

[Barry University](#)
[Institutional Repository](#)

[Theses and Dissertations](#)

2005

Treating Depression with Taekwondo

Tori Terrizzi Kelley

TREATING DEPRESSION WITH TAEKWONDO

DISSERTATION

Presented in Partial Fulfillment of the Requirements for

the Degree of Doctor of Philosophy in

Counseling in

the Adrian Dominican School of Education of

Barry University

by

Tori Terrizzi Kelley, B.A., M.S.

Barry University

2005

Area of Specialization: Marriage and Family Therapy

TREATING DEPRESSION WITH TAE KWON DO

DISSERTATION

by

Tori Terrizzi Kelley

2005

APPROVED BY:

Catharina M. Eeltink, Ph.D.
Chairperson, Dissertation Committee

J. Paul Gallant, Ph.D.
Member, Dissertation Committee Member

Steve E. Livingston, Ph.D.
Member, Dissertation Committee

Sister Evelyn Piché, O.P., Ph.D.
Dean, Adrian Dominican School of Education

Copyright by Tori Terrizzi Kelley 2005
All Rights Reserved

ABSTRACT

TREATING DEPRESSION WITH TAEKWONDO

Tori Terrizzi Kelley

Barry University, 2005

Dissertation Chairperson: Catharina M. Eeltink, Ph.D.

Purpose

Families who have a depressed member tend to have poor problem solving skills, poor communication, and difficulty experiencing affective responses (Keitner, Archambault, & Ryan 2003). Family functioning is more hindered by a depressed member than a family dealing with schizophrenia, bipolar disorder, rheumatoid arthritis, or cardiac disease. Depressed mothers tend to parent poorly and have adversarial relationships. Children raised in these homes have a greater risk for developing affective disorders or other psychopathology. The risk of suicide is high in this population (Keitner & Miller, 1990). Depression is a serious illness. More research is needed to identify effective treatments of depression. The study is an examination of the effects of taekwondo on depression.

Method

Participants were recruited from the Central Florida area. Thirteen participants responded to 1263 posted flyers in the community. Nine participants completed the study. The author used a randomized experimental design with a pretest-posttest and control group. Taekwondo was tested as a supplemental treatment method to reduce depression in adults. Nine participants were given the Beck Depression Inventory-II (BDI-II) as a pretest and posttest. Four participants completed taekwondo training while the other five

waited for their training to begin. Training consisted of a one hour group session in a local taekwondo center, twice per week, for four weeks.

Major Findings

The results of an independent samples *t* test revealed did not reveal a significant difference between the experimental and control groups at the $p < .05$ level, $p = 0.052$. The large effect size ($\eta^2 = .44$) found among the differences of scores between the control and experimental groups support previous research that shows exercise as having an effect on depression (McNeil et al. 1991; Dimeo et al., 2001; Singh et al. 2001).

The data presented in this study contributes to the base of knowledge that exercise is effective. The results might have been more significant had a larger sample been used. Obtaining large samples among the severely depressed who are not hospitalized is a difficult undertaking. These individuals are doing all they can to function on a day to day basis under heavy duress, it would seem an insurmountable task to get a large group together on any consistent basis to commit to training for any length of time. It is the author's suggestion that future research be geared toward motivational concepts to help depressed individuals.

ACKNOWLEDGEMENTS

The author wishes to thank the following people in order of their appearance into her life.

Thank you, God, for always being with me and giving me the strength to go forward. I believe you are always there protecting me and helping me cope through the challenging times. Thank you for your blessings and the experiences that have made me stronger.

Thank you, Mom, for always telling me that I could be anything I wanted to be if I did well in school. I appreciate your quick sense of humor and constant emotional support. Your laughter taught me how to cope.

Thank you, Dad, for showing me how to go to work every day, without excuses. I appreciate your example of reliability and steadfastness. Your quiet personality taught me how to take a step back before proceeding when I feel overwhelmed.

Thank you, Gabby, for teaching me, by your example, how to be generous. I appreciate the times you have listened to me and offered your advice and support. You have taught me about being strong and “sucking it up!”

Thank you, Rick, for being my soul mate since the day we met. Your support and love have been priceless. I appreciate your steadfastness in coming to my aid, in being there when I needed you, in your competence to get the job done, no matter what the task. I thank you for your love and admiration. I love how I can count on you as much as I count on myself. I thank you for your laughter and tremendous sense of humor in tough times and in joyful ones. I thank you for helping me put insurmountable tasks into

perspective. I thank you for the fact that our marriage has survived yet another challenge and look forward to being your teammate through many more.

Thank you, Master Sosa, for being so generous with your taekwondo facility and your time. I could not have completed this project without your help. I appreciate all the times you have been there for me as a coach and mentor.

Thank you, Dr. Eeltink, for being so available, reliable, and clear in your feedback. I appreciate all the time you have put into preparing me and guiding me towards graduation.

Thank you, Dr. Gallant and Dr. Livingston, for being on my committee and providing your feedback and guidance.

I give thanks to the Barry University library system for all the articles they helped me locate and especially for those mailed to my home.

Thank you fellow classmates, most especially Gloria Rivera and Corrie Hungerford, for listening to me and supporting me through this mutual journey, how wonderful to be able to say, “We did it!”

DEDICATION

This work is dedicated to my parents, Rocco and Diane Terrizzi. You taught me well, you never allowed me to quit. And to my husband and best friend, Rick Kelley, the most competent and fun person I will ever know. I love you...infinity.

TABLE OF CONTENTS

	Page
ABSTRACT.....	iv
ACKNOWLEDGEMENTS.....	v
DEDICATION.....	vii
LIST OF TABLES.....	x
LIST OF GRAPHS.....	xi
Chapters	
I. THE PROBLEM.....	1
Introduction.....	1
Background.....	1
Theoretical Framework.....	8
Statement of the Problem.....	9
Purpose of the Study.....	11
Research Questions.....	12
Organization of the Study.....	12
II. REVIEW OF THE LITERATURE.....	13
Introduction.....	13
Depression and Families.....	13
Economic Burden of Depression.....	14
Medication as Treatment for Depression.....	15
Exercise as a Treatment for Depression.....	16
Summary.....	24
III. METHODOLOGY.....	25
Introduction.....	25
Research Design and Rationale.....	25
Independent Variables.....	26
Dependent Variables.....	26
Hypotheses.....	26
Participants.....	26
Selection of Participants.....	27
Instrumentation.....	29
Procedure.....	31
External Validity.....	33
Assumptions.....	33
Limitations.....	33
Delimitations.....	34
Data Analysis.....	35
Summary.....	35

	Page
IV. RESULTS	36
Introduction.....	36
Descriptive Statistics and Demographic Data.....	37
Inferential Statistics	40
Summary	43
V. SUMMARY/CONCLUSIONS/RECOMMENDATIONS	44
Introduction.....	44
Restatement of the Methodology	44
Conclusions.....	45
Implications.....	46
Recommendations.....	47
Summary	48
REFERENCES	49
APPENDIX A.....	57
APPENDIX B	58
APPENDIX C	59

LIST OF TABLES

	Page
Table 1 Demographic Data	38
Table 2 Independent Samples <i>t</i> test Assessing Control and Experimental Group Equivalency	40
Table 3 <i>t</i> Test Results	41

LIST OF GRAPHS

	Page
Graph 1 Pre-BDI-II and Post-BDI-II Scores	42

CHAPTER I

THE PROBLEM

Introduction

The effects of depression are felt beyond the individual. Families and our entire community also suffer. When an individual is clinically depressed, they stop functioning in their world. They withdraw and leave an empty shell of the person that once was. These individuals can no longer continue their routine of taking care of themselves, their families, and professional commitments. The author's own experience of depressed patients is one of low energy and a feeling of pervasive hopelessness.

There are many treatments for depression, which will be reviewed in more detail in Chapters I and II. New treatments are needed that are natural, cost effective, and accessible to the patient. The more options a depressed patient has, the more chance that one treatment or a combination of treatments will benefit him/her and relieve the feelings of depression. The goal is to find a way to help the patient return to normal life functioning with enough energy to complete their everyday tasks.

Background

According to Cassano and Maurizio (2002), depression is defined as having a depressed mood and a loss of interest in activities that one once found pleasurable. Depression is further defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). According to Kessler, McGonagle, Zhao, and Nelson (1994), 17.1% of Americans suffer from depression. This illness costs our society money in hospital treatments, medical care, and lost productivity in the workplace. Greenberg, Stiglin, Finkelstein, and Berndt (1993) report that in the year 1990, the economic burden

of depression to the United States was \$43.7 billion. Callahan, Bertakis, Azari, Robbins, Helms, and Leigh (2002) found that 15.1% of patients seeking medical care for their symptoms from their primary care physician were suffering from depression. Callahan et al. also noted that those incurring the most medical charges for their symptoms, including emergency care and hospitalization expenses, were females with lower socioeconomic status and educational levels.

There are accepted treatments of depression such as psychopharmacology, talk therapies, and electroshock therapy. In a study by Teusch, Bohme, Finke, Gastpar, and Skerra (2003) patients with mild and moderate depression were split into 2 groups. Both groups received client-centered psychotherapy but only one group received psychotropic medication. At the end of the study, both groups improved, but the group without medication had reportedly higher levels of insight in psychotherapy. If an entire group of depressed patients could improve without medication, it seems that the next step would be to explore more natural remedies of healing.

Dimeo, Bauer, Varahram, Proest, and Halter (2001) conducted a study on psychiatric patients with major depression and found that exercise could produce a significant improvement in mood in a short period of time. He further stated that exercise produces a faster improvement in mood than anti-depressive medication and does not cause side effects that are associated with such medications. He also noted that on occasion, medication does not seem to make any difference in his patients, but that exercise reliably improves mood.

Crown, Treglia, Meneades, and White (2001) examined different anti-depressant medications were examined for their effects on depression and prevention of relapse.

Crown et al. found that medication was associated with high cost usually stretching over a two year period. Patients who did not adhere to the medication instructions were more likely to relapse, producing higher costs of treatment. Due to the expensive and long term costs of anti-depressant medication, Crown et al. suggest the need for alternative forms of treatment for depressive disorders.

Recently science has been documenting social support systems and exercise as alternative and supplemental treatments. According to Armstrong (2003), new mothers with infants between the ages of six weeks and twelve months who were experiencing depressive symptoms were recruited for a study to see if social support and a walking program would improve symptomatology. There were two groups, the walking and social support group and the control group who received social support via telephone calls by the researchers encouraging them to continue their normal, daily routines. The results indicated a significant improvement in the exercise group but did not show any significant change in the control group receiving only social support. It is interesting that a mild form of exercise such as walking can have such a positive effect on mood. However, it does not seem likely that social support would have no impact. It is the author's belief that this article, although it testifies that social support was given, lacks the true essence of a social support system. The social nature of contact for the control group was perhaps not defined well enough or pervasive enough to have an observed effect. A telephone call by a stranger is certainly not going to be as effective as a telephone call or a personal visit by a friend or loved one. One outstanding quality of this paper is the use of a physical fitness test and a required letter of health by the

participants' general practitioner. In this way, physical risks and danger to participants could be avoided.

Oman and Oman (2003) found that depressed women were likely to have a weaker social support system than non depressed women and that social support was a significant treatment of depression among depressed women, arguing that psychosocial factors are a significant part in the healing of depression.

Brosse, Sheets, Lett, and Blumenthal (2002) found both clinical and medically ill patients improved depressed mood by engaging in exercise. Their survey of multiple studies supported the hypothesis that exercise can decrease symptoms of depression. In fact, those who exercised were less likely at risk to develop depression. Griest, Klein, Eischens (1979) studied running as a treatment for depression. Griest et al. showed no difference between three randomly assigned groups of 28 participants (outpatients between the ages of 18-30) with minor depression. The three groups provided the following treatments: running, ten sessions of time-limited psychotherapy, and ten sessions of time-unlimited psychotherapy. All took place over the course of twelve weeks, at which time all three groups showed a reduction in depression.

Fremont and Craighead (1987) studied 49 participants between the ages of 19 and 62 years old, with a Beck Depression Inventory score between 9 and 30. The participants were randomly assigned to one of three experimental groups including running, cognitive-behavior therapy, and a combination group of running and cognitive-behavior therapy. After ten weeks, all three groups had improved and maintained their improvement at a four month follow-up. There was no significant difference between any of the three groups, indicating the possibility that therapy can be as effective as running.

Cardiac patients significantly improved depressed symptoms after completing an exercise program. The same exercise benefits were documented for the pulmonary rehabilitation group. Improvements remained at both the six month and one year follow ups. Another group, patients with neuromuscular disorders also significantly improved after an exercise program. Fibromyalgia patients felt significant decreases in their depression from their exercise program. This study was useful in defining depression and reviewing the usefulness of exercise as a treatment method.

In addition to treating depression with exercise, Van Veldhoven, Vermeer, Bogard, Hessels, Winjnroks, Colland, et al. (2001) studied children with asthma and experimented with an exercise program as part of their treatment. The children not only improved medically, but learned coping skills in order to deal with their physical illness. This is an encouraging study that shows the degree in which exercise can be helpful. The idea that one can use exercise to improve clinical and medical conditions seems limitless.

Dimeo et al. (2001) reviewed the available research on exercise and depression. Each experiment reviewed showed significant results which lowered depression, evidenced by the Beck Depression Inventory (BDI), through various forms of exercise such as running, weight lifting, and endurance training. The study critiqued other studies for lacking detail in their exercise designs. The Dimeo et al. study is extremely specific in the design of the exercise program, the duration, and methods of measurement. The majority of the participants in the study showed a significant decrease in their depression, which was measured objectively by a psychiatric evaluation, including the Hamilton Rating Scale for Depression (HAM-D), which produced a post experiment rating of ten or less for most participants. Interestingly, a high correlation was calculated between self

assessment of mood and the HAMD. It seems that an experimenter could be confident of a test score via HAMD objective methods or the BDI, a self assessment scale.

Dimeo et al. state, “This evidence supports the need for further investigation of the effects of physical activity on patients with more severe forms of affective disorders. Indeed, exercise could have several advantages as a treatment for depression – for example, low cost, associated positive effects on physical performance and cardiovascular risk, absence of secondary effects, and the potential prevention of future episodes” (p. 114).

A review of the literature reveals such exercise programs as aerobics, weight training, walking, running, and yoga have shown significant benefits in decreasing depression. It is the author’s intention to develop a new treatment option: taekwondo. The literature does not show that there have been previous studies of treating depression with taekwondo. The literature on treating depression with exercise is more encouraging but limited still. Taekwondo was chosen over other exercise methods due to the many benefits it offers. Taekwondo is a sport and a way of life practiced all over the world. “Taekwondo” is Korean for “the way of the hand and foot,” and was recently added to the Olympic world games (Parney, 2000).

General Choi Hong Hi is credited with inventing taekwondo in the 20th century. The fighting form was developed for military purposes since Koreans were not allowed to own weapons and felt the oppression of the Japanese. By learning to fight with their hands and feet, Koreans were able to take a stand, even though they practiced secretly. The fighting style was adopted into their military. Today an estimated 50 million people practice taekwondo (Father of a Sport, 2002).

Taekwondo is credited with helping Theresa Lee get her life under control by getting away from her abusive boyfriend, having the discipline to finish school and lose 110 pounds (McBride, 2002). In another case, George Mureu has helped build confidence and self-esteem in poor children in Nairobi by teaching them taekwondo (Robinson 2001). Dawn McDermott used to have a terrible temper, but since her taekwondo training, she reports being able to keep her cool. She says she can also kick her foot over her head. Her training has improved her asthma, decreased her weight by 35 pounds and she reports being able to control her stress (Yunginger, 2000).

The author has her black belt in taekwondo and has experienced physical, mental, and spiritual benefits while training in taekwondo. These benefits seem to be experienced universally, evidenced by countless personal accounts as described above.

Those physical benefits, more specifically include the development of coordination, flexibility, strength, physical fitness, agility, weight control, self-defense, endurance, and muscle tone. On a mental level, taekwondo develops an individual's potential energy, positive attitude, motivation, leadership qualities, patience, respect for life, stress management, perseverance, concentration, poise, and grace. Spiritually, taekwondo training increases self-esteem, inner peace, self-control, self-confidence, self-awareness, inner strength, and integrity.

With so many positive benefits coming from just one activity, it is hard to imagine why anyone would choose to do anything else. Because taekwondo sport develops so much and provides so many aspects of therapeutic needs, such as self-esteem, self-control, and stress management, to name a few, it seems a very fitting treatment for a variety of psychological needs.

According to Newman, Gray, and Fuqua (1999), women tend to suffer from depression more than men. Their anger is usually turned inward, which is expressed in the form of depression. When a group of men and a group of women were given the Beck Depression Inventory and the State-Trait Anger Expression Inventory, it was found that women scored the higher on the BDI and in the Anger-in scales than men. This suggests that women are more prone to keep anger in, which can result in depression.

Theoretical Framework

The rationale that exercise is an effective treatment of depression comes out of the neurobiological theoretical model. According to a recent study by Kanner and Balbanov (2002), patients with epilepsy had comorbid depression. It was noted that their levels of serotonin were low in their frontal lobes, a common trait of a brain suffering from neurochemical depression. In addition, Murphy, Smith, Cowen, Robbins, and Sahakian (2002) ran a study that confirmed the altering of serotonin levels (5-HT) in healthy individuals produced depressed-like symptoms. Another study from the Journal of Neurology showed that exercise improved serotonin levels (Knecht, Imai, Kamping, Breitenstein, et al. 2001).

Dr. Andrew Weil (2002), author of *Self Healing* and a Harvard M.D., recommends an integrative approach when coping with depression, which includes exercise. Weil maintains that exercise increases serotonin, which releases endorphins that make a person feel good. A person who is suffering from depression can feel an improvement relatively quickly by getting up and moving around doing some sort of exercise. They will feel the health benefits of exercise and increase their self-esteem. Dr.

Weil also mentions treatments such as: antidepressants for severe cases, talk therapy, diet, acupuncture, breath work, and meditation.

When an individual is feeling “stressed out,” their immune system suffers. They are more likely to experience physical illness than their body is too depressed to cure. The perception of stress is more powerful than the stress itself. The body begins releasing enkephalins which prohibits the body’s own healing by numbing the cells in response to the perceived stress (Northrup, 1998). Taekwondo is helpful in empowering the individual to handle stress and life in general. Taekwondo teaches a person to focus and act, which can be stress relieving when facing many tasks at once.

While the benefits of taekwondo are many, there is an obvious physical aspect that increases levels of serotonin through moving the body as is found in any aerobic exercise program. The author’s intention is to engage depressed clients in taekwondo in order to decrease their depression. It is assumed that by exercising, serotonin levels will be increased. As cited in Dimeo et al. (2001), “Exercise produces changes in the concentration of several biologically active molecules such as adrenocorticotrophic hormone, cortisol, catecholamines, opioid peptides, and cytokines, which have been reported to affect mood or are involved in the pathophysiology of affective disorders” (p. 116).

Statement of the Problem

As seen in the literature review, depression is a serious and expensive problem in the United States. A Corporation study by RAND showed that “patients with depressive symptoms spend more days in bed than those with diabetes, arthritis, back problems, lung problems, and gastrointestinal disorders” (National Institute of Mental Health [NIMH],

1999). Too many people are suffering, and feeling hopeless to find a way out of the dark cloud that seems to linger over them. Families are torn apart watching their loved ones wither away from the creative, vibrant life they once knew. Companies are at a loss of productivity from the employee who is no longer fulfilling their duties or performing poorly when they do show up for work.

Hospitals and medical centers are busy with the never ending physical complaints of patients who appear to have nothing wrong with them, especially after numerous diagnostic tests have been performed. Suicides and attempted suicides continue to cost our country money in lost resources and the hole the person left in our hearts. In 1997, it was estimated that 19.4 million people sought ambulatory care for depression.

Depression caused more emergency care visits than drug and alcohol related emergencies, tallying 3.6 million (The Center for Disease Control [CDC], 2001). America needs to fight against depression with as many weapons as we can develop. The more options for treatment a depressed patient has, the more likely they are to find one or a combination that works for them to improve their condition.

Thompson and Campbell (1992) found there were many different preferences chosen to alleviate mild depression. The 500 participants reported 38 activities chosen. Out of all 38 activities, talking with family and friends was the first choice (74%) and exercise was a close second (72%). It is interesting to note that out of 38 chosen activities to alleviate depression, exercise was the second most preferred method after talking to someone. The author believes that as more technology develops to aid in our convenience and lessen our need to physically exert ourselves, the more depression will become a problem; even running errands take place in a car. The author has noticed

individuals who parked their cars at one store of a shopping center, then returned to their car and drove less than 100 feet to the next store, parked again, got out of the car, and walked only a few steps to the next store. The less we need to physically exert our bodies for work and survival, the more we will have to schedule a time to exercise for the sake of our health. Since we no longer have to outrun woolly mammoths, or spend hours churning cream into butter, or beating laundry against rocks, we will now have to find time to exercise with less of a practical purpose as the motivation. Perhaps now our motivation will come from simply wanting to feel good and have a healthy body that we can live in for many years while we roam this planet.

Purpose of the Study

The purpose of this study is to test an alternative and natural treatment for depression. The method selected to test the effectiveness of this treatment is the Beck Depression Inventory (BDI-II) (Beck, Steer, & Brown, 1961-1996). Margolis (2001) reports that the reliability of the BDI-II is high, with an estimated coefficient alpha of .92; it is simple to administer and score, taking only five to ten minutes to complete. The BDI-II has been referenced in many studies (Callahan et al., 2002; Dimeo, et al. 2001; Fauerbach, Lawrence, Bryant, & Smith 2002). Participants in taekwon do will be measured with a pretest and posttest of the Beck Depression Inventory-II to see if the training in taekwondo decreases depression as evidenced by the BDI-II test scores.

Research Questions

The author's intention is to engage depressed clients in the aerobic activity of taekwondo in order to decrease depression. Will the participants show decreased levels of depression on the Beck Depression Inventory?

Organization of the Study

Chapter I presents an overview, background, theoretical framework, and purpose for the study. In Chapter II, related literature is reviewed to provide the reader with an expanded understanding of the subject area. The methodology, procedures, and data analysis techniques are described in Chapter III. The results of the study are reported in Chapter IV, and Chapter V contains conclusions, implication, and recommendation for further study.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This study was conducted to determine if training in the methods of taekwondo will reduce depressive symptoms. Chapter II will serve to acquaint the reader with past studies conducted about methods used to alleviate depression with various forms of exercise. The purpose of Chapter II is to provide a comprehensive review of research findings in the last ten years that present exercise as a viable, supplemental treatment for depression.

Depression and Families

The effects of depression are felt by the individual, their families, and the nation in which they work. Families who have a depressed member tend to have poor problem solving skills, poor communication, and difficulty experiencing affective responses (Keitner, Archambault, & Ryan 2003). Family functioning is more hindered by a depressed member than a family dealing with schizophrenia, bipolar disorder, rheumatoid arthritis, or cardiac disease. Depressed mothers tend to parent poorly and have adversarial relationships. Children raised in these homes have a greater risk for developing affective disorders or other psychopathology. The risk of suicide is high in this population (Keitner & Miller, 1990). A study by Friedmann, McDermut, Solomon, Ryan, Keitner, & Miller showed that families with a depressed member had significantly poorer family functioning when compared to healthy controls (1997). Friedmann, et al. specifically found that the areas of difficulty were in problem solving, communication, roles, affective responses, affective involvement, and general functioning. Depression scores

on the Beck Depression Inventory were positively correlated with family dysfunction. As depression scores increased, so did family dysfunction (Boettcher, Billick, & Burgert, 2001). Non-depressed family members report feeling a tremendous burden when dealing with the patient's excessive worry, hopelessness, fatigue, and lack of interest in their social life. Findings suggest that patients with depression cause distress for those around them (Coyne, Kessler, Tal, Turnbull, Wortman, & Greden, 1987).

Economic Burden of Depression

Depression is an illness that spans across psychological, physical, and behavioral symptoms (Cassano & Fava, 2002). Twenty paid days of employment were lost on average by workers suffering from depression over the course of six months, and thirty days were lost of normal activity (Tylee, Gastpar, Lepine, & Mendlewicz, 1999). Insomnia and other sleep disorders are a symptom of depression. Depressed patients with insomnia commit mistakes on the job since their memory, concentration and ability to accomplish tasks is impaired. Direct costs of treating insomnia were estimated at 10.9 billion dollars in 1990. Indirect costs included health problems, professional consequences, and accidents (Brunello, et al. 2000). When a person arrives at work or is driving down the road, they are expected to pay attention. When a person is suffering from a chronic sleep disturbance, their capacity for attention declines, resulting in lost productivity, and at times costs associated with medical treatments for accidents or death. The estimated cost of these sleep related accidents was between 46 and 52 billion dollars in 1988 (Balter, et al., 1992).

Absenteeism is a large financial burden. Depressed employees miss work days more than their healthy counterparts, resulting in "diminished productive capacity."

Suicide is the most severe outcome resulting from depression. The emotional non-monetary costs of the grieving family and friends and the financial cost of the person's lost resources are felt by society (Greenberg, et al. 1993).

Callahan et al. (2002) identified the treatment of depressive symptoms by primary care physicians as having higher associated costs for laboratory testing charges (2002). Many primary care physicians are not properly prepared to recognize and treat depression. Some depressed patients do not receive an appropriate diagnosis and other patients who are not depressed sometimes receive a diagnosis of depression due to omitting symptoms or the physician diagnosing depression in addition to, or instead of, a general medical condition.

Medication as Treatment for Depression

Crown et al. engaged in a study to examine antidepressant selection and the compliance with taking drugs to reduce depressive symptoms. It was estimated that the patient would fill a prescription four times within six months. The concern is that patients may not follow through with their medication consistently, resulting in longer terms of depression and ineffective pharmacological treatment. Side effects are another major concern of medication. Many patients will not tolerate certain side effects and will thus terminate their medication treatment prematurely and all at once, which can leave the patient open to other problems relating to medication withdrawal or cause the patient to sink into a deeper depression.

Crown et al. (2001) maintains that there must be alternative treatments available and urges research to be done for safe, effective treatments which will relieve depression. Crown et al. discuss the refill practices of patients and drug adherence as an issue needing

further examination. The cost of purchasing a medication on a regular basis and the costs associated with switching to different antidepressant medications before finishing a prior prescription due to negative side effects or ineffectiveness are mounting.

Pharmaceutical costs for treating depression in 1990 were estimated at 1.175 billion dollars (Greenberg, 1993).

Exercise as a Treatment for Depression

The results in the literature are inconclusive regarding the effects of exercise on depression. The questions remaining are: What types of exercise will be effective? How long must one exercise to achieve the desired results? How often must one exercise to enjoy any benefits? How long do the effects of exercise last?

In a chapter by Dunn and Blair, physical fitness is examined for its preventative and treatment benefits to cardiovascular disease, cancer, osteoporosis, obesity, and depression (1997). The chapter is appropriately titled, "Exercise Prescription," as it seeks to determine the correct amount, intensity, and type of work out needed to achieve the desired results. The guidelines have already changed from 1978 to 1990, as individuals once encouraged to exercise at 60% of their maximum heart rate were later encouraged to increase to 90%. The Center for Disease Control (CDC) recommends that sedentary individuals be involved in a physical activity for 30 minutes every day. Some data suggests that any amount, however minimal, can produce a health benefit (Dunn & Blair, 1997). Since there is a gap in the literature for determining the appropriate dose of exercise, many more studies will be needed to try different exercise amounts in order to discover the best solution for our health.

Many studies have been performed with positive results using exercise to improve mood. However, the studies are mostly on healthy individuals and those with medical issues who experience benefits by increasing their activity levels. There is a great need to examine the mentally ill population to see to what extent they might benefit from regular exercise (Brosse, 2002).

McCannon (1984) studied the effect of exercise on depression by administering the Beck Depression Inventory-II (BDI-II) to 250 female students in a general psychology class. Sixty were found eligible for the study with a BDI-II score of 11 or more. Forty-seven students enrolled in the study and 43 completed all requirements of the study. Students were randomly assigned to three conditions: an aerobic exercise group, one hour per week (jogging, running, and dancing), a placebo group, which included progressive relaxation training for 15-20 minutes four times per week, and a waitlist control group. After ten weeks, all three groups substantially lowered their scores, but the aerobic exercise group showed the most improvement. The BDI-II pretest score for the aerobic exercise group was $BDI-II = 15.35$, after five weeks their score went down to $BDI-II = 6$, and after ten weeks their score was $BDI-II = 3.5$.

Toskovic (2001) found that depression scores were significantly lowered with a single 75 minute session of taekwondo according to the Profile of Mood States by McNair, Lorr, and Droppleman (1992). There were 20 participants in the experimental group and 20 participants in the control group. The participants were college students without any mental illnesses. In the mood survey given to all experimental and control participants, the experimental group showed significant improvement in overall mood, including “Tension, Depression, Anger, Fatigue, Confusion, and Vigor” (Toskovic 2001).

Toskovic's study maintains that a prolonged period of exercise is not necessary to achieve positive results. Still, at any taekwondo center, a student would be expected to attend two to three times a week, for 45 to 60 minutes of training. Perhaps physiologically, 75 minutes, one time, did improve mood, but what if those results are an anomaly and could not be repeated? In a literature review by Toskovic, it was found that a single bout of exercise was effective in improving mood, but the findings were less consistent than exercise over a longer period of time. It is the author's intention to examine how viable regular taekwondo training would be as an effective method for reducing depression. This is an important unanswered question among the available research since Toskovic's study used a total of 40 normal college students, new to taekwondo, as its participants (2001).

Taekwondo is a unique sport, in addition to providing physical exercise, many other spiritual and mental aspects are experienced. Iso-Aloha (1996) looked at the social support and feelings of friendship that arise from participation in taekwondo, aspects which keep depressive symptoms low during periods of high life stress. According to Brown (1991) and Wheeler and Frank (1988), sports and leisure activities continue to be found as an effective source of stress management. Iso-Aloha and Park's study, which had 252 current taekwondo practitioners as its participants, found that "life stress" is positively related to mental and physical health problems. Higher levels of depression and life stress were found among those who had a low level of leisure and companionship. On the other hand, those engaging in too many activities reported a higher level of life stress (1996). It is of interest to note that the 252 participants were already in training at their choice of taekwondo studio prior to the study. The large

sample size was due to the fact that the researcher studied students already committed to taekwondo, training among 10 different studios in Washington, D.C., and that the participants were not suffering from a mental disorder.

Since much of the available research on the effects of exercise on mood has been done with normal participants, it is the author's intention to expand the area of knowledge on exercise effects for the mentally ill. The following study examines yoga's effects on the mentally ill.

Whiddon (2003) studied 12 participants with major depressive disorder and had them attend yoga training for eight weeks. The results of the study were a dramatic lowering of scores on the Beck Depression Inventory-II. The pretest scores for both experimental and control groups included participants in the mild, moderate, and severe range, but none in the minimal range for depression based on the BDI-II scoring system. The posttest scores for the experimental group in which the participants had trained in Hatha yoga for 90 minutes, three times per week, were now in the minimal category of depression. The 14 participants in the control group did not have a significant change in BDI-II scores.

Three studies conducted in a psychiatric rehabilitation program revealed a decrease in depression for groups who participated in aerobic activity. The BDI was used to monitor the second study, and participants' scores were lower after they engaged in physical activity. All three studies supported the finding that exercise has benefits on mood. Eighty-two percent of the participants reported an increase in energy and higher compliance in their other treatment programs at the psychiatric facility, in addition to feeling less depressed (Pelham, Campagna, Ritvo, & Birnie, 1993).

To determine whether there is a difference between the effects of aerobic or anaerobic exercise on depression, Martinsen (1989) studied 90 psychiatric inpatients diagnosed with a depressive disorder. The inpatients were sorted into two groups, aerobic and anaerobic. The aerobic group jogged for one hour three times per week and the anaerobic group lifted a series of weights three times per week. Both groups lowered their scores after eight weeks. There was no significant difference between the aerobic or anaerobic exercise group.

Singh, Clements, and Fiartrone (1997) ran an exercise study with depressed elderly, ages 60 and older. The researchers recruited volunteers by pulling from two databases, the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRC) and the Harvard Cooperative on Aging. The researchers mailed 2953 recruitment letters and BDI test sheets to volunteers in those databases. The volunteers who returned their letter and test sheet, with a BDI score of 12 or above, were included in the study. There were 32 participants who expressed an interest and qualified for the study, which was only 1% of the mailed letters. The experimental group engaged in resistance weight training for 50 minutes, three times per week, for ten weeks. The control group learned about health and wellness in a lecture and video presentation. Transportation was provided for all participants. The result was a significant decrease in depression among the experimental group.

In 2001, Singh, et al. repeated their 1997 study with 32 participants with an average age of 71. At the end of ten weeks, the researchers gave the participants the opportunity to continue training on their own for another ten weeks. After 20 weeks, the participants had significantly reduced their depression scores. After the second ten weeks,

33% of participants were still lifting weights without supervision. Singh et al.'s study was funded by a large federal grant and other donations.

McNeil, LeBlanc, & Joyner (1991) asked local communities and churches to refer depressed citizens to their study investigating the effects of exercise and social support on depression. From the 82 referrals, 30 met criteria for inclusion to the study. The pretest BDI scores were within the 12-23 range for moderate levels of depression. The study lasted for six weeks and randomly assigned participants to three groups: waitlist control group, social support group, which received two home visits per week, and the exercise group, which involved walking three times per week, with one walk accompanied by the experimenter. The results showed that walking with the experimenter and social contact had similar results in reducing depression. Walking with accompaniment was the only condition to show a significant reduction in depression.

The effect of exercise on the elderly was further examined by Blumenthal, et al. (1999). Subjects were recruited by media advertisements and distribution of flyers to local physicians and mental health facilities. Those who responded and met the criteria for a major depressive disorder were admitted to the study. One hundred fifty-six participants over the age of 50 were randomly placed in three different treatment groups. Treatment groups included: medication only, aerobic exercise only, and a combination of exercise and medication. The study lasted 16 weeks. Those in groups with exercise spent a total of 45 minutes warming up, walking or jogging and then cooling down their bodies with stretching exercises. Thirty-two participants dropped out of the study before its completion, drop out rates did not vary between the groups. All three groups showed a

significant decrease in depression at the end of the study, with exercise being just as effective as medication for improving mood.

Doyne, et al. (1987) recruited 40 depressed women into a study comparing weight-lifting (anaerobic) and running (aerobic) exercise and its effects on depression. Doyne, et al.'s participants responded to mass media advertising and paid \$60 as a deposit that would be returned to them, in \$5 increments, only upon completion of three exercise sessions over an 8 week period and completion of all assessment forms. Even with the financial investment, 40%, 29% and 13% of participants dropped out of their running, weight-lifting, or wait-list control group respectively, prior to the study's completion. The participants in both exercise groups showed a significant decrease in depression at each testing interval, which was conducted by mail at 4 weeks, 8 weeks, 1 month, 7 months, and 12 months, showing a lasting effect and no significant difference between aerobic or anaerobic groups. The baseline BDI scores for the running, weight-lifting, and control group were 22.27, 22.07, and 20.17 respectively. At four weeks, the BDI scores were 11.00, 10.96, and 15.72. At eight weeks, the BDI scores were 8.18, 5.93, and 15.25 respectively. Participants had been instructed to exercise four times per week, but the actual rate of participation was 2.8 times per week.

In an article reviewing physical activity and health, Dixon, Mauzey, and Hall (2003) find that the literature points to exercise as "an effective, viable, cost-effective intervention for depressed and anxious moods" (p. 504). According to Palmer, a review of six articles examining the effects of exercise on elderly subjects found favorable results in all. Subjects experienced a sense of well-being, significant decreases in depression scores, reduced anxiety, and an increase in the following: life meaning, health,

and functioning, and self-efficacy (2005). The importance of exercise is well noted (CDC, 2001), there are even corporations that are recognizing the value of healthy, fit employees and have installed workout facilities within the job site (King, Taylor, Haskell, & DeBusk, 1990). Although exercise can provide numerous benefits for human beings, there is a great problem with maintenance of fitness schedules. Depression is an illness that attacks motivation, energy level, and interest (DSM-IV). The biggest challenge to examining the effects of exercise on depression will be to keep participants motivated and engaged. Some ideas evaluated for keeping people moving are social support, goal setting, relapse or prevention training, self-monitoring, incentive rewards, chart posting, social rewards, self-reinforcement, modeling and feedback, telephone prompts, contingency (money deposit), self-persuasion, and contracts (Dishman, 1991).

Due to the small number of sample sizes in the majority of these exercise studies, it will be important for other researchers to continue their studies in order to paint a more complete picture of the situation and to rule out any extraneous variables. Chaouloff (1997) urges the need for more studies to further the examination that “the functional effects of exercise on 5-HT, including those related to the hypothesis that the positive mood effects of exercise rely (partly or totally) on central serotonergic systems” (p. 58). The PET scans of a depressed brain show less amounts of serotonin when compared to the non depressed brain (Kotulak, 1997). Anti-depressants help to increase one’s level of serotonin. After exercising, the depressed brain had increased levels of serotonin and the individual reported feelings of well-being (Chaouloff, 1997).

Summary

While there are many well accepted treatments available for depression, including psychotherapy, medication, and electroshock therapy, there are also alternate treatments for depression which are less commonly used and accepted: acupuncture, herbal/vitamin therapy, aromatherapy, hypnosis, and biofeedback. The most accepted methods are covered by insurance, however those less accepted methods to the standard of practice are left up to the individual to pay for without assistance. Some treatments can be very costly, while exercise is comparatively inexpensive. Walking and running can be accomplished with no additional equipment, except a pair of shoes. Exercise is reviewed in the literature as very beneficial, and more studies are needed to provide the dose, type, and duration and frequency to achieve maximum benefits.

CHAPTER III

METHODOLOGY

Introduction

Chapter III includes a description of the research design, and discusses the rationale for the approach. In addition, the sample population, participant selection, research procedures, and instrumentation are described. Lastly, issues of external validity, data analysis, and limitations are discussed.

This study was conducted to determine if training in the methods of taekwondo will reduce depressive symptoms, evidenced by the results of the BDI-II test scores. Although 1263 recruitment flyers were distributed, of the 25 individuals who responded to the advertisements, only 13 qualified and committed to the study, and 9 of those 13 participants actually completed the study, with 5 in the control group and 4 in the experimental group. The BDI-II test scores of the experimental group was compared with the control group scores, who received taekwondo training after the experimental group. If a significant decrease in depression is found among the experimental group, taekwondo could then be recommended as a supplemental treatment for depression.

Research Design and Rationale

This was a randomized experimental study with a pretest-posttest and control group (Best & Kahn, 1998). The participants were assigned randomly to the experimental and control group. The participants were not aware of their group status. The experimental group was called “Group X” and received the training first. The control group was called “Group Y” and received the training after the experimental group and after the BDI-II was administered for the second time as a posttest. This research design

was selected for its true experimental nature. The researcher would like to explore the effect of taekwondo on participants' depression, while ruling out as many other explanations for the results of this study. The researcher would also like to have enough control over the groups to ensure their equality to each other in order to rule out any pre-existing differences among the two groups.

Independent Variables

Taekwondo training is the independent variable. Participants in both groups will train in taekwondo for 60 minutes, two times a week, for four weeks. The control group did not train until four weeks after the experimental group.

Dependent Variables

The dependent variable in this study is depression. The dependent variable will be measured by the BDI-II.

Hypotheses

The hypothesis of this study is that the BDI-II scores will be lower for the experimental group trained in taekwondo when compared to the control group before they receive their training in taekwondo.

The null hypothesis is that there will be no difference between the experimental and control groups' BDI-II scores.

Participants

The participants were adult volunteers who were suffering from depression and who were in treatment for depression. Although 1263 recruitment flyers were distributed, of the 25 individuals who responded to the advertisements, only 13 qualified and committed to the study, and 9 of those 13 participants actually completed the study, with

5 in the control group and 4 in the experimental group. Four were in the experimental group, “Group X,” and 5 participants were in the control group, “Group Y.” Participants were unaware of their group status. Participants did not know whether they were in the control or experimental group. Participants only knew their group letter, X or Y. Participants were 18 years or older. Participants were both male and female. All participants had a BDI-II score of 14 or above. Participants continued ongoing treatment with their regular licensed mental health practitioner and/or doctor. All subjects participated voluntarily. Volunteers with medical conditions, psychotic symptoms, bipolar disorder, or with a high suicide risk were not admitted as participants of the study.

Selection of Participants

The researcher, who is a licensed mental health counselor, posted recruitment flyers (see Appendix A for the recruitment flyer) in local private practices, community mental health centers, medical centers, hospitals, health food stores, universities, and colleges, businesses, community bulletin boards, and libraries to recruit adults. The researcher requested and obtained permission to post the recruitment flyers in clinical waiting areas. A total of 1263 flyers were distributed. Twenty-five individuals expressed an interest in the study either by phone or email.

The participants, who responded to the flyer and met the preliminary criteria as determined by the above during a brief phone interview, received the names and contact numbers for the researcher and researcher’s sponsor to further assist with their questions. Participants met together in a group meeting to discuss further details of the study, and received information regarding their rights as voluntary participants. Those who chose to participate were given the date, time, and location of the group meeting. Those who did

not meet the criteria were offered a free trial class coupon, mailed to them at their request.

At the group meeting, which took place in the taekwondo center, the participants signed in and received a random number, which they used for the duration of the study on all forms except the Informed Consent Form (see Appendix C for the Informed Consent Form). The researcher reviewed and signed an Informed Consent Form with participants, after they received answers to their questions. Additionally, they received assurance that this was a voluntary study that they may withdraw at any time without penalty, and that their confidentiality will remain protected. During this review the researcher:

1. Stated her name, professional experience, and affiliation;
2. Reviewed the procedures of the study;
3. Described the purpose of the study;
4. Gave information that participation is voluntary and they may withdraw at any time;
5. Described that the risk of involvement is minimal, such as joint pain, minor muscle pains, soreness, and aches from moving their bodies in new ways, more severe risks would include pulled muscles, twists, and strains;
6. Explained that the researcher will make the necessary referrals within their financial range and/or insurance benefits should any physical or psychological issue arise;
7. Informed participants that information from the study will be confidential to the extent permitted by law and that only group averages will be published and no individual information will be identified.

After signing the informed consent forms, participants completed the Demographic Data Survey (Appendix B) and took the BDI-II. Those who scored 14 or above and met the criteria, based on the Demographic Data Survey were admitted to the study, assigned a random number and randomly assigned to the experimental (X) or control (Y) group. The groups were informed of when to begin their training and were given a selection of times to come for training. The experimental group had the earlier date and the control group began four weeks later. Those who did not have a 14 or above and/or did not meet the criteria above were thanked for their time and given two free taekwondo class passes. Within four weeks of each other, groups X and Y participated in taekwondo at a local taekwondo center and received formal training from a Certified World Taekwondo Federation Black Belt instructor for 60 minutes, two times a week, for four weeks. At the end of the four weeks, both control and experimental groups met separately to take the BDI-II again. The control group then began training at the center. As part of confidentiality procedures, signed consent forms were stored separately from the Demographic Data Surveys and BDI-II score sheets; all data was stored in a locked file cabinet in the researcher's office and will be destroyed after 5 years.

Instrumentation

The Beck Depression Inventory-II (BDI-II) has been chosen to measure depression in the participants as both a pretest, in order to ensure experimental and control group similarity, and a posttest in order to determine the amount of change in the experimental versus the control group. The BDI-II is in line with the definition of depression as described in the DSM-IV. The BDI-II is simple to administer and score, requiring only a pencil and test form, and can be completed in five to ten minutes. This

test was chosen over others due to its ease and popularity (Callahan et al., 2002; Dimeo, et al. 2001; Fauerbach, Lawrence, Bryant, & Smith 2002). The BDI-II was selected over the Hamilton Psychiatric Rating Scale for Depression-Revised because it is a simpler test to administer and score. Copyrighted since 1978, the BDI has gone through three revisions and is now more sound than ever, according to its authors, with the BDI-II Coefficient Alpha = .92, while the old BDI Coefficient Alpha = .86. The format is a 21-item self rating scale. The current item content of the BDI-II includes sadness, pessimism, past failure, loss of pleasure, guilty feelings, punishment feelings, self-dislike, self-criticalness, suicidal thoughts or wishes, crying, agitation, loss of interest, indecisiveness, worthlessness, loss of energy, change in sleeping pattern, irritability, changes in appetite, concentration difficulty, tiredness or fatigue, and loss of interest in sex. Each item contains four statements ranked 0-3 and asks the reader to pick the most accurate description of him/herself over the past two weeks, including the day the test is taken. The response choices are mixed in severity. For example,

Question One:

- 0 I do not feel sad
- 1 I feel sad much of the time
- 2 I am sad all the time
- 3 I am so sad or unhappy that I can't stand it

The points per question are added up to determine the total score. The levels of depression are broken up into the following categories: Minimal Depression 0-13; Mild Depression 14-19; Moderate Depression 20-28; Severe Depression 29-63 (Beck, Steer, & Brown 1996).

Reliability is defined as consistency, being able to get the same results over and over again (Shadish, Cook, & Campbell 2002). The BDI-II has strong reliability with a coefficient alpha of .92 for outpatients and .93 for students. Over a period of one week, the test-retest reliability was found to be .93 (Beck, Steer, & Brown 1996).

For a test to be valid, it must measure what it says it measures. The BDI-II has high face validity and was found to have moderately high concurrent validity when correlated with the Hamilton Psychiatric Rating Scale for Depression-Revised ($r = .71$) (Beck, Steer, & Brown 1996).

Procedure

At the end of the group meeting, those who met criteria and were willing to participate received a handout with the dates that the study will begin, “Groups X” and “Y” had separate start dates, four weeks apart, and the control started four weeks after the experimental group. Participants received directions to the taekwondo training center and a list of times and days that classes are offered. They were instructed to attend two, 60 minute classes each week, for the next four weeks. At the end of the four weeks, both control and experimental groups met separately to take the BDI-II again. The control group then began the training at the center. After the initial group meeting, which randomly divided the participants into experimental (X) and control (Y) groups, each group received instructions separately. Groups X and Y participated in taekwondo at a local taekwondo center and received formal training from a Certified World Taekwondo Federation Black Belt instructor for 60 minutes, two times a week, for four weeks.

Free traditional, white taekwondo uniforms and white belts were given to participants in the groups to wear during their training. The groups participated in regular

taekwondo classes already in progress with existing students, for natural setting purposes. Only the master of the taekwondo center was aware of the experiment. The master is a Certified World Taekwondo Federation Black Belt instructor. The classes contained all levels of athletes and belt ranks, as any taekwondo class naturally does. Bare feet are the preferred footwear for taekwondo. Committed students wear the traditional, white, belted martial arts uniform.

Participants signed an agreement to keep their experimental nature confidential from the other students in the class. Because there are two classes offered Monday through Friday, at 6:30pm and 7:30pm, the participants were spread out enough to avoid any questioning from the other students. The participants signed in on a special sign in sheet, located discretely at the master's desk to ensure their participation for the purpose of this study.

Every taekwondo class begins with a respectful salutation in the Korean language to the master, instructors, and flags, followed by warm up stretching exercises, then kicking and punching rounds. Self-defense and forms techniques are taught next and students are divided into smaller groups according to their belt rank. They are taught their new forms and self-defense techniques by either an instructor or a higher ranking student, chosen by the master. All participants will enter as white belts, the beginner rank. White belts do not participate in sparring, they sit along the edge of the mat and watch and learn while higher belts spar with each other in pads and other protective gear. Class finishes with more kicking exercises, and some cool down stretches, and thankful greetings to the master, instructors, and flags.

After the first four weeks of training all participants attended a second group meeting and were asked to complete the BDI-II as a post-treatment measurement. The control group met with the researcher at the taekwondo center and took the BDI-II an hour earlier than the experimental group. Afterward the control group began their training. A question and answer period was held for all participants in their respective groups. Participants were given a chance to request the study's results by signing a sheet with their printed name and home or email address.

External Validity

The results of this study are valid for adult volunteers who suffer from depressive symptoms and who live in the Central Florida area.

Assumptions

1. It is assumed that the participants are answering truthfully at all times, including: their assessment of the inclusion and exclusion criteria, their answers of the BDI-II, and their report of receiving treatment for depression which has remained unchanged for a period of one month prior to the study.
2. The participants will keep the identity of other participants confidential.
3. The participants will try their best while in taekwondo training and will participate in all regular activities.

Limitations

1. Participants who respond to recruitment for this study may be more interested in taekwondo than other depressed patients and therefore this treatment method may not be useful to all depressed patients.

2. Results of this study could be muddled by the interaction and social nature of taekwondo activity. Participants may have reduced depression due to the fact that they were in a social setting, and not necessarily improved their mood due to taekwondo training.
3. The sample size is small compared to most studies and will limit the generalizability of the results of this study. A small sample size is not uncommon for this type of study which is limited in its selection of participants (Whiddon, 2003; Armstrong & Edwards, 2003).
4. This study cannot control the amount of exercise/physical activity that participants pursue on their own while they are outside of the taekwondo center.
5. The participants may obtain improvement due to the social nature of taekwondo and this cannot be controlled.
6. The results of this study can only be based on the BDI-II and may not generalize to other testing instruments which measure depression.

Delimitations

1. Participants will be volunteers from the Central Florida area.
2. The researcher will only accept participants who are suffering from depressive symptoms, as indicated on the BDI-II, and currently in treatment for their depression.
3. The researcher will use participants who have a BDI-II score of at least 14 or above.
4. The participants have had no change in their mental health treatment for the past one month period prior to beginning the study.
5. The study will not control the type of mental health treatment that the participants receive.

6. The study will not predict the benefits of taekwondo for all sufferers of depression or that training in any taekwondo center will have the same results.

Data Analysis

The Statistical Package for the Social Sciences for Microsoft Windows, Version 10.0, software was used to analyze the results (SPSS, Chicago, Ill). Isaac and Michael (1997), recommend using “the *t* test to determine a significant difference between two sample means. Stating that, the *t* test is “satisfactory for large samples; particularly appropriate for small samples (p. 183).” In this study the *t* test will be used to determine if there are differences between the group mean scores of the experimental and control groups on both the pretest and posttest. Mean scores can also be examined to assess the extent of treatment effects. A coding system was implemented to protect the confidentiality of participants. No names or identifying information was used in any publications.

Summary

This chapter describes the methodology used in this study. Included is the research design, the research design rationale, a description of the independent and dependent variables, the hypotheses, and describes the participants and their selection method. Chapter III describes the instrumentation used and the procedure for the experiment, as well as its external validity. Assumption, limitations, delimitations, and data analysis have also been presented.

CHAPTER IV

RESULTS

Introduction

This chapter provides a comprehensive analysis of the data obtained from the study using descriptive and inferential statistics. The pretest and posttest scores obtained from the Beck Depression Inventory-II (BDI-II), a standardized depression inventory. In the tables and chart below, descriptive statistics identify demographic, pretest, and posttest data. The data was analyzed using a *t* test with a significance level of 95% in order to assess differences in the pretest and posttest scores among the experimental and control groups.

The null hypothesis tested was: Participants who train in taekwondo will not show a significant difference in BDI-II scores when compared to individuals who did not train. To evaluate this hypothesis, the differences of BDI-II scores were examined.

The research question was: Will the participants who trained in taekwondo show decreased levels of depression on the BDI-II? This question was examined by administering the BDI-II to all participants. The participants were then randomly assigned to the experimental “X” and control “Y” groups. The experimental group received the taekwondo training while the control group waited for their training day to start four weeks later. The training consisted of a 60 minute taekwondo class, twice a week, for four weeks. At the end of the four weeks, both experimental and control groups met again to complete the BDI-II a second time to gather posttest scores.

Descriptive Statistics and Demographic Data

Although 1263 recruitment flyers were distributed, of the 25 individuals who responded to the advertisements, only 13 (9 females and 4 males) qualified and committed to the study, and 9 of those 13 participants completed the study, ending with 5 in the control group (100% female) and 4 (50% female and 50% male) in the experimental group. The number of participants to complete the study in the experimental “X” group was 4 and the number of participants in the control “Y” group was 5. The experimental group was comprised of 2 males and 2 females with ages ranging from 25-53 and a mean age of 39.5. The control group was comprised of 5 females with ages ranging from 36-54 and a mean age of 43. Fifty percent of the experimental group had prior martial arts experience and 40% of the control group had prior martial arts experience. The participants were 78% Caucasian, 11% Hispanic, and 11% Native American. Table 1 shows descriptive statistics about the participants.

Table 1.

Demographic Data

Participant	Age	Gender	Race	Martial Arts Experience
Experimental				
1	25	Male	Caucasian	None
2	53	Female	Caucasian	Other Martial Arts Experience
3	47	Male	Native American	Other Martial Arts Experience
4	33	Female	Hispanic	None
N = 4	M = 39.5			
Control				
1	42	Female	Caucasian	None
2	54	Female	Caucasian	Other Martial Arts Experience
3	38	Female	Caucasian	None
4	47	Female	Caucasian	None
5	36	Female	Caucasian	Other martial arts experience
N = 5	M = 45			

The BDI-II pretest scores were obtained at the beginning of the study to show the participants baseline level of depression. The scores were also used in a statistical analysis to ascertain the group equivalency of the experimental and control groups. The mean pretest score of the BDI-II for the experimental group was 32.25 with a standard deviation of 9.03. The mean pretest score for the control group was 20.2 with a standard deviation of 9.01.

There was a wide range of pretest scores for both groups. The range of pretest scores for the experimental group was 23-40 and the control group range was 14-36. The BDI-II categorizes depression into minimal 0-13, mild 14-19, moderate 20-28, and severe 29-63 (Beck, Steer & Brown, 1996). For the experimental group, two scores were in the

moderate range for depression, and two scored in the severely depressed range. For the control group, four scored in the mild range for depression and one scored within the severely depressed range.

At the completion of the four-week study, both the experimental and control groups were re-administered the BDI-II to discover whether the groups had a significant difference in depression levels. The mean posttest score for the experimental group was 19 and the standard deviation was 16.70. The mean posttest score for the control group was 20.60 and the standard deviation was 11.31.

The experimental group's posttest scores ranged from 4 – 42 and the control group's scores ranged from 12 - 38. For the experimental group, two scores were in the minimal range for depression, one score was in the moderate range, and one scored in the severely depressed range. For the control group, two scored in the minimal range for depression, one scored in the mild range, one scored in the moderate range, and one scored within the severely depressed range.

Group Equivalency Analysis

Independent sample *t*-tests were accomplished to determine if the control and experimental groups differed significantly on the pretest BDI-II scores at the beginning of the study. The mean and standard deviation for the control group were $M = 20.20$, $SD = 9.01$ and for the experimental group, the mean and standard deviation were $M = 32.25$, $SD = 9.03$. The analysis showed no significant differences between the control and experimental groups, $t(7) = 1.99$, $p = .087$. Thus, the groups were considered equivalent in terms of their initial depression scores as measured by the BDI-II. The results of the *t* test are presented in tabular form in Table 2.

Table 2.

Independent Samples *t* Test Assessing Control and Experimental Group Equivalency

Group Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Experimental	4	32.25	9.032	4.516
Control	5	20.20	9.011	4.030

Independent Samples Test for BDI-II Pretest

<i>t</i> Test for Equality of Means						
<i>t</i>	df	Sig. 2-tailed	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
					Lower	Upper
1.991	7	.087	12.05	6.051	-2.258	26.358

Inferential Statistics

An independent sample *t* test was conducted to evaluate the hypothesis that participants who trained in taekwondo would show decreased levels of depression as measured on the BDI-II when compared to the control group who did not train. The *t* test was used to determine if the experimental and control groups differed on the BDI-II posttest. The test was insignificant, $t(7) = 2.334$, $p = .052$, but the results were counter to previous research hypotheses in which exercise significantly improved mood. Because $\eta^2 = .44$, the researcher believes that the insignificant results of the study are due to the small sample of participants. In fact, 44% of the difference in scores was accounted for by

taekwondo, indicating an important relationship. In addition, the experimental group was asked to train two times per week; the actual rate of training attended was 1.68 times per week. Please see Table 3 for the results of the *t* test.

Table 3.

t Test Results

Group Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Experimental	4	13.2500	10.30776	5.15388
Control	5	-.4000	7.30068	3.26497

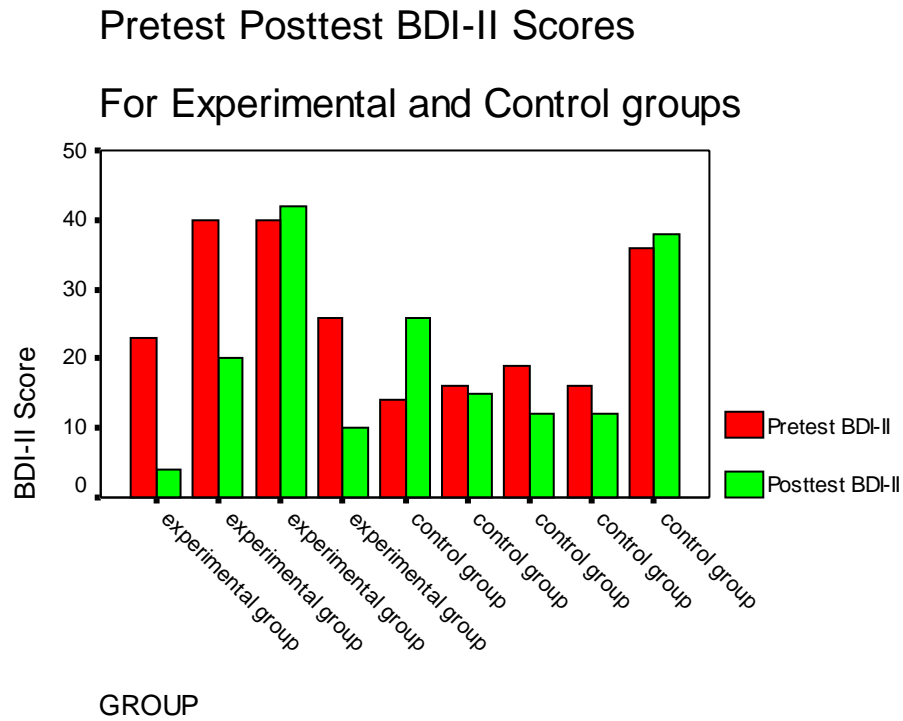
Independent Samples Test for BDI-II Posttest Scores

<i>t</i> Test for Equality of Means						
<i>t</i>	df	Sig. 2-tailed	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
					Lower	Upper
2.334	7	.052	13.6500	5.84780	-.17785	27.47785

Graph I displays the difference between pretest and posttest scores on the BDI-II for both groups in a bar graph. Three out of four participants in the experimental group has reduced their BDI-II scores. The participants in the control group show very minimal changes in their scores, with the exception of one participant who actually increased their BDI-II score. The mean difference of scores for the experimental group is 13.25 and the control group has a mean difference of -0.40, revealing a dramatic reduction in depressive symptomatology for the experimental group when compared to the control

group. The experimental group reduced their depression by 13.25 points and the control stayed roughly unchanged.

Graph I.



Summary

The results of an independent samples *t* test indicate that training in taekwondo does not yield a significant difference in test scores when compared to a control group. Perhaps if more participants had completed the study, the results would have been significant. Taekwondo training did produce an effect size of 44%, ($\eta^2 = .44$) identifying the difference in pretest and posttest BDI-II scores. Chapter V provides an explanation and summary of the findings, implications regarding the results of the study, and recommendations for further research.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Little is known about the effects of exercise in natural settings on our emotional and mental well-being (Dubbert & Stetson, 1995). The National Institute of Mental Health reports that 19 million adults suffer from depression in the United States (1999). With so many people suffering, it is unquestionable that more research is needed to identify viable treatment options. Pharmacology and psychotherapy are noted as being the top choices for the treatment of depression, but with the high cost and time commitment attributed to these treatments, many people give up prematurely.

Restatement of the Methodology

This research study was an experimental, randomized pretest-posttest control-group design (Shadish, Cook & Campbell 2002). Participants who met the pre-established criteria were randomly assigned to either a control or experimental group. Pretest and posttest scores were obtained through the administration of the BDI-II, which is a standard and very popularly used depression inventory. Both groups were given the BDI-II in a group meeting format at the beginning of the study. The experimental group trained in taekwondo for 60 minutes, twice per week, for four weeks, while the control group waited for their treatment to begin four weeks later. After the experimental group completed their treatment, the groups met again to take the BDI-II a second time to obtain posttest scores.

An independent sample t test was used to determine the equivalency of the BDI-II pretest scores for both experimental and control groups. A second t test was used to

determine if there were significant changes in the posttest scores between the experimental and control groups.

Conclusions

The research question was: Will the participants show decreased levels of depression on the Beck Depression Inventory? An independent samples t test revealed $\eta^2 = .44$, indicating an important statistical relationship; however, an independent samples t test revealed an insignificant difference between the differences of the BDI-II scores. The mean difference of the BDI-II scores was 13.25 for the experimental group and -0.40 for the control group. A 13.25 drop in BDI-II scores within four weeks' time is not something that is insignificant and it is the author's belief that the statistically insignificant results were due to the small sample size and high rate of attrition. The insignificant results do not coincide with previous research studies on depression and the effects of exercise that have been noted in previous chapters. The research history has shown exercise to have a positive effect on mood among their samples. The author believes that the previous research data that found significant results was due to the populations studied such as inpatients, who were highly accessible and much easier to control attendance than outpatient samples (Dimeo 2001; Martinsen 1989). Another sample population that would have lent itself more easily to study is normal college students, not suffering any mental illness (McCannon 1984; Toskovic; 2001). Finally, the other most popular sample that the previous chapters reference in their significant results, of reduction of depression through exercise, is on the elderly population. The author speculates that the elderly is a population associated with more available time than their younger, working counterparts who may also be raising a family. It is important to note

that this population was recruited through two databases, the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRC) and the Harvard Cooperative on Aging. Still, even after 2,953 recruitment letters were sent with a Beck Depression Inventory, only 1% responded and actually was eligible and enrolled in the study (Singh, Clements, & Fiatarone, 1997). In Singh, Clements, & Fiatarone (1997) and McNeil, LeBlanc, and Joyner (1991), who both studied exercise effects on the elderly, only moderately depressed (BDI range 12-24) individuals were admitted to the study, which puts them at a higher rate of functioning and motivation to show up than the participants in this study who were quite severely depressed with a mean BDI-II score of 32.25.

Existing research showing effects of exercise on the moderately and severely depressed among working age adults is quite scarce (Whiddon, 2003; Freidmont, 1987; & Doyne et al., 1987). It is of interest to note that Doyne et al. (1987) had participants pay a \$60 deposit, which was returned to them in \$5 increments only upon attending the exercise sessions. While this was probably highly motivating to entice individuals to complete the study, only 32 out of 57 actually completed. Lack of interest and energy, including motivation are complicating factors of depression, making it difficult for a depressed individual to get up and get anything accomplished.

Implications

The large effect size ($\eta^2 = .44$) found among the differences of scores between the control and experimental groups support previous research that shows exercise as having an effect on depression (McNeil et al. 1991; Dimeo et al., 2001; Singh et al. 2001). Individuals in this study were severely depressed and had much difficulty coming to class. Of the 1263 flyers that were distributed, only 25 people expressed an interest and

13 qualified and committed to the study. One the four who dropped out had a severe decompensation and had to be referred to their psychiatrist and counselor for treatment. One participant moved away and the other two stated they could not fit the training into their schedules. Of the nine who completed the study, attendance was not in 100% compliance. Instead of coming to two trainings per week, the actual rate of attendance was 1.68 times per week. Even though exercise has been shown to reduce depression in the above mentioned studies, the most difficult part is motivating a depressed person to actually get to the training center.

Recommendations

The data presented in this study contributes to the base of knowledge that exercise is effective. The results might have been more significant had a larger sample been used. Obtaining large samples among the severely depressed who are not hospitalized is a difficult undertaking. These individuals are doing all they can to function on a day to day basis under heavy duress, it would seem an insurmountable task to get a large group together on any consistent basis to commit to training for any length of time. It is the author's suggestion that future research be geared toward motivational concepts to help depressed individuals. Even while in the field, the author has noted in her own practice a tendency for patients to give up even on treatments that have been well researched, such as psychotherapy and pharmacotherapy. With the energy level at such a threatening low, more research needs to be identified on how to help severely depressed patients generate the energy to help themselves. Since there is no research in existence to this author's knowledge on the effects of taekwondo or any martial arts on the severely depressed, it is

the author's recommendation to bring this study design into a residential facility where patients would be more easily accessible and attendance would not be such an obstacle.

Summary

The data from this study did not support the hypothesis that the BDI-II scores between experimental and control groups would differ significantly. With over 19 million Americans suffering from depression, it is vital that more research is produced to examine more treatments for fighting depression. Since exercise is a socially acceptable activity and does not carry the stigma that therapy and psychopharmacology do, more research should be examined in order to make this a viable treatment. Furthermore, motivational studies should be conducted to find ways to promote physical and emotional health among the mentally ill.

REFERENCES

- Armstrong, K. E., (2003). The effects of exercise and social support on mothers reporting depressive symptoms: A pilot randomized controlled trial. *International Journal of Mental Health Nursing, 12*(2), 130-138.
- Association, A. P. (1994). *Diagnostic and statistical manual of mental disorders. 4th ed.* (4th ed.). Washington, DC: American Psychiatric Association.
- Balter, M.B., Uhlenhuth, E. H., Kupfer, D. J., Dement, W. C., Gelenberg, A. J., Jonas, J. M., Nino-Murcia, G. & Mendelson, W. B. (1992). New epidemiologic findings about insomnia and its treatment. *Journal of clinical psychiatry, 53*, 34-42.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1961-1996). Beck Depression Inventory-II.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory-II Manual.* (2nd ed.). San Antonio, TX: The Psychological Corp.
- Best, J. W. & Kahn, J. V. (1998). *Research in education* (9th ed.). Boston: Allyn & Bacon.
- Blumenthal, J. A., Babyak, M. A., Moore, K. A., Craighead, W. E., Herman, S., Khatri, P., et al. (1999). Effects of exercise training on older patients with major depression. *Archive Internal Medicine, 159, October 25*, 2349-2356.
- Boettcher, A., Billick, S. B., Burgert, W. (2001). Family functioning and depression in patients with medical illness. *Psychiatric Annals, (31) 12*, 694-700.
- Brosse, A. L., Sheets, E. S., Lett, H. S., Blumenthal, J. A. (2002). Exercise and the treatment of clinical depression in adults. Recent findings and future directions. *Sports Medicine, 32*(12), 741-760.

- Brown, J. D. (1991). Staying fit and staying well: physical fitness as a moderator of life stress. *Journal of Personality and Social Psychology*, *60*, 555-561.
- Brunello, N., Armitage, R., Feinberg, I., Holsboer-Trachsler, E., Leger, D., Linkowski, P., Mendelson, W. B., Racagni, G., Saletu, B., Sharpley, A. L., Turek, F., Van Cauter, E., Mendlewicz, J. (2000). Depression and sleep disorders: Clinical relevance, economic burden, and pharmacological treatment. *Neuropsychobiology*, *42*, 107-119.
- Callahan, E. J., Bertakis, K. D., Azari, R., Robbins, J. A., Helms, L. J., & Leigh, J. P. (2002). Association of higher costs with symptoms and diagnosis of depression. *The Journal of Family Practice*, *51*(6), 540-544.
- Cassano, P. & Fava, M. (2002). Depression and public health: An overview. *Journal of Psychosomatic Research*, *53*, 849-857.
- Center for Disease Control. (2001). Mental Health. Retrieved February 5, 2004, from <http://www.cdc.gov/nchs/fastats/mental.htm>
- Chaouloff, F. (1997). Effects of acute physical exercise on central serotonergic systems. *Medicine and Science in Sports and Exercise*, *29*, 58-62.
- Coyne, J. C.; Kessler, R. C.; Tal, M., Turnbull, J., Wortman, C. B., Greden, J. F. (1987). Living with a depressed person. *Journal of Consulting and Clinical Psychology*, *55*, (3), 347-352.
- Crown, W. H., Treglia, M., Meneades, L., & White, A. (2001). Long-term costs of treatment for depression: Impact of drug selection and guideline adherence. *Value in Health*, *4*, (4), 295-307.

- Dimeo, F., Bauer, M., Varahram, I., Proest, G., & Halter, U. (2001). Benefits from aerobic exercise in patients with major depression: a pilot study. *British Journal of Sports Medicine, 35*, 114-117.
- Dishman, R. K. (Summer, 1991). Increasing and maintaining exercise and physical activity. *Behavior Therapy, 22*(3), 345-378.
- Dixon, W. A., Mauzey, E. D., & Hall, C. R. (Fall, 2003). Physical activity and exercise: Implication for counselors. *Journal of Counseling & Development, 81*, 502-505.
- Doyne, E. J., Ossip-Klein, D. J., Bowman, E. D., Osborn, K. M., McDougall-Wilson, I. B., & Neimeyer. (1987). Running versus weight lifting in the treatment of depression. *Journal of Consulting and Clinical Psychology, 55*(5), 748-754.
- Dubbert, P. M. & Stetson, B. A. (1995). Handbook of health and rehabilitation psychology. In A. J. Goreczny (Ed.), *Exercise and physical activity* (pp. 255-274). New York: Plenum Press.
- Dunn, A. L., Trivedi, M. H., Kampert, J. B., Clark, C. G., & Chambliss, H. O. (2002). The DOSE study: a clinical trial to examine efficacy and dose response of exercise as treatment for depression. *Controlled Clinical Trials, 23*(5), 584 - 604.
- Dunn, A. L. & Blair, S. N. (1997). Exercise Prescription. In W. P. Morgan, *Physical Activity and Mental Health* (pp. 49-62). Philadelphia, PA, US: Taylor & Francis.
- Father of a Sport. (2002, July 22). *News magazine, 29*(15), 4.
- Fauerbach, J. A., Lawrence, J. W., Bryant, A. G., & Smith, J. H. (2002). The relationship of ambivalent coping to depression symptoms and adjustment. *Rehabilitation Psychology, 47*(4), 387-401.

- Friedmann, M. S., McDermut, W. H., Solomon, D. A., Ryan, C. E., Keitner, G. I., & Miller, I. W. (1997). Family functioning and mental illness: A comparison of psychiatric and nonclinical families. *Family Process, 36* (4), 357-367.
- Freemont, J. & Craighead, L. W. (1987). Aerobic exercise and cognitive therapy in the treatment of dysphoric moods. *Cognitive Therapy and Research, 11*(2), 241-251.
- Greenberg, P. E., Kessler, R. C., Birnbaum, H. G., Leong, S. A., Lowe, S. W., Berglund, P. A., & Corey-Lisle, P. K. (2003). The economic burden of depression in the United States: How did it change between 1990 and 2000? *Journal of Clinical Psychiatry, 64* (12), 1465-1475.
- Greenberg, P. E., Stiglin, L. E., Finkelstein, S. N., & Berndt, E. R. (1993). The economic burden of depression in 1990. *Journal of Clinical Psychiatry, 54*(11), 405-418.
- Griest, J. H., Klein, M. H., Eischens, R. R. Faris, J., Gurman, A. S., & Morgan, W. P. (1979). Running as a treatment for depression. *Comprehensive Psychology, 20*, 40-45.
- Heppner, P. P., Kivlighan, D. M., Jr., & Wampold, B. E. (1999). *Research Design in Counseling* (2nd ed.). Belmont, CA: Brooks/Cole.
- Isaac, S. & Michael, W. B. (1997). *Handbook in research and evaluation for education and the behavioral sciences* (3rd ed). San Diego, CA: Educational and Industrial Testing Services.
- Iso-Aloha, S. E. & Park, C. J. (1996). Leisure-related social support and self-determination as buffers of stress-illness relationships. *Journal of Leisure Research, 28*, (3), p. 169-187.
- Kanner, A. M., & Balabanov, A. (2002). Depression and epilepsy: How closely related are they? *Neurology, 58*, 527-539.

- Keitner, G. I., Archambault, R., Ryan, C. E., & Miller, I. W. (2003). Family therapy and chronic depression. *Journal of Clinical Psychology, (59) 8*, 873-884.
- Keitner, G. I., Miller, I. W. (1990). Family functioning and major depression: An overview. *American Journal of Psychiatry, 147 (9)* 1128-1137,
- Keitner, G. I., Miller, I. W., & Ryan, C. E. (1996). Mood disorders and the family. *Handbook of relational diagnosis and dysfunctional family patterns*, 434-447.
- Kessler, R. C., McGonagle, K. A., Zhao, S., & Nelson, C. B. (1994). Lifetime and 12 month prevalence of DSM III-R psychiatric disorders in the United States. *Archives General Psychiatry, 51*, 8-19.
- King, A. C., Taylor, C. B., Haskell, W. L., & DeBusk, R. F. (Fall 1990). Identifying strategies for increasing employee physical activity levels: Findings from the Stanford/Lockheed exercise survey. *Health Education Quarterly, 17(3)*, 269-285.
- Knecht, S., Imai, T., Kamping, S., Breitenstein, C., & et al. (2001). D-amphetamine does not improve outcome of somatosensory training. *Neurology, 57*, 2248-2252.
- Kotulak, R. (1997). Inside the brain: Revolutionary discoveries of how the mind works. Kansas City, Missouri: Andrews McMeel Publishing.
- Kull, M. (2002). The relationships between physical activity, health status and psychological well-being of fertility-aged women. *Scandinavian Journal of Medicine and Science in Sports, 12*, 241-247.
- Margolis, H. (2001). Review of the Beck Depression Inventory-II. In B. S. Plake & J. C. Impara (Eds.), *The Fourteenth Mental Measurements Yearbook*. Lincoln, NE: Buros Institute of Mental Measurements.

- Martinsen, E.W., Hoffart, A., Solberg, O. (1989). Comparing aerobic with nonaerobic forms of exercise in the treatment of clinical depression: A randomized trial. *Comprehensive Psychiatry*, 30(4), 324-331.
- McBride, P. M. (2002, October). A Fighting Spirit. *Essence*, 33(6), 102.
- McCannon, I.L. & Holmes, D. S. (1984). Influence of aerobic exercise on depression. *Journal of Personality and Social Psychology*, 46(5), 1142-1147.
- McNeil, J. K., LeBlanc, E. M., Joyner, M. (1991). The effect of exercise on depressive symptoms in the moderately depressed elderly.
- Murphy, F. C., Smith, K. A., Cowen, P. J., Robbins, T. W., & Sahakian, B. J. (2002). The effects of tryptophan depletion on cognitive and affective processing in healthy volunteers. *Psychopharmacology*, 163, 42-53.
- National Institute of Mental Health. (1999). The effects of depression in the workplace. Retrieved February 5, 2004, from <http://www.nimh.nih.gov/publicat/workplace.cfm>
- National Institute of Mental Health. (1999). An overview that summarizes research into the causes, diagnosis, prevention, and treatment of depression. Retrieved October 26, 2005, from <http://www.nimh.nih.gov/publicat/depresfact.cfm>
- Newman, J. L., Gray, E. A., & Fuqua, D. R. (1999). Sex differences in the relationship of anger and depression: An empirical study. *Journal of Counseling and Development*, 77(2), 198-203.
- Northrup, C. (1998). *Women's Bodies, Women's Wisdom. Creating Physical and Emotional Health and Healing*. (Second ed.). New York: Bantam Books.

- Oman, R. F., & Oman, K. K. (2003). A case-control study of psychological and aerobic exercise factors in women with symptoms of depression. *The Journal of Psychology, 137*(1), 338-350.
- Parney, L. L. (2000, 8/11/2000). Sports 101. *Christian Science Monitor, 92*(183), 12.
- Palmer, C. (February, 2005). Exercise as a treatment for depression in elders. *Journal of the American Academy of Nurse Practitioners, 17*(2), 60-66.
- Pelham, T. W., Campagna, P. D., Ritvo, p. G., Birnie, W. A. (Spring, 1993). The effects of exercise therapy on clients in a psychiatric rehabilitation program. *Psychosocial Rehabilitation Journal, 16*(4), 75-84.
- Robinson, S. (2001, 4/2/2001). The Way of the Strong. *Time Europe, 157*(13), 65.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. New York: Houghton Mifflin.
- Singh, N., Clements, K., & Fiatarone, M. (1997). A randomized controlled trial of progressive resistance training in depressed elders. *Journal of Gerontology: Medical Sciences, 52A*(1), M27-M35.
- Singh, N., Clements, K., & Fiatarone, M. (2001). The efficacy of exercise as a long-term antidepressant in elderly subjects: a randomized, controlled trial. *The Journals of Gerontology, 56A*(8), M497-M504.
- Teusch, L., Bohme, H., Finke, J., Gastpar, M., & Skerra, B. (2003). Antidepressant medication and the assimilation of problematic experiences in psychotherapy. *Psychotherapy Research, 13*(3), 307-322.

- Thompson, C. L., & Campbell, S. B. (1992). Personal intervention preferences for alleviating mild depression. *Journal of Counseling and Development*, 71(1), 69-73.
- Toskovic, N. N. (2001). Alterations in selected measures of mood with a single bout of dynamic taekwondo exercise in college-age students. *Perceptual and Motor Skills*, 92 (3), 1031-1038.
- Tylee, A., Gastpar, M., Lepine, J.P., Mendlewicz, J. (1999). DEPRES II [Depression Research in European Society II]: a patient survey of the symptoms, disability and current management of depression in the community. DEPRES Steering Committee. *International Clinical Psychopharmacology*, May; 14(3): 139-151.
- Van Veldhoven, NHMJ, Vermeer, A. V., Bogard, J. M., Hessels, M. G. P., Wijnroks, L., Colland, V. T. & et al. (2001). Children with asthma and physical exercise: effects of an exercise programme. *Clinical Rehabilitation*, 15, 360-370.
- Wheeler, R. J. & Frank, M. A. (1988). Identification of stress buffers. *Behavioral Medicine*, 14, 78-89.
- Whiddon, J. (2003). Hatha yoga as a treatment for depression. Unpublished doctoral dissertation, Barry University, Florida.
- Yunginger, D. (2000, November 2000). Gotta Try It. *Prevention*, 52, 71



If you or someone you know suffers from **Depression**,

A doctoral research study is being conducted by Tori Kelley, a doctoral candidate at Barry University in the Adrian Dominican School of Education investigating the effects of **Taekwondo on Depression.**

Physical movement has been shown to lower stress and anxiety, improve memory, control pain, elevate mood, and improve concentration, attention, and ability to focus.

Study Requirements:

- *Participate in one brief telephone interview, one 1-hour group orientation, and complete a 15 minute depression inventory.
- *Train in taekwondo for FREE, 2 times a week for 1 hour, for 4 weeks at a local taekwondo center.

Eligibility Requirements

- *Must be at least 18 years of age
- *Must currently be receiving mental health treatment
- *Not diagnosed with a serious, chronic medical condition

This study is **FREE** to all selected participants. Confidentiality will be carefully protected. Participation is entirely voluntary.

Please contact:

Tori Kelley at (407) 808-8050

Or email: tori@centralfloridamentalhealth.com

(please put "FREE STUDY" on the subject line)



APPENDIX C

Barry University
Informed Consent Form

Your participation in a research project is requested. The title of the study is “A Quantitative Study to Discover if Taekwondo Training Can Reduce Depression.” The research is being conducted by Tori Kelley, a student in the Counseling Department at Barry University, and is seeking information that will be useful in the field of counseling. The purpose of this study is to examine the relationship between taekwondo and depression. In accordance with this aim the following procedures will be used: complete two depression tests and participate in taekwondo classes. We anticipate the number of participants to be 20.

If you decide to participate in this research you will be asked to do the following: complete the Beck Depression Inventory-II as a pre-test and post-test. Participate in 60 minute taekwondo classes two times per week for four weeks.

Your consent to be a research participant is strictly voluntary and should you decline to participate or should you choose to drop out at any time during the study, there will be no adverse affects whatsoever.

The risks of involvement in this study are minimal and are not expected to exceed that ordinarily experienced during any other physical activity. The risk involved in completing the depression scale is not expected to exceed that ordinarily experienced during routine psychological examinations. Although there are no direct benefits to you, your participation in this study may help our understanding of how taekwondo impacts depression, and may help improve treatment strategies for depression.

As a research participant, information you provide will be held in confidence to the extent permitted by law. Any published results of the research will refer to group averages only and no names will be used in the study. Demographic Data Surveys and BDI-II Score Sheets will be kept in locked files, in separate cabinets, in the researcher’s office. Your signed consent form will be kept separate from the Demographic Data Surveys and BDI-II Score Sheets. All data, including Demographic Data Surveys and BDI-II Score Sheets will be destroyed after 5 years.

If you have any questions or concerns regarding the study or your participation in the study, you may contact me, Tori Kelley, M.S., at (407) 808-8050, my supervisor, Dr. Kitty Eeltink, at (321) 235-8402, or the Institutional Review Board point of contact, Avril Brenner, at (305) 899-3020. If you are satisfied with the information provided and are willing to participate in this research, please sign your consent by signing this consent form.

Voluntary Consent

I acknowledge that I have been informed of the nature and purposes of this experiment by _____ and that I have read and understand the information presented above, and that I have received a copy of this form for my records. I give my voluntary consent to participate in this experiment.

Signature of Participant

Date

Researcher

Date

Witness

Date