nature.

Procedures

The present study was approved by the Institutional Review Board (IRB) at the University of West Florida (UWF) as well as the IRB at Lakeview Center, Incorporated (Appendix B). The study was advertised through a flyer posted in the waiting room at the Certified Rape Crisis Center in Pensacola, Florida. The flyer stated that the lead researcher was seeking volunteers interested in participating in a study examining exercise and traumatic stress. The lead researcher also informed clients at the Rape Crisis Center of this opportunity. Individuals interested in participating in the study were required to be in good physical health, measured by using the Physical Activity Readiness-Questionnaire (PAR-Q), a questionnaire designed to assess one's readiness to begin an exercise program (Appendixes C & D). Participants must have responded "no" to all health-related questions on the PAR-Q to be eligible for participation in the study. Otherwise, participants were required to obtain a written letter of medical clearance from their physician in order to begin the exercise program. Participants were required to complete an Informed Consent Agreement for voluntary participation in this study as well as Lakeview Center's Informed Use Agreement for voluntary participation in the exercise intervention being conducted at the Therapeutic Activity Center (gym) at Lakeview Center (Appendixes E & F). Participants then completed an assessment with

the lead author of the study to determine that they were not actively suicidal and that they did not exhibit symptoms of severe mental illness such as schizophrenia.

Participants agreed to participate in no fewer than three therapy sessions during the course of the study and agreed to record on a form, provided by the researcher, any psychiatric medications they were prescribed and any types of sustained exercise they participated in (outside of the aerobic exercise sessions for the CBT+E treatment group) during the course of the study (Appendixes G & H). Although participants in CBT were not asked to refrain from exercising during the course of the study for ethical reasons, exercise was not encouraged. Those in the CBT+E treatment group also agreed to participate in an 8-week exercise program, in which they exercised no fewer than 12 sessions during the course of the exercise program, with the prescribed goal of exercising at least twice per week. Participants were required to be between the ages of 18 and 65.

Participants who met the study criteria then completed a thorough assessment conducted by the primary researcher to assess for the presence of current symptoms of PTSD. The CAPS was then utilized to measure symptom severity. The CAPS was developed by Blake and colleagues at the National Center for PTSD (Blake et al., 1995). The CAPS is one of the most widely used structured interviews for diagnosing PTSD and measuring symptom severity. Although the CAPS assessment was initially validated with combat veterans, it has since been used widely and successfully with victims of other traumas, including victims of rape and incest. Research indicates the CAPS assessment has excellent reliability, validity, diagnostic utility, and sensitivity to clinical change (Weathers, Litz, Herman, Huska, & Keane, 1993). It is considered the gold standard in PTSD assessment (Gray, Litz, Hsu, & Lombardo, 2004). The CAPS takes approximately

one hour to administer. It is in the public domain, available at no cost to experienced clinicians and researchers upon request through the National Center for PTSD.

In order to assess for an individual's exposure to potentially traumatic events, the Life Events Checklist (LEC) was administered at the beginning of the CAPS assessment, per the protocol developed by Weathers et al. (1993). The LEC was developed concurrently with the CAPS to facilitate a diagnosis of PTSD. The LEC provides a list of "difficult or stressful things that sometimes happen to people," evaluating the respondent's experience of a vast array of potentially traumatic events such as "sexual assault" (rape, attempted rape, made to perform any type of sexual acts through force or threat of harm). Individuals are instructed to check the boxes that apply to them, indicating if each event "happened to me," or if they "witnessed it," "learned about it," "aren't sure," or if it "doesn't apply." Then the CAPS is used to inquire about up to three index events (such as first, worst, or most salient), to clarify the nature and description of the event, to determine whether the event meets the Criterion-A definition of trauma as outlined in the DSM-IV-TR (APA, 2000; Appendix A) and to evaluate the presence and severity of posttraumatic stress resulting from the event (United States Department of Veterans Affairs, n.d.). Notably, all individuals who expressed interest in participating in the study experienced more than three life events that "happened to me." As the CAPS assessment inquires about up to three events only, the lead researcher had predetermined to inquire about the first, worst, and most recent life events, which included the trauma of interest (the sexual trauma).

Participants were instructed to keep the three selected events in mind throughout the remainder of the interview. The CAPS assesses the frequency and intensity of

individual PTSD symptoms on separate five-point (0-4) rating scales. These ratings can then be summed to create a nine-point (0-8) severity score for each symptom. This scoring system provides excellent flexibility, as clinicians and researchers can focus on the frequency, intensity, or severity ratings for individual PTSD symptoms, for the three PTSD symptom clusters (re-experiencing, avoidance and numbing, and increased physiological arousal), and/or for PTSD as a whole. Interviewers can administer the 17 core symptoms, all DSM-IV criteria (A-F), or add the associated symptoms (items 26-30). For the purpose of this study, the 17 core symptoms were administered and scored. Additionally, the CAPS can be used to derive a diagnosis of PTSD based on current symptom status (past week or past month) or lifetime status (based on the worst month since the trauma occurred). For the purpose of this study, current symptom status, inquiring about symptoms experienced in the past month, was utilized.

Nine scoring rules have been developed for scoring the CAPS assessment to derive a PTSD diagnosis. As recommended by Weathers, Ruscio, & Keane (1999), several different scoring rules were utilized for the purpose of this study to examine the impact of the various scoring rules on the outcome of the study. The scoring rules used for the purpose of this study, Total Severity > 65 (TSEV65) and Frequency > 1/Intensity > 2/Total Severity > 65 (F1/I2/TSEV65), are empirically derived rules for converting CAPS frequency and intensity scores into a dichotomous PTSD diagnosis. The decision to utilize the TSEV65 scoring rule was based on research revealing that a total severity score of 65 or higher is the optimally efficient cutoff for predicting a PTSD diagnosis, based on the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (Weathers et al., 1999). The F1/I2/TSEV65 scoring rule was also

utilized, as this rule ensures a significant overall level of PTSD symptom severity as well as the necessary distribution of symptoms that is required for a DSM-IV-TR diagnosis of PTSD (Weathers et al., 1999). This is also the most frequently used scoring rule (United States Department of Veterans Affairs, n.d.). This rule is recommended for confirming a diagnosis of PTSD and creating a homogeneous group of individuals with definitive PTSD, to minimize the risk of false positives (Weathers et al., 1999).

Additionally, five severity score ranges have been proposed for interpreting the CAPS total severity score. These ranges include 0-19= asymptomatic/few symptoms, 20-39=mild PTSD/subthreshold, 40-59=moderate PTSD/threshold, 60-79=severe PTSD symptomatology, and >80=extreme PTSD symptomatology. A 15-point change in the CAPS total severity score has been proposed as an indicator of change that is clinically significant (Weathers, Keane, & Davidson, 2001).

Individuals with a score of at least 45 on the CAPS were eligible for inclusion in this study. This decision was based upon Orr's (1997) finding that a total CAPS severity score of 45 "demonstrated the greatest concordance with physiological reactivity to script-driven imagery" (Weathers et al., 1999, p. 128) among adult female survivors of childhood sexual abuse. Using the proposed severity score ranges, a score of 45 also indicates moderate PTSD/threshold. This criteria is more rigorous than that used in previous studies examining PTSD and exercise; a cutoff score of 20, indicating mild PTSD symptoms/subthreshold, was utilized in Manger and Motta's (2005) study and a cutoff score of 25, indicating mild PTSD/subthreshold, was used in Newman and Motta's (2007) study. All individuals who expressed interest in participating in this study were

eligible for inclusion, as all participants scored 45 > on the CAPS. Following administration of the CAPS, participants then completed the following measures: the PCL-S, the SCL-90-R, and the Exercise Motivation Scale (EMS).

The PCL-S was administered to all participants to measure PTSD symptom severity. The PCL-S is a 17-item self-report measure that takes approximately 5-10 minutes to complete. The checklist was developed by Weathers and colleagues with the National Center for PTSD. It is in the public domain, available through the National Center for PTSD at no cost, upon request. The scale includes 17 questions that correspond to DSM-IV criteria for a diagnosis of PTSD. The PCL has demonstrated reliability. The PCL-S, the version used to describe one's reactions to a specific life event, was chosen for the purpose of this study over the PTSD Checklist-Civilian Version (PCL-C) because less information and empirical support is available on the civilian version, as it does not identify a specific "stressful" event. The PCL-S has been shown to correlate highly with clinician-administered measures, such as the CAPS. Individuals were asked to complete the PCL-S, keeping in mind the presenting problem which brought them to treatment (United States Department of Veterans Affairs, 2010).

There are several ways to score the PCL-S. For the purpose of this study, a combination of the two recommended scoring approaches were utilized. First, all 17 items were added up for a total symptom severity score. A total score of 30-38 is considered to be PTSD positive for the civilian (primary care) population. Then, DSM-IV scoring rules were applied to make a diagnosis, this included an endorsement of at least one B item (questions 1-5), at least 3 C items (questions 6-12), and at least two D items (questions 13-17). All "moderately" or above responses (responses 3-5) were considered

symptomatic and all responses below "moderately" (responses 1 and 2) were considered non-symptomatic. Therefore, the total severity score was above the cutoff of 29 and the required number of items within each subsection was also met, confirming a diagnosis of PTSD. This combination of scoring approaches is a more rigorous approach, as it ensures that an individual has both sufficient severity of PTSD symptoms as well as the necessary pattern of symptoms as required by the DSM-IV-TR. Evidence suggests that a 5-10 point change in score represents a reliable change that is not due to chance while a 10-20 point change in score represents clinically significant change. Therefore, the National Center for PTSD recommends using a five point minimum change in score to determine if an individual has responded to treatment and a 10 point minimum change in score for determining if the improvement is clinically meaningful (United States Department of Veterans Affairs, 2010).

The SCL-90-R, a 90-item self-report measure of psychological distress, was administered in this study, as recommended by Resick and Schnicke (1996) due to the widespread use of this instrument in sexual assault research. Kilpatrick, Veronen, and Resick's 1979 longitudinal study demonstrated systematic alterations in the SCL-90-R profiles of victims of sexual assault that distinguished them from the profiles of those who did not identify as rape victims, across four measurements over a six-month period. Additionally, Swett, Surrey, and Cohen (1999) examined the abuse histories of 125 adults receiving outpatient psychiatric treatment in order to compare the symptomatic distress of individuals with and without a reported history of experiencing abuse. The SCL-90-R profiles of individuals with a history of sexual abuse and/or physical abuse were found to

be significantly higher than those individuals without the same abuse history (Derogatis, 1994).

With regard to the SCL-90-R, each of the 90 items is rated on a five-point scale of distress (0-4) ranging from "Not at All" to "Extremely." The inventory has demonstrated reliability and validity and provides a multidimensional symptom profile. The SCL-90-R takes about 15 minutes to complete. The inventory is then scored and clinically interpreted based upon three global indices of distress and nine primary symptom dimensions. The global indices include the Global Severity Index (GSI), Positive Symptom Distress Index (PSDI), and Positive Symptom Total (PST). The nine subscales include Somatization (SOM), Obsessive-compulsive (O-C), Interpersonal Sensitivity (I-S), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic Anxiety (PHOB), Paranoid Ideation (PAR), and Psychoticism (PSY), dimensions that are often impacted for survivors of sexual violence. To calculate the three global indices, the GSI is derived by adding the scores on all nine symptom dimensions and the additional items. The sum is then divided by the total number of responses, typically 90, if there are no missing responses. The PST is computed by adding the number of items endorsed with a positive (nonzero) response. Finally, the PSDI is calculated by dividing the sum of all item values by the PST (Derogatis, 1994).

Participants also completed the EMS. The EMS is a multifaceted 31-item scale used to measure eight facets of the exercise motivation construct, including amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, intrinsic motivation to learn, intrinsic motivation to accomplish tasks, and intrinsic motivation to experience sensations (Appendixes I & J). The EMS is designed to assess

motivation in the context of exercise. It has been found to be both a reliable and valid measure of exercise motivation (Li, 1999).

Participants self-selected participation in one of two treatment groups: bi-weekly CBT or bi-weekly CBT+E. The author of this study, a Licensed Marriage and Family Therapist (Florida) and a Certified Trauma Specialist (through the Association of Traumatic Stress Specialists), provided the bi-weekly CBT sessions. A female personal trainer and group exercise instructor, certified through the National Exercise Trainers Association, facilitated the group exercise sessions. All therapy sessions were conducted at Lakeview Center's Rape Crisis Center. All group exercise classes were conducted at Lakeview Center's Therapeutic Activity Center (gym).

Participants in the exercise treatment were asked to complete a minimum of two aerobic exercise sessions per week over eight consecutive weeks. The instructor recorded attendance at every exercise class to verify participation in treatment. The lead researcher also regularly monitored class attendance to ensure treatment integrity. To be included in the final analysis, participants must have completed no fewer than 12 exercise sessions over the 8-week course of the study. At the initial exercise session, resting heart rate and blood pressure was recorded for each participant in CBT+E using the procedures for assessment as outlined by the American College of Sports Medicine (ACSM). The ACSM procedure for blood pressure measurement consists of calculating the average of two separate blood pressure readings taken while the individual is in the seated position. While attending their first exercise session, participants also received information on what to expect from the exercise program and how to monitor and maintain their target

heart rate during each exercise session. Notably, none of the individuals who elected to participate in CBT+E were currently or recently engaging in regular aerobic exercise.

Exercise sessions were 40 minutes in duration. The exercise treatment included five minutes of warm up (stretches), followed by 30 minutes of aerobic exercise (circuit training), and concluded with five minutes of cool down (walking). The circuit training sessions included full-body exercises such as squats and lunges for lower body and bicep curls and tricep extensions for upper body. The circuit consisted of 30 seconds per exercise. Participants exercised at moderate intensity, as they were instructed to maintain 60% to 80% of their maximum heart rate, during each exercise session. The facilitator of the exercise treatment recorded each participant's heart rate using the InstaPulse Heart Rate Monitor on four occasions at every exercise session: pre-treatment (prior to beginning the exercise intervention), 15 minutes into the exercise intervention, immediately post-exercise intervention, and approximately 2-3 minutes following completion of the exercise intervention.

Examining participant's physiological wellbeing during and following exercise was important, not only to ensure that the prescribed exercise intensity was achieved, but also because abuse history has been found to be related to autonomic regulation to mild exercise. Dale et al., 2009 found that abuse history is associated with less vagal regulation of the heart (i.e., respiratory sinus arrhythmia) as well as an inability to rapidly re-engage vagal regulation immediately following mild exercise. This is consistent with previous findings suggesting that individuals with an abuse history have more difficulty shifting from mobilization to calmness (Dale et al., 2009).

Exercise sessions were offered four days per week, and participants were encouraged to attend no fewer than two sessions per week. On the dates when only one participant attended the exercise session, the facilitator instructed the participant to complete 40 minutes of cardiovascular exercise, recording her target heart rate as usual.

While undergoing the exercise treatment, participants also attended bi-weekly therapy sessions. The bi-weekly therapy sessions were 50 minutes in duration. Participants attended no fewer than three sessions over the 8-week course of the study. Specific CBT interventions, such as normalizing common reactions to trauma, providing psychoeducation on PTSD symptoms, teaching breathing retraining exercises, and utilizing cognitive restructuring techniques, thought stopping techniques, and guided self-dialogue, were delivered during the therapy sessions, as outlined by Foa (1998). At the conclusion of the study, all participants completed post-treatment paperwork including the CAPS, PCL-S, and SCL-90-R. Participants then completed a questionnaire asking them to describe any events they experienced during the 8-week study that either positively or negatively impacted their treatment and to provide feedback regarding their experience in the exercise and/or therapy sessions. Participants were also asked to complete an anonymous questionnaire regarding their experience during the exercise and therapy treatment. Participants in CBT+E also completed a post-treatment blood pressure reading and resting heart rate measurement at their final exercise session.

Participants in CBT attended bi-weekly therapy sessions. Participants attended no fewer than three sessions over the 8-week course of the study to be included in final analysis. The therapy sessions consisted of delivery of the same CBT techniques as described above, as outlined by Foa (1998).

As the lead researcher was awarded a Scholarly and Creative Activities Grant through UWF, participants received a $25 Walmart ™ gift card following completion of the study and were also entered into a raffle for a $50 gift card to Walmart ™. These gift cards were used as participation incentives.

Statistical Analysis

Means and standard deviations were calculated for all descriptive variables. This study utilized a repeated measures analysis of variance (ANOVA) with two levels for time (pre-post) and two levels for group (CBT-CBT+E). Statistical significance was set at $p \leq 0.05$.

CHAPTER IV

RESULTS

The results of this study were based on the 14 participants who completed their self-selected treatment program (CBT or CBT+E). The participants in the CBT treatment group attended no fewer than three therapy sessions during the 8-week course of the study. Participants in the CBT+E treatment group attended no fewer than three therapy sessions and completed no fewer than 12 exercise sessions over the course of the study. This study had very low attrition, as only 1 participant who began treatment withdrew from the study. This participant elected to participate in the CBT+E treatment group; however, she fractured her foot in a non-exercise related incident after completing her first week of exercise sessions. She was unable to continue treatment in the CBT group, as she was not able to drive for over one month following her injury and did not have transportation to therapy sessions.

Study participants reported experiencing between 6 and 12 traumatic events. Participants in the CBT treatment group (n=7) reported experiencing a total of 66 life events and witnessing 5 life events while participants in CBT + E (n=7) reported experiencing a total of 62 life events and witnessing 16 life events (Tables 5 & 6). The mean number of life events experienced by the CBT group was 9.4, while the mean number of life events experienced by the CBT+E group was 8.8. The mean number of life events witnessed by the CBT group was .7, and the mean number of life events

Table 5

Description of Experienced Life Events: Number and Percent

Event	CBT	CBT+E	Total
Natural Disaster	6 (85.7%)	9 (85.7%)	12 (85.7%)
Fire or Explosion	1 (14.2%)	6 (85.7%)	7 (50%)
Transportation Accident	6 (85.7%)	6 (85.7%)	12 (85.7%)
Serious Accident	2 (28.5%)	3 (42.8%)	5 (35.7%)
Exposure to Toxic Substance	2 (28.5%)	3 (42.8%)	5 (35.7%)
Physical Assault	7 (100%)	7 (100%)	14 (100%)
Assault with a Weapon	1 (14.2%)	5 (35.7%)	6 (42.8%)
Sexual Assault	7 (100%)	7 (100%)	14 (100%)
Other Unwanted Sexual Experience	6 (85.7%)	7 (100%)	13 (92.8%)
Combat or Exposure to a War Zone	1 (14.2%)	1 (14.2%)	2 (28.5%)
Captivity	4 (57.1%)	4 (57.1%)	8 (57.1%)
Life-threatening Illness or Injury	5 (57.1%)	4 (57.1%)	9 (64.2%)
Severe Human Suffering	3 (42.8%)	1 (14.2%)	4 (28.5%)
Sudden, Violent Death	4 (57.1%)	0 (0%)	4 (28.5%)
Sudden, Unexpected Death	6 (85.7%)	1 (14.2%)	7 (50%)
Serious Injury, Harm, Death You Caused Someone Else	0 (0%)	0 (0%)	0 (0%)
Other Stressful Event	5 (57.1%)	1 (14.2%)	6 (85.7%)
Total Events	66	62	128

Note. Events as Reported by Participants on the Life Events Scale (LES). CBT=Cognitive Behavioral Therapy, CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions

Table 6

CAPS TSEV65 Total Symptom Severity Scores at Pre-treatment and Post-treatment

Pp	Score Pre	PTSD status Pre	Score Post	PTSD status Post	Clinically Significant Scoring Change
CBT					
1	92	Positive	83	Positive	No
2	45	Negative	19	Negative	Yes
3	103	Positive	80	Positive	Yes
4	67	Positive	28	Negative	Yes
5	115	Positive	86	Positive	Yes
6	67	Positive	50	Negative	Yes
7	92	Positive	62	Negative	Yes
CBT+E					
1	96	Positive	69	Positive	Yes
2	108	Positive	71	Positive	Yes
3	101	Positive	58	Negative	Yes
4	51	Negative	44	Negative	No
5	61	Negative	29	Negative	Yes
6	91	Positive	55	Negative	Yes
7	100	Positive	51	Negative	Yes

Note. CBT=Cognitive Behavioral Therapy, CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, Score Pre=CAPS Score at Pre-treatment, Score Post=CAPS Score at Post-treatment, CAPS=Clinician Administered PTSD scale, PTSD=Posttraumatic Stress Disorder

witnessed by CBT+E was 2.2. Although there were no differences between the groups with regard to the number of life events experienced, participants in CBT+E were found to have witnessed significantly more life events than participants in CBT.

There are nine scoring rules, or procedures, for scoring the CAPS (Weathers et al., 1999). As recommended by Weathers et al. (1999), several different CAPS scoring rules were utilized in order to examine the impact of various scoring rules on the outcome of the study. First, the TSEV65 scoring rule was utilized. This rule was developed from the total CAPS severity score, in which frequency and intensity are summed for all 17 PTSD symptoms (Weathers et al., 1999).

Next, the F1/I2/TSEV65 scoring rule was examined. This rule combines the Frequency > 1, Intensity > 2 (F1/I2) and TSEV65 scoring rules, meaning that a PTSD symptom is considered present only for those responses with a frequency rated as 1 or higher and a corresponding intensity rated as 2 or higher. The total CAPS severity score (frequency + intensity summed for all 17 PTSD symptoms) must also be > 65. This rule ensures a significant overall level of PTSD symptom severity as well as the necessary distribution of symptoms that is required for a DSM-IV-TR diagnosis of PTSD (Weathers et al., 1999).

With regard to the CBT treatment group, using the TSEV65 scoring rule, 6 of the 7 participants (85.7%) met the criteria for PTSD at pre-treatment, while 3 (42.8%) did post-treatment (Table 6). Additionally, at pre-treatment, 5 participants (71.4%) met the criteria for PTSD using the stringent F1/I2/TSEV65 scoring rule while 3 (42.8%) did following treatment (Table 7). Using the TSEV65 scoring rule, 6 of the 7 participants (85.7%) obtained a clinically significant 15-point change in CAPS scores, while all 7

participants (100%) obtained the clinically significant scoring change using the F1/I2 TSEV65 scoring rule (Tables 6 and 7).

For the CBT+E treatment group, 5 of the 7 participants (71.4%) met the criteria for a diagnosis of PTSD at pre-treatment, using the TSEV65 scoring rule, while only 2 (28.5%) still did following treatment (Table 6). Using the stringent F1/I2/TSEV65 scoring rule, 5 participants (71.4%) met the criteria for a diagnosis of PTSD at pre-treatment, while notably, none of the participants did following treatment (Table 7). Six of the 7 participants (85.7%) obtained a clinically-significant 15-point change in CAPS scores using both the TSEV65 and F1/I2/TSEV65 scoring rules (Tables 6 and 7).

To further examine the clinical significance of CBT and CBT+E on symptoms of PTSD using the CAPS, the means for each treatment group were matched to the symptom categories outlined by Weathers et al., 2001. These ranges include 0-19= asymptomatic/few symptoms, 20-39=mild PTSD/subthreshold, 40-59=moderate PTSD/threshold, 60-79=severe PTSD symptomatology, and >80=extreme PTSD symptomatology. Using these cutoff scores and categories, with regard to the CAPS TSEV65 scoring rule, the pre-treatment mean of 83 for CBT and 86.86 for CBT+E indicate extreme PTSD symptomatology. The post-treatment means of 58.29 and 53.86 for CBT and CBT+E, respectively, indicate moderate PTSD/subthreshold. It is important to note that the post-treatment mean of 58.29 observed for CBT is less than one point from being categorized as severe PTSD. Using the same cutoff scores and symptom category ratings with regard to the CAPS F1/I2/TSEV65 scoring rule, the pre-treatment mean of 79 for the CBT treatment group indicates severe PTSD while the pre-treatment mean of 83.57 for CBT+E indicates extreme PTSD. The post-treatment means of 48.86

Table 7

CAPS F1/I2/TSEV65 Total Symptom Severity Scores at Pre-treatment and Post-treatment

Pp	Score Pre	PTSD Status Pre	Score Post	PTSD Status Post	Clinically Significant Scoring Change
CBT					
1	90	Positive	68	Positive	Yes
2	30	Negative	10	Negative	Yes
3	103	Positive	72	Positive	Yes
4	65	Positive	16	Negative	Yes
5	115	Positive	84	Positive	Yes
6	58	Negative	38	Negative	Yes
7	92	Positive	54	Negative	Yes
CBT+E					
1	94	Positive	54	Negative	Yes
2	108	Positive	61	Negative	Yes
3	99	Positive	46	Negative	Yes
4	41	Negative	40	Negative	No
5	54	Negative	11	Negative	Yes
6	89	Positive	45	Negative	Yes
7	100	Positive	45	Negative	Yes

Note. CBT=Cognitive Behavioral Therapy, CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, Score Pre=CAPS Score at Pre-treatment, Score Post=CAPS Score at Post-treatment, CAPS=Clinician Administered PTSD Scale, PTSD=Posttraumatic Stress Disorder

and 43.14 observed for CBT and CBT+E, respectively, indicate moderate PTSD/threshold (Table 8).

Results for the PCL-S revealed that, for the CBT group, all 7 participants (100%) met the criteria for PTSD at pre-treatment while only 3 (42.8%) did post-treatment. For the CBT+E treatment group, all 7 participants (100%) met criteria for PTSD at pre-treatment while 5 (71.4%) still did post-treatment. Evidence suggests that a 5-10 point change in score represents a reliable change that is not due to chance while a 10-20 point change in score represents change that is clinically significant. Therefore, 5 of the participants (71.4%) in CBT and all 7 of the participants (100%) in CBT+E were found to have responded to treatment. When measuring for change that was clinically significant, 3 of the participants in the CBT group displayed clinically significant change while 5 participants in the CBT+E treatment group did (Table 8).

Repeated measures ANOVAs were also conducted. Results did not reveal a statistically significant difference at pre-treatment between the CBT and CBT+E treatment groups with regard to the CAPS, PCL-S, or SCL-90-R. At post-treatment, a significant main effect for time was observed for the CAPS TSEV65 ($F_{2/10}$= 84.5, p=<.000), CAPS F1/I2/TSEV65 ($F_{2/10}$=78.09, p=<.000), and PCL-S ($F_{2/10}$=25.99, p=<.000). A non-significant effect for group was observed for the CAPS TSEV65, CAPS F1/I2/TSEV65, and PCL-S with non-significant effects for the group by time interaction (Table 9).

Repeated measures ANOVAs were then conducted to examine CAPS scores on the three PTSD symptom clusters: re-experiencing, avoidance and numbing, and increased physiological arousal. Results revealed significant main effects for time when

Table 8

PCL-S Scores at Pre-treatment and Post-treatment

Pp	Score Pre	PTSD Status Pre	Score Post	PTSD Status Post	Clinically Significant Scoring Change
CBT					
1	71	Positive	70	Positive	No
2	44	Positive	37	Negative	No
3	76	Positive	69	Positive	No
4	54	Positive	24	Negative	Yes
5	85	Positive	82	Negative	No
6	57	Positive	39	Negative	Yes
7	60	Positive	50	Positive	Yes
CBT+E					
1	75	Positive	64	Positive	Yes
2	68	Positive	63	Positive	No
3	72	Positive	46	Positive	Yes
4	55	Positive	35	Negative	Yes
5	57	Positive	32	Negative	Yes
6	70	Positive	47	Positive	Yes
7	60	Positive	53	Positive	No

Note. CBT=Cognitive Behavioral Therapy, CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, Score Pre=PCL-S Score at Pre-treatment, Score Post=PCL-S Score at Post-treatment, PCL-S=PTSD Checklist-Specific Version, PTSD=Posttraumatic Stress Disorder

Table 9

CAPS, PCL-S, and SCL-90-R Outcome Variables across Time for CBT and CBT+E

Outcome Measure	Mean Score (SD)		Time (within subjects)		Group (between subjects)		Time x Group	
			df (2, 10)		*df* (1, 12)		*df* (2, 10)	
	CBT	CBT+E	*F*	*p*	*F*	*p*	*F*	*p*
CAPS TSEV65			84.51	<.000	.001	<.981	1.74	.21
Pre-treatment	83.00 (24.30)	86.86 (21.89)						
Post-treatment	58.29 (27.06)	53.86 (14.52)						
CAPS F1/I2/TSEV65			78.09	<.000	.002	<.966	1.66	.22
Pre-treatment	79.00 (29.44)	83.57 (25.59)						
Post-treatment	48.86 (28.49)	43.14 (15.78)						
PCL-S			25.99	<.000	.020	<.891	1.64	.22
Pre-treatment	63.00 (15.64)	65.29 (7.87)						
Post-treatment	53.00 (21.17)	48.57 (12.48)						
GSI			22.79	<.000	.150	<.705	.54	.48
Pre-treatment	2.09 (.97)	2.01 (.67)						
Post-treatment	1.62 (.98)	1.37 (.58)						

(Table 9 continues)

Table 9 (continued)

CAPS, PCL-S, and SCL-90-R Outcome Variables across Time for CBT and CBT+E

Outcome Measure	Mean Score (SD)		Time (within subjects)		Group (between subjects)		Time x Group	
			df (2, 10)		*df* (1, 12)		*df* (2, 10)	
	CBT	CBT+E	*F*	*p*	*F*	*p*	*F*	*p*
PSDI			14.13	.003	.259	<.620	.03	.88
Pre-treatment	2.61 (.75)	2.43 (.42)						
Post-treatment	2.10 (.75)	1.96 (.50)						

Note. Group by Time repeated measures ANOVAs assessed treatment effects by group (CBT or CBT+E) over time (pre-treatment and post-treatment).CBT=Cognitive Behavioral Therapy, CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, SD= Standard Deviation, df=degrees of freedom, CAPS= Clinician-Administered PTSD Scale, PCL-S=PTSD Checklist - Specific Version, GSI=Global Severity Index of the SCL-90-R, PST=Post Symptom Total of the SCL-90-R, PSDI=Positive Symptom Distress Index of the SCL-90-R, SCL-90-R=Symptom Checklist-90-Revised, PTSD=Posttraumatic Stress Disorder

analyzing CAPS TSEV65 scores, including re-experiencing ($F_{2/10}$=16.30, p=.000), avoidance and numbing ($F_{2/10}$=56.59, p=.000), and arousal ($F_{2/10}$=33.31, p=.000). Non-significant effects for group were observed for each construct, including re-experiencing, avoidance and numbing, and arousal, with non-significant effects for the group by time interaction. Significant main effects for time were also found upon analyzing CAPS F1/I2 TSEV65 scores, including re-experiencing ($F_{2/10}$=25.17, p=.000), avoidance and numbing ($F_{2/10}$=50.30, p=.000), and arousal ($F_{2/10}$=23.58, p=.000). Non-significant effects for group were found for each construct, including re-experiencing, avoidance and numbing, and arousal, and there was a non-significant effect for the group by time interaction.

Repeated measures ANOVAs were then conducted for two of the three global indices of the SCL-90-R (GSI and PSDI). Significant main effects for time ($F_{2/10}$=22.79, p=.000) were found for the GSI, with non-significant effects for group and for group by time interaction. Significant main effects for time ($F_{2/10}$ =14.13, p=.003) were also found for the PSDI, with non-significant effects for group and for the group by time interaction (Table 9).

Participant's scores on the nine symptom dimensions of the SCL-90-R were also analyzed. Results revealed significant effects for time for eight of the nine dimensions, including SOM ($F_{2/10}$=8.47, p=<.01), O-C ($F_{2/10}$=31.67, p=.<000), I-S ($F_{2/10}$=13.31, p=<.003), DEP ($F_{2/10}$=12.70, p=.004), ANX ($F_{2/10}$=30.19, p=.000), HOS ($F_{2/10}$=11.90, p=.005), PAR ($F_{2/10}$=6.87, p=.022), and PSY ($F_{2/10}$=13.90, p=.003), with non-significant effects for group and for the group by time interaction.

All 7 participants in CBT participated in the requisite number of therapy sessions. Additionally, all 7 participants in CBT+E participated in both the requisite number of

therapy sessions and exercise sessions. Participants were asked to participate in four therapy sessions over the course of treatment, attending no fewer than three sessions in order to be included in final analysis. The mean number of therapy sessions attended by the CBT group was 3.7 while the mean number of therapy sessions attended by the CBT+E group was 3.5 (Table 10).

Participants were asked to complete exercise sessions twice per week for 8-weeks, attending no fewer than 12 exercise sessions in order to be included in final analysis. Participants in CBT+E completed no fewer than 12 and no more than 19 exercise sessions. The mean number of exercise classes completed by the CBT+E group was 14.85 (Table 10). It is important to note that all participants achieved their individually prescribed target heart rate at every exercise session. Furthermore, prior to each participant exiting the exercise room, her post-exercise heart rate was found to have decreased sufficiently. Participants in CBT+E were not asked to discontinue exercising during the course of the study for ethical reasons and as required by the IRB at UWF. However, the participants were asked to record any exercise they engaged in during the 8-week course of the study, and exercise was not encouraged. Three of the 7 participants in CBT reported engaging in aerobic exercise, including using the treadmill and elliptical machine at a local gym, during the course of the study. Of the participants, 2 reported engaging in occasional aerobic exercise, and 1 reported engaging in regular aerobic exercise during the 8-week study (Table 10). Participants in CBT+E were also asked to record any additional exercise they engaged in outside of the scheduled aerobic exercise sessions that comprised the exercise treatment. Three of the 7 participants reported engaging in additional aerobic exercise during the course of the study (Table 10).

Blood pressure and resting heart rate was measured at pre-treatment for participants who engaged in CBT+E. Blood pressure and resting heart rate were measured using the procedures outlined by the ACSM. There were no significant differences observed among participants in comparing pre-treatment and post-treatment measurements of resting heart rate (Table 11). Pre-treatment and post-treatment measurements of blood pressure could not be compared, as this data was missing for 3 of the 7 participants due to an oversight made by the author. As post-exercise heart rate was also measured at every exercise session, scores from participants' first class and final class were also compared. There were no significant differences observed between pre-treatment and post-treatment post-exercise heart rate measurements (Table 11).

Regarding the results of the EMS, identified regulation was the most strongly endorsed subscale by the CBT+E treatment group, with 4 of 7 participants (57.1%) endorsing this type of motivation. Internal motivation to experience was the next most frequently endorsed type of motivation, with 3 of 7 participants (42.8%) in CBT+E. endorsing this subscale. Of the participants in CBT, identified regulation was the most strongly endorsed subscale in this treatment group as well, with 4 of 7 participants (57.1%) endorsing this type of motivation. The aforementioned subscale was followed by 2 participants (28.5%) endorsing internal motivation to learn and 1 participant (14.2%) endorsing introjected regulation.

Table 10

Summary of Participation in Therapy, Exercise, and Additional Exercise

Pp	Age	Therapy Sessions	Exercise Sessions	Additional Exercise
CBT				
1	42	4	N/A	None
2	55	4	N/A	None
3	30	3	N/A	None
4	50	4	N/A	18 hours Aerobic Exercise*
5	45	4	N/A	7 hours Aerobic Exercise*
6	34	3	N/A	1.5 hours Aerobic Exercise*
7	62	4	N/A	None
CBT+E				
1	59	3	12	9.5 Hours of Walking
2	53	4	19	5 Hours Walking
3	31	4	14	None
4	44	4	15	None
5	43	3	15	None
6	54	3	12	None
7	41	4	17	25.5 Hours of Walking, .5 Hours of Swimming

Note. CBT=Cognitive Behavioral Therapy, CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, *=Aerobic Exercise Completed at Gym (Includes Time on Treadmill and Elliptical Machine)

Table 11

Summary of Resting Heart Rate, and Post-exercise Heart Rate at Pre-treatment and Post-treatment for CBT+E

Pp	HR pre	HR post	Post Ex HR pre	Post Ex HR post
1	78	80	108	120
2	98	80	118	110
3	98	102	129	114
4	72	78	120	105
5	109	120	140	120
6	120	89	126	118
7	105	88	118	114

Note. CBT+E=Cognitive Behavioral Therapy plus group aerobic exercise sessions, Pp=Participant, HR pre=Heart Rate at Pre-treatment, HR Post=Heart Rate at Post-treatment (measured after completion of final exercise class), Post Ex HR pre=Post-exercise Heart Rate at Pre-treatment (measured 2 to 3 minutes after completion of first exercise class), Post Ex HR post=Post Exercise Heart Rate at Post-treatment (measured 2 to 3 minutes after completion of final exercise class).

Interestingly, the majority of participants in CBT and CBT+E endorsed identified regulation as their primary motivation for exercising. Identified regulation is a type of extrinsic motivation which reflects participation in an activity because one holds the outcomes of the behavior to be personally important or significant. Although one may not enjoy the activity itself, the person has internalized the value associated with the activity and freely chooses to participate. There were no overall differences between the treatment groups with regard to exercise motivation, although half of the study's participants elected to participate in the exercise treatment while half did not.

Participants were also asked to complete a satisfaction with treatment questionnaire following completion of the study (Appendixes K & L). All participants in CBT+E reported satisfaction with both the exercise sessions and the therapy sessions. Additionally, all participants in CBT reported satisfaction with the therapy sessions (Appendixes K & L). It is important to note that after participants in CBT+E began exercising, they wanted to continue. In fact, the majority of participants reported continuing to exercise regularly at the Lakeview Center gym following completion of the 8-week exercise program. It was also the author/therapist's observation that individuals who participated in CBT+E experienced additional benefits that were not measured for the purpose of this study, including improved posture, weight loss, improved self-esteem, and improved body-image. Participants in CBT+E verbalized these same additional benefits and expressed appreciation for the opportunity to participate in this study.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the effects of an aerobic exercise treatment on symptoms of PTSD among a sample of adult women who reported a history of experiencing sexual violence. Results did not reveal a statistically significant difference between the CBT and CBT+E treatment groups at post-treatment with regard to CAPS, PCL-S, or SCL-90-R scores. However, results were clinically significant: more participants in CBT+E no longer met the criteria for PTSD following treatment, when comparing CAPS F1/I1 TSEV65 scores. The CAPS is considered to be the "gold standard" in PTSD assessment (Gray et al., 2004) and the F1/I2 TSEV65 scoring ruling is the most commonly utilized method for scoring the CAPS (United States Department of Veterans Affairs, n.d.). Additionally, more of the participants in CBT+E displayed change that was clinically significant when comparing post-treatment PCL-S scores. There was also a trend on most measures in favor of the CBT+E treatment group.

The specific hypothesis formulated for this study was as follows:

HR1: Participants in CBT+E will demonstrate a greater reduction in PTSD symptoms, as measured by pre-treatment and post-treatment CAPS and PCL-S scores, compared to individuals in the treatment group receiving CBT alone.

The research hypothesis was not supported statistically. There are multiple factors which may have led to clinically significant, but not statistically significant, findings.

First, an 8-week exercise treatment was selected based on the limited prior research examining PTSD and exercise. Manger and Motta (2005) found that although reductions in PTSD symptoms were observed at mid-intervention (after four weeks of exercise), PTSD symptoms were significantly further reduced at post-intervention (after eight weeks of exercise).

Additionally, as the therapy sessions were to be conducted on a bi-weekly basis, because of the therapist's availability, an 8-week treatment program also allowed for the completion of four therapy sessions during the course of treatment. This decision was based on Foa, Hearst-Ikeda and Perry's (1995) research finding that four sessions of CBT reduced PTSD symptoms among recent victims of rape and aggravated assault. As there was a trend on most measures in favor of the CBT+E treatment group, the results may have been statistically significant if a longer duration of treatment, such as 12 or 16 weeks or longer, had been prescribed.

It also may be that this clinical population was experiencing unique challenges in their recovery from being the victims of violent crime which may have impacted the outcome of this study. More individuals in the CBT+E treatment group were experiencing ongoing trauma-related stressors, including that multiple participants were pending divorce from the perpetrators of their domestic violence, one participant was involved in an ongoing civil suit against the perpetrators of her childhood sexual abuse, one participant was involved in ongoing stressors related to a worker's compensation claim, and most participants were experiencing chronic financial stressors. Additionally, it may be that a larger sample size may have produced statistically significant results.

It is important to note that both the CBT and CBT+E treatment groups demonstrated adherence to treatment. One hundred percent of participants in CBT completed the required number of therapy sessions while 87% (7 of 8) participants in the CBT+E group completed the required number of therapy sessions and exercise sessions. Only one individual, who fractured her foot in a non-exercise-related incident following one week of participation in the exercise treatment, was unable to continue participation in either group because of being unable to exercise, or even to drive to her therapy appointments, for a period of time following her injury. This study had very low attrition when compared to previous studies examining PTSD and exercise. Given the ongoing stressors that participants in both groups were experiencing during their time in treatment, their adherence to treatment is reflective of their motivation in treatment.

For the purpose of this study, clients were allowed to self-select participation in either the CBT or CBT+E treatment group. In working with survivors of trauma, it is important to allow each client to dictate the pacing of treatment. The empowerment of the survivor must remain the guiding principle of trauma recovery (Herman, 1997). Therefore, requiring clients to participate in exercise sessions would not be recommended, as this criterion could complicate treatment, lead to resistance, or promote a power-struggle that would be detrimental to the therapeutic process. It was viewed as most beneficial to allow clients to self-select into their preferred mode of treatment. This process was also viewed as reflective of how treatment would most likely be conducted outside of the research environment, making it more applicable to Rape Crisis Centers and other outpatient settings. As individuals who have experienced a sexual trauma often feel uncomfortable in their own body and experience difficulty with issues surrounding a

perceived lack of control (Herman, 1997), it was viewed as important to allow each participant to decide for herself if she was interested in engaging in an exercise program. It may be that assisting clients, through therapy, with reaching a place in their recovery work where they feel comfortable to begin to engage in exercise could be an important goal of treatment. Aerobic exercise could then have the added benefit of allowing survivors of sexual trauma to feel more comfortable, and in control, of their own bodies, in addition to any mental health or cardiovascular benefits that may be obtained.

It is also possible that the frequency, duration, and/or intensity of the exercise sessions may have impacted the lack of statistically significant findings in this study. However, it is important to note that none of the individuals in the CBT+E treatment group had been engaging in regular aerobic exercise for quite some time, and therefore, this consideration was important when setting the requirements of the study, which included exercising no fewer than two times per week, for 50 minute sessions, at moderate intensity.

Conclusions

This study overcame many limitations that were inherent in the limited prior research examining PTSD and aerobic exercise. Perhaps most importantly, this study compared aerobic exercise to an empirically validated treatment for PTSD (CBT as outlined by Foa, 1998). Additionally, participants were monitored for adherence to treatment by both the researcher/therapist and the facilitator of the exercise treatment. For the CBT treatment group, the researcher/therapist monitored adherence to therapy sessions. For participants in CBT+E, the researcher/therapist monitored adherence to

therapy and exercise sessions, and the facilitator of the exercise treatment monitored both participation in the exercise treatment and adherence to the individually-prescribed target heart rate to ensure that each participant was exercising at moderate intensity at every exercise session. Additionally, it is important to note that a female certified personal trainer facilitated all exercise sessions, so as to separate the therapeutic relationship from the exercise treatment. Therefore, it cannot be stated that the trend in favor of the CBT+E treatment group was due to increased time with the therapist.

Research indicates that individuals with PTSD have a difficult time self-regulating, as evidenced by higher levels of sympathetic nervous system activation and lower heart rate variability. Interventions allowing trauma survivors to develop strategies to self-soothe, or increase affective regulation, have been found to be effective in reducing trauma survivor's anxiety and subjective feelings of safety. Such interventions may include relaxation, meditation, and yoga, all of which have been found to decrease autonomic sympathetic activation, muscle tension, and blood pressure, improving neuroendocrine and hormonal activity, decreasing physical symptoms and emotional distress, and improving quality of life (Emerson et al., 2009). It is possible that aerobic exercise may serve this same purpose. Because aerobic exercise decreases sympathetic nervous system activation and can be completed virtually anywhere, at any time, and at minimal cost, it is a promising treatment for addressing both the emotional and physiological symptoms associated with PTSD.

Some researchers theorize that when individuals with anxiety increase their heart rate and breathing in the context of aerobic exercise, they learn that these physical signs do not necessarily lead to the development of a panic attack, which, among survivors of

trauma, is often the result of a trauma-related trigger. Exercise, therefore, may lead individuals to become more comfortable with feelings of physiological arousal in their bodies, so they no longer automatically associate their arousal as being harmful or indicative of imminent danger. In other words, aerobic exercise, over time, may re-train the brain by reprogramming the cognitive distortions/misinterpretations experienced by trauma survivors with anxiety that are specifically related to this idea that physiological arousal always signifies danger. Exercise is also known to produce calming chemical changes within the body which are helpful for all of those who exercise, not only trauma survivors (Ratey, 2008).

Although memories of earlier traumas can never be erased, these memories can be obscured by creating a new memory and reinforcing it. Like CBT, exercise may also work to serve this same purpose. In CBT, an individual is gradually exposed to the situations that she has been avoiding and that have been creating anxiety for her related to her trauma history. As an individual experiences anxiety without panic, the brain goes through a cognitive restructuring. The individual develops connections in the prefrontal cortex of the brain; this restructuring calms the amygdala, thereby teaching the individual to experience feelings of safety and creating a new memory of that feeling. Exercise adds neurotrophic factors and neutrotransmitters to further increase the circuits between the prefrontal cortex and the amygdala (Ratey, 2008). In his book, *Spark: The Revolutionary New Science of Exercise and the Brain*, Ratey (2008) describes seven ways that exercise works to address both anxiety disorders and symptoms of anxiety in day-to-day life. First, exercise provides a distraction. Second, exercise reduces muscle tension. Third, exercise builds brain resources. Fourth, exercise teaches a different outcome. Fifth, exercise

reroutes circuits of the brain. Sixth, exercise improves resilience. And, finally, exercise sets us "free," in the sense that one is able to move around, including leaving one's home, without feeling confined because of anxiety. As traditional trauma therapy is talk-based, focusing on cognitions, emotions, and behaviors, therapy may neglect the physical, visceral, and body-based dimension of trauma. Therefore, aerobic exercise may uniquely address the needs of trauma survivors (Emerson et al., 2009).

Limitations

This preliminary study has several limitations. The primary limitation is perhaps the limited generalizability and validity of the results because of the small number of participants (n=14). This study allowed participants to self-select participation in CBT or CBT+E, instead of utilizing randomized sampling. Therefore, there may be differences between those who chose to participate in the exercise treatment and those who did not, as well as differences between those who would choose to participate in a study in general and those who would not elect to participate. Notably, no differences were observed between the CBT and CBT+E treatment groups with regard to age, number of life events experienced, pre-treatment PTSD scores, or exercise motivation.

The general trend in favor of the CBT+E treatment group could possibly be due to the benefit of increased social interaction, instead of to the exercise treatment itself. It is important to note that social interaction before, during, and after the exercise sessions was not encouraged and participants were encouraged to focus on and monitor their own individual efforts and progress. Additionally, all of the women who participated in this study have experienced multiple potentially traumatic life events; therefore, PTSD

symptoms may not be due to just one event (the sexual trauma). Furthermore, as this study is designed to examine the effects of exercise on symptoms of PTSD among a sample of adult women voluntarily seeking outpatient treatment at their local Rape Crisis Center, results may not be generalizable to male trauma survivors, child/adolescent survivors, or individuals undergoing treatment either voluntarily or involuntarily at an inpatient treatment center or at another type of treatment facility. For the reasons described above, it is important to use caution when interpreting these results.

Recommendations for Future Research

The limitations encountered in this study indicate several recommendations for future study. Perhaps most importantly, increasing the number of participants in both the CBT and the CBT+E treatment groups would increase the validity and generalizability of the results. It has been recommended that data be collected from a minimum of 15 participants when conducting experimental clinical studies involving the comparison of groups (Currier, 1984). As there was a trend on most measures in favor of the CBT+E treatment group, results of this study suggest that future research utilize a longer duration of treatment and possibly measure PTSD symptoms at not only pre-treatment and post-treatment but also at mid-treatment.

It would be worthwhile for future studies to utilize randomized sampling, instead of allowing participants to self-select their treatment program. Finally, future research should explore various exercise prescriptions, particularly the frequency and intensity of exercise treatments. It would also be interesting to examine the impact of various types of

exercise on symptoms of PTSD, ranging from aerobic exercise sessions completed outside of a gym to more traditional western approaches, such as yoga.

Furthermore, substance use disorders are particularly common among individuals who are experiencing PTSD. Many of those with PTSD who use alcohol or drugs do so to self-medicate, to reduce or manage the emotional pain associated with the trauma (Foa, 1998). Therefore, it may be the case that aerobic exercise can also assist trauma survivors with managing the emotional impact of the trauma in a more adaptive way, thereby decreasing substance use. This may be a particularly important area for further research. Finally, it would also be valuable for future studies to compare physiological measures, such as resting heart rate and cortisol levels, between treatment groups.

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APPENDIXES

Appendix A

American Psychiatric Association Criteria for PTSD

American Psychiatric Association Criteria for PTSD

Diagnostic criteria for 309.81 Posttraumatic Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:

(1) the person experienced witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of others

(2) the person's response involved intense fear, helplessness, or horror. **Note:** In children, this may be expressed instead by disorganized or agitated behavior.

B. The traumatic event is persistently reexperienced in one (or more) of the following ways:

(1) recurrent and distressing recollections of the event, including images, thoughts, or perceptions. **Note:** In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.

(2) Recurrent distressing dreams of the event. **Note:** in children, there may be frightening dreams without recognizable content.

(3) acting or feeling if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). **Note:** In young children, trauma-specific reenactment may occur.

(4) Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event

(5) Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three or more of the following:

(1) efforts to avoid thoughts, feelings, or conversations associated with the trauma

(2) efforts to avoid activities, places, or people that arouse recollections of the trauma

(3) inability to recall an important aspect of the trauma

(4) markedly diminished interest or participation in significant activities

(5) feeling of detachment or estrangement from others

(6) restricted range of affect. (e.g., unable to have loving feelings)

(7) Sense of a foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:

(1) difficulty falling or staying asleep

(2) irritability or outbursts of anger

(3) difficulty concentrating

(4) hypervigilance

(5) exaggerated startle response

E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than one month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if:
Acute: if duration of symptoms is less than three months.
Chronic: if duration of symptoms is three months or more

Specify if:
With Delayed Onset: if onset of symptoms is at least 6 months after the Stressor

Appendix B

IRB Approval Letters from The University of West Florida and Lakeview Center, Incorporated

University of West Florida

Research and Sponsored Programs
Building 11, Room 109
11000 University Parkway
Pensacola, FL 32514-5750

Ms. Erica Smith

November 10, 2008

Dear Ms. Smith:

The Institutional Review Board (IRB) for Human Research Participant Protection has completed its review of your proposal titled "Exercise and Post-traumatic Stress Disorder" as it relates to the protection of human participants used in research, and has granted approval for you to proceed with your study. As a research investigator, please be aware of the following:

- You acknowledge and accept your responsibility for protecting the rights and welfare of human research participants and for complying with all parts of 45 CFR Part 46, the UWF IRB Policy and Procedures, and the decisions of the IRB. You may view these documents on the Office of Research and Sponsored Programs web page at http://www.research.uwf.edu. You acknowledge completion of the IRB ethical training requirements for researchers as attested in the IRB application.
- You will ensure that legally effective informed consent is obtained and documented. If written consent is required, the consent form must be signed by the participant or the participant's legally authorized representative. A copy is to be given to the person signing the form and a copy kept for your file.
- You will promptly report any proposed changes in previously approved human participant research activities to the Office of Research and Sponsored Programs. The proposed changes will not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the participants.
- **You are responsible for reporting progress of approved research to the Office of Research and Sponsored Programs at the end of the approved data gathering period of April 30, 2009.**
- You will immediately report to the IRB any injuries or other unanticipated problems involving risks to human participants.

Good luck in your research endeavors. If you have any questions or need assistance, please contact the Office of Research and Sponsored Programs at 857-6378.

Sincerely,

Dr. Terry Prewitt, Chair
IRB for Human Research
Participant Protection

Dr. Richard S. Podemski
Associate Vice President for Research and
Dean of Graduate Studies

CC: Dr. Petra Schuler
Dr. John Todorovich

Phone 850.474.2824 Fax 850.474.2082
Web research.uwf.edu

Lakeview Center
BAPTIST HEALTH CARE

1221 West Lakeview Avenue
Pensacola, Florida 32501-1836
Phone (850) 432-1222
Fax (850) 595-1400

Erika Smith
Research Proposal
Letter of Approval

Date10/26/08

Dear Erika:

The application of your project, Exercise and Posttramatic Stress Disorder submitted to the Lakeview Center Institutional Review Board has been approved based upon your response to our recommendation. You may commence with your project.

You must promptly notify the IRB of any changes in the project and of any unanticipated problems involving risk to participants.

Please submit a copy of the final report to the IRB.

Thank you for you adherence to the IRB Policy and Procedures and we wish you well in you research.

Sincerely,

John Bilbrey, Ph.D.
Chairperson
Institutional Review Board

Appendix C

PAR-Q Letter of Permission

Re: PAR Q & U
Mary Duggan
to:
Erika.Smith
10/22/2010 10:06 AM
Show Details

1 Attachment

csep_NOregion(10).jpg

Dear Erika,
Yes this is fine.
All the best with your study.
Mary Duggan

On 10/22/10 10:51 AM, Erika.Smith@bhcpns.org wrote:

> My name is Erika Smith and I am a graduate student in Exercise Science at the University of West Florida. I want to be sure that I am understanding correctly that I may administer the PAR Q & U in my study examining PTSD and Exercise since the PAR Q & U is in the public domain.
>
> If granted permission, I will include a copy of the PAR Q & U in the appendixes section of my Master's thesis. The title of my thesis is "A community-based treatment for survivors of sexual violence with posttraumatic stress disorder utilizing cognitive behavioral therapy and aerobic exercise." There is no cost to publish my thesis.
>
> Thank you,
>
> Erika Smith

Erika Smith, M.S., LMFT, CTS
Rape Crisis/Trauma Recovery Therapist
Lakeview Center, Inc.
Phone (850) 469-3942
Fax (850) 469-3661

--

Mary Duggan, CAE
Manager
Canadian Society for Exercise Physiology
#370, 18 Louisa St, Ottawa ON K1R 6Y6
1-877-651-3755 x223
613-234-3755 x223
www.csep.ca
@CSEPdotCA

Appendix D

PAR-Q

Physical Activity Readiness
Questionnaire - PAR-Q
(revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	**Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2.	**Do you feel pain in your chest when you do physical activity?**
☐	☐	3.	**In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4.	**Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5.	**Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6.	**Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7.	**Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

Supported by: Health Canada Santé Canada

continued on other side...

Appendix E

Informed Consent for Treatment

Informed Consent Form

Title of Research: Exercise and Traumatic Stress

I. Federal and university regulations require us to obtain your signed consent for this project. After reading the statements below, please give your consent by signing and dating this form.

II. **Statement of Procedure:** Thank you for your interest in this research project. The project is directed by Erika Smith. Ms. Smith is a Rape Crisis/Trauma Recovery Therapist at Lakeview Center and a graduate student at the University of West Florida. Ms. Smith will describe for you in detail the procedures for this research project. This project involves asking you to complete several surveys to examine psychological stress following trauma. You will be asked to fill out the surveys in a private setting. Next, you will be asked to choose one of two treatments to participate in, which may help you to deal with your stress. One treatment is called cognitive behavioral therapy. Cognitive behavioral therapy involves helping you to work through some of the negative thoughts and feelings you have experienced following your trauma. The other treatment involves both cognitive behavioral therapy sessions and aerobic exercise sessions. The cognitive behavioral therapy sessions will be delivered in a private setting. The aerobic exercise sessions will be held in a small group setting. The major aspects of the study are described in the statements below, including the risk and benefits of your participation. Your information will be kept strictly confidential.

I understand that:

(1) I will be asked to complete the "PAR-Q and YOU", a survey that will show if I am ready to safely begin an exercise program. If my survey results raise concerns about my ability to safely begin an exercise program, I must obtain a written letter of approval from a physician stating that it is safe for me to begin an exercise program prior to my participation in this study.

(2) I will be asked to disclose certain information about the presence or absence of symptoms of traumatic stress by completing several surveys. These surveys will be filled out by me at the beginning and end of the project and again one month after the project ends.

(3) After completing the initial surveys, I will be asked to choose one of two treatments to participate in, either bi-weekly cognitive behavioral therapy sessions or bi-weekly cognitive behavioral therapy sessions and twice weekly aerobic exercise sessions.

(4) This study will last for eight weeks. If I choose to participate in bi-weekly cognitive behavioral therapy session, I will be asked to attend no fewer than 3 therapy sessions during the course of the study. If I choose to participate in bi-weekly cognitive behavioral therapy and twice weekly aerobic exercise sessions, I will be asked to participate in no fewer than 3 therapy sessions and no fewer than 12 exercise sessions during the course of this study.

(5) My resting heart rate and blood pressure will be measured on two occasions during the course of the study, once at the beginning of the study and once at the conclusion of the study.

(6) If I choose to participate in the exercise sessions, my heart rate will be measured no more than four times at every exercise session.

(7) If I choose to participate in the exercise sessions, I will be asked to report any other types of exercise that I am involved in during the course of this study.

(8) I will be asked to disclose the medications, if any, that I am currently prescribed. I will be asked to keep a daily record of the name and dosage of any medications that I take for a mental health condition (such as medicine for Depression or Anxiety) during the course of this study.

(9) Ms. Smith will tell me how I'm doing, if I wish to know. I will check the box below if I am interested in this.

(10) After the data are gathered, my name will be replaced with an identifying code known only by the researcher. At no time will my name be referenced in the study results and/or reports.

(11) I may discontinue my participation in this study at any time without penalties.

III. Potential Risks of the Study:

(1) There is minimal risk associated with beginning an exercise program. The risk includes minor side effects such as temporary muscle soreness and fatigue. These side effects are common and should subside within one to two days.

(2) Participants will be asked to respond to personal and potentially sensitive questions regarding their trauma history, which may result in some psychological discomfort. You may notify Ms. Smith if you have any

concerns. The Rape Crisis Center also operates a 24 hour crisis hotline (#433-7273) that you may call at any time if needed.

IV. Potential Benefits of the Study:

(1) Data obtained from this study may provide mental health professionals and fitness professionals with an improved understanding of the role of aerobic exercise in the treatment of traumatic stress, potentially leading to improved services for victims of trauma.

(2) Participants may experience improvements in their symptoms of traumatic stress.

(3) Participants may experience improvements in their cardiovascular fitness.

V. Statement of Consent: I certify that I have read and fully understand the Statement of Procedure and Potential Risks and Benefits of this study described above. I agree to my participation in this research project. My permission is given voluntarily and without coercion or undue influence. I understand that I may discontinue my participation in this project at any time without penalty or loss of any benefits to which I may otherwise be entitled. I will be given a signed copy of this consent form.

Please schedule a time for me to review my survey results. _____yes_____no

If you have any questions or concerns, please call Ms. Erika Smith at (850) 469-3800.

_____
Participant's Name (Please Print)

_____ _____
Participant's Signature Date

_____ _____
Witness Signature Date

Appendix F

Informed Use Agreement

LAKEVIEW CENTER, INC.
An Affiliate of Baptist Health Care

Informed Use Agreement

(FOR VOLUNTARY USE OR PARTICIPATION IN THE ACTIVITIES OF THE MORRIS L. EADDY ACTIVITY CENTER)

Thank you for choosing to use or participate in the activities, facilities, services, or programs of the Morris L. Eaddy Activity Center of Lakeview Center, Inc. We request your understanding and cooperation in maintaining both your and our safety and health by carefully reading and signing this Informed Use Agreement.

I, _____, declare that I intend to use some or all of the activities, facilities, programs, and services offered by Lakeview Center, Inc. in the Morris L. Eaddy Activity Center, and I understand that each person (including me), has a different capacity for participating in such activities, facilities, programs, and services. I am aware that all activities, services, and programs offered are voluntary and are either educational, recreational, or self-directed in nature. I assume full responsibility, during and after my participation, for my voluntary choice to use the facilities or apply, at my own risk, any portion of the information or instruction I receive.

I understand that part of the risk involved in undertaking any activity or program is relative to my own state of fitness or health (physical, mental, or emotional) and to the awareness, care, and skill with which I conduct myself in that activity or program. I acknowledge that my voluntary choice to participate in any activity, service, and program of the Morris L. Eaddy Activity Center of Lakeview Center, Inc. brings with it my assumption of those risks or results stemming from this choice and the fitness, health, awareness, care, and skill that I possess and use.

I further acknowledge that I am voluntarily participating or engaging in the activities, services, or programs of the Morris L. Eaddy Activity Center. I also acknowledge that if I am an employee of Lakeview Center, Inc., or any of its affiliates, and am not, at the time of my participation or engagement, engaged in the rendering of any care of services to residents or clients of Lakeview Center, Inc., or any of its affiliates, my participation in any activity, service or program of the Morris L. Eaddy Activity Center is entirely voluntary and is not within the course or scope of or a condition of my employment with Lakeview Center, Inc., or any of its affiliates. As a consequence, I acknowledge and understand that Lakeview Center, Inc., its affiliates and their insurers are not obligated to provide me with any workers compensation benefits under Chapter 440, Florida Statutes, or any other similar law.

Additionally, regardless of whether or not I am employed by Lakeview Center, Inc., and its affiliates, I further hereby release and discharge Lakeview Center, Inc., and its affiliates from all manner of actions, causes of action, suits, damages, demands and claims, whether in law, in equity or by statute which I ever had, now have or may have against Lakeview Center, Inc., or its affiliates for or by reason of anything mentioned or referenced in this Agreement.

I acknowledge that it is my responsibility to determine in advance whether I am in adequate physical condition to use the facilities and that it is my responsibility to take proper precautions to minimize the risk of injury to others and myself. I acknowledge that I have been advised (which advice is reaffirmed by this provision) to consult with and obtain approval from my physician before using the facilities. I have no knowledge of any physical condition, injury, or disease which would preclude my use of the facilities. I agree to periodically consult with my

physician, especially with regard to any physical condition, injury, or disease that arises subsequent to the execution of this Informed Use Agreement, that could affect my continued use of the facilities.

I recognize that by participating in the activities, facilities, programs, and services offered by Lakeview Center, Inc. in the Morris L. Eaddy Activity Center, I may experience potential health risks such as transient light-headedness, fainting, abnormal blood pressure, chest discomfort, leg cramps, and nausea, ischemia, systole, myocardial infarction, and cardiac arrhythmias, and may sustain physical injuries including, but not limited to, musculoskeletal strain/sprain, bruising, ecchymosis, scarring, lacerations, fractures, blistering, concussion, and neurological compromise or injury. I hereby agree and acknowledge that I freely and in an informed manner, voluntarily and knowingly assume all such risks.

I further acknowledge my obligation to immediately inform the nearest Activity Center supervisor or employee of any pain, discomfort, fatigue, or any other symptoms that I may suffer during and immediately after my participation. I understand that I may stop or delay my participation in any activity or procedure if I so desire and that I may also be requested to stop and rest by an Activity Center supervisor or employee who observes any symptoms of distress or abnormal response.

I understand that I may ask any questions or request further explanation or information about the activities, facilities, programs, and services offered by Lakeview Center, Inc., in the Morris L. Eaddy Activity Center at any time before, during, or after my participation.

I declare that I have carefully read, fully understand, and agree to the contents of this Informed Use Agreement in its entirety.

Print Name _____ Phone #_____

Signature_____ Date Signed_____

Witness_____ Date Signed_____

Appendix G

My Monthly Medication Record

MY MONTHLY MEDICATION RECORD

My Name: _____
Date I Began this Record: _____

Please write down the name of each medication you take, the reason you take it, how much you take, and what time of day you take the medication. In the last column, write down any special instructions your doctor or pharmacist has given you for taking the medication. Add new medicines the day you start taking them. Please be sure to fill out this record every day. If you miss a pill/dose, do not write down the medication for that time.

Date	**Name of Medication**	**Purpose or Reason Taken**	**Dose**	**Time of Day Taken**	**Special Instructions**
Example: 10/28/08	Klonopin	Panic Attacks	.5 mg	8 AM and 6 PM	None
Example: 10/28/08	Wellbutrin XL	Depression	300 mg	8 AM	None

Appendix H

My Exercise Record

MY EXERCISE RECORD

My Name: _____
Date I Began this Record: _____

If you complete any prolonged physical activity OUTSIDE of the scheduled exercise classes at the Activity Center, please write down the date, type of exercise, and length of exercise. Also record where you completed the exercise. Thank you!

DATE	TYPE OF EXERCISE	LENGTH OF EXERCISE	LOCATION OF EXERCISE
Example: 2/02/09	Walk – moderate pace	15 minutes (~1.5 miles)	My Neighborhood
Example: 2/05/09	Jog on treadmill	20 minutes	Activity Center Gym

Appendix I

Exercise Motivation Scale (EMS)

Letter of Permission

RE: Exercise Motivation Scale
Fuzhong Li
to:
Erika.Smith
02/02/2009 04:44 PM
Hide Details
From: "Fuzhong Li" <fuzhongl@ori.org>

To: <Erika.Smith@bhcpns.org>

History: This message has been replied to and forwarded.

1 Attachment

scale.doc

HI Erika, here is the scale. Let me know if you have trouble with the file.
Best luck with your thesis project.
Fuzhong

From: Erika.Smith@bhcpns.org [mailto:Erika.Smith@bhcpns.org]
Sent: Monday, February 02, 2009 2:00 PM
To: Fuzhong Li
Subject: Exercise Motivation Scale

Dear Dr. Li,

I am requesting your permission to use the "Exercise Motivation Scale" in my thesis project on "Exercise and Posttraumatic Stress Disorder." I have attached a copy of the Informed Consent Form for my project.

Sincerely,

Erika Smith

Erika Smith, M.S., LMFT, CTS
Rape Crisis/Trauma Recovery Therapist
Lakeview Center, Inc.
Phone (850) 469-3942
Fax (850) 469-3661

Appendix J

Exercise Motivation Scale (EMS)

First Name: _____

Exercise Motivation Scale

WHY ARE YOU CURRENTLY PARTICIPATING IN THIS ACTIVITY?

Direction: Please read each of the statements listed below and indicate how strongly you agree or disagree with each statement by circling the appropriate response to the right of the statement. Use the following response categories:

Strongly disagree (SD) 1	Disagree (D) 2	Moderately disagree (MD) 3	Moderately agree (MA) 4	Agree (A) 5	Strongly agree (SA) 6

	SD	D	MD	MA	A	SA
1. For the pleasure it gives me to experience positive sensations from the activity.	1	2	3	4	5	6
2. For the satisfaction it gives me to increase my knowledge about this activity.	1	2	3	4	5	6
3. Because other people believe that it's a good idea for me to exercise.	1	2	3	4	5	6
4. Because I must exercise to feel good about myself.	1	2	3	4	5	6
5. Because I believe that regular exercise is a good way to enhance my overall development.	1	2	3	4	5	6
6. Because it is consistent with what I value.	1	2	3	4	5	6
7. I can't understand why I am doing this.	1	2	3	4	5	6
8. Because I feel pressure from others to participate.	1	2	3	4	5	6
9. Because I think that exercise allows me to feel better about myself.	1	2	3	4	5	6
10. For the pleasure I experience while learning about this activity.	1	2	3	4	5	6
11. For the satisfaction I feel when I get into the flow of this activity.	1	2	3	4	5	6
12. Because I feel I have to do it.	1	2	3	4	5	

WHY ARE YOU CURRENTLY PARTICIPATING IN THIS ACTIVITY?

	SD	D	MD	MA	A	SA
13. To satisfy people who want me to exercise.	1	2	3	4	5	6
14. Because exercising is an important aspect of how I perceive myself.	1	2	3	4	5	6
15. For the pleasure of understanding this activity.	1	2	3	4	5	6
16. I have no idea.	1	2	3	4	5	6
17. For the pleasure of mastering this activity.	1	2	3	4	5	6
18. Because I think it is a good thing for my personal growth.	1	2	3	4	5	6
19. For the pleasure I experience when I feel completely absorbed in the activity.	1	2	3	4	5	6
20. For the satisfaction I feel while I try to achieve my personal goals during the course of this activity.	1	2	3	4	5	6
21. Because I would feel guilty if I did not take the time to do it.	1	2	3	4	5	6
22. Because I value the way exercise allows me to make changes in my life.	1	2	3	4	5	6
23. It is not clear to me anymore.	1	2	3	4	5	6
24. Because I think exercise contributes to my health.	1	2	3	4	5	6
25. To comply with expectations of others (e.g., friends).	1	2	3	4	5	6
26. For the enjoyment that comes from how good it feels to do the activity.	1	2	3	4	5	6
27. Because I enjoy the feelings of discovering more about this activity.	1	2	3	4	5	6
28. Because I enjoy the feelings of improving through participating in this activity.	1	2	3	4	5	6

WHY ARE YOU CURRENTLY PARTICIPATING IN THIS ACTIVITY?

	SD	D	MD	MA	A	SA
29. Because I feel that changes that are taking place through exercise are becoming part of me.	1	2	3	4	5	6
30. For the pleasure I experience while trying to become the person I want to be.	1	2	3	4	5	6
31. Because I would feel ashamed if I was not doing anything to improve my current situation.	1	2	3	4	5	6

Appendix K

Qualitative Responses to Satisfaction with Treatment Questionnaire: Anonymous Responses

Satisfaction with Treatment Questionnaire

1) How satisfied were you with the exercise sessions? What was your overall experience with the exercise sessions? Would you recommend the exercise sessions to other trauma survivors?

   Responses from CBT+E

   1) "Everything about it was great. I think this would be beneficial to others. I hope I can start exercising again in the near future."

   2) "A) At first, I was dubious, because I'd never really done real circuit training – that changed, as I realized how effective it is in making changes. It's a bit exhaustive at first, but in time it's a welcome experience. B) It was gratifying. C) Absolutely (would recommend exercise) – but not just to trauma – affected, I recommend it to everyone."

   3) "Very satisfied; I enjoyed them. They were long enough and not too long. I would most definitely recommend the exercise sessions to other survivors."

   4) "Absolutely satisfied and thankful to be a part of the exercise sessions. Everyone was very professional and I think that it helped profoundly – I think that I would have needed more of my anxiety medication if I didn't 'work it out' on the exercise floor."

   5) "Very satisfied. I was surprised that not many more of the women signed up actually showed up (after completing the 8-week program). I feel more confident, healthier and stand and sit straighter. I actually spoke with people while I was there, which is one of my weaknesses. I am glad it will be there if I decide to continue attending."

   6) I loved the exercise sessions! I would definitely recommend them. Overall, exercising made me more connected to my body – especially seeing my heart rate. Don't know if I would have been aware of negative effects from my meds, had I not taken the class. Thank you!"

   7) "I was grateful to be a part of the study and hope to be asked to be in other studies. There were times I had to really push myself to get there, but once I got there, the benefit paid off. I lost weight, felt better, had more of a positive outlook. Most of the time, I had determination and my self-esteem heightened. But, I will say there was a couple of times I got emotional and tearful during the exercising. I guess that was just part of the process, which was beneficial to be able to release those emotions and continue to move forward with the healing process. YES, YES, YES, I would recommend the exercise process/sessions to other trauma survivors. Thank you. ☺"

2) How satisfied were you with your therapy sessions? What was your overall experience with your therapy sessions? Would you recommend the therapy sessions to other trauma survivors?
Responses from CBT+E:

1) "I am very satisfied with my therapy. Erika is absolutely wonderful. I thank God there are people and programs like these to help people like me live again. I would definitely recommend these sessions for trauma survivors."

2) "Quite – I like feeling as though I have a valid say in things and Erika Smith is a gentle guide, rather than a regimented type of counselor. I was unsure at first because I saw this youthful, "unweathered" person; but as I understood her personality, and considered her experience, I became quite comfortable. B) It was wonderful to have someone to talk to. Once again, a gentle guide. She's such a sweet spirited person." C) I would and have (recommended the program to others)."

3) "I am very pleased with the therapy sessions. I am learning of 'tools' for my toolbox when some events or memories of events re-occur. It sometimes takes me extra time to remember those tools and use them though."

4) "Therapy is a must in my opinion for any trauma survivor – in the past two years I've been trying to sort it out myself but it wasn't working – Therapy was very professional and is helping me get to the root of my depression. It was affecting my family and I could not function – now, I can face it and work through it. I highly recommend therapy.

5) "Erika pushes me to try to do just a little more each session. She understands my fears and pains and is quick to assure me it is all a normal way the human spirit copes, but that only I can make things better. She makes me want to achieve something, to step up and try, even if it's one step back sometimes."

6) "I was very satisfied with the therapy sessions. My overall experience has been empowering. I would definitely recommend therapy to other survivors. I sincerely appreciate all of Erika's hard work and dedication to helping me through my recovery."

7) "I am assuming this question is referring to Erika. I feel she and I have come quite a ways together. I have learned, and am using, better coping skills as the sessions continue. I feel it is of vital importance to be able to have these therapy sessions to learn how to get back to my own self and to want to be alive and live. That's what these sessions have done for me. I most definitely feel therapy sessions are important and needed for those of us trauma survivors. It, therapy, has been a safe haven for me and it is very important to be able to feel safe and have trust after a traumatic experience. Thank you! ☺"

Responses from CBT:

1) “Very satisfied. My therapist is a kind and compassionate person who makes it easy to open up and deal with “memories” even though a great many years have passed. I would highly recommend it to all.”

2) “I was very satisfied with my therapy. I learned coping skills that have helped me a lot. I would recommend therapy sessions to other trauma survivors.”

3) “Moderately satisfied. I don’t feel like I’m progressing as quickly as I should. Erika is great. I would recommend therapy to others.”

4) “Erika is the perfect counselor, she is soft spoken, kind, and extremely helpful to all her clients. I would rate my experience with therapy as excellent. I would have no qualms recommending therapy to those with traumatic stress.”

5) “I am very satisfied with my therapy. I would definitely recommend these sessions for trauma survivors.”

6) “I love Erika Smith, she has helped me feel like a whole person again and to look at life head on.”

7) “I very much enjoy therapy. I sorta feel it is the only place I can truly be honest with myself and others. I hope to be able to do this everywhere soon and I would recommend it to other people.

Appendix L

Qualitative Responses to Satisfaction with Treatment

Questionnaire: Responses by Participants

Satisfaction with Treatment Questionnaire

1) Were there any events you experienced during the 8-week exercise and therapy program that either positively or negatively impacted your treatment (such as medication changes, contact with perpetrators of abuse, etc.). Please describe any positive and/or negative events you experienced during the 8-week program.

   Responses from CBT+E

   Pp

   1) "Yes, the perpetrator of abuse was extradited to Escambia County and those court dates interrupted my exercise sessions (negative). My ability to attend the court dates seemed stressful; however, not like the original court date. I believe the exercise and therapy have helped this (positive). I have lost weight ☺ and feel better about self."

   2) "Heather is a very good choice for this program. She gives encouragement and at the same time challenges you to go just one more or life just a little more each day. She makes me feel like a person, not a patient. It was good to know Heather and Erika were sharing information frequently."

   3) "Change in meds – stopped taking Adderall two weeks ago, began taking Paxil and Priolsec (for possible ulcer). Had contact with police regarding some experiences – positive and stressful."

   4) Missing data

   5) "Well, what I had known was confirmed – I was <u>badly</u> out of shape and still need a <u>lot</u> of work. However, I don't view this as a negative, because the program was an opportunity for me to affect change. The exercise is a major asset and I think should become a standardized part of the course of treatment. Positive effect, I feel <u>so</u> <u>much</u> better. I can feel the strength of developing muscle. I can see definition and I am proud to say I have continued the exercise long after the implemented program concluded."

   6) "My experience was most definitely positive. I felt better and healthier, thought processes were improved and helped me make better choices. No changes in my medications yet, but hopefully, I will be able to stop some of them, as I continue to be active on and way from the gym. I have no negative comments regarding the 8 week program other than I wished it had continued a little bit longer. I think 12 weeks instead of 8 weeks might show more of an indicator level because it gives your body more time to adjust."

7) "I was having bad side effects from the Wellbutrin XL that I was taking and I had to stop the medication. I think that the exercise got me through it. I've seen the perpetrator during the past 8 weeks and it really shook me – I have a lot going on and it's a great outlet. I ran into a loud, sarcastic guy that was using the facility that I avoided him, but when made known to staff, the problem was quickly resolved."

2) Is there any other information you would like to share on your experience during the exercise and therapy sessions?

Responses from CBT+E

Pp

1) "It felt good for me to be part of a/the group (exercise). I know I am making progress because of the therapy. Sometimes I take steps backwards when something has retriggered the event, but I am practicing the lessons I'm learning and make progress. It still gets overwhelming sometimes though not as often. I am very grateful for the therapy."

2) "It was hard for me to drive all the way over from Alabama for therapy and exercise, but I felt so good about myself and may chances for improving after each session it made me want to come back."

3) "Loved the exercise sessions! Felt good at the end of them, despite often being a struggle to convince myself my body needs exercise to function properly."

4) Missing data

5) "Simply that, once again, the exercise should be implemented as a more standardized part of the treatment process. Perhaps, even in conjunction with a diet/nutrition component. Combine this with an educative, gradual process to help women understand why they (their bodies, too – as much of a woman's self-portrait is how they are viewed by others) respond to certain stimuli as they do."

6) "Just a word of thanks for allowing me the opportunity to participate and contribute to the study for future references in handling trauma by means of physically working it out, a means of emotional release as well."

7) "I think that the women in the exercise program were friendly and the social aspect was a factor that needs to be considered. Therapy is helping me identify problems that I need to work through instead of avoid (which I have been

doing this year). THANK YA'LL more than you'll ever imagine. Thank you. Thank you. Thank you."