EXAMINATION OF A PEER-ASSISTED PHYSICAL ACTIVITY
PILOT PROGRAM FOR COLLEGE STUDENTS WITH
DEPRESSION: WELLCAT FIT

A Thesis

by

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ABSTRACT

EXAMINATION OF A PEER-ASSISTED PHYSICAL ACTIVITY PILOT PROGRAM FOR COLLEGE STUDENTS WITH DEPRESSION: WELLCAT FIT

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The purpose of this study was to examine if a peer-assisted physical activity program, Wellcat Fit, affected depression symptoms, self-efficacy for physical activity, and physical activity participation in college students with depression. Nine students 18 to 32 years of age, diagnosed with mild to moderate depression, participated in an eight-week physical activity program as part of the treatment for their depression. Participants in Wellcat Fit completed the Zung Self-Rating Depressions Scale (ZSDS), Self-Efficacy for Exercise Scale (SEES), and the modified Seven Day Recall of Self-Reported Physical Activity (PAR) before and after the program. Mean scores for the ZSDS showed a non-significant trend of improvement of 46.78 to 36.22 over the eight-week program. Mean scores for the SEES showed a significant improvement from 2.14 to 3.33 over
the eight-week program. Scores on the modified Seven Day Recall indicated improve-
ments in physical activity participation. Despite the small sample size, the positive
trends in the data indicate that Wellcat Fit may be an effective adjunct intervention for
treating college students with depression. Wellcat Fit should be examined with a larger
population to determine effectiveness.
CHAPTER I

INTRODUCTION OF THE STUDY

Introduction

Depression is one of the most prevalent mental health issues experienced by college students and is among the leading causes of disability in the United States (Center for Disease Control and Prevention [CDC], 2011). In the 2010, American College Health Association’s (AMCH) National College Health Assessment 30% of students reported being so depressed that it was difficult to perform normal, everyday functions (AMCH, 2011).

Fortunately, depression can be treated, with the two most commonly used options being psychotherapy and antidepressant medications (National Institute of Mental Health [NIMH], 2011). However, psychotherapy alone may not be enough to fully treat depression and antidepressant medications are expensive, and have a wide variety of negative side effects (NIMH, 2011). Consequently, health care professionals have sought out alternate ways to treat depression. This has led to numerous studies examining the relationship between depression and exercise/physical activity, with several researchers concluding that physical activity is an effective treatment for depression either by itself (Babyak et al., 2000; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005; Klein et al., 1985), or as an adjunct to other treatment, such as psychotherapy and antidepressant medication.
Background

There has been a considerable amount of research examining the potential for physical activity to predict and prevent depressive symptoms (De Moor, Beem, Stubbe, Boomsma, & De Geus, 2006; Goodwin, 2003; Martinsen, 2008; Teychenne, Ball, & Salmon, 2010). Most notably a Dutch study of 19,288 twins and their families found that exercisers were less anxious, less depressed, less neurotic, and more socially outgoing than their inactive twin (De Moor et al., 2006). Similar results were found in college students when results from the 2005 National College Health Assessment showed that students who engaged in high levels of physical activity had significantly lower occurrences of hopelessness, depression, and suicidal behavior than their inactive counterparts (Taliaferro, Rienzo, Pigg, Miller, & Dodd, 2009).

The relationship between an inactive lifestyle and poor mental health is starting to become a concern, not just in the general population, but among college students as well. The CDC and ACHA are currently promoting a physically active lifestyle to improve one’s mood, relieve depression, and increase feelings of well-being (ACHA, 2011; CDC, 2012). There have also been several physical activity interventions with the sole purpose of encouraging college students to increase their physical activity; such as lecture classes, group exercise programs, healthy lifestyle seminars, exercise behavior change consultations, and participation in college physical activity classes (Ferrara, 2009; Leslie et al., 1999; Mailey et al., 2010; Wallace, Buckworth, Kirby, & Sherman, 2000; Carron et al, 1996; Sallis et al., 1992; Von Ah et al., 2004).

Unfortunately, of all the physical activity interventions implemented in a college setting,
only one (Mailey et al., 2010) has focused on effective methods to implement physical activity programs for college students suffering from depression.

Statement of the Problem

Depression is becoming increasingly prevalent in modern society and college students may be at higher risk for depression than the general population (ACHA, 2010). However, in 2010 nearly half of college students stated that their university or college did not provide them with information on depression (ACHA, 2010). Furthermore, in 2010 30% of college students self-reported being depressed, while only 7.5% were clinically diagnosed with depression (ACHA, 2010). Additionally, approximately 40% to 50% of college students are physically inactive leading to additional health issues (ACHA, 2010; Keating, Jianmin, Piñero, & Bridges, 2005), which makes it important to address both depression and physical activity participation.

Research empirically shows that physical activity can improve symptoms of depression regardless of age or gender (Rethorst, Wipfli, & Landers, 2009). Physical activity can be a valuable treatment option because it not only has the potential to prevent depressive symptoms, but it can also offer protection from chronic disease and disability (Durstine et al., 2009).

There have been a handful of physical activity interventions implemented in a college setting to date, but there is still limited research examining their effectiveness on college students with depression. Further research is necessary to determine effective physical activity interventions in the treatment of depression in college students.
Purpose of the Study

Self-efficacy for physical activity, the extent to which one feels they can perform physical activity, has consistently been identified as a correlate of physical activity in both healthy individuals and those with chronic diseases (Doerksen, Umstatt, & McAuley, 2009; McAuley & Blissmer, 2000; Von Ah et al., 2004). Social support has also been found to be a significant predictor of physical activity participation in college students, which is why peer-support has been a popular form of health promotion on many college campuses (Boyle, Mattern, Lassiter, & Ritzler, 2011; Leslie et al., 1999; Wallace et al., 2000). However, there are no known studies that included a peer social support design to improve physical activity participation, exercise self-efficacy and depression symptoms among college students.

The purpose of this study is to examine if a peer-assisted physical activity program, namely Wellcat Fit, affects depression symptoms and self-efficacy for physical activity in college students with depression. Effectiveness of the program will be measured by quantifying: depressive symptomology, self-efficacy for physical activity, adherence rates, and weekly levels of physical activity participation. Researchers have measured these same characteristics among college students, but there are no known studies that have been specifically designed for students suffering from depression.

Theoretical Bases and Organization

Social Cognitive Theory (SCT) is a theoretical approach used in research for a variety of health related behavior changes (Mailey et al., 2010). One of the main components of the SCT is Self-Efficacy Theory, which has become increasingly
prevailent in the explanation for exercise behavior. Researchers have consistently shown that having self-efficacy for physical activity is associated with overcoming barriers to being active, improvements in well-being, and assisting behavioral changes in those with depression (Mailey et al., 2010). Bandura (1997) proposed that there are four major sources of self-efficacy; enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological/affective states. Lox, Martin Ginis, and Petruzzello (2010), used Bandura’s (1997) four sources of self-efficacy to develop sources that are specific to physical activity: past performance accomplishments, vicarious experiences, social persuasion, and physiological/affective states. Previous studies have been designed to increase self-efficacy for physical activity by targeting one or more of these sources. However, there are no known interventions that have been specifically designed for college students suffering from depression. Wellcat Fit is unique because it is designed to improve depression symptoms in college students through physical activity by increasing the four sources of self-efficacy; past performance accomplishments, social persuasion, and physiological/affective states (Lox et al., 2010) (Figure 1).

Hypotheses

1. At the end of the program, depression symptoms for the intervention group will be less than the control group while keeping baseline scores constant.

2. Self-efficacy for physical activity will improve more for the intervention group than the control group.
Figure 1. Wellcat Fit theoretical framework.


3. Self-efficacy for physical activity will increase in participants from the intervention group, leading to increased physical activity participation on the 7-day recall.

Null Hypothesis

1. At the end of the program, depression symptoms will not improve more for the intervention group than those in the control group.
2. Self-efficacy for physical activity will not improve more for the intervention group than the control group.

3. Increases in self-efficacy for physical activity will not increase physical activity participation on the 7-day recall.

Limitations of the Study

1. Data collection depended on compliance from the intervention and control group.

2. The study is specific to the college population and one university.

3. A convenient sample is being used.

4. The study did not take into account the effects of medication and counseling.

5. There is a much higher percentage of female participants.

Definition of Terms

**Affective States**

Temporary positive or negative feelings that are influenced by outside behaviors (Lox et al., 2010)

**Depression**

A mental illness associated with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration (World Health Organization, 2011).
Exercise

Physical activity done especially for the purpose of becoming physically fit (Corbin & Lindsey, 2007).

Past Performance Accomplishments

An individuals’ perceived success with a previously performed activity that is similar, or the same as, the current behavior (Lox et al., 2010).

Peer-Assistants

Kinesiology students that provide social support by being physically active with Wellcat Fit Participants. Also known as “exercise buddies.”

Physiological States

Temporary physical condition of the body, such as pain, fatigue, sweating or rapid heartbeat (Lox et al., 2010).

Physical Activity

Movement using the major muscles of the body; may be done for enjoyment, to complete a task, or to improve physical fitness (Corbin & Lindsey, 2007).

Self-Efficacy for Physical Activity

The extent to which one feels they can perform physical activity (Lox et al., 2010).

Social Persuasion

Verbal and nonverbal strategies used by others in an effort to increase a person’s self-efficacy (Lox et al., 2010).
Vicarious Experiences

Experiencing an increase in self-efficacy by observing the successful performance of a behavior by another individual (modeling) (Lox et al., 2010).

Wellcat Fit

A peer supported physical activity program designed as part of the overall treatment of depression in college students.
CHAPTER II

REVIEW OF LITERATURE

According to the World Health Organization (2011), depression affects 121 million people worldwide and is among the leading cause of disability in the U.S., affecting an estimated 1 in 10 American adults (CDC, 2011). Also referred to as Major Depression (MD) if clinically diagnosed, depression is categorized as a mental illness or mood disorder that can be devastating to sufferers (American Psychiatric Association [APA], 2011; CDC, 2011). Depression does not just affect mood levels, but it also is associated with feelings of sadness over a long period of time (at least two weeks) combined with changes in appetite, sleep, energy level, cognitive disturbances, feelings of worthlessness, inappropriate guilt, trouble concentrating or decision making, and suicidal ideation (NIMH, 2011). Depression can also have an adverse effect on the prevention and treatment of common chronic conditions such as cardiovascular disease, asthma, cancer, arthritis, diabetes, and obesity, and can result in absence from work, temporary disability, and decreased productivity (CDC, 2011). These secondary effects can interfere with activities of daily living, normal functioning, and cause discomfort for individuals with depression and those around them. Although depression is a serious illness, it is so common and stigmatized that many do not seek treatment (NIMH, 2011).

Major Depression is characterized by a combination of symptoms that can prevent a person from functioning normally and performing every day activities. It can
affect a person’s eating and/or sleeping patterns (too much or too little), efficiency at work or school, and can cause a loss of interest in once pleasurable activities (Aguirre, 2008). Some people will only experience MD once in their lifetime, while others may have multiple episodes. Although Major Depression is the focal point of the majority of research, depression can take several forms that range from mild to severe. The first is dysthymic disorder, or dysthymia, which is characterized by at least two years of depressed mood for more days than not, with generally milder symptoms then someone with MD (APA, 2005). Those with dysthymia do not meet the criteria for MD, but may still experience major depressive episodes, frequently referred to as double depression (APA, 2005; Brosse, Sheets, Lett, & Blumenthal, 2002). The National Institute of Mental Health (2011) has also acknowledged minor depressive disorders such as psychotic depression, post-partum depression, which many women experience post-birth, and seasonal depressive disorder, which is the start of depressed feelings during the winter months when there is decreased exposure to direct sunlight. Although not as common as MD and dysthymia, bipolar disorder, is a mental illness effecting over 10 million people in America (National Alliance on Mental Illness (NAMI), 2011). It is generally a life-long condition that is characterized by mood fluctuations from extremes highs (mania) to extreme lows (depression) that can last from days to months (NIMH, 2011; NAMI, 2011). While the term depression is used to describe various dysphoric mood states, temporary feelings of depression are generally not the focus of diagnosis and clinical attention (Brosse et al., 2002).
Causes of Depression

There is no single identifiable cause of depression; rather it is the result of a combination of biochemical, environmental, genetic, and psychological factors (NIMH, 2011; Schwartz & Schwartz, 1993). Genetics could be the most likely explanation, as depression sometimes “runs in the family,” suggesting a hereditary link (Tsuang & Faraone, 1990). However, depression can also occur in individuals without a family history of depression. Genetics research shows that depression is not simply inherited, but is influenced by several genetic factors acting together with environmental or other factors (Tsuang, Bar, Stone, & Faraone, 2004). Some of the environmental factors that can increase the risk of depressive disorders are poverty, child/spousal abuse, trauma or everyday stresses, while psychological factors such as coping with a disease or disability, losing a loved one, relationship difficulties, or other emotionally traumatic situations (NIMH, 2011).

Biochemical factors, although difficult to prove, have been one of the more recently recognized causes for depression. Brain-imaging technologies, such as magnetic resonance imaging (MRI) and positron emission topography (PET) scans have demonstrated that the brains of people with depression differ from those without depression (NIMH, 2011). Researchers have theorized that the regions of the brain responsible for the regulation of mood levels, thought processes, sleep cycles, appetite, and behavior, are out of balance and function abnormally in those people with depression (NIMH, 2011; Schwartz & Schwartz, 1993). These areas of the brain are affected by a lack of chemicals known as neurotransmitters, which are used for communication amongst neurons in the brain (Kraly, 2006). Because depression affects such critical areas
of the brain, many of the treatments prescribed by physicians aim to repair these imbalances and restore normal brain function.

Recent findings by the CDC support that multiple factors contribute to high rates of depression in certain groups. The CDC (2011) conducted a study measuring behavior health risks among adults in the U.S. and found that persons 45-64 years of age, women, blacks, Hispanics, non-Hispanic persons of other races or multiple races, persons without a high school education, those previously married, individuals incapable of working or unemployed, and persons lacking health insurance coverage were at an increased risk of meeting the criteria for major depression. It is also important to note that the prevalence of depression is much higher in women than men, with researchers suggesting that women are 70% more likely to experience depression than men at some point throughout their lifetime (Kessler et al., 2005).

Prevention and Management

Like many other disorders, the earlier treatment begins for people with MD, the more effective treatment can be while also decreasing the likelihood of reoccurrence. Although there is no one perfect choice to treat depression for all patients, there are common treatments that have been effective either by themselves or when paired with another. The two most commonly used options are psychotherapy and antidepressant medications (NIMH, 2011). Psychotherapy (also known as talk therapy) can be separated into two categories: cognitive–behavioral therapy (CBT) and interpersonal therapy IPT (NIMH, 2011). CBT helps people alter negative thought processes and behaviors, while interpersonal therapy (IPT) supports individuals in understanding and working through troubled personal relationships (NIMH, 2011). Both talk therapies are effective in their
own right by targeting possible causes of depression or those that make it worse. Psychotherapy can vary in time and is usually the best treatment for mild depression. Alone, it may not be enough to fully treat depression which has led many physicians to combine psychotherapy with antidepressant medications in order to cover a broader spectrum of symptoms (Rush, 2005).

Antidepressants are prescription medications that work to normalize the imbalance in neurotransmitters, such as serotonin, norepinephrine and dopamine. As stated earlier these specific chemicals are responsible for regulating mood, but scientists are still unsure exactly how they work. One of the latest and most prevalent medications are serotonin reuptake inhibitors (SSRIs), such as Prozac, Celexa and Zoloft (Rush, 2005). Serotonin and norepinephrine reuptake inhibitors (SNRIs) are also widely used and include prescription medications such as Effexor and Cymbalta (Rush, 2005). The older classes of antidepressants, which have more side effects, are Tricyclics and Monoamine Oxidase Inhibitors (MAOI) (NIMH, 2011). There is no one size fits all prescription and trials of different antidepressants may be needed until the right one can be found (NIMH, 2011).

Antidepressants have become a controversial issue over the years because of the wide range of side effects associated with their consumption (NIMH, 2011). According to the National Institute of Mental Health (2010), the most common side effects linked with SSRIs and SNRIs are headache, nausea, insomnia, nervousness, agitation, and sexual problems. The side effects of Tricyclic Antidepressants are dry mouth, constipation, bladder problems, sexual problems, blurred vision, and drowsiness (NIMH, 2011). Because of these side effects, the FDA issued a “Black Box” warning on
antidepressants, the most severe form of warning on prescription drug labeling (NIMH, 2011). The “Black Box” warning was implemented to emphasize that persons of all ages who are prescribed antidepressants should be carefully monitored during treatment (NIMH, 2011).

**Alternative Treatment Options**

Because of the wide variety of side effects that can be experienced with antidepressants, health care professionals have sought out alternate ways to treat depression. One option is electrocompulsive therapy (ECT). Formerly known as shock therapy, ECT chemically induces seizures to change the chemical composition of the brain (Bolwig, 2011). During ECT, an electrical current passes through brain tissue and a grand mal seizure is induced (Bolwig, 2011). This practice has been all but abandoned as it is predicted that treatments like these would have severe physiological consequences (Bolwig, 2011). The dietary supplement St. John’s Wort has also be used as an alternate treatment for depression, but an 8-week trial involving 340 patients diagnosed with major depression found it no more effective than a placebo for treating MD (Szegedi, Kohnen, Dienel, & Kieser, 2005).

**Treating Depression with Exercise/Physical Activity**

The relationship between depression and exercise/physical activity has recently become a heavily studied phenomenon by researchers from around the world. The first study was in 1979 when running was evaluated as treatment for depression (Greist et al., 1979). There have been several studies since 1979 concluding that exercise is an effective treatment for depressed individuals either by itself or as an adjunct to other
treatment, like psychotherapy and antidepressant medications (e.g. Babyak et al., 2000; Dunn et al., 2005; Klein et al., 1985). One of the most notable studies was conducted by Blumenthal et al. (2007) entitled Standard Medical Intervention and Long-Term Exercise (SMILE). The study involved 156 participants divided into three groups, with each receiving one of the following treatments: (1) Zoloft, (2) exercise, and (3) a combination of the two (Ratey, 2008). The exercise group was allocated to supervised walking or jogging, at 70 to 85% of aerobic capacity, 3 times a week for 30 minutes (Blumenthal et al., 2007). At the conclusion of the SMILE program, all three groups showed a significant decrease in depression symptoms, with a 60% decrease for the exercise group, 65% for Zoloft, and 68% for both (Blumenthal et al., 2007). Upon completion of the study, the authors made the conclusion that exercise was as effective as medication for treating depression (Blumenthal et al., 2007).

Researchers have also conducted several meta-analyses examining the effects of exercise on depression, with the objective of reaching common conclusions across all ages, genders, and various types of exercise (Rethorst et al., 2009). Because authors of previous meta-analyses have been criticized for including studies of poor methodology, Rethorst et al. (2009) used a more extensive search procedure eliminating studies with incomplete literature reviews and a shortage of moderating variable analysis. This process resulted in the analysis of 58 randomized trials ($N = 2982$) studying the effect of exercise on depressive symptom (Rethorst et al., 2009). As a result of this meta-analysis, the authors found that interventions lasting 4 to 9 weeks had significantly larger effect sizes than interventions of 17 to 26 weeks, but interventions of 10 to 16 weeks resulted in larger effect sizes than 4 to 9 weeks (Rethorst et al., 2009). Furthermore, the authors
found that aerobic and resistance exercises were equally effective in relieving depression symptoms (Rethorst et al., 2009).

Exercise has not only been studied for treatment of depression, but there has also been a considerable amount of research examining its potential for predicting and preventing depressive symptoms (Goodwin, 2003; Martinsen, 2008; Teychenne et al., 2010). Most notably, a Dutch study of 19,288 twins and their families found that exercisers were less anxious, less depressed, less neurotic, and more socially outgoing (De Moor et al., 2006). The relationship between exercise levels and mental health goes far beyond the psychological benefits because exercise not only has the potential of fighting off depressive symptoms, but it can also offer protection from chronic diseases such as obesity, cardiovascular disease, hypertension and diabetes (Durstine et al., 2009). The promotion of exercise consequently affects not only mental health, but physical health as well, thus creating a win-win situation.

To fully understand the psychological effects of exercise and physical activity, one must recognize that the combination of genetic, environmental, psychological, and biochemical factors contribute to episodes of major depression. Because there are so many factors involved with causing depression, researchers have developed many different hypotheses in an effort to explain why people are depressed, why depression is so prevalent in modern society, and why a physically active lifestyle can prevent or help treat depressive symptoms (Lox et al., 2010). These major hypotheses are categorized by Lox et al. (2010) as the anthropological hypothesis, endorphin hypothesis, monoamine hypothesis, mastery hypothesis, and social interaction hypothesis.
**Anthropological Hypothesis**

Named the anthropological hypothesis, a possible explanation for the relationship between physical activity and depression reflects an evolutionary view (Lox et al., 2010). Lox et al. (2010) argue that until recently humans relied heavily on a physically active lifestyle in order to survive. Whether as hunter-gatherers, farmers, or even manual labor workers, past lifestyles emphasized physical activity was as a means to survival. It is also interesting to note that as technology progresses and physical activity is no longer a necessity for survival, the prevalence of depression is increasing dramatically (Lox et al., 2010). Johnsgard (2004) believes we are working against our genetics by leading a physically inactive lifestyle. Simply put, Johnsgard stated that humans were born to be physically active, thus a sedentary lifestyle will consequently be accompanied by a variety of health problems, including depression (Johnsgard, 2004; Lox et al., 2010).

**Endorphin and Monoamine Hypothesis**

In recent research, the endorphin and monoamine hypotheses seem to be garnering the most attention throughout the medical community when trying to explain the depression reducing effects of exercise and physical activity (Carron, Hausenblas, & Estabrooks, 2003). Researchers hypothesize that depression reduction during exercise is the result of the body’s production of natural painkillers called endorphins (Kraly, 2006; Lox et al., 2010; Ratey, 2008). Through the monoamine hypothesis, researchers suggest that depression reduction during exercise is due to improvements in the production of key neurotransmitter (serotonin, dopamine, norepinephrine) that are responsible for mood regulation (Kraly, 2006; Lox, et al., 2010; Ratey, 2008). The basis for these hypotheses
could be derived from a process called neurogenesis, which is the growth of new neurons in the brain (Dinas, Koutedakis, & Flouris, 2010). It is believed that a decreased production of neurogenesis is a contributing factor to depressed moods in patients with major depression (Santarelli et al., 2003). Much like antidepressant medications, exercise is believed to cause physiological changes that result in neurogenesis, which in turn produces chemicals such as endorphins, serotonin, dopamine and norepinephrine that are believed to be responsible for the reduction of depressive symptoms (Ernst et al., 2006; Rethorst et al., 2009).

Mastery Hypothesis

Though the anthropological, endorphin, and monoamine hypotheses rely on physiological changes to explain the depression-reducing effects of exercise, the mastery and social interaction hypotheses propose that the psychological effects of physical activity is the mechanism of change in those with depression (Lox et al., 2010). Depressed patients often have low self-efficacy and self-concept which can lead to feelings of poor self-esteem (Fox, 2000). Lox et al. (2010) use the mastery hypothesis to suggest that learning a new task will create a sense of accomplishment, thus increasing self-efficacy and improving self-concept. As White, Kendrik and Yardley (2009) state, changes in physical activity self-efficacy can lead to positive changes in perceptions of the physical self, such as exercise competence, body image, physical condition, and physical strength. These changes in physical self-worth may then be generalized into higher feelings of global self-esteem, self-concept, self-efficacy and positive mood (Sonstroem et al., 1994).
Lox et al. (2010) take a different approach with the social interaction hypothesis, suggesting that depression reducing effects of exercise are derived from the social aspect of being physically active. One of the main symptoms of depression can be isolating oneself from family and friends or avoiding social situations entirely (APA, 2011). The idea behind the social interaction hypothesis is that physical activity reduces depression by providing an opportunity for a person to interact with others. Although studies have shown that social support increases adherence to exercise (Carron et al, 1996), there have also been studies showing reductions in depression symptoms after exercise bouts performed without social support (Babyak et al., 2000; Dunn et al., 2005; Klein, 1985).

It has become clear that the researchers who developed the previously mentioned hypotheses make valid arguments in trying to explain the depression-reducing effects of exercise and physical activity. Some use the physiological effects as the mechanism for change, while others propose that the psychological effects explain reductions in depression symptomology. More than likely the depression reducing effects of exercise can be explained by a combination of all or part of each of these hypotheses.

Depression in a College Setting

Moving away from home and taking on an independent lifestyle can be an exciting time for many new college students. Unfortunately, sometimes this transition from dependent to independent decision-making can be too drastic, leaving many new college students struggling to find their way (Kadison & DiGeronimo, 2004). Issues such as academic performance, parental pressures, financial worries, substance abuse, and
social fears may cause students to reach stress levels they are unaccustomed to coping with (Kadison & DiGeronimo, 2004). These high stress levels can have harmful consequences, leaving students with a host of mental health issues such as depression, sleep disorders, substance abuse, anxiety disorders, eating disorders, sexual promiscuity, self-mutilation and suicide (Kadison & DiGeronimo, 2004).

Of all the mental health issues experienced by college students, depression is one of the most prevalent. In the 2010 American College Health Association’s National College Health Assessment 30% of students reported being so depressed that it was difficult to perform normal, everyday functions (ACHA, 2011). It may also be important to note that of those 30%, only 7.5% were diagnosed or sought treatment for their depression, which further supports claims by the Centers of Disease Control and Prevention that the majority of young adults suffering from depression do not receive appropriate treatment, or in many cases, any treatment at all (CDC, 2012). Because depression most commonly presents itself in one’s mid to late twenties (Kadison & DiGeronimo, 2004), this deficiency in proper treatment may not be a conscious choice, but rather depressed college students may lack the knowledge needed to make the association between their symptoms and mental illness. In the 2010 National College Health assessment, over 100,000 students were asked if their university or college had provided information on depression and nearly half the students responded “No” (ACHA, 2010). Fortunately, many of those students who are aware of the signs and symptoms of depression have access to free health care through student health services, with many universities having counseling centers that can further assist students suffering from depression.
The evolution of on-campus mental health services began in 1910 at Princeton University, when it became apparent that if students were emotionally unstable they could not perform to their fullest potential (Kadison & DiGeronimo, 2004). Since then, there has been considerable controversy over how much responsibility colleges and universities should accept regarding the mental health of their students (Kadison & DiGeronimo, 2004). Nonetheless, the development of college health resources has increased dramatically over the last century and continues to grow to this day. One of the largest advocates for college health is the American College Health Association, which has the following mission statement:

The American College Health Association will provide advocacy, education, communications, products, and services, as well as promote research and culturally competent practices to enhance its members’ ability to advance the health of all students and the campus community. (ACHA, 2011, p. 1)

The Centers for Disease Control and Prevention (2011) is also making a conscious effort to improve health in college students with various webpages completed devoted to college health and safety information. A common theme that has developed between the CDC and ACHA is the promotion of a physically active lifestyle to improve health among college students. The CDC currently encourages college students to participate in 2½ hours of physical activity per week to increase overall health and fitness, improve one’s mood, relieve depression, and increase feelings of well-being (CDC, 2012). The ACHA created Healthy Campus 2010, which “establishes national college health objectives and serves as a basis for developing plans to improve student health” (ACHA, 2011, “Healthy Campus 2010,” para. 1). The Healthy Campus 2010 campaign has also developed a list of 10 health indicators that reflect the main health
concerns in the United States, with physical activity ranked number one and mental health coming in at number six (ACHA, 2011).

The relationship between sedentary living and poor mental health is beginning to be studied, not just in general population, but among college students as well. The most recent study came in 2009 when Taliaferro et al. used results from the 2005 National College Health Assessment to compare the odds of experiencing hopelessness, depression, and suicidal behavior in students who were physically active with those who were not. The findings showed significantly lower occurrences of these traits in college students who were physically active compared with their sedentary counterparts, which may offer support for the use of physical activity as an adjunct treatment for college students suffering from depression (Taliaferro et al., 2009).

Treating Depression with Exercise/Physical Activity in a College Setting

There have been physical activity interventions implemented thus far with the sole purpose of getting college students to increase their physical activity. These interventions have used various methods such as physical activity based lecture classes, group exercise programs, healthy lifestyle seminars, exercise behavior change consultations, and participation in college physical activity classes (Ferrara, 2009). Many, if not all of these interventions targeted potential mediators of change in exercise behavior and adherence (Sallis Calfus, Alcaraz, et al., 1999).

Self-efficacy for physical activity, the extent to which one feels they can perform physical activity, has consistently been identified as a correlate of physical activity in both healthy individuals and those with chronic diseases (Doerksen et al.,
Furthermore, physical activity self-efficacy has been associated with high physical activity levels in college students. In a study conducted by Von Ah et al. (2004), self-efficacy significantly predicted physical activity behavior in college students ($N = 161$) and played an important role in overcoming perceived barriers to becoming physically active. Unfortunately, of all the physical activity interventions implemented in a college setting, few have focused on effective methods to implement physical activity programs for college students suffering from depression.

A recent study conducted by Mailey et al. (2010) examined the effects of a 10-week internet based physical activity intervention on physical activity, self-efficacy, depression, and anxiety in college students receiving mental health counseling. Participants ($N = 57$) in the intervention group received access to a secure website that featured a series of four modules based on the social cognitive theory providing information on beginning a physically active lifestyle, proper planning to be successful, overcoming barriers, and how to maintain a physically active lifestyle (Mailey et al., 2010). Measures were taken at baseline and post-intervention for physical activity with the use of pedometers, while depression, anxiety, and self-efficacy were measured using valid questionnaires to determine if the program was feasible and effective. The study was moderately successful resulting in higher levels of physical activity participation, but the effects of the program on depression and anxiety were not significant (Mailey et al., 2010). Further, self-efficacy for exercise actually declined after the intervention (Mailey et al., 2010). The authors acknowledged the surprising decrease in self-efficacy and explained that it could have been the result of participants overestimating their own abilities before the program started, which has also occurred in previous studies (Mailey
et al., 2010). The authors concluded that further examination is needed to determine how physical activity interventions can be better tailored to meet the needs of college students actively seeking treatment for their depression (Mailey et al., 2010). Although research involving physical activity interventions for depressed college students is sparse, there are associations that can be made from the studies conducted in a general population of college students.

Social Support

Carron, Hausenblaus, and Estabrooks (2003) define social support as

an umbrella term used to represent a wide variety of concepts such as belonging, bonding, and binding; attributes that characterize groups, relationships and/or people, and interpersonal processes that are social, behavioral and/or affective. (p. 109)

Generally, there are two methods used to define and measure social support in exercise behavior: one’s social network and the type of social support an exerciser receives (Lox et al. 2010). An individual’s social network refers to the number of social relationships a person has and is typically measured by the number of people an exerciser can turn to for support (Lox et al., 2010). The types of social support can be categorized into five categories: instrumental, emotional, informational, companionship, and validation (Lox et al., 2010). Researchers have yet to reach a consensus on what type of support is most effective for exercisers (Lox et al., 2010). However, exercisers with multiple support sources engage in greater levels of health promoting and preventative health behaviors (Hibbard, 1988), implying that the interaction of multiple support types may be most effective in supporting a physically active lifestyle.
While information from physicians and other health care professionals can be important factors in the adoption of a physically active lifestyle, most behavior changes occur in a person’s workplace or private life (Verheijden, Bakx, van Weel, Koelen, & van Staveren, 2005). This has led numerous researchers to examine the effects of social support on physical activity related behaviors. One such study conducted by Leslie et al. (1999) examined social support, personal characteristics, and environmental factors as predictors for physical activity participation in 2,729 male and female college students. Lower social support for exercise was the strongest psychosocial attribute and most significant predictor of insufficient activity levels in male and female college students (Leslie et al., 2010). Wallace et al. (2000) also found social support to be a significant predictor in physical activity participation in college students. However, the source of social support was different in males and females. In females, family social support was the greatest predictor for physical activity participation, while men were more significantly affected by friend/peer support (Wallace et al., 2000). These findings support results from previous research that also found family members and peers to be strong influences on physical activity levels (Carron et al., 1996; Sallis et al., 1992). Although no research was found examining the effectiveness of social support during physical activity in college students suffering from depression, it seems likely that the effect could be the same as the general population.

Peer Support

Because many college students move away from home to attend their respective universities, it may be safe to assume that family support for a physically active lifestyle may be lacking for many of these individuals. This lack of family support
may be the reason peer support is a popular form of health promotion on many college campuses (Boyle et al., 2011). Peer support has been used specifically in interventions designed for physical activity promotion, but only in a general population of college students. Two examples of university based physical activity interventions that used peer support were Project GRAD (Sallis, Calfas, Nichols, et al., 1999) and FitU (Keeler, Clifford, August, Kowalski, & Morris, n.d.). Project GRAD included a college course to assess potential mediators of change in a physical activity promotion course for 338 university seniors (Sallis, Calfas, Nichols, et al., 1999). The health related university course they offered covered behavioral science (goal setting, benefits, body image, self-talk, etc.) and exercise science (components of physical fitness, injury prevention, mental health and physical activity, etc.) as potential mediators of change in graduating seniors (Sallis, Calfas, Nichols, et al., et al., 1999). The intervention showed significant effects on three out of five physical activity outcomes for women: total leisure time, energy expenditure, and strength and flexibility activities. However, it was ineffective in changing mediating variables in men (Sallis, Calfas, Nichols, et al., et al., 1999).

Using the Self-efficacy for Exercise Scale, Keeler and colleagues (n.d.) examined the effect of peer-led exercise adherence interventions (FitU) on exercise stages of change (e.g., precontemplation, contemplation, preparation, action, maintenance) and negative thoughts/barriers to exercise in college females. Among the 17 college females who completed the study, 65% reported an improvement in their stage of change from baseline to post intervention, compared to just 20% in the control group (Keeler et al., n.d.). Further, the FitU group decreased their reported negative thoughts/barriers to exercise; however, there was no difference between the exercise self-
efficacy scores from pre to post or between the intervention and the control at post testing (Keeler et al., n.d.). While both FitU and Project Grad had similar results (showing effectiveness in short term increases in physical activity for female participants), Project GRAD was ineffective in changing exercise behavior in its male participants, and FitU did not include male participants, leading to a gender specific study (Keeler et al., n.d.; Sallis, Calfas, Nichols, et al., 1999).

Additional research is necessary to determine effective physical activity interventions for male participants, as well as recruitment strategies for male participants in future studies. Although peer support continues to be a prevalent form of health promotion on many college campuses, research involving peer-supported physical activity interventions for college students suffering from depression is still needed, as there are no known interventions at this time.

Conclusion

Depression is becoming increasingly prevalent in modern society and college students may be at higher risk for depression than the general population. Research empirically shows that physical activity can improve symptoms of depression regardless of age or gender (Rethorst et al., 2009). Because depression most commonly presents itself in one’s mid to late twenties, college campuses can be an ideal place to educate students on how to properly treat their depression (Kadison & DiGeronimo, 2004). Physical activity is a valuable treatment option because it not only has the potential to fight off depressive symptoms, but it can also offer protection from chronic disease and disability (Durstine et al., 2009).
Peer support is a common form of health promotion on many college campuses. Of the many physical activity interventions used in a college setting, peer support has been consistently used as a mechanism for change. Still, there is limited research examining the effectiveness of any physical activity intervention for college students with depression. Further research is needed to determine effective physical activity interventions in the promotion exercise adherence and the treatment of depression in college students, including interventions that utilize peer support.
CHAPTER III

METHODOLOGY

Purpose

Numerous researchers have studied the relationship between depression and exercise/physical activity, with several concluding that physical activity is an effective treatment for depression either by itself or as an adjunct to other treatment, such as psychotherapy and antidepressant medications (Babyak et al., 2000; Dunn et al., 2005; Klein et al., 1985). Approximately 40% to 50% of college students are physically inactive (Keating et al., 2005). Self-efficacy for physical activity, the extent to which one feels they can perform physical activity, has consistently been identified as a correlate of physical activity in both healthy individuals and those with chronic diseases (Doerksen et al., 2009; McAuley & Blissmer, 2000).

Of the many physical activity interventions used in a college setting, peer support has been consistently used as a mechanism for change. Still, there is limited research examining the effectiveness of any physical activity intervention for college students with depression. The purpose of this study is to determine if a peer-assisted physical activity program improves depression symptoms, self-efficacy for physical activity, and physical activity rates in college students with depression.
Research Questions

- What are the effects of a peer-assisted physical activity program on depression symptoms in college students with depression?
- What are the effects of a peer-assisted physical activity program on self-efficacy for physical activity in college students with depression?
- What are the effects of a peer-assisted physical activity program on physical activity rates of college students with depression?

Data Collection Procedure

Wellcat Fit is a peer supported physical activity program designed as part of the overall treatment of depression in college students. The physical activity program is a minimum of 2 hours (over 2 days) per week for 8 weeks. Students diagnosed with depression through the Student Health Center and Counseling Center were offered Wellcat Fit by their medical provider as part of treatment for their depression. If a student was interested in the program, they signed a consent form and provided contact information. Students who declined the program or were wait listed, joined the control group with an incentive of being entered into a raffle for a $50 gift certificate to the student bookstore. Once the consent form was signed and contact information was acquired, the medical provider gave all information to the program coordinator. Participants in the control group were contacted by the program coordinator via email with a web link to access the surveys on Student Voice. Student Voice is a website used to create and administer assessments through a secure server. Participants in the control group completed all questionnaires during week 1 and week 8.
Participants who accepted and joined the Wellcat Fit program were contacted by the program coordinator via telephone, who explained the program in detail and then obtained the student’s schedule, gender preference of peer-assistant and physical activity history. The program coordinator also informed participants that they would need to complete two confidential surveys across the eight-week period; one survey before starting the program and then one at the conclusion of the program. Wellcat Fit participants received the surveys via email with a confidential web link to access the surveys on Student Voice. Results of the survey remained confidential by using only the student’s ID number to match pre and post surveys. The program coordinator then matched participants with a peer-assistant or “exercise buddy” based on mutual physical activity interests, scheduling compatibility and gender preference. All physical activities throughout Wellcat Fit were self-selected by the participant in a location of their choice (student recreation center, local park, outdoor track). Approval was obtained through the human subjects review board prior to beginning of the program.

Participants

Participants were recruited from Student Health Services through the Student Health Center and Counseling Center at California State University Chico. Student participants, 18 to 40 years of age, receiving a diagnosis of mild to moderate depression, were given information about the Wellcat Fit program. Students were diagnosed through Student Health Services using the Zung Self-Rating Depression Scale (Zung, 1965). During the initial appointment, or in a follow up appointment, students were asked by their medical provider if they would be interested in participating in a peer assisted
physical activity program designed as part of the treatment for their depression. To be included in the study participants had to be able-bodied, non-pregnant, and have no relative or absolute contraindications to physical activity or exercise (Thompson, Gordon, & Pescatello, 2010). Students with comorbidities were included in the study as long as being physically active would not negatively affect their preexisting condition. Students participating in Wellcat Fit had routine medical care and follow-up for their depression, identical to students not in the program. All Wellcat Fit participants were matched with a peer-assistant, or “exercise buddy.”

Peer-assistants

Peer-assistants were undergraduate and graduate students, 21 to 25 years of age, majoring in Kinesiology, who are recreationally active with no contraindications to frequent physical activity. To apply for a peer-assistant position, applicants had to meet the following criteria: be recommended by a university faculty member, have successfully completed course work in Exercise Psychology and complete an application which includes an up to date resume, unofficial transcripts, a cover letter describing their potential fit with the program, and at least two references. The application was reviewed by the program director. Applicants who met the criteria for a peer-assistant position were then interviewed by the program director and program coordinator. After successfully completing the application process and interview, the program director determined if the applicant was to be hired as a peer-assistant. Upon being hired, peer-assistants attended three hours of training at the university Counseling and Wellness Center, as well as training conducted by Kinesiology faculty members specializing in
Exercise Psychology and Exercise Physiology. Trainings included information on the benefits and risks of exercise, evaluating exertion during exercise, confidentiality, motivational enhancement, exercise adherence strategies, emergency contacts, and symptoms and signs of suicidal ideation. Peer-assistants were not allowed to contact any student participant until they completed all of their training.

Measures

Surveys were comprised of demographic questions, the Zung Self-Rating Depression Scale (Zung, 1965), the Self-Efficacy for Exercise Scale (Marcus, Selby, Niara, & Rossi, 1992), and the modified Seven Day Recall of Self-Reported Physical Activity (Sallis et al., 1985). These measures were used to quantify symptoms of depression, self-efficacy for physical activity, and physical activity participation. The post survey also included a 5-point Likert scale to allow participants to rate their overall experience from very beneficial (5) to very detrimental (1).

Depression

Student participants were asked to complete an online self-administered questionnaire to quantify symptoms of depression. The questionnaire used was the Zung Self-Rating Depression Scale (ZSDS) (Zung, 1965). The questionnaire consisted of 20 questions (10 positive/10 negative) used to assess depression levels and quantify symptoms (Zung, 1965). Scores range from 20-80 and are scaled 1-4 based on the following replies: a little of the time, some of the time, good part of the time, and most of the time (Zung, 1965). Most people with depression score 50-69, with the highest score being an 80 (Carrol, Fielding & Blashki, 1973). The ZSDS, along with the Becks
Depression inventory, are the most frequently used self-administered depression scales (Biggs, Laurence & Ziegler, 1978). Findings support the validity of the ZSDS as a research instrument for assessing the severity of depression symptoms during treatment (Biggs et al., 1978). The ZSDS was included in the survey that was available online through Student Voice. Completed surveys were de-identified, kept in a password protected file and viewed only by the students medical provider and Kinesiology faculty researchers.

Students in the program were asked to fill out the online Zung Depression Scale questionnaire before and after the 8-week period. It is estimated that completing the questionnaire takes approximately 5 – 10 minutes per session. Students who did not want to participate in the program continued their normal treatment, but were asked to take the Zung Depression Survey to serve as a control group. Students had the choice not to participate in the program or withdraw at any time.

Self-Efficacy for Physical Activity

Participants completed the Self-Efficacy for Exercise (SEE) Scale online before and after the 8-week program (Marcus et al., 1992). The SEE scale assessed confidence in overcoming barriers to be physically active such as being tired, being in a bad mood, having no time, being on vacation and experiencing bad weather (Marcus et al., 1992). Responses fall on a 5-point Likert scale that range from confident (1) to extremely confident (5) (Marcus et al., 1992).

Researchers have proven internal consistency (0.92), validity and reliability (0.38 - 0.76) for the SEE scale (Resnick & Jenkins, 2000). The SEE scale has also been
used by Keeler and colleagues (n.d.) to examine the effect of a peer-led exercise adherence intervention (FitU) on exercise stages of change (e.g., precontemplation, contemplation, preparation, action, maintenance) and negative thoughts/barriers to exercise in college females.

Upon completion of Wellcat Fit, the program coordinator analyzed the scores before and after the program to determine if the program was successful in improving the participant’s self-efficacy for engaging in physical activity.

Physical Activity

Physical activity was measured using a modified Seven-Day Recall of Self-Reported Physical Activity (PAR) (Sallis et al., 1985). Participants completed the modified PAR online before and after the 8-week program. The modified Seven-Day Recall of Self-Reported Physical Activity determined if in the last seven days the participant engaged in moderate physical activity (walking, yoga, light cycling, weight training, etc.), vigorous activity (jogging, basketball, backpacking, etc.), and muscle strengthening activities. It also assessed how many days the person has engaged in at least 30 minutes of these activities. The modified Seven-Day Recall of Self-Reported Physical Activity has proven reliability (0.63) and validity (0.71) in a 5-9 week study involving college students (Dishman & Steinhart, 1988). These data were used to determine if the participant was meeting the physical activity recommendations of 150 minutes moderate intensity or 75 minutes of vigorous activity and two or more days of muscle strengthening activities before the program and at the conclusion (CDC, 2011).
Physical activity was also documented by peer-assistants who were given a journal to record frequency, time, and type of physical activities performed during the sessions. This was done in a casual manner at the end of each session by writing a brief summary of what was done during their time together. Frequency was measured by how many days the exercise was performed each week, during the 8-week period. Time was measured by minutes spent on average in each individual session across the 8-week program. Type was measured by identifying the kinds of activities performed throughout the program. All records kept by the peer-assistants were presented to the program coordinator every two weeks. At the conclusion of the program, this information was used to determine participation rates and which activities were chosen most often.

Results of all measures were available for review on Student Voice. At the conclusion of the 8-week program, all scores were de-identified by the program coordinator. The program coordinator also had access to peer-assistant journals, which contained information regarding participation rates in the Wellcat Fit program.

Data Analysis

Pre and post data were analyzed at the conclusion of the 8-week study to evaluate the effectiveness of the program. Data were analyzed using SPSS version 20.0 software. Data were analyzed using a 2x2 Mixed Factorial ANOVA with pre/post as the repeated measures factor and experimental condition as the between subjects factor. Covariate (ANCOVA) analysis was not used because it appeared that none of the continuous level demographics had sufficient correlation with the dependent variables.
that would aid in finding a significant relation between the treatment condition and the
dependent variables. Data were also analyzed using descriptive statistics.
Examination of a Peer-Assisted Physical Activity Pilot Program for College Students with Depression: Wellcat Fit

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²California State University, Northridge
³Western Washington University

Abstract

The purpose of this study was to examine if a peer-assisted physical activity program, Wellcat Fit, affected depression symptoms, self-efficacy for physical activity, and physical activity participation in college students with depression. Nine students 18 to 32 years of age, diagnosed with mild to moderate depression, participated in an eight-week physical activity program as part of the treatment for their depression. Participants in Wellcat Fit completed the Zung Self-Rating Depressions Scale (ZSDS) (Zung, 1965), Self-Efficacy for Exercise Scale (SEES) (Marcus, Selby, Niara, & Rossi, 1992), and the modified Seven Day Recall of Self-Reported Physical Activity (PAR) (Sallis et al., 1985) before and after the program. Mean scores for the ZSDS showed a non-significant trend of improvement of 46.78 to 36.22 over the eight-week program. Mean scores for the SEES showed a significant improvement from 2.14 to 3.33 over the eight-week program. Scores on the modified Seven Day Recall indicated improvements in physical activity participation. Despite the small sample size, the positive trends in the data indicate that Wellcat Fit may be an effective adjunct intervention for treating college students with depression. Wellcat Fit should be examined with a larger population to determine effectiveness.

Depression is one of the most prevalent mental health issues experienced by college students and is among the leading causes of disability in the United States (Centers for Disease Control and Prevention [CDC], 2011). Depression is becoming increasingly prevalent in modern society and college students may be at higher risk for depression than the general population (American College Health Association [ACHA], 2010). In the 2010 National College Health Assessment, 30% of students reported being...
so depressed that it was difficult to perform normal, everyday functions (ACHA, 2011). Additionally, approximately 40% to 50% of college students are physically inactive, leading to additional health issues (ACHA, 2010; Keating, Jianmin, Piñero, & Bridges, 2005). Physical activity has been identified as a valuable treatment option for depression because of its potential to prevent depressive symptoms and chronic disease and disability (Durstine, Moore, Painter, & Roberts, 2009).

The results of numerous scientific investigations have concluded that physical activity is an effective treatment for depression either by itself or as an adjunct to other treatment, such as psychotherapy and antidepressant medications (Babyak, et al., 2000; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005; Klein et al., 1985). In 2005, the National College Health Assessment showed that students who participated in high levels of physical activity had significantly lower occurrences of hopelessness, depression, and suicidal behavior than their inactive counterparts (Taliaferro, Rienzo, Pigg, Miller, & Dodd, 2009). Self-efficacy for physical activity, the extent to which one feels they can perform physical activity, has consistently been identified as a correlate of physical activity in both healthy individuals and those with chronic diseases (Doerksen, Umstatt, & McAuley, 2009; McAuley & Blissmer, 2000). Social support has also been found to be a significant predictor of physical activity participation in college students, which is why peer-support has been a popular form of health promotion on many college campuses (Boyle, Mattern, Lassiter, & Ritzler, 2011; Keeler, Clifford, August, Kowalski, & Morris, n.d.; Leslie et al., 1999; Wallace, Buckworth, Kirby & Sherman, 2000). Of the physical activity interventions implemented in a college setting that were reported in research, only one (Mailey et al., 2010) has focused on effective methods to implement physical
activity programs for college students suffering from depression. Mailey et al. (2010) examined the effects of a 10-week internet based physical activity intervention on physical activity, self-efficacy, depression, and anxiety in college students receiving mental health counseling.

The purpose of this study was to examine if a peer-assisted physical activity program, Wellcat Fit, affected depression symptoms, self-efficacy for physical activity, and physical activity participation in college students with depression. Effectiveness of the program was measured by quantifying depression symptomology, self-efficacy for physical activity, and self-reported levels of physical activity participation. Based on previous research findings, the authors hypothesized that participants in a peer-assisted physical activity program would: 1) improve their depression symptoms 2) improve their self-efficacy for physical activity and 3) increase their participation in physical activity.

Methods

This study examined the effectiveness of a peer-assisted physical activity program, Wellcat Fit, as part of the overall treatment of depression in college students. Participants were recruited by medical providers from Student Health Services through the Student Health Center and Counseling Center at California State University Chico. Students qualified for Wellcat Fit if they received a diagnosis of mild to moderate depression from their medical provider using the Zung Self-Rating Depression Scale (Zung, 1965). Additionally, students had to be actively seeking treatment for their depression (e.g., counseling and/or medication) through the counseling center and/or student health center and be able-bodied, non-pregnant, and have no contraindications to being physically active. Students with comorbidities were included in the study as long as
being physically active would not have any relative or absolute contraindications to physical activity or exercise (Thompson, Gordon, & Pescatello, 2010).

Students who qualified and agreed to join the 8-week intervention signed a consent form and gave their contact information to their medical provider. Students declining the program or waitlisted until the following semester were asked to join the control group with an incentive of being entered into a raffle for a $50 gift certificate to the student bookstore. The medical provider gave all contact information for the intervention and control subjects to the program coordinator. Communication with participants in the control groups was done via email to ensure easy access and confidentiality. Emails contained a web link to access a survey on Student Voice, a survey-based website used to create and administer assessments through a secure server. Control group participants were asked to complete the same survey as the intervention group before and after an eight-week period. The survey was comprised of demographic questions, the Zung Self-Rating Depression Scale (Zung, 1965), the Self-Efficacy for Exercise Scale (Marcus et al., 1992), and the modified Seven Day Recall of Self-Reported Physical Activity (Sallis et al., 1985).

The Wellcat Fit intervention consisted of physical activity with a peer-assistant (i.e., exercise buddy) for one hour per day, two days per week for an eight-week period. All physical activities were self-selected by the participant in a location of their choice (e.g., student recreation center, local park, outdoor track). Control group participants did not participate in a structured exercise program across the eight-week period. However, control group participants were actively seeking treatment for their depression (e.g.,
counseling and medication) and all physical activity participation was measured using a modified Seven Day Recall of Self-Reported Physical Activity.

Participants who accepted and joined Wellcat Fit were contacted by the program coordinator via telephone, who explained the program in detail and then obtained the student’s schedule, gender preference of peer-assistant and physical activity history. The program coordinator also informed the participants that they would need to complete the survey once before starting the program and once at the conclusion of the program. All Wellcat Fit participants received an email with a web link to access the survey on Student Voice.

Participants were then matched with a peer-assistant or “exercise buddy” based on mutual physical activity interests, scheduling compatibility, and gender preference. Peer-assistants provided social support during physical activity for participants throughout the program. Peer-assistants were Kinesiology undergraduate and graduate students, 20 to 25 years of age. To be hired as a peer-assistant, students were recommended by a faculty member, successful in completing coursework in exercise psychology, and required to complete an application and interview with the program coordinator and director. Upon being hired, peer-assistants attended a comprehensive training covering information on the benefits and risks of exercise, evaluating exertion during exercise, confidentiality, enhancing intrinsic motivation, exercise adherence strategies, emergency contacts, and symptoms and signs of suicidal ideation. Peer-assistants were not allowed to be in contact with any student participant until they completed all of their training.

After recruiting participants for the study, a convenience sample of 16 subjects in the intervention group and 6 control subjects was obtained. At the completion of the
eight-week program, the study included 9 subjects in the intervention group and 4 in the control group. Dropouts in the intervention group were classified as those who attended less than 75% of physical activity meetings and failed to complete both the pre and post survey. Of the seven participants who dropped out of the intervention group, two never started the program, one dropped out after four weeks, three dropped out due to illness, and one failed to complete both their surveys. Participants in the intervention group were comprised of 8 females and 1 male, with a range of 18-38 years of age and ethnicities of White (78%) and Hispanic/Latino(a)(22%) (Table 1).

Table 1

Baseline Demographics for Study Participants (n = 13)

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n = 9)</th>
<th>Control (n = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD)</td>
<td>24.90 (6.54)</td>
<td>24.25 (4.99)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>7 (78%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td>Hispanic/Latino(a)</td>
<td>2 (22%)</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>8 (89%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td>Males</td>
<td>1 (11%)</td>
<td>1 (75%)</td>
</tr>
</tbody>
</table>

Measures

The Zung Self-Rating Depression Scale (ZSDS) (Zung, 1965) was used to quantify symptoms of depression. This instrument consists of 20 questions (10 positive/10 negative) used to assess depression levels and quantify symptoms (Zung, 1965). Scores range from 20-80 and are scaled from 1 to 4 based on the following replies: a little of the time, some of the time, good part of the time, and most of the time (Zung, 1965). Most people with depression score 50-69, with the highest score being an 80 (Carrol, Fielding & Blashki, 1973). The ZSDS, along with the Becks Depression
inventory, are the most frequently used self-administered depression scales (Biggs, Laurence & Ziegler, 1978). For the current sample the Cronbach’s alphas for the ZSDS were .87 and .93 for the intervention and control group, respectively. Findings support the validity of the ZSDS as a research instrument for assessing the severity of depression symptoms during treatment (Biggs et al., 1978).

Participants completed the Self-Efficacy for Exercise Scale (SEES) (Marcus et al., 1992), which assessed confidence in overcoming barriers to be physically active such as being tired, being in a bad mood, having no time, being on vacation and experiencing bad weather (Marcus et al., 1992). Responses fall on a 5-point Likert scale ranging from confident (1) to extremely confident (5) (Marcus et al., 1992). For the current sample, the Cronbach’s alphas for the SEES were .62 and .69 for the intervention and control group, respectively. Researchers have found internal consistency (0.92), construct validity, and reliability (0.38 - 0.76) of the SEES (Resnick & Jenkins, 2000). The SEES has also been used by Keeler et al. (n.d.) to examine the effect of a peer-led exercise adherence intervention (FitU) on exercise thoughts and behaviors.

Physical activity participation was measured using a modified Seven Day Recall of Self-Reported Physical Activity (PAR) (Sallis et al., 1985). The modified PAR determines if in the last seven days the participant engaged in moderate physical activity (MPA), vigorous physical activity (VPA), and muscle strengthening activity (MSA). It then assesses how many days the person has engaged in at least 30 minutes of these activities. The modified PAR has found reliability (0.63) and validity (0.71) in a 5-9 week study involving college students (Dishman & Steinhardt, 1988).
Post surveys also included a 5-point Likert scale to allow participants to rate their overall experience from very detrimental (1) to very beneficial (5). Pre and post data were analyzed at the conclusion of the 8-week study. Data were analyzed using SPSS version 20.0 software. Data were analyzed using a 2x2 Mixed Factorial ANOVA with pre/post as the repeated measures factor and experimental condition as the between subjects factor. Data were also analyzed using descriptive statistics.

Findings

Overall, statistical significance was not found between the intervention and control group at post testing for the ZSDS F(1,11) = 2.03, \(p = .18\), eta squared = .156, power = .26, 95%, modified PAR-MPA F(1,11) = .094, \(p = .75\), eta squared = .01, power = .06, 95%, modified PAR-VPA F(1,11) = 3.14, \(p = .10\), eta squared = .22, power = .37, 95%, and modified PAR-MSA F(1,11) = 1.99, \(p = .17\), eta squared = .153, power = .25, 95%. Statistical significance was found for the SEES, F(1,11) = 5.02, \(p = .047\), eta squared = .31, power = .53, 95%.

At posttest participants reported their overall experience in Wellcat Fit to be very beneficial by 78% (7), somewhat beneficial by 11% (1), and somewhat detrimental by 11% (1) on a 5-point Likert scale. Table 2 and 3 summarizes intervention and control subjects means, standard deviations, and confidence intervals at pre- and posttest.

Peer-assistants reported the following physical activities to be chosen most often by Wellcat Fit participants:

1. Weight training
2. Biking outdoors
3. Spin class/stationary bike
Table 2

*Means and Standard Deviations for Depression, Self-Efficacy for Physical Activity and Physical Activity Participation Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Mean (SD)</th>
<th>Control Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zung Self-Rating Depression Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>46.78 (7.29)</td>
<td>51.25 (15.71)</td>
</tr>
<tr>
<td>Post</td>
<td>36.22 (9.02)</td>
<td>51.00 (14.09)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy for Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>2.14 (0.65)</td>
<td>2.85 (0.41)</td>
</tr>
<tr>
<td>Post</td>
<td>3.33 (0.81)</td>
<td>2.90 (0.53)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Reported MPA Participation in the Last Seven Days</td>
<td>Pre 3.20 (2.15)</td>
<td>1.75 (2.28)</td>
</tr>
<tr>
<td></td>
<td>Post 3.66 (2.40)</td>
<td>2.75 (1.25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Reported VPA Participation in the Last Seven Days</td>
<td>Pre 0.50 (0.85)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td></td>
<td>Post 2.00 (1.73)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Reported MSA Participation in the Last Seven Days</td>
<td>Pre 0.10 (0.32)</td>
<td>0.25 (0.50)</td>
</tr>
<tr>
<td></td>
<td>Post 1.80 (0.82)</td>
<td>0.50 (1.00)</td>
</tr>
</tbody>
</table>

4. Walking/jogging indoor track
5. Elliptical machine
6. Stretching/yoga
7. Indoor sports (e.g., badminton, basketball, rock climbing)
8. Kickboxing class
9. Aerobic dance class
10. Outdoor sports (e.g., tennis, soccer)
Table 3

**Confidence Intervals (CI) for Depression, Self-Efficacy for Physical Activity and Physical Activity Participation Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention CI</th>
<th>Control CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zung Self-Rating Depression Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>39.39, 54.16</td>
<td>40.17, 62.33</td>
</tr>
<tr>
<td>Post</td>
<td>29.41, 44.04</td>
<td>39.28, 62.72</td>
</tr>
<tr>
<td>Self-Efficacy for Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>1.63, 2.50</td>
<td>2.20, 3.50</td>
</tr>
<tr>
<td>Post</td>
<td>2.79, 3.88</td>
<td>2.08, 3.70</td>
</tr>
<tr>
<td>Self-Reported MPA Participation in the Last Seven Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>1.39, 4.61</td>
<td>0.66, 4.16</td>
</tr>
<tr>
<td>Post</td>
<td>2.48, 4.85</td>
<td>0.97, 4.53</td>
</tr>
<tr>
<td>Self-Reported VPA Participation in the Last Seven Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>0.01, 1.11</td>
<td>-0.83, 0.83</td>
</tr>
<tr>
<td>Post</td>
<td>0.92, 3.08</td>
<td>-1.63, 1.63</td>
</tr>
<tr>
<td>Self-Reported MSA Participation in the Last Seven Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>-0.17, 0.39</td>
<td>-0.18, 0.68</td>
</tr>
<tr>
<td>Post</td>
<td>0.60, 2.96</td>
<td>-1.27, 2.27</td>
</tr>
</tbody>
</table>

Physical activities taking place indoors occurred at the university student recreation facility. Activities specified as outdoors, occurred at the local/campus park and around the community.

**Conclusion**

This study investigated the effectiveness of peer-assisted physical activity program for college students with depression. In this study, ZSDS scores and self-reported physical activity participation for Wellcat Fit participants did not differ significantly from the control group at the end of the study; possibly due to the small sample size in the intervention ($n = 9$) and control groups ($n = 4$). There was however a statistical significance between the intervention and control group on the SEES scale, which is promising since McAuley et al. (2000) and Doerksen et al. (2009) identified
self-efficacy for physical activity to be a correlate of physical activity participation in
individuals with chronic diseases and disabilities.

Although there was a lack of statistical significance in the ZSDS and modified PAR, there were trends toward improvements in depression symptoms and physical activity participation. Additionally, over half (78%) of Wellcat Fit participants reported through the survey that the program was very beneficial. There was also a dropout rate of 38%, which is lower than the standard 50% of individuals who drop out within the first 6 months of starting an exercise program (McAuley & Courneya, 1993).

Positive changes were found among Wellcat Fit participants for depression symptomology, self-efficacy for physical activity, and physical activity participation. Follow up data may be important to evaluate the programs long term effects of increased moderate physical activity since long-term changes are not guaranteed, as seen in a two-year follow-up of a physical activity intervention among college students (Calfas et al., 2000). It is also recommended that future studies employ different strategies in an effort to recruit more previously inactive intervention subjects. Many of the participants who chose to enroll in Wellcat Fit had more extensive history of physical activity participation than those who opted for the control group. Control subjects were also difficult to recruit. In this study, control subjects were offered a chance to win a gift certificate. In the future, it may be useful to offer control subjects a guaranteed incentive. Male participants were also difficult to recruit, which has been seen in other campus based activity programs (Keeler et al., n.d.).

In summary, there is an alarming prevalence of depression and sedentary behavior on college campuses, and an intervention like Wellcat Fit may be a valuable health
promotion intervention for college students with depression. Although peer-assistants were paid for their work in Wellcat Fit, the program is still relatively inexpensive, simple and easy to implement. Based on the decrease in depression symptoms, improvements in self-efficacy for physical activity, and increased participation in physical activity, Wellcat Fit may be an effective adjunct intervention for treating college students with depression. Due to the apparent trends in the data, Wellcat Fit should be examined with a larger population to determine effectiveness.

References


REFERENCES


*Examination of a peer-led, non-diet nutrition and exercise adherence pilot program on a college campus: FitU.* Manuscript submitted for publication.


