A Quality Improvement Project Entitled:

An Evaluation of an Intervention Designed to Assist Undergraduate College Students with Stress, Anxiety, or Depression to Increase Physical Activity Levels

In Partial Fulfillment of the Requirements for the

Doctor of Nursing Practice

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Abstract

Background: Incidence of stress, anxiety and depression have risen dramatically among the young adult population. Identifying methods of preventing and treating these problems could reduce the disease burden and improve quality of life. Research indicates that self-efficacy is positively related to physical activity (PA) levels and both are inversely related to stress, anxiety, and depression and can be utilized to treat these symptoms. Purpose: To design an intervention to improve self-efficacy that will assist college students complaining of stress, anxiety and depression, and not meeting national recommendations for PA, to increase their level of PA in order to reduce psychological symptoms. Method: Undergraduate students (n=10), males (n=3) and females (n=7), 18-25 years old were enrolled in Fall 2019. A self-efficacy intervention was utilized to assist students to increase PA for eight weeks. Symptoms were evaluated pre- and post-intervention. Results. The cohort of participants consisted of 8 undergraduates after excluding 2 students who were not cleared for physical activities and one dropped before the start of the intervention. Only 4 participants reported their post-intervention scores. Paired t-tests were conducted to test for the difference between pre and post scores and demonstrated that the change in the depression score was statistically significant at 5% (p-value = 0.0464 < 0.05). Conclusions: The sample size was small but reduction in depression scores was statistically significant. Methods for engaging a larger portion of this population were identified.

Keywords: humans; depression; self-efficacy; anxiety; depressive disorder; students; exercise

Background and Significance

Introduction

Depression is a serious health concern affecting over 300 million people worldwide and is a leading cause of disease burden in most countries regardless of level of development affecting persons of all ages, genders, and socio-economic classes. Nearly the same number of people experience a range of anxiety disorders and approximately half of all persons with depression have co-morbid anxiety. The consequences of these disorders in terms of lost health are tremendous since depression is the single largest contributor to disability globally and anxiety is ranked 6th. Depression is also the major contributor to 800,000 deaths which occur by suicide each year (WHO, 2017).

Chronic stress is a major contributor to heightened states of anxiety leading to depression. Stress, which is the normal reaction of the brain and body to unpleasant changes in one's environment or physical health, causes the activation of the hypothalamic-pituitary-adrenal axis which, by means of corticotropin releasing hormone and adrenocorticotropic hormone, stimulates the adrenal medulla to secrete glucocorticoids, most importantly cortisol. While this hormone plays a vital role in helping the body return to homeostasis, prolonged stress and therefore, prolonged production of cortisol has been shown to be linked to the development of mood disorders, especially major depression (Khan & Khan, 2017).

While chronic stress can be a significant precursor to states of anxiety and depression, there is no single cause of depression and/or anxiety. It can be related to (a) altered brain chemistry, (b) hormones, (c) genetics, (d) physical health, and/or (e) life experiences. Whatever the cause, depressive symptoms include (a) low mood, (b) loss of interest, (c) sadness, (d) loss of enjoyment, and (e) reduced energy leading to increased fatigability and diminished activity

(Gautam, Jain, Gautam, Vahia, & Grover, 2017). It has been demonstrated that depressive symptoms and symptoms of anxiety have been associated with low physical activity lifestyles and that these persons are concurrently at higher risk for cardiovascular and other chronic physiological disease processes (Hiles, Lamers, Milaneschi, & Penninx, 2017). Moreover, Brenes (2007) demonstrated that persons with anxiety and/or depression had significant reduction in quality of life and more impairment in eight independent domains of functioning than persons with congestive heart failure, diabetes, and myocardial infarction. Economically, the estimated costs of depression each year are $210.5 billion with half of those costs related to absenteeism or lost productivity while at work. The other half are associated with the actual costs of medical treatment, both inpatient and outpatient (Morin, 2018).

Depression Among College Students

In 2015, 16.1 million Americans over the age of 18 or 6.7% of the U.S. adult population, experienced at least one major depressive episode (NIMH, n.d.). This rate increases to 10.5% for the 18-25-year-old age group which is the highest of any adult age group (Bose, Hedden, Lipari, & Park-Lee, 2017). Forty-two-point six percent of this age group was enrolled in college in 2016, according to the National Center for Education Statistics (2017) reported enrollment data. Why college students experience depressive symptoms is multi-faceted (Barton & Hirsch, 2016; Bishop, Norona, Roberson, Welsh, & McCurry, 2019; Borsari et al., 2018; Brandy, Kessler, & Grabarek, 2018; Crawford & Ridner, 2018; Dinis & Braganca, 2018; Gobbi, Atkins, & Zytynski, 2019; Gupta, Epari, &,Pradhan, 2018; Liu et al., 2019; Longo & Kim-Spoon, 2013; Nelson & Liebel, 2018; Primack et al., 2017; Rankin, Paisley, Mulla, & Tomeny, 2018; ul-Haq, Dar, Aslam, & Mahmood, 2018; Van Eck, Morse, & Flory, 2018; Walters, Bulmer, Troiano, Obiaka, & Bonhomme, 2018), but this population has been shown to be increasingly vulnerable to (a)

stress, (b) anxiety, and (c) depression (Astrês-Fernandes, Rocha-Vieira, Silva, Silva-Dantas-Avelino, & Marques-Santos, 2018; Beiter et al., 2015; Horgan, Kelly, Goodwin, & Behan, 2018; Primack et al., 2017; Selkie, Kota, Chan, & Moreno, 2015). In the years 2011-2015 undergraduate enrollment increased by approximately 6%. However, the number of students seeking counseling services at university/college counseling centers rose an astonishing 30% during the same period (CCMH, 2016). Most recently, the American College Health Association, National College Health Assessment-II (2018) indicated that during the last 12 months, 42.9% of students presenting for college-based counseling services stated that they felt "so depressed that they were unable to function," 69.9% stated that they felt "very sad," 64.4% complained of loneliness, 55% expressed feelings of hopelessness, and 64.3% complained of overwhelming anxiety. Of these, 22.3% had been previously diagnosed with anxiety and 18.4% with depression. Jacksonville University statistics fall roughly within these national averages with 46% of students who presented to the Student Counseling Center (SCC) during the 2017-2018 academic year reporting feelings of depression as a current concern. Forty-eight percent stated that they had a history of depression.

It is significant to note that women express classical symptoms of depression twice as often as men. However, recent studies indicate that in western culture men frequently express dysphoric moods by means of increased aggression and risky behaviors such as substance abuse and multiple sexual partners and are less likely to complain of classical symptoms such as low mood, loss of interest, sadness and/or crying as these are not seen as masculine behaviors (Genuchi, 2015).

Depression and Low Physical Activity

The relationship of low physical activity (PA) with (a) stress, (b) anxiety, and (c) depression is well-established in the literature (Blough & Loprinzi, 2018; Henchoz et al., 2014). Significance to the current project is demonstrated in that current recommendations for PA are not being met by 40%-90% of the young adult population (Downes, 2015; Kaigang et al., 2016; Sevil, Sanchez-Miguel, Pulido, Praxedes, & Sanchez-Oliva, 2018). Additionally, college students who self-report PA typically over-estimate the amount of PA engaged in when compared to objective measurement (Downs, Van Hoomissen, Lafrenz, & Julka, 2014). At Jacksonville University, the SCC began tracking which students were meeting national recommendations for PA in the Fall of 2018. During that initial semester, 76.6% of students (n=107) presenting to the SCC stated that they had a history of (a) stress, (b) anxiety, and/or (c) depression and 62.6% stated that one or all of these is a current problem. Of these (n=67), 68.7% did not meet national recommendations for PA (K. Alberts, personal communication, April 8, 2019).

The transitional period between adolescence and young adulthood is a key period for the formation of life-long habits, good or bad. It is during this stage that most young adults lose the healthy habits instilled in their home environments or reinforce bad ones that had already been learned (Frech, 2012). Similarly, young adults who suffer with depression will tend to have increasing problems into later adulthood. However, these effects can be mitigated through early intervention. A lifestyle including at least 75-150 minutes of moderate to vigorous physical activity (Reibe, Ehrman, Liguori, & Magal, 2018) will reduce symptoms of depression and anxiety and impart protective effects that reduce risk of depression as the individual ages (Conley, Durlak, & Kirsch, 2015; Werner-Seidler, Perry, Calear, Newby, & Christensen, 2017).

Assisting young adults with depressive symptoms to establish/re-establish habits of healthy physical activity has been shown to decrease depressive symptoms in the short-term and to decrease risk of depression at later stages of life (McKercher et al., 2014). Another key concern for this population is successful completion of a college education. Melnyk, Kelly, Jacobson, Arcoleo, and Shaibi (2014) demonstrated via the Freshman 5 to Thrive: COPE/Healthy Lifestyles program note that increasing PA contributed to increased college retention. Therefore, this project seeks to determine, for 18-25-year-old college students who present to the SCC with a complaint of (a) stress, (b) anxiety, and/or (c) depression and who are not meeting national recommendations for physical activity (P), would an intervention designed to improve self-efficacy for PA (I) assist students to increase their current levels of PA and reduce symptoms of (a) stress, (b) anxiety, and (c) depression (O)?

Literature Review

Search Criteria and Strategies

Identification of depressive symptoms and effective intervention requires different strategies for different stages of life. The literature on this topic focuses on either (a) children and adolescents, (b) adults, or (c) elderly as population foci. However, the young adult population and, more particularly, college students have had a significant increase in depressive symptoms and suicidality in recent years (Taliaferro, Rienzo, Pigg, Miller, & Dodd, 2009). Since it has been shown that increased physical activity is inversely related to the risk of depression over time (Brunes, Augestad, & Gudmundsdottir, 2013; McKercher et al., 2014) it is important that depression and depression risk be addressed among young adult college students to prevent the increase in depressive symptoms and suicidality. The Cochrane Database of Systematic Review,

CINAHL, ProQuest Nursing and Allied Health Source and PubMed databases were searched, and 44 studies were identified as representative of the current state of research on this topic.

Literature Review

There are a few studies which focus primarily on children and adolescents that appear to be relevant for this review due to similarities in adolescent and young adult populations related to the frequent use of electronic media for social engagement and entertainment (Shapiro & Margolin, 2014). While there may be some inconsistency related to relational and developmental challenges, the increase in suicidality of this group parallels that of the older cohort (Hetrick, Cox, Witt, Bir, & Merry, 2016).

Two of the quasi-experimental studies surveyed children and teens to determine the association between physical activity and depression scores (McDowell, MacDonncha, & Herring, 2017) one of which added the co-variate of screen time (Gunnell et al., 2016) and found that depression scores were inversely proportional to levels of physical activity and directly proportional to amount of screen time. In the latter instance, a bi-directional relationship was noted in that screen time would increase concomitantly with increased symptoms of depression. Conversely, Edwards and Loprinzi (2016) demonstrated in a study of active young adults that a sedentary behavior inducing intervention had deleterious effects on depression and mood in this population. In a retrospective study, McKercher et al. (2014) found that a habitual discretionary participation in physical activity since childhood significantly decreased the incidence and degree of depression in adulthood.

Two randomized controlled trials (RCTs) studied a total of 225 participants. The earlier study focused on young females and found that an 8-week group jogging program helped to reduce depressive symptoms and stress hormone excretion levels (Nabkasorn et al., 2006). The

latter study was gender inclusive and did not prescribe a certain activity, but its intervention was a behavioral activation physical activity group. There was a reduction of depressive symptoms in this group over the control group (psychoeducation) but the intervention group did not indicate an increase in physical activity, so the mechanism of action was unclear (Parker et al., 2016).

Five studies examined the effects of exercise in a treatment arm in addition to cognitive behavioral therapy (CBT) or internet-based cognitive behavioral therapy (ICBT) (Fremont & Wilcoxson-Craighead, 1987; Hallgren, Helgadottir et al., 2016; Hallgren, Kraepelien et al., 2015; Hallgren, Nakitando et al., 2016; Veale et al., 1992). Only two indicate the type of exercise used in the intervention (Fremont & Wilcoxson-Craighead, 1987; Veale et al., 1992) and both studies used forms of aerobic exercise. These studies indicate that the addition of exercise to a CBT or ICBT regimen improves outcomes. Siqueira et al. (2016) conducted a 4-week trial of aerobic activity as adjunct to antidepressant therapy. They found no specific association of the exercise program with reduction in severity of depressive symptoms. However, they did note that participants in the exercise intervention required lower doses of sertraline compared to the control group. Of two studies that focused on aerobic exercise as the exclusive treatment condition, Lane and Lovejoy (2001) utilized aerobic dance and found that the participants had improved mood 30 minutes post exercise. McDowell, Campbell, and Herring (2016) focused on sex-related differences which indicated that females with greater depression scores had the most benefit and that women in general benefited more in all the measured dimensions than males except for tension. Abdollahi et al. (2017) did not report the type of exercise intervention but demonstrated that three times weekly exercise intervention in addition to weekly CBT intervention effectively decreases both depressive symptoms and suicidal ideation among mild-to-moderately depressed patients.

Taliaferro et al. (2009) performed the largest study to date on college age population including 43,499 participants. Their study found that increase in physical activity reduced rates of (a) hopelessness, (b) depression, and (c) suicidality among men and women in this age group across all races. The authors note a difference in outcome based on the type of exercise undertaken as well as the intended goals of the participant. Participation in aerobic activity provided the greatest benefit to participants but muscle toning exercises provided no benefit after adjustment for aerobic activity participation was made. Additionally, students who participated in any exercise activity for purposes of weight loss or improvement of body image had a significant increase in hopelessness and depression, significant precursors to suicidal ideations. This was further demonstrated by Tylka and Homan (2015) who indicated that while appearance motives are detrimental to the psychological benefits of exercise, body appreciation by others significantly improves mood in participants. Benefits were seen primarily when the activities were enjoined for health and recreation purposes. Conversely, Zarshenas, Parsa, and Tahmasebi (2013) found that, among Iranian women, participation in aerobic exercise improved both depression and body image suggesting a cultural component to this aspect. However, in this study health and illness orientation were also included as part of body image dependent variables along with appearance evaluation and appearance orientation which may have affected the interpretation of the results.

Other researchers did not specify the type of exercise in the intervention but only designated the intervention as “physical activity” or “acute exercise.” Weinstein, Deuster, Francis, Beadling, and Kop (2010) found that previously depressed persons had a delayed increase in depressed mood and fatigue after exercise accounting for decreased initiation behaviors and adherence to exercise regimens in this group. Brunes et al. (2013) related the

effects of personality type on levels of physical activity and depression indicating that those who were more extroverted had higher levels of physical activity and lower levels of depression and anxiety whereas the inverse was true of those whose personality types were more neurotic. Abrantes, Scalco, O'Donnell, Minami, and Read (2017) demonstrate the inverse relationship between risky behaviors and health behaviors including exercise. This study shows that while this is of special importance to the male population it has proven consistent across genders and ethnicities.

Four systematic reviews/meta-analyses, two indicated reviewed RCTs that compared exercise to antidepressant therapy, psychological therapy, placebo (meditation/relaxation), treatment as usual, or no treatment. The effect sizes were small and insignificant when compared to antidepressant therapy, moderate and significant or trending toward significance when compared to psychological therapy, and large and significant when compared to the other three conditions (Josefsson, Lindwall, & Archer, 2014; Kyam, Kleppe, Nordhus, & Hovland, 2016). A more recent meta-analysis focusing on the young adult population identified 17 RCTs showing large effect sizes of physical activity compared to controls (Bailey, Hetrick, Rosenbaum, Purcell, & Parker, 2018). The effect sizes remained robust in trials with clinical samples and those with attention/activity placebo controls. However, the authors down-graded the quality of the RCT level evidence to "low" due to trial-level bias and suspected publication bias suggesting uncertainty in the effect sizes and recommending caution in its interpretation. It is worthy to note in this context that a meta-analysis of RCTs examining control group responses indicated that exercise intervention studies had nearly twice the control group response as antidepressant therapy studies (Stubbs et al., 2016). By contrast, Poquet and Maher (2015) found no studies with significant differences between exercise and antidepressant therapy, or exercise and

psychological therapy but this study acknowledges that of the ones identified for their meta-analysis most were small and had methodological weaknesses.

Women have roughly twice the rate of depression and anxiety as men (Albert, 2015). Therefore, there have been several studies on the effects of exercise on depressive symptoms that have been geared specifically for women (McKercher et al., 2013). All these studies (Hemat-Far, Shahsavari, & Mousavi, 2012; Legrand, 2014; McCann & Holmes, 1984; Pinchasov, Shurgaja, Grischin, & Putilov, 2000; van der Waerden, Hoefnagels, Hosman, Souren, & Jansen, 2013) indicate that depressed women benefit significantly from exercise. This is true regardless of socio-economic status (SES) (Legrand, 2014) but in some instances, lower SES women, especially those with lower education, may have greater benefit than more educated women of higher SES (van der Waerden et al., 2013).

While many of these studies indicate that there may be a significant benefit to exercise either as a treatment or preventive measure for depression, the mechanism of action remains unclear. Aerobic exercise, strength training, and stretching exercises reduce depression equally with no clear preference for one type of exercise over the others (Chu, 2008; Chu, Buckworth, Kirby, & Emery, 2009; Doyne et al., 1987; Foley, Prapavessis, Osuch, De Pace, & Podolinsky, 2008; Krogh, Saltin, Gluud, & Nordentoft, 2009; Ossip-Klein et al., 1989;). There is some evidence that exercise at moderate intensity at least, has a greater effect than low intensity exercises but with little increase in benefit as intensity increases beyond the moderate level (Balchin, Linde, Blackhurst, Rauch, & Schönbächler, 2016; Stanton & Reaburn, 2014) although this assertion lacks universal support (Helgadóttir, Hallgren, Ekblom, & Forsell, 2016). There is also the potential for other factors in the amelioration of depressive symptoms (Legrand, 2014; Eisho, Daisuke, Matsuoka, Yoshikawa, & Nishi, 2016). As a result, the type of exercise as well

as dose and frequency necessary for best results remain undetermined as does the effect of the contributing factor of social support.

Self-Efficacy

Self-efficacy theory (SET) forms the theoretical framework of this project as it has been found to have a significant influence on the symptoms of (a) stress, (b) anxiety, and (c) depression and to be a strong predictor of initiation and maintenance of PA across genders, cultures, and age groups. A detailed description of SET and its use in a PA intervention are provided in the Theoretical Framework section below. Here a review of the literature supporting the above statement is provided. CINAHL, PubMed, and Ovid Full-Text Nursing were searched for articles related to this topic using the key words: self-efficacy, self-efficacy and depression, self-efficacy and anxiety, self-efficacy and stress, and self-efficacy and physical activity. Fifty-two articles were identified as representative of the literature on this topic. The quality of the evidence is moderate as most of the studies were cross-sectional with self-report surveys. There were four RCTs and one non-randomized controlled trial. The other studies included a variety of methodological approaches including pre-and post-test surveys with and without control as well as longitudinal surveys and retrospective studies.

Among adolescents and young/emerging adults, (a) stress, (b), anxiety, and (c) depression have a pronounced effect on immediate quality of life and on long-term outcomes connected to the development of coping skills that allow successful navigation of life's challenges. Seven studies identified general self-efficacy (GSE) as being negatively or inversely related to (a)stress, (b) depression, and/or (c) anxiety. Tahmassian (2011) identified a negative relationship between GSE and (a) depression and (b) anxiety in high school students. Ehrenberg (1991) identified GSE and task specific self-efficacies (SE) as having an important relationship

to adolescent depression. Ding, Huang, Fing, Yang, and Zhang (2017) found that SE is inversely related to depression in a cohort of 223 Chinese medical residents and identified poor SE as a main influential factor in resident depression reinforcing the results of a similar study in a cohort of Arabic medical students (Mohammedi, Mohebi, Dehgani, & Ghasemzadeh, 2019). Conversely, (a) anxiety, (b) poor coping strategies, (c) and low emotional intelligence contribute significantly to perceived GSE (Morales-Rodriguez & Perez-Marmol, 2019).

Academics are responsible for a large amount of stress in this population and this is complicated by the additional stressors of marriage/family and employment. Rayan (2019) found stress to be negatively associated with SE and mindfulness among 200 final year nursing students. Ringeisen, Lichtenfeld, Becker, and Minkley (2019) also found SE to be negatively associated with subjective and objective measures of anxiety related to exams among 92 undergraduate students but increased SE mitigates the effect of stress on adolescents' life satisfaction (Burger & Samuel, 2017). One additional study in this context indicates that female gender tends to moderate the effect of academic stress on self-efficacy (Lin, Posada, & Yangyang, 2018) though Rayan (2019) notes that women tend to have higher stress levels than men but with greater mitigating effects of GSE on stress levels.

Young adults also experience stressors leading to (a) anxiety and (b) depression that are present in the general population whether they pursue an academic path. Among these are (a) obesity, (b) diabetes, (c) mental health disorders such as depression and addictive disorders and (d) HIV infection. For each of these stressors, low SE has been identified as a significant contributor to poorer coping and/or decreased functioning (Cybulski, Cybulski, Krajewska-Kulak, & Cwalina, 2017; Kav, Yilmaz, Bulut, & Dogan, 2017; Konttinen, Silventoinen, Sarlio-Lahteenkorva, Mannisto, & Haukkala, 2010; Milanovic, Ayukawa, Usyatynsky, Holhausen, &

Bowie, 2018; Papadopoulou, Kotronoulas, Schneider, Miller, McBride, Polly, …, & Maguire, 2017; Paxton, Motl, Aylward, & Nigg, 2010; Ramo, Myers, & Brown, 2010; Wang, Wang, Qian, Ruan, Amico, Vermund, …, & Zheng, 2019). Similarly, interventions designed to improve self-efficacy either directly through the development of coping skills (Edraki, Rambod, & Molazem, 2018), or indirectly via the use of cognitive behavioral therapy (CBT)-based interventions (Brenninkmeijer, Lagerveld, Blong, Schaufeli, & Wijngaards-de Meij, 2019; Gallagher, Payne, White, Shear, Woods, Gorman, & Barlow, 2013) or an inquiry-based stress reduction intervention (Krispenz, Gort, Schultke, & Dickhauser, 2019) noted significant reduction in symptoms of (a) stress, (b) anxiety, and/or (c) depression associated with improved SE. With special relevance to this project, four studies found a decrease in depressive symptoms and increase in participants' quality of life mediated by SE. All four of these studies measured PA in the target population finding similar associated increases (EunSeok, Braxter, Kim, Heeyoung, Akazawa, Talman, & Spezia Faulkner, 2015; Siow, Leung, Wong, Lam, & Lo, 2018; Paxton et al., 2010; Zechner & Gill, 2016).

As these last four studies demonstrate, PA has also been linked to SE in populations of (a) both genders, (b) multiple age groups, and (c) across cultures. Younger populations appear to be especially vulnerable to the effects of low self-efficacy. A longitudinal study of 2,278 children enlisted at age 9 and surveyed over three years demonstrated that predilection and self-adequacy for PA reduce sedentary behaviors while enjoyment did not have a significant effect. Predilection and self-adequacy are subsets of GSE in this population and the study demonstrates how different aspects of GSE effect levels of PA in children (Li, Joshi, King-Dowling, Hay Faught, & Cairney, 2018). Two systematic reviews demonstrate that SE is one of the key determinants of PA engagement in children. Congchau, Stolk, Sauer, Sijtsma, Wiersma, Guowei Huang, and

Corpeliejn (2017) reviewed studies indicating that SE and parental involvement in PA were positively associated with PA in children and adolescents with SE having a greater impact on adolescents. Pakarinen, Parisod, Smed, and Salantera (2017) review five studies on health game interventions which effectively increase children's SE for PA. The most effective games were those that employed active games rather than educational games.

Once adolescence is reached, parental involvement is less important. Although role-modeling continues to be a predictor of PA, direct parental encouragement has an inhibitory effect (Burns, 2019). SE has been shown to be a strong predictor of PA (Wright, Ding, & Li, 2005) and interventions to increase PA have shown a positive correlation with GSE and SE for PA (Lee & Kim, 2015; Su, Eun, Kyung, Yu-Mi, 2019). Friend support becomes a stronger predictor in this age group although it is less important for those with high SE. For those with low SE, social support from friends is partly compensatory but even this is mediated through SE (Hamilton, Warner, & Schwarzer, 2017; Chen, Sun, & Dai, 2017; Liang, Shoubin, Jiaying, Lele, & Ling, 2016). The same principals seem to hold true for young adults/college students in that interventions designed to increase PA and psychosocial factors, including social support and SE, increased the likelihood of the maintenance of PA guidelines in this population (Farren, Zhang, Martin, & Thomas, 2017; Ickes, McMullen, Pflug, & Westgate, 2016; Suorsa, Cushing, Mullins, Meier, Tackett, Junghans, …, & Mullins, 2016). A study by Partridge, McGeechan, Bauman, Phongsavan, Allman-Farinelli (2017) demonstrated that SE accounted for 8%-37% of improvement in nutrition and PA behaviors.

For middle-aged and older adult populations, friend involvement becomes less important for increased PA irrespective of socioeconomic status (Bergstrom, Borjesson, & Schmidt, 2015; Craike, Bourke, Hilland, Wiesner, Pascoe, Bengoechea, & Parker, 2019; Gleeson-Krieg, 2004;

Miao, Gan, Gan, & Zhou, 2017; Nezami, Wei, Jackicic, Davis, Polzien, Rickman, & Tate, 2016). Changes in PA for this age group are related to changes in self-regulation mediated by SE (Annesi, 2018). Even temptations to not be physically active do not affect PA beyond what can be explained by SE (Nigg, McCurdy, McGee, Motl, Paxton, Horwath, & Dishman, 2009). As one might imagine, health status has a greater effect on PA level in this age group (Ben-Ami, Shapiro, Chodick, Mirovsky, & Pincus, 2017) however, interventions designed to address PA continue to significantly effect PA outcomes though there is variation in this related to cultural context (Klompstra, Jaarsma, & Stromberg, 2018; Stochl, Mudrak, Slepicka, & Elavsky, 2018). Outcomes for increased PA among older adult populations have been shown to be short-term especially for those with declining health reinforcing the need for intervention at an earlier age (Olson & McAuley, 2015; Toyin Babatunde, 2015).

Summary of Findings

Most of the studies cited above have indicated that there is a clear benefit of exercise in both treatment and prevention of depressive symptoms. While the effect sizes vary considerably across studies, most had mild to moderate effects with greater effects achieved in higher intensity programs over time. Effects did not vary appreciably between studies with a gender inclusive population versus those that focused exclusively on women nor did the results vary greatly based on (a) age, (b) socioeconomic status, or (c) living situation. While the mechanism of action remains unclear, it can be derived from this literature that both strength and aerobic exercise have significant benefits with slight preference for either aerobic or combination programs. Similarly, supervised programs are preferred over independent models presumably due to lack of consistent participation for those in unsupervised settings. Finally, appropriate duration appears to be 8-12 weeks with optimal results occurring with programs that last at least 9 weeks.

Regarding the role of self-efficacy in (a) depression and anxiety symptoms, and (b) PA, the evidence is unclear as to the directionality of the relationship. However, there is an inverse relationship between high self-efficacy and low mood. This holds true for the relationship between PA and self-efficacy. Moreover, interventions that target both PA and self-efficacy have had a positive effect on (a) PA and symptoms of (b) depression, (c) anxiety, and (d) stress.

Literature Review Update

At the completion of the project, the literature review was updated for articles published between 2018 and 2020. CINAHL and Pub Med databases were searched for articles related to PA/exercise and depression; PA/exercise and anxiety; PA/exercise and stress; self-efficacy and depression; self-efficacy and anxiety; self-efficacy and stress; self-efficacy and PA/exercise. Twenty-two articles were identified as appropriate and examined.

The primary result of this search was to further confirm the relationship between (a) depression and (b) anxiety and a sedentary lifestyle for all populations across (a) ages and (b) cultural contexts (Chen, Chen, Etnier, Martinez, and Cheng, 2019; Debbia, Rodríguez-Muñoz, Carmona-Torres, Hidalgo-Lopezosa, Cobo-Cuenca, López-Soto, and Rodríguez-Borrego, 2020; de Oliveira, Oancea, Nucci, and Vogeltanz-Holm, 2018; Kim, 2019; Lee, Callaghan, Ory, Zhao, Foster, and Bolin, 2020; Saeed, Cunningham, and Bloch, 2019). Pavey and Brown (2019) examined the effects of extended periods of sitting on a female population and indicated that this did increase the risk of depressive symptoms which were mitigated by regular engagement in vigorous PA. However, positive results were impeded by excessive periods of sitting. Kaseva et al., 2019 found that the low PA and depression relationship is at least partially mediated by sleep reduction. Low PA and diet are positively associated with depression and increased BMI (Lincoln, 2019) but, for persons with metabolic syndrome, other factors such as inflammation

may play a role in depressive symptoms as well (Matta et al., 2019). Conversely, increased PA has been associated with improved health-related quality of life and depressive symptoms in women with metabolic syndrome (Li-Chi, Shang-Lin, Wen-Chii, Meei-Shyuan, Yi-Jen, and Chia-Huei 2019).

The use of PA in the prevention and treatment of (a) depression, and (b) anxiety has been increasingly established in the literature for patients in both inpatient and outpatient contexts (Averill et al., 2018; Lee, Callaghan, Ory, Zhao, Foster, and Bolin, 2020) although, patients with depressive symptoms felt like it required more effort to initiate PA (Padin et al., 2019). Soucy, Provencher, Fortier, and McFadden, 2019, noted that PA had positive effects on symptoms of low mood and self-efficacy and Cartwright, Gibson, and Read, 2018, found that this effect was mediated through personal agency, a component of self-efficacy, for women. Deng and Paul, 2018, noted that treatment was less effective due to decreased PA participation in rural dwelling populations versus urban populations due to lack of recreational facilities. However, horticultural activities have been shown to be effective in a variety of populations but especially for older adults (Makizoko, Tsutsumimoto, Doi, Makino, Nakakubo, Liu-Ambrose, and Shimada, 2019; Seo and Chao, 2018). Supervised activities have been shown to be most effective for all populations (Patten et al., 2019). Provider confidence in prescribing has also been shown to have a significant impact on client buy-in for the usefulness of PA in the treatment of anxiety and depression (Radovic, Melvin, and Gordon, 2018). Kim, Park, Lee, Oh, Shin, and Shin (2019) attempted to discern the appropriate dose for the alleviation of depressive symptoms and found that 1200-3000 metabolic equivalents (METs)-min/week expenditure was needed for women to experience symptom alleviation. Men required a minimum of 1800 METs-min/week, but further studies are needed to confirm these results.

Current Practice and Guidelines

Guidelines for Healthy Adults

The United States Office of Disease Prevention and Health Promotion (ODPHP) released new guidelines for Americans in 2018. These guidelines recommend that healthy adults should obtain at least 300 minutes of moderate-intensity aerobic PA, or 75-150 minutes of vigorous aerobic PA per week, or an equivalent combination of moderate and vigorous intensity PA. The ODPHP also recommends that moderate or greater intensity muscle strengthening PA be performed on all major muscle groups at least 2 days/week. Additional health benefits can be obtained by participating in greater than 300 min. of moderate-intensity PA, and PA should be spread throughout the week for optimal health benefits (ODPHP, 2018).

Guidelines for Individuals with Depression and Anxiety

Based on the available data, current guidelines have acknowledged the role of physical activity and exercise in the overall scheme of good mental health. Most guidelines in the United States and Europe divide their recommendations based on age groups: (a) child/adolescents; (b) adult; (c) elderly. Within the guidelines cited here there are limited specifics for recommendations regarding (a) kind, (b) intensity, and (c) duration of exercise/physical activity. The guideline for children and young adults experiencing depressive episodes are the clearest in that they recommend a structured and supervised exercise program of up to three sessions per week. Duration is moderate consisting of 45 minutes to one-hour sessions for between 10 and 12 weeks (National Collaborating Centre for Mental Health, 2015). This is in accordance with the current literature which indicates that structured exercise programs which have had documented success typically last at least nine weeks (Bailey et al., 2018; Stanton & Reaburn, 2014).

Guidelines for treatment of depressive symptoms in adults mention exercise as an adjunctive therapy in addition to (a) first line use of selective serotonin reuptake inhibitors, (b) serotonin-norepinephrine reuptake inhibitors, (c) norepinephrine reuptake inhibitors, (d) dopamine agonists, and (e) tricyclic antidepressants (Kaiser Permanente Care Management Institute, 2012). The willingness and ability of the patient to engage in physical activity must be taken into consideration. Including the patient and family is a crucial aspect of care plan development. The provider should take the patient's (a) physical condition, (b) preferences, (c) motivation, (d) beliefs, and (e) cultural influence into consideration to maximize patient participation and buy-in. Physical activity should be considered an adjunct to antidepressants and/or psychotherapy in severe and moderate depression (Working Group of the Clinical Practice Guideline on the Management of Depression in Adults, 2014).

Framework

QI Model

One significant challenge facing those who see a need for a change in practice is the development of a strategy for implementation. The PDSA (Plan-Do-Study-Act) Cycle, developed by the Institute for Healthcare Improvement (IHI, 2018) is a commonly used tool for the implementation of change and continuous improvement in healthcare. PDSA is a four-step process for planning and testing a change, observing the results and acting on what is learned (Murray, 2018).

Once a need has been identified, the first step of the process involves (a) setting goals, (b) developing a plan for implementation, (c) identifying data to be collected, and (d) measurement tools to be utilized. Outcomes are also predicted and a plan for analyzing the data is established. In this case, a need for an accessible, holistic method for the treatment of depression which is

also affordable for most patients has been identified. PA has been shown to have significant benefit for persons with depressive symptoms both as a stand-alone therapy and as an adjunct to psychological and/or pharmacological treatment so a project which provides clinicians with specific modalities clients could utilize to increase PA as a therapeutic intervention for depressive symptoms was envisioned. After choosing an accessible target population, key stakeholders were identified and approached with an invitation to participate in the project. Upon each person's agreement, communication ensued through email and face-to-face meetings to address issues of (a) recruitment, (b) intervention implementation, and (c) data collection. Intervention modalities were subsequently identified, a plan for implementation and data collection and analysis was agreed upon.

Once project approval by both the Project Review Committee and the Institutional Review Board was received, the second phase of the PDSA cycle was implemented which was the *Do* portion of the project. In this phase, the referral source developed during the *Plan* phase was offered to participants and the data identified as necessary in the prior phase was collected. During this phase it was necessary to follow up with participants to document (a) type of activity, (b) time and date of participation, (c) duration of activity, and (d) intensity. This will lead, in the final phase, to the modification of the intervention to reduce risk and improve outcomes.

The *Study* phase of the project involved the analysis of the data collected to determine if the available opportunities for PA were utilized by participants, to what degree, and to determine if utilization of the PA modalities recommended had the predicted outcome. Indications for the effectiveness of the PA opportunities and whether the separate modalities did or did not have the predicted outcome were reviewed to determine what modifications can be made to improve

outcomes. This leads to the final stage, *Act*, which is the implementation of those changes. At this point, the cycles start over. In this way, ongoing planning, assessment and evaluation leads to continuous quality improvement.

Conceptual Framework

Self-Efficacy Theory (SET) derives from and is a constituent part of Social Cognitive Theory (SCT). SCT is the reformulation of the former Social Learning Theory posited by Albert Bandura in the 1960s. SLT evolved into SCT in 1986 (LaMorte, 2016). SET was subsequently developed in Bandura's work on the subject in 1997. The major thrust of this theory is that those with higher self-efficacy that is, a higher sense of confidence that one can achieve what one sets out to do, are healthier and more effective performers (Bandura, 2008).

Sources of Self-Efficacy

Performance accomplishments. The first source of a person's self-efficacy derives from his/her past experiences. Essentially, self-efficacy derives partly from mastery of tasks. Successes encourage a sense of self-efficacy whereas failure undermines it especially if failure occurs before one has developed a strong sense of self-efficacy. There is a caveat here in that easy successes tend to encourage the need for immediate gratification. Self-efficacy depends on the development of resilient perseverance in the face of obstacles. Success requires a sustained effort and some setbacks are useful in helping the individual to develop discipline in perseverance (Bandura, 1994).

Vicarious experiences (modeling). People develop a sense of self-efficacy through watching the examples of sustained effort by others that the individual perceives as like himself/herself. If the model with whom the observer identifies achieves success in her/his goal(s) then the observer will be encouraged the s/he too can accomplish this task. Similarly, if the model fails then self-efficacy is undermined in the observer. The key qualification is that the

observer must identify the model as being enough like herself that the observer will identify with her accomplishments (Bandura, 1994).

Social persuasion. The third way in which persons develop self-efficacy is through encouragement from a (a) mentor, (b) leader, or (c) model. These persons help to instill a belief in one's capabilities by verbally encouraging the learner. However, unfounded praise is quickly proven false by successive failures. For this reason, the competent teacher/mentor will structure situations that foster success and avoid placing the learner in situations that are too advanced or complex for his level of achievement and in which s/he will most likely fail often (Bandura, 1994).

Affective arousal. People also derive their sense of self-efficacy from their physical and psychological state. If one develops butterflies in his stomach, and a rapid heart and respiratory rate before a presentation he may interpret this as an anxiety response and perceive it negatively. Conversely, another person may perceive this as excitement and interpret it positively. Ultimately, it is not the concrete physiological experience that is important but how the person interprets it. Similarly, mood can affect self-efficacy positively or negatively. If one is down or depressed the sense of self-efficacy will be low. If the mood is bright and optimistic, then self-efficacy will be positively influenced (Bandura, 1994). Self-efficacy depends on a sense of optimism and resilience. "Realists," says Bandura (2008) "forego endeavor, are easily discouraged and become cynics about the possibility of effecting change" (p. 1). Life is strewn with obstacles to personal and corporate success. To succeed, one must be an optimist, not a realist.

Modes of Agency

Personal. Personal agency is how one martials his/her resources and effects change in daily life/situations by his own effort. This is frequently what we understand when considering self-efficacy. The belief that one has the capability to directly effect change in a situation is the most basic application of self-efficacy (Bandura, 2008).

Proxy. A secondary level of agency is that of proxy. Many times, one does not have the tools necessary to effect change in a situation and s/he must influence others to bring about the change deemed necessary. This is most evident in the situation of influencing public policy. Obviously, no individual can initiate change in this arena unilaterally. The agency must be through persuasion of others (often many others) that a change is necessary or desirable (Bandura, 2008).

Community. Frequently, the most important changes in society are those that cannot be accomplished by any one individual or even multiple individuals acting independently. Whole groups or communities must act in concert according to a planned and cooperative effort to effect change. Together these are the (a) personal, (b) interpersonal, and (c) social aspects or agencies of self-efficacy (Bandura, 2008).

Implications for Advanced Nursing Practice

SET and its cognitive predecessor, SCT, are relevant to advanced nursing practice in that many theories of behavior, especially those involved in health promotion, are primarily concerned with the initiation of a proposed behavior. While this is a necessary initial component of behavioral change, it is the maintenance of the behavior over time that is key to the achievement of health promotion goals. SET and SCT are attempts at explaining how persons

regulate behavior through internal control and external reinforcement to achieve goal-directed behavior over time (LaMorte, 2016).

Past experiences exert a strong influence on self-efficacy either positively through past successes or negatively through failures. This influence can be mitigated, however, through knowledge. Understanding of the modifiable circumstances of past failures or education regarding the factors supporting the necessity or desirability of a goal as well as the factors that make success possible can bolster one's confidence in one's ability to overcome obstacles to success. What one expects to occur because of a behavior also influences action. While the expected outcome can be influenced by experience as well, expectancies are relative to the value placed on that outcome and are, therefore, subjective to the individual (LaMorte, 2016). Consequently, if a health care provider can, through education and example, successfully convince an individual that an outcome is necessary and/or desirable as well as achievable then s/he has increased that person's sense of self-efficacy that the goal can be achieved. This is the crux of healthcare and the aspect at which nurses excel because of the holistic approach of the nursing profession. Ultimately, health maintenance is the responsibility of the individual while the provider's role is one of (a) education, (b) encouragement, and (c) facilitation.

There is much more evidence related to SET's application in patient care. Sweet, Fortier, Strachan, and Blanchard (2012) reviewed evidence related to SET in relation to physical activity, an application that has been heavily researched and is applicable to the current project. In this context, the study determined that self-efficacy was significantly related to physical activity. Furthermore, outcome expectation, while not directly related to physical activity did influence self-efficacy for physical activity which has prompted further research into the (a) outcome expectation, (b) self-efficacy, (c) physical activity relationship. Sonthava, Supaporn, and

Panuwat (2016) tested SCT constructs to predict physical activity in undergraduate students. All the SCT variables significantly correlated and contributed to the variance in physical activity among participants. The influence of self-efficacy was partially mediated by both self-regulation and outcome expectation.

Minsun et al. (2017) describe the effect of an educational intervention on the psycho-social variables influencing HBV screening in a Vietnamese immigrant community. The study found that the intervention was associated with a significant increase in (a) self-efficacy, (b) knowledge, (c) perceived benefits, (d) perceived severity, and (e) risk susceptibility and a decrease in perceived barriers. These positive effects also had a significant influence on 6-month follow up improving the overall utilization of HBV screening. Knowledge which has been shown to enhance self-efficacy and patient perception of (a) benefits, (b) severity, and (c) susceptibility which are constituent to self-efficacy, has positively influenced health behaviors in this community.

The results of a qualitative study by Mladenovic, Wozniak, Plotnikoff, Johnson, and Johnson (2014) on the effects of a program for Healthy Eating and Active Living for Diabetes (HEALD) were congruent with SCT in that the participants reported self-efficacy in adopting physical activity during the HEALD program. However, this was tied to support from exercise specialists who led the program and peers participating in the program. Many participants lost self-efficacy after the program ended and returned to former lifestyle patterns. In this study, continued support from professionals and peers was recommended by participants to maintain self-efficacy for lifestyle maintenance.

Nurses Role in Exercise Promotion

The promotion of healthy lifestyles in individuals and communities is an integral part of the responsibility of nurses. In her analysis of the American Nurses Association's (ANA) *Nursing's Social Policy Statement,* Neuman (2012) stated that the provision for the public's health "promotes the responsibility of nursing to supply basic self-help measures for all, and it enhances the use of health promotion, disease prevention, and environmental measures." In the same chapter, she quoted Virginia Henderson's 1960 definition of the purpose of nursing is:

> To assist the individual in the performance of those activities contributing to health that s/he would perform unaided if s/he had the necessary strength, will, or knowledge, and to do this in such a way as to help him gain independence as rapidly as possible.

The Florida Nurse Practice Act (2019) defines the scope of professional nursing practice as:

> the performance of those acts requiring substantial specialized knowledge, judgment, and nursing skill based upon applied principles of psychological, biological, physical, and social sciences which shall include, but not be limited to:
>
> (a) The observation, assessment, nursing diagnosis, planning, intervention, and evaluation of care;
>
> (b) health teaching and counseling of the ill, injured, or infirm; and the promotion of wellness, maintenance of health, and prevention of illness of others.

The inclusion of physical activity promotion is a vital aspect of the nurse's role. Over the past several years, guidelines for Americans have evolved from the recommendation of highly structured, vigorous exercise to more general, moderate-to-vigorous lifestyles of physical activity. Nurses can influence patients to change behaviors that include development of increased

levels of physical activity due to their frequent and often prolonged contact with patients which leads to the development of trusting therapeutic relationships. Additionally, by familiarizing themselves with these guidelines, nurses can recommend activities that may or may not include structured exercise. For example, a nurse who has become familiar with a patient's current lifestyle can assist her in identifying facilitators for PA and suggest ways to overcome barriers such as walking or riding a bike to work, walking during lunch breaks, or taking stairs rather than elevators (Richards, 2015). The *Preventive Cardiology Nurses Association,* in collaboration with *EIM* has developed a *Nurses' Action Guide* which provides nurses with up-to-date guidelines and tools for the assessment of patients' current level of PA and exercise prescription for those not meeting national recommendations. If the nurse is not comfortable with his level of expertise in prescribing exercise, he may refer the patient to a licensed exercise professional (https://www.exerciseismedicine.org/assets/page_documents/NursesActionGuide_HQ.pdf).

Project Description

Definition of Terms

Physical activity (PA) and exercise are terms which are often used interchangeably in literature. However, the terms are not synonymous. In *ACSM's Guidelines for Exercise Testing and Prescription,* Reibe et al., (2018) stated:

PA is defined as any bodily movement produced by the contraction of skeletal muscles that results in a substantial increase in caloric requirements over resting energy expenditure. *Exercise* is a type of PA consisting of planned, structured, and repetitive bodily movement done to improve and/or maintain one or more components of physical fitness. Physical fitness has its own definition which is not pertinent to the current project. Throughout this project, the author

has used the term “PA” since by the current definition, exercise is a specifically designed set of movements which is not the purpose of this project but rather to increase PA.

Aerobic activity is defined by the ACSM as any activity that uses large muscle groups, can be maintained continuously and is rhythmic in nature (Patel et al., 2017). Examples of aerobic activity are: (a) walking, (b) running, (c) hiking, and (d) dancing. Resistance training is any exercise that causes the muscles to contract against an external resistance with the expectation of increases in (a) strength, (b) tone, (c) mass, and/or (d) endurance (Reibe et al., 2018). Other forms of PA are currently recommended by ACSM and the American Heart Association (AHA). However, aerobic and resistance activities have been shown in research to have the most significant effects for relief of (a) stress, (b) anxiety, and (c) depression as demonstrated in the above literature review and have been the focus of PA recommendations for this project (Piercy & Troiano, 2018).

Persons who presented to the SCC with symptoms of (a) depression, (b) anxiety, or (c) stress are considered candidates for participation. These persons may or may not have been previously diagnosed with one or more of these conditions based on DSM-V criteria and it is not the purpose of the doctoral student to provide such diagnosis as this would be outside of his current scope of practice. Therefore, throughout this proposal, the term “symptoms” of these conditions has been used to signify that the participants self-report experiencing (a) thoughts and (b) feelings that are consistent with one or more of these diagnoses and are, therefore, at increased risk for having the conditions. The project was designed to assist individuals to modify their lifestyles in such a way as to alleviate these symptoms.

Instruments and Measures

There were two measurements of PA for this project. The first of these is the participants' current levels of PA. The SCC screened potential candidates to determine if they met national recommendations for PA. The doctoral student assessed each candidate's baseline level of PA using the Physical Activity Vital Sign (PAVS). Exercise is Medicine (EIM) developed the PAVS to guide health care professionals in assessing current PA (Appendix A). It is a brief, 2 question form which asks the participant how many days per week s/he engages in moderate to vigorous PA and, how many minutes s/he engages in this activity (Exercise is Medicine, n.d.).

The second PA measurement is (a) frequency, (b) intensity, (c) type, and (d) time/duration (FITT) of the participant's activity(ies) and was assessed weekly throughout the 8-week intervention. Frequency is the number of times per week that an activity was engaged in by the participant. Type was (a) aerobic, (b) resistance or, (c) a combination. Time/duration was the total length, in minutes, of the activity.

There are a variety of methods to measure intensity both directly and relatively. Most of these methods, especially the direct measurement methods, are complicated and unreasonable to ask an average lay person to execute. Even measurement of heart rate (HR) to determine percentage of maximum would require the participant to stop frequently during any activity to count her/his pulse. Therefore, ACSM, AHA, and other organizations have recommended the "Talk Test" for the average adult to use as a guide for intensity of activity as it has been shown to be robustly related to ventilatory threshold (Foster et al., 2008) and its utility has been established for use in sedentary and athletically trained young adults (Saini, Kulandaivelan, Devi, & Saini, 2018). The criteria for using the talk test are as follows: During physical activity, if the participant can talk and/or sing, the intensity level is light; if s/he can only talk with some

difficulty, but cannot sing the intensity is moderate; if the participant can only say a few words during the activity, the intensity is vigorous; if s/he is unable to speak, the intensity is extreme and should be reduced (American College of Cardiology, n.d.).

Each candidate was also assessed for readiness to engage in PA or, an increased level of PA. For this purpose, this project used the *Exercise Stages of Change Questionnaire* developed by EIM (Appendix B). Candidates for this project were in the (a) Contemplation, (b) Preparation, or (c) Action stages of change. After assessing each candidate's current level of PA and readiness to change, the doctoral student educated the candidate on the psychological benefits of increased PA and s/he was encouraged to participate in this project to gain assistance in developing a more active lifestyle. Candidates who were not ready to take this step were provided with contact information and encouraged to contact the doctoral student, project chair, or the SCC if s/he became interested in participating. Candidates who expressed a readiness for change and who were interested in this project progressed to screening, goal setting, and plan development described in detail below.

It was necessary to conduct a preparticipation health screen for all candidates prior to engaging in an increased level of PA to avoid exposing persons with known or occult cardiovascular disease (CVD) to transiently heightened risk of sudden cardiac death (SCD) or acute myocardial infarction (AMI). ACSM updated its recommendations on this screening in 2018 based on the outcomes of a scientific roundtable conducted in 2014. The experts unanimously agreed that preparticipation screening is necessary but that screening recommendations needed refinement to better reflect the state of the science and reduce barriers to the adoption of PA. The new algorithm is based on the individual's current level of PA, presence of signs and symptoms of, or known CV, metabolic, or renal disease as these conditions

represent the highest risk for SCD and AMI among adult populations (Appendix C). The relative and absolute risks of an adverse event are extremely low even during vigorous activity in asymptomatic individuals. (Reibe et al., 2018). The screening tool based on the new algorithm was utilized prior to participation in this project. As per the instrument, all ‘no’ answers indicated that the individual was clear to participate in levels of PA that were gradually increased from his/her baseline. Any ‘yes’ answer prompted a recommendation for medical clearance and the individual was required to obtain clearance from a licensed healthcare provider prior to final acceptance into this project.

The measurement of (a) stress, (b) anxiety, and (c) depression, while not diagnostic, are important to the purpose of this project which utilized increased PA as a means of alleviating symptoms of these frequently co-occurring states. The Depression, Anxiety, and Stress Scales (DASS) was chosen for this purpose (Appendix D). The instrument was developed by Lovibond and Lovibond (1995) to measure (a) anxiety, and (b) depression with (c) stress being added as a third subscale after extensive research on the development of the other two. It is particularly appropriate to this project in that the original research on its validity and reliability was conducted on a student population. It has since been validated on a large, adult population broadly representative of the general population. Age, gender, and socio-economic status have minimal effects on scores (Crawford & Henry, 2001). DASS does not contain indicators for suicidal or homicidal ideations and can be administered and scored by non-psychologists as the instrument development assumes that (a) depression, (b) anxiety, and (c) stress experienced by normal persons differs in degree to that experienced by those who are clinically disturbed (Psychology Foundation of Australia, 2018). Candidates for this project had been assessed by therapists at the SCC prior to referral for this project. The DASS instrument is available for open

access online by the University of New South Wales. The manual for the use of the instrument was also made available for a nominal fee and was utilized to ensure proper interpretation of the results (Psychology Foundation of Australia, 2018).

Self-efficacy is one's confidence that s/he has in her/his ability to perform well in a variety of situations where performance or achievement is involved (Eden, 2001). Since the conceptual framework of this project is SET, self-efficacy was measured using the New General Self-Efficacy Scale (NGSES) (Chen, Gully, & Eden, 2001) (Appendix E). This instrument is available via open access from Stanford University|*SPARQtools* (http://sparqtools.org/mobility-measure/new-general-self-efficacy-scale/). The stated goal of this site is to provide materials that educators and practitioners (http://sparqtools.org/about/). Research on the validity of this instrument demonstrated that measurement of general self-efficacy (GSE), while of limited use with high-performing individuals, provides considerable information regarding GSE for those at average, or below average levels of the construct (Scherbaum, Cohen-Charash, & Kern, 2006). This tool is utilized rather than the *Self-Efficacy Questionnaire* developed by Marcus, Selby, and Niaura (1992) which was recommended by Pekmezi, Jennings, and Marcus (2009) due to wide recognition that self-efficacy obtained in one context is transferrable to a wide variety of other contexts. It was appropriate to this project since it was used as an indicator that the participant's self-efficacy experienced in other areas, such as academics, could aid in the development of an increased level of PA. In the setting of this project, this information provided the doctoral student with information regarding participants who needed additional encouragement to overcome barriers to reach his/her stated goals.

Project Description in Detail

The goal for this project was to assist the participants toward meeting national recommendations for physical activity as a means of alleviating symptoms of (a) stress, (b) anxiety, and/or (c) depression. It was not realistic to believe that participants would meet this goal by the end of the project. For this reason, this project sought, by means of increased SE, to empower participants to increase intentional PA beyond their current levels.

Based on prior data from the SCC indicating the number of students who present with complaints of (a) stress, (b) anxiety, and/or (c) depression and who are not meeting national recommendations for level of PA, approximately 20 students were expected to participate in this project. From November 4 to November 22, 2019, students who presented to the SCC and who met these criteria were informed about the current project and asked if s/he would be willing to participate. If the student expressed an interest, a referral was sent to the doctoral student. The doctoral student and the candidate agreed upon a (a) date, and (b) time to meet. This meeting took place in the SCC, in a setting that provided for confidentiality and accessibility to assistance or witness, if needed.

The candidate's current level of PA was assessed using the PAVS and his/her readiness for change using the *Exercise Readiness for Change Questionnaire.* The doctoral student provided a brief educational intervention on the psychological benefits of increased PA to all candidates with written material provided for the participant (Appendix F). This education highlighted 10 key areas of psychological and cognitive benefits of PA. The first three are key to the purposes of this project in that increased PA helps to relieve (a) stress, (b) alleviates anxiety, and (c) depressive symptoms especially if enjoined outdoors. Additionally, increased PA: (a) bolsters self-esteem/self-confidence; (b) improves memory and productivity; (c) increases

regulation of the sleep cycle; (d) aids in reduction in substance abuse/addiction recovery; (e) and will help to slow cognitive decline that occurs normally as one ages. If a candidate expressed his/her readiness to implement this change, then the doctoral student described the project in detail per the Informed Consent document (Appendix G) and the Informed Consent was signed.

Once the participant gave informed consent, the doctoral student conducted a brief health screen using a tool provided for this purpose by the ACSM to determine if there were any potential medical barriers to increased PA. If the candidate gave a positive answer to any of the items on the health screening instrument, s/he was still eligible to participate if s/he obtained a written clearance for increased PA by a licensed health care provider. At the conclusion of the assessment portion of the initial meeting the doctoral student administered the DASS and NGSES screening instruments.

Pekmezi, Jennings and Marcus (2009) established a protocol for assisting persons to increase PA by helping to enhance individual self-efficacy. Using this model, after all baseline assessments had been completed, the doctoral student assisted each participant to identify realistic, achievable goal(s) related to increased PA and how that goal(s) might be obtained. Options that were available to the participants were reviewed with special attention to opportunities available and/or provided for on the campus of Jacksonville University. Persons who had been essentially sedentary could have chosen to utilize breaks or free time to (a) walk around campus, (b) climb stairs, or (c) perform some other simple activity of his/her choice. For those who were interested in weight and/or resistance training or in fitness classes such as (a) Yoga, (b) Zumba, (c) Spin/Indoor Cycling, the Nimnicht Fitness Center provides these services with liberal hours throughout the week and on weekends. For participants interested in swimming, the Wurn Pool is available and swimming classes were available if desired. There are

multiple clubs and organizations on campus that emphasize one or more physical activities. The JU Running/Track Club was available for those who were interested in this type of activity and is open to persons of all skill levels with instruction from coaches and experienced runners. EIM-OC also provides several activities including (a) J-Walkers walking club, (b) weekly track workouts, (c) Spin class, and (d) an EIM supervised strength workout at the Fitness Center. The School of Applied Health Sciences could also have been contacted regarding classes participants could have taken for academic credit as an additional motivation.

The doctoral student then helped the participant to identify barriers to the achievement of the participant's goal(s) and the means available to the participant to overcome those barriers. The primary barrier identified in several studies (Anjali & Sabharwal, 2018; Awadalla et al., 2014; Dyck, Bourdeaudhuij, Deliens, & Deforche, 2015; Ramírez-Vélez et al., 2015) was time. Crowded, busy schedules are not conducive to implementing a regimen that many people believe to be unpleasant to begin with but, the participant was encouraged that major restructuring of one's activities would be unnecessary when considering that even modest increases in PA could engender significant results. For example, the doctoral student could have assisted the participant to identify breaks during his/her day that could have been utilized for short bursts of PA such as walking or stair-climbing rather than setting aside large amounts of time for more formal activities. Ways in which the participant could better manage her/his time were also explored so that the participant was encouraged to gain a fresh perspective on how his/her day could have been restructured to make room for more PA.

Non-modifiable barriers identified in some research has been (a) family context/responsibilities (Anjali & Sabharwal, 2018), transportation issues (Dyck et al., 2015), and lack of resources (Ramirez et al., 2015). The doctoral student was available to help the

participant explore alternatives such as enlisting a friend or family member to help with domestic responsibilities and identify opportunities that existed in the participant's environment or locale for increasing PA so that s/he did not have to travel to another location or utilize limited resources. Safety issues have also been cited and are especially pertinent to persons who wish to participate in activities outdoors in isolated or dangerous areas (Ramirez et al., 2015). Some of the participants in this project did participate in outdoor activities but not in isolation and identified safe areas to utilize before beginning the activity.

One's motive to increase PA could also serve as a barrier. Research indicates that appearance motives are counterproductive to encouraging PA (Tylka & Homan, 2015) and, as noted above, have a deleterious effect on depressive symptoms. The doctoral student explored this motivation with each participant and cautioned him/her regarding the possible increase in symptoms of anxiety and depression if this was one of her/his motivating factors and that physical and psychological health should be the participant's main goals.

Finally, many of the barriers to PA are issues that can be improved by it. These are (a) anxiety, (b) depression (Kim et al., 2015), (c) social factors (isolation and/or hostility) (Harmon, Forthofer, Bantum, & Nigg, 2016; Kim et al., 2015; Marr & Wilcox, 2015; Ramirez et al., 2015), (d) perceived athletic ability/self-concept (Lemoyne, Valois, & Guay, 2015), and (e) self-efficacy (Marr & Wilcox, 2015; Ramirez et al., 2015). While these are very real emotional barriers to increasing PA, the participant was encouraged that these factors would abate.

The doctoral student and participant also discussed potential facilitators of PA. The facilitators reviewed here have been identified in current research and were reviewed with each participant to determine usefulness in aiding him/her in completing the project. A (a) perception of good athletic ability (Lemoyne, Valois, & Guay, 2015; Farren, Zhang, Martin, & Thomas,

2017; Dyck et al., 2015), (b) high self-efficacy, and/or positive outcome expectations (Choi, Chang, & Choi, 2015; Marr & Wilcox, 2015) serve as facilitators of PA. The doctoral student helped each participant to identify the presence of these facilitators and encouraged her/him to focus on these positive traits when faced with doubts concerning his/her ability to accomplish stated goals. Additionally, strong social support (friends and family) is a powerful facilitator of PA especially for first year students (Harmon, Forthofer, Bantum, & Nigg, 2016; Kim et al., 2015; Marr & Wilcox, 2015; Scarapicchia, Sabiston, Pila, Arbour-Nicitopoulos, & Faulkner, 2017). Each participant was encouraged to talk to his/her significant person(s) about the symptoms of (a) stress, (b) anxiety, and (c) depression that s/he had been experiencing and this project with its goal of helping to reduce the participant's symptoms.

As one may expect, college students who participated in sports or who were physically active during their high school years will have a higher likelihood of continuing that pattern in college (Kaigang, et al., 2016) although (a) increased responsibility, (b) change in eating and sleeping habits, (c) social isolation, and (d) unhealthy coping strategies (alcohol, drugs) can alter previously ingrained healthy habits making adaptation to this transition extremely important in a college students first year. The doctoral student identified participants with a history that included higher levels of PA and encouraged him/her that increased responsibility increases the need for self-care. The educational intervention was utilized to instruct participants on the pitfalls of unhealthy coping strategies (alcohol and drugs) and how increased PA could help restore healthy patterns and reduce unhealthy cravings

Counterintuitively, persons who perform volunteer work have been shown to be more physically active despite their additional time constraints (Lederer, Autry, Day, & Oswalt, 2015) as are those with higher levels of education (De Mateo-Silleras et al., 2019). Finally, the use of a

tracking device or other form of technology, especially text messaging and smart phone apps, have proven in multiple studies to facilitate increased PA among a wide variety of participants (Reese et al., 2017; Sharp & Caperchione, 2016; Towne Jr. et al., 2017). Participants were informed about the availability of fitness apps and how to download them to assist with increasing PA. Text messaging was utilized throughout this project to provide frequent contact and encouragement to participants and as a convenient method for communicating with and sending activity logs to the doctoral student.

Once (a) the participant's goal(s) were established, (b) barriers and facilitators addressed, and (c) the specific activities the participant was interested in performing were identified, the participant's plan was written in her/his activity log (Appendix F) for that week and a copy of the plan retained for reference by the doctoral student. The participant was asked to keep a log recording his/her activity(ies) including (a) activity type, (b) the time and date of participation, (c) intensity, and (d) duration.

The doctoral student contacted each participant weekly throughout the 8-week project via each participant's chosen means of communication identified in the Informed Consent. At this time, the doctoral student collected the data from the participant's activity log for that week. He also interviewed the participant as to (a) whether s/he believed that his/her goal for that week was met and, (b) why or why not. If goals were met, the doctoral student asked the participant if s/he thought that a higher goal could be met for the next week and, if so, to identify that specific goal. If the goal was not met, (a) was the goal unrealistic, (b) were there unforeseen barriers or, (c) did the participant choose not to attempt the goal. Possible solutions were discussed and a plan for the next week established for the participant and the doctoral student.

Through self-monitoring and discussion of (a) log data and, (b) perceived accomplishments and failures, the doctoral student (a) highlighted each participant's successes, (b) addressed barriers, and (c) helped develop realistic goals thereby utilizing the participant's performance experience to increase self-efficacy. During these sessions, the doctoral student utilized any available examples of peers and/or others that the participant viewed as like him/herself as examples of what the participant was able to accomplish. The doctoral student offered verbal encouragement and continued to suggest that the participant seek out others who would support her/him in his/her efforts toward increased PA. The doctoral student assisted the participant to identify likely outcomes, both pleasant and unpleasant, as a means of fostering improved self-efficacy for PA.

Each participant began this 8-week project at the beginning of the week following her/his completion of the initial interview, medical clearance, and establishment of personal goals and PA plan with the doctoral student. Although there was still an insufficient number of participants, recruitment was discontinued after three weeks to allow adequate time for project completion, data analysis and reporting of outcomes. The doctoral student maintained a record of the participants' start dates, contact information, personal goals, and PA plan identified by his/her randomly assigned number. As stated above, the doctoral student collected PA data from each participant weekly. The PA data was transferred to an Excel spreadsheet that also identified each participant according to number.

During week-7 for each participant, the doctoral student arranged a time to meet with each participant after s/he completed week-8 to collect the PA data for the final week and to re-administer the DASS and NGSES. Once this data had been collected on all participants, it was

forwarded to the statistician for analysis who returned these results to the doctoral student for the final report on the project outcomes.

It was not expected that all potential candidates for this project would choose to participate. However, the total number of eligible persons who present to the SCC during the 4-week recruitment period was compared to the number who chose to participate as one factor considered in determining the effectiveness of the project. Also, data on the number of dropouts was included in the statistical analysis.

Safety

Per ACSM guidelines, a brief history was taken to rule out the presence of (a) cardiovascular disease, (b) metabolic syndrome, and/or (c) renal disease; determine his/her current level of physical activity; and activity goals. If the student did not display any signs or symptoms of the above-mentioned physical conditions, then it was considered safe for her/him to participate in increased PA without medical clearance. If s/he had been diagnosed with one of the above conditions but was asymptomatic and had participated in planned, structured physical activity for 30 minutes/day, 3 days/week for at least 3 months, medical clearance was not required. Since the goal of this project was to assist participants to increase PA, symptoms of exacerbation of these disease processes were thoroughly reviewed with instruction to the participant that, if one or more of these symptoms occurred, s/he was to discontinue the activity immediately and seek medical help. If the participant had been diagnosed with one of the above conditions and had not been physically active or has been symptomatic, s/he must have medical clearance prior to participation in increased levels of PA (Reibe et al., 2018).

All physical activities engender some element of risk. As outlined in the Informed Consent document, participants agreed to participate in this project at their own risk. However,

to ensure that all activities which the participant wished to participate in were as safe as possible, the doctoral student reviewed safe participation once the activities were chosen. This included Jacksonville University emergency management policies regarding what to do in the event of a minor or serious illness or injury, and/or mental health crisis. If the participant wished to engage in an activity which s/he was to execute alone such as (a) running, (b) swimming, (c) biking, (d) weight-lifting, etc., s/he was encouraged to take a partner, and to familiarize her/himself with the proper technique and safety measures associated with the activity. If it was an activity that the participant had never participated in, s/he was encouraged to obtain instruction from an expert such as a (a) physical trainer, (b) coach, (c) team member or (d) someone who was experienced in the sport or activity. If the participant wished to join a group sport or activity, s/he was cautioned to familiarize him/herself with the rules, safety equipment and procedures of that (a) sport, (b) activity, or (c) club and to follow all safety precautions, and instructions by the activity leader. If a participant had reported any physical injury resulting from participation in the activity to the (a) doctoral student, (b) project chair, (c) director of the SCC, (d) therapist, or (e) anyone associated with this project, s/he would have been referred to a qualified medical provider for evaluation and treatment of the injury. As per the Informed Consent document, the participant was informed that all medical expenses would be billed to his/her own insurance and s/he would be responsible for expenses not covered by insurance.

Due to the nature of this project, the doctoral student recognized the possibility that a participant could experience an exacerbation of anxiety or depression before, during, or after his/her participation in any activity encouraged by this project. Along with a copy of the Informed Consent document which listed telephone numbers of persons to call with questions or problems that may have arisen during the course of the project, participants received a card

(Appendix H) with the telephone number of the SCC and encouraged to contact the Center if s/he feels that s/he experienced increased (a) depressive symptoms, (b) symptoms of anxiety, or (c) increased stress at any time during the course of the project. The card also included telephone numbers for (a) Campus Security, (b) the Jacksonville and Duval County Suicide Prevention Hotline, (c) the National Crisis Line, and (d) Crisis Text Line in case the participants experienced thoughts of harming self or others, or substance abuse. Hours of operation of the SCC were clearly set forth in the Informed Consent document and the participant was instructed regarding alternate numbers to use in contacting help for problems that occur outside of these hours.

It was important that personal identifiers and health information of participants were safeguarded. Participants were each assigned a random number at the initial interview and the participant's assigned number was referenced on her/his preparticipation screening forms. All reported data was logged under that number. Personal identifiers and protected health information was confined to the Preparticipation Screening forms, DASS, and Informed Consent documents which were secured in a locked cabinet in the office of the project chair. For the purposes of data collection and encouragement of the participant(s) to attain his/her goals, the doctoral student sought permission to communicate with individual participants via their Jacksonville University email accounts. The participants will have the option not to divulge their personal email accounts in which case, data was collected in an alternative format. Most of the participants chose to communicate via cell text. Telephone numbers were kept in the participants' identification file. Text threads were deleted as soon as the conversation was complete and forwarded data was recorded. All paper documentation was identified by the participant's assigned number without any personal identifiers. The data was transferred to an

Excel spreadsheet stored on a secure electronic file kept by the doctoral student. This file also recorded data under the participants' assigned numbers without personal identifiers and was forwarded to the statistician once all participants had completed the project and all data had been collected.

Stakeholder Assessment

Stakeholders for this project were identified early in the process. It was determined by the doctoral student and project chair that an accessible population for this project would be young adult college students attending Jacksonville University. As the program combined aspects of psychology and kinesiology the Director of the SCC, and the Director of EIM-OC, are primary stakeholders in this project and were consulted frequently throughout its development.

Sustainability Plan

The above identified stakeholders as well as University administrators have a vested interest in the physical and psychological well-being of students and have committed (a) time, (b) funds, (c) facilities, and (d) staff to develop programs to improve the health status of the student population. Even though multiple opportunities have been identified and facilities provided for the development of physically active lifestyles, many students do not take advantage of these opportunities. Upon completion of this project, the results were analyzed to determine if a viable method of assisting students to increase PA incrementally to meet national recommendations had been identified and if the participants experienced the expected reduction in symptoms of (a) stress, (b) anxiety, and (c) depression. Based on the results of that analysis, further recommendations have been made to assist Jacksonville University students to develop and maintain a healthy, active lifestyle which will aid in the treatment and prevention of (a) depression, (b) anxiety, and (c) stress.

Plan for IRB Approval

This proposal was submitted to the Institutional Review Board at Jacksonville University and was accompanied by an application for an expedited review and a review by the full board. This is a quality improvement project with a large amount of data collected indicating that PA is a safe and effective form of treatment for depressive and anxious symptoms and does not represent a significant risk to the participants. However, (a) stress, (b) anxious, and (c) depressive symptoms are a subjective experience and the individual experiencing these symptoms are the final authority on their significance and intensity. Therefore, the doctoral student endeavored to take every precaution to provide for the safety of all participants by informing them of the psychological services that are available if the need arose as well as how to access appropriate emergency services if they had been needed. The doctoral student demonstrated that participant identifiers were kept secure throughout the program and that information was destroyed upon completion of the project. The JU IRB granted approval of this project on October 19, 2019.

Statistical Analysis Plan

Demographics, pre- and post-survey data (i.e. DASS scale) were summarized using descriptive statistics and/or frequency tables. Continuous variables were intended to be summarized by n, mean, standard deviation [SD], median, minimum and maximum. Categorical variables were to be summarized by frequency count and percentage of participants within each category. Bar charts, pie charts, histograms and, box and whisker plots were considered for data visualization when appropriate.

Activity log data (type of activity, duration and intensity) were summarized by week and across all weeks (i.e. Week 1 to Week 8). The percentage of participants who met national

recommendation for PA were to be calculated over time. NGSES and DASS survey items will be summarized individually by intervention period (pre vs. post-intervention). NGSES and DASS scores (Depression, Anxiety and Stress subdomains) will be calculated for each participant and summarized by intervention period. Univariate statistical tests were to be used to test for differences between pre- and post-measures. Paired t-test were used for continuous variables and Wilcoxon signed rank tests would have been used for ordinal data.

Self-Efficacy, depression, anxiety and stress scores were to be analyzed separately using a multivariate linear mixed model for repeated measure to evaluate the effect of the intervention in reducing depression, anxiety and stress. Each model was to be adjusted for activity log data including duration and intensity. Other factor would have been considered in the model such number of times a participant met national recommendation for PA. The correlation between pre and post scores from the same participant across intervention period were to be modeled using an unstructured covariance matrix (UN). Tests for changes in scores will be conducted using t-tests on least-square means (i.e. adjusted means from the model) at 5% significance level. Unless otherwise specified, all statistical tests were two-sided.

Further exploratory analysis will be undertaken if necessary, at the discretion of the doctoral student. All statistical analysis will be conducted using R version 3.5 or higher (R Foundation for Statistical Computing, Vienna, Austria) and/or SAS version 9.4 or higher (SAS Institute Inc., Cary, NC).

Results

Process Measures and Outcomes

Recruitment began on November 4, 2019 and continued for three weeks until November 22, 2019. Per instruction of the director of the SCC, the doctoral student provided a brief, Power-Point introduction to the project for the SCC therapists. The therapists were asked to inform their

clients who met inclusion criteria about the project and, during each client's next scheduled appointment with the therapist, to ask if s/he would be interested in participating.

From the beginning of the Fall semester, 2019 until the conclusion of recruitment for this project, the SCC registered 106 clients who met the initial inclusion criteria. Single-contact clients and those who were not following-up in the SCC were not contacted regarding this project. Only clients currently attending therapy appointments during the recruitment period were informed. The number of potential candidates attending appointments during the recruitment period for this project was not tracked but 12 of these persons expressed interest in this project and were referred to the doctoral student for follow-up. Nine students expressing interest in the project were interviewed regarding participation in this project immediately following a session with his/her therapist. Three students who expressed interest were referred to the doctoral student by email. One of these students made an appointment and completed the initial interview. Two others did not attend their appointments and did not respond to the doctoral student's request to reschedule. One student dropped out of the project in week one. Two other students required medical clearance based on their pre-participation screening forms but neither student obtained this clearance. Although there was an insufficient number of participants who had been recruited at that point, in order to allow for (a) adequate time for project completion, (b) compilation and analysis of data, (c) writing of the final paper, and (d) oral defense, recruitment was concluded on November 22, 2019.

During the initial interview, pre-intervention (a) DASS, and (b) NGSES screening was completed. DASS has composite scores for each of the subsets of (a) depression, (b) anxiety, and (c) stress. For this cohort of participants, the average score for depression was 19.3 indicating a high moderate score. Scores for "severe depressive symptoms" on this instrument are 20-27.

Average score for the anxiety subset was 10.9 indicating a low moderate level of anxiety symptoms. Average score for stress was 18.5 indicating low moderate symptom burden where a score of 18 represents the borderline between mild and moderate symptoms. NGSES average score was 3.75 out of a possible 5 points. Most participants' results indicated a moderate self-efficacy at pre-intervention. Pre-intervention data is summarized in table 1 below.

Of the eight participants who were cleared to begin the project, only five responded to requests for activity logs and other communication after their first week of enrollment. One participant failed to respond to any requests after the first week so, only four participants continued for the entire eight weeks and completed the post-intervention surveys.

In addition to quantitative data, in the form of activity logs, collected from participants, each was also asked to contribute qualitative data. The participants were asked each week if s/he felt that the activity goals for that week were met. Why or why not? In gathering this data, the doctoral student was able to (a) assist each participant to identify barriers to PA and, (b) possible facilitators that may help him/her to overcome that barrier, (c) provide encouragement, and (d) highlight participant strengths and accomplishments. During the intervention, the Fall semester ended, and the students left campus for break. One participant had difficulty at home due to inclimate weather. This barrier was discussed with the doctoral student and alternatives to the participant's preferred activities were identified. One participant attempted to utilize the EIM-OC app that became available as the project was beginning but had difficulty scheduling with the personal trainer which delayed full participation. There were family difficulties that participants cited but, with encouragement, participants were able to overcome this barrier. New opportunities for preferred activities were also identified which helped participants overcome perceived barriers. Participants completed their eighth week either during the Winter Break or

during the first week of the Spring semester. The qualitative data summarized here was analyzed for recurrent themes with no recurring themes noted across participant experiences.

At the conclusion of week seven for each participant, the doctoral student reminded her/him that the following week would be the last week of activity for this project and each was asked to schedule his/her post-intervention meeting as soon as possible after week 8. At the post-intervention meeting, DASS and NGSES surveys were repeated. The mean scores for (a) depression, (b) anxiety, and (c) stress at post intervention were (a) 6.0, (b) 1.75, and (c) 5.6 respectively. The mean score for NGSES was 4.34. Though these changes were clinically significant for participants, only the score for the depression subset on the DASS achieved statistical significance (P = 0.464). Post-intervention data is summarized in table 2 below.

Qualitative data was also obtained from each of the participants who completed the final surveys. Each was asked to contribute any thoughts that s/he may have regarding the project or its implementation. A desire for a greater structure or specific direction on the implementation of increased level of PA was a consistent theme across all participants. A secondary theme noted was the benefit of continued (weekly) follow-up by the doctoral student as an impetus to perform each student's chosen activities.

Missing Data

As noted above, four of the original 10 participants completed the project including post-intervention surveys. Two of the participants did not engage in activities every week and had no data for the missing weeks. Pre-intervention data was included for the eight participants who had given consent and were medically clear to participate. No data was included from those participants who did not obtain medical clearance.

Summary Report

The goal for this project was to assist enrolled participants toward meeting national recommendations for physical activity (PA) as a means of alleviating symptoms of (a) stress, (b) anxiety, and/or (c) depression. NGSES, and DASS scores before and after 8 weeks of self-efficacy intervention to improve PA were compared to assess the effect of the intervention in reducing depression, anxiety and stress.

Results. The cohort of participants consisted of 8 undergraduates after excluding 2 students who were not cleared for physical activities and one dropped before the start of the intervention. Among the 8 participants who participated in the PA, 3 were males and 5 were females. The vital activity sign was ranging between 0 and120 minutes with a median of 30 minutes. NGSES and DASS scores before the intervention are summarized in the table below:

Table 1: Pre-intervention NGSES and DASS

Variables	n	Mean	Std	Median	Min	Max
NGSES	8	3.79	0.19	3.75	3.50	120.00
DASS-D	8	16.71	6.85	15.00	8.00	4.00
DASS-A	8	10.86	9.62	7.00	2.00	26.00
DASS-S	8	18.29	9.09	19.00	9.00	26.00

Only 4 participants reported their post-intervention scores. Among those, only one student successfully completed all the planned PA across the 8 weeks period. The remaining participants either reported zero activity during the intervention period or did not respond to the request for log or survey completion.

The descriptive statistics for the pre and post scores as well as the change in scores are summarized in Table 2:

Table 2: Pre- and Post-intervention NGSES, depression, Anxiety and Stress Scores

Variables	n	Pre Mean ± Std	Post Mean ± Std	Difference Mean ± Std	P-value
NGSES	4	3.81 ± 0.16	4.34 ± 0.47	0.53 ± 0.52	0.1357
DASS-D	4	16.75 ± 6.90	6.00 ± 4.16	-10.75 ± 6.55	0.0464
DASS-A	4	5.00 ± 2.94	1.75 ± 1.50	-3.25 ± 4.11	0.2122
DASS-S	4	17.50 ± 9.47	5.75 ± 2.87	-11.75 ± 7.54	0.0527

As shown in Table2, the post score of NGSES was improved by an average of 0.54 from 3.81 to 4.34. Post-score for depression, anxiety and stress scores were also improved by averages of 10.75, 3.25 and 11.75; respectively. Although the sample size was too small, we conducted paired t-tests to test for the difference between pre and post scores. The results are summarized in Table 2 using p-value. The test results showed that the change in the depression score was statistically significant at 5% (p-value = 0.0464 < 0.05).

Interpretation

Consistent with the literature and the expected outcomes for this project, utilizing an intervention to improve self-efficacy for these participants did assist them to engage in greater levels of PA than prior to participation in this project. Similarly, (a) depression, (b) anxiety, and (c) stress scores evinced a decrease in symptom burden and participants' self-efficacy improved for those who completed the project.

It is not clear how much impact contextual factors had on project outcomes. For example, for some participants, going home for Winter Break may have aided in abatement of symptoms which may have been intensified during the semester due to homesickness or the intensity of their workload. For others, going home may have exacerbated symptoms due to difficult family relationships or other environmental factors. It is unknown to what extent these factors influenced post-intervention survey scores. Additional factors influencing this project were its initiation at the mid-point of the semester with limited time in which to help participants develop a consistent habit

of PA prior to changes in their respective environments and disruption of their weekly schedules. One provider in the SCC also expressed limited buy-in as to the project's hypothesis. This was an unforeseen barrier to recruitment, and it is unknown how much this may have influenced some candidates' lack of interest in the project.

Limitations

The principal limitation of this project was its small sample size. A number of statistical tests could not be completed indicating that this project was ineffective for its intended purpose. This could have been mitigated had the project been initiated at the beginning of the semester when most students are beginning to establish their schedules for the semester and opportunities for PA are being initiated on campus. This is also the time when most students will initially present to the SCC with symptom complaints and could have been identified for recruitment. As noted above, the lack of a structured PA intervention also proved to be a limitation for this project.

Conclusions

There were several impeding factors limiting the effectiveness of this project. As a result, it has demonstrated that an unstructured, self-directed PA modality is ineffective for a college student population. However, the results of this project were clinically significant for participants indicating that a SET framework to assist young adults with low-to-moderate self-efficacy to increase PA is useful for the young/emerging adult population. Additionally, promotion of PA through improved self-efficacy has been shown to improve psychological well-being. As noted in the literature, this will help this population to establish health trajectories that will influence their level of chronic disease burden as they age thus, potentially reducing health care costs.

Recommendations

Each of the students who participated in this project were identified as being at the contemplation or action stage of change at his/her initial interview. Students should be consistently presented with information regarding both the physical and psychological benefits of PA so that those who are in the pre-contemplation stage of change could be challenged to consider increasing PA and those in the maintenance stage can be encouraged to continue with healthy lifestyle habits.

It is particularly important that students who present to the SCC or the Student Health Center (SHC) have their baseline emotional state and current level of PA assessed at every visit. Most healthcare organizations currently assess for the presence of symptoms of (a) depression and (b) anxiety. Assessment of PA level using an instrument like the PAVS should also be standardized. Those students who are not meeting national recommendations for PA should be assessed for stage of change and encouraged to increase PA. ACSM now publishes an Action Guides for Nurses as well as Providers which includes the use of an Exercise Prescription as it is part of the health promotion role for nurses (https://exerciseismedicine.org/assets/page_documents/NursesActionGuide_HQ.pdf).

Providers in both the SCC and SHC should be educated on the importance of PA for overall well-being for students including psychological well-being and academic success. For those who are willing, education can be provided on how to write an exercise prescription. For those who may be uncomfortable with this process, a referral to an exercise professional should be made. The JU School of Applied Health Sciences, EIM-OC program is an ideal target for these referrals. While the program is continuing to develop, EIM-OC has developed an app that students can download that will create a referral to a personal trainer who can provide a

structured, supervised program that will help increase the student's PA and improve her/his physical and psychological health. A protocol needs to be established for providers and trainers to follow-up with the student at regular intervals utilizing the SET framework of improving personal agency by (a) identifying facilitators, (b) helping to overcome barriers, and (c) highlighting personal successes without inappropriately downplaying failures. Identifying (a) role models, (b) social support networks, and (c) community resources are also important parts of SET that are beneficial to persons with lower self-efficacy.

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Appendix A

The Physical Activity Vital Sign

1. On average, how many days per week do you engage in moderate to strenuous exercise (like a brisk walk)? _____ days

2. On average, how many minutes do you engage in exercise at this level? _____ minutes

Total minutes per week of physical activity (multiply #1 by #2) _____ minutes per week

Using the Physical Activity Vital Sign

 National guidelines recommend 150 minutes per week of moderate intensity physical activity. Moderate intensity activity is usually done where an individual can talk but cannot “sing”. Examples include: brisk walking, slow biking, general gardening, and ballroom dancing.

 In place of moderate intensity activity, an individual can also complete 75 minutes of vigorous intensity physical activity. Vigorous intensity activity is done at a pace where individuals can no longer talk and are somewhat out of breath. Examples include: swimming laps, playing singles tennis, and fast bicycling.

 Individuals can also achieve 150 “minutes” through a combination of moderate and vigorous intensity physical activity, with 1 minute of vigorous activity being equal to 2 minutes of moderate activity.

 If activity is done throughout the day, individuals are encouraged to perform activity in "bouts" that are at least 10 minutes in length.

 If your patient is NOT achieving 150 minutes a week of physical activity, advise them to gradually increase either their frequency or duration until they are capable of safely performing 10 minutes bouts of activity and achieve national recommendations.

The Physical Activity Vital Sign – Other Considerations

 A comprehensive assessment of physical activity should include promotion of active living throughout the day to reduce sedentary time, as well as muscle strengthening and flexibility exercises as recommended by the Physical Activity Guidelines for Americans.

 If you wish to add a question on muscle strengthening activities, we would recommend the following question:

How many days a week do you perform muscle strengthening exercises, such as bodyweight exercises or resistance training? _____ days

Appendix B

Exercise Stages of Change Questionnaire

Goal: To do physical activity or exercise regularly, such as accumulating:

- 150 minutes of moderate physical activity per week, or
- 75 minutes of vigorous physical activity per week, or
- a combination of moderate and vigorous physical activity each week, such as

75 minutes of moderate and 40 minutes of vigorous physical activity, or 90 minutes of moderate and 25 minutes of vigorous physical activity.

Examples of Moderate-Intensity Activity

- Brisk walking
- Biking<10 mph (16kph)
- Ballroom dancing
- General gardening, such as weeding
- Golfing (no cart)
- Any other physical activity where the exertion is similar to these.

Examples of Vigorous-Intensity Activity

- Jogging, running
- Tennis
- Biking>10 mph (16kph)

 Aerobic dancing

 Heavy gardening, such as digging

 Any other physical activity where the

exertion is similar to these

Regular physical activity means meeting or exceeding the physical activity goal described above.

For each statement, please mark yes or no.

1. I am currently physically active (at least 30 minutes per week). ☐ Yes ☐ No

2. I intend to become more physically active in the next 6 months. ☐ Yes ☐ No

3. I currently engage in regular physical activity. ☐ Yes ☐ No

4. I have been regularly physically active for the past 6 months. ☐ Yes ☐ No

Exercise Stages of Change - Scoring Key

 No to 1, 2, 3, and 4 = Pre-contemplation stage

 No to 1, 3, and 4, Yes to 2 = Contemplation stage

 Yes to 1 and 2, No to 3 and 4 = Preparation stage

 Yes to 1 and 3, Yes or No to 2, No to 4 = Action stage

 Yes to 1, 3, and 4, Yes or No to 2 = Maintenance stage

Appendix C

EXERCISE PREPARTICIPATION HEALTH-SCREENING QUESTIONNAIRE FOR EXERCISE PROFESSIONALS

Assess your client's health needs by marking all *true* statements.

Step 1

SYMPTOMS

Does your client experience:

- ☐ chest discomfort with exertion
- ☐ unreasonable breathlessness
- ☐ dizziness, fainting, blackouts
- ☐ ankle swelling
- ☐ unpleasant awareness of a forceful, rapid, or irregular heart rate
- ☐ burning or cramping sensations in your lower legs when walking short distances

If you **did** mark any of these statements under the symptoms, **STOP,** your client should seek medical clearance before engaging in or resuming exercise. Your client may need to use a facility with a **medically qualified staff**.

If you **did not** mark any symptoms, continue to steps 2 and 3.

Step 2

CURRENT ACTIVITY

Has your client performed planned, structured physical activity for at least 30 minutes at moderate intensity on at least 3 days per week for at least the past 3 months?

Yes ☐ No ☐

Continue to Step 3.

Step 3

MEDICAL CONDITIONS

Has your client had or does he or she currently have:

- ☐ a heart attack
- ☐ heart surgery, cardiac catheterization, or coronary angioplasty
- ☐ pacemaker/implantable cardiac defibrillator/rhythm disturbance
- ☐ heart valve disease
- ☐ heart failure
- ☐ heart transplantation
- ☐ congenital heart disease
- ☐ diabetes
- ☐ renal disease

Evaluating Steps 2 and 3:

- If you **did not mark any of the statements in Step 3,** medical clearance is not necessary.
- If you marked Step 2 **"yes"** and **marked any of the statements in Step 3,** your client may continue to exercise at light to moderate intensity without medical clearance. Medical clearance is recommended before engaging in vigorous exercise.
- If you marked Step 2 **"no"** and **marked any of the statements in Step 3,** medical clearance is recommended. Your client may need to use a facility with a **medically qualified staff.**

Appendix D

DAS S *Name: Date:*

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

1	I found myself getting upset by quite trivial things	0 1 2 3
2	I was aware of dryness of my mouth	0 1 2 3
3	I couldn't seem to experience any positive feeling at all	0 1 2 3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0 1 2 3
5	I just couldn't seem to get going	0 1 2 3
6	I tended to over-react to situations	0 1 2 3
7	I had a feeling of shakiness (eg, legs going to give way)	0 1 2 3
8	I found it difficult to relax	0 1 2 3
9	I found myself in situations that made me so anxious I was most relieved when they ended	0 1 2 3
10	I felt that I had nothing to look forward to	0 1 2 3

11	I found myself getting upset rather easily	0 1 2 3
12	I felt that I was using a lot of nervous energy	0 1 2 3
13	I felt sad and depressed	0 1 2 3
14	I found myself getting impatient when I was delayed in any way (eg, elevators, traffic lights, being kept waiting)	0 1 2 3
15	I had a feeling of faintness	0 1 2 3
16	I felt that I had lost interest in just about everything	0 1 2 3
17	I felt I wasn't worth much as a person	0 1 2 3
18	I felt that I was rather touchy	0 1 2 3
19	I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion	0 1 2 3
20	I felt scared without any good reason	0 1 2 3
21	I felt that life wasn't worthwhile	0 1 2 3

Appendix E

New General Self-Efficacy Scale

Age: Adult

Duration: < 3 minutes

Reading Level: 6th-8th grade

Number of items: 8

Answer Format: 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree.

Scoring:

To calculate the total score for each participant, take the average rating of the items by adding respondents' answers to each item and dividing this sum by the total number of items (8).

Sources:

Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational research methods, 4*(1), 62-83.

Instructions: Participants are told that (a) general self-efficacy relates to "one's estimate of one's overall ability to perform successfully in a wide variety of achievement situations, or to how confident one is that she or he can perform effectively across different tasks and situations," and (b) self-esteem relates to "the overall affective evaluation of one's own worth, value, or importance, or to how one feels about oneself as a person."

Self-Efficacy Questionnaire

Instructions: Please circle your answer below.

1. I will be able to achieve most of the goals that I set for myself.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

2. When facing difficult tasks, I am certain that I will accomplish them.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

3. In general, I think that I can obtain outcomes that are important to me.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

4. I believe I can succeed at most any endeavor to which I set my mind.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

5. I will be able to successfully overcome many challenges.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

6. I am confident that I can perform effectively on many different tasks.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

7. Compared to other people, I can do most tasks very well.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

8. Even when things are tough, I can perform quite well.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

Appendix F

STOP! STRESS, ANXIETY, AND DEPRESSIONWITH PHYSICAL ACTIVITY

A Quality Improvement Project

Timothy Byrd, BSN, RN, DNP(c)

Jacksonville University Keigwin School of Nursing

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Stress Relief

Norepinephrine is a neurotransmitter in the brain that is thought to influence stress and anxiety. Physical and mental symptoms may be relieved by an increase in the level of norepinephrine in response to physical activity similar to the way that some antidepressants work.

More importantly, physical activity gives the body a chance to practice dealing with stress. It forces the body's physiological systems, which are all involved in the stress response, to communicate more efficiently. The more sedentary we are, the less efficiently our bodies respond to stress.

(Dishman and Sothmann, 2019)

Alleviates Depressive Symptoms

Although the mechanism of action is not clearly understood, this statement is supported in most studies designed to test the association between depression and physical activity. There are many hypotheses regarding how this happens.

- Thermogenic Hypothesis
  An increase in temperature within certain regions of the brain, such as the brain stem, induce feelings of relaxation and a reduction in muscle tension.

- Endorphin Hypothesis
  Acute and chronic physical activity lead to an increase in β-endorphins. Endorphins are related to an overall enhanced mood and feelings of well-being.

- Monoamine Hypothesis
  States that increased physical activity leads to a higher level of a variety of neurotransmitters in the brain including serotonin, dopamine, and norepinephrine.

In addition to physiological hypotheses, there are multiple psychological ones posing various mechanisms of action of the antidepressant effects of physical activity.

- Distraction Hypothesis
  Suggests that physical activity distracts from worries and depressing thoughts. It has proven more effective than more introspective methods such as journaling. Unlike other distraction activities, PA has been shown to increase a positive affect.

- Self-Efficacy Hypothesis
  Refers to the belief that one has the necessary skills to complete a task as well as the confidence that the task can be completed with the desired outcome. Persons who experience depression have been shown to have low self-efficacy and PA has been shown to increase/improve participants' self-efficacy.

  (Craft and Perna, 2004)

Alleviates Anxiety

Many of the same physiological and psychological mechanisms of physical activity which are hypothesized to decrease depression also work to decrease anxiety. In addition to these, physiologically PA has been shown to decrease reactivity in the Hypothalamic-Pituitary Axis which is key to the body's stress response. Psychologically, increased PA has been shown to have an inverse relationship to anxiety sensitivity. Short-term aerobic activity has repeatedly demonstrated the ability to decrease this sensitivity.

(Anderson and Shivakumar, 2013)

Regular Cardio Creates New Brain Cells (Neurogenesis)

A part of the brain known as the hippocampus is key to the development of new memories as well as detecting new surroundings, occurrences, and stimuli. It also pivotal in the maintaining long-term memory. Stress, anxiety and depression have been shown to adversely effect the hippocampus by preventing it from developing new cells (neurogenesis) thus inhibiting the formation of new memories. Physical activity has been shown to up-regulate neurogenesis specifically in the hippocampus.

(Anderson and Shivakumar, 2013)

Improves Self-Esteem

Increased physical activity has been repeatedly shown to have both a direct and indirect effect on self-esteem. Studies indicate that one's body mass index (BMI), perceived physical fitness, and body image play both motivating and mediating roles in this relationship. More importantly, increased PA has also been shown to increase self-esteem independent of other factors.

(Zamani Sani, Fathirezaie, Brand, Puhse, Holsboer-Trachsler, Gerber, and Talepasand, 2016)

Do It Outdoors!

Studies comparing PA in indoor v. outdoor natural (green) environments indicate that outdoor activity causes greater feelings of revitalization and positive engagement. It also improves self-esteem and reduces tension, anger and depression. The psychological benefits are often immediate indicated by the fact that the first 5-minutes of green activity appears to have the biggest impact on mood and self-esteem.

(Gladwell, Brown, Wood, Sandercock, and Barton, 2013)

Increased Productivity

An increased level of physical activity enhances your ability to get things done. People who pause during the day to get in some PA have the same level of productivity as those who work a 40-hour week without the interruption to their day. Additionally, those with increased PA have improved mood, increased perception of their productivity level and have fewer sick days than those who are more sedentary.

(Expertanswer, 2011 September 8)

Improved Sleep Quality

While not a universal finding, overall, increased PA has been shown to improve sleep quality and a key psychological result of improved sleep is improved mood. These results can be hampered by increased stress levels (such as during exams) or by exercising too late in the day.

(Wunch, Kasten, and Fuchs, 2017; Dolezal, Neufeld, Boland, Martin, and Cooper, 2017)

Addiction Recovery

Exercise causes a release of dopamine just like the pleasure response from drugs, food, alcohol, or sex.

Exercise helps to distract from addictive behaviors so that it helps to re-prioritize cravings in the short-term

Helps to reset the circadian rhythm disrupted by alcohol, drugs, stress, and anxiety and allows you to get to sleep at the right time and stay asleep.

(Hardy, 2016)

Slows Cognitive Decline of Aging

Exercise helps to shore up the brain against cognitive decline as you age by supporting and preventing degeneration of the hippocampus which is important for memory and learning.

(Anderson and Shivakumar, 2013)

Goals_____

_____

_____

_____

_____

Recommendations_____

_____

_____

_____

_____

_____

_____

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_____

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Activity Log

Week 1

Sunday

Activity:_____

Duration:_____

Intensity:_____

Monday

Activity:_____

Duration:_____

Intensity:_____

Tuesday

Activity:_____

Duration:_____

Intensity:_____

Wednesday

Activity:_____

Duration:_____

Intensity:_____

Thursday

Activity:_____

Duration:_____

Intensity:_____

Friday

Activity:_____

Duration:_____

Intensity:_____

Saturday

Activity:_____

Duration:_____

Intensity:_____

The remainder of the booklet is a repetition of the above Activity Log for weeks 2-8 and are not reproduced here.

Appendix G

JACKSONVILLE UNIVERSITY

Informed Consent Document to Participate in a Doctoral Quality Improvement Project

You are being asked to take part in a quality improvement project conducted by a Jacksonville University doctoral nursing student. The doctoral student will explain to you in detail the purpose of the project, the procedures to be used, the expected duration or frequency of your participation, and the potential benefits and possible risks of participation. You may ask him any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss any questions you may have with the doctoral student.

Participation is voluntary. If you decide to participate in the project, please sign on the last page of this form. You will be given a blank copy of this form to keep. Refusal to participate in this quality improvement project will have no effect on your grades or any future services you may be entitled to from the University. Anyone who agrees to participate in this quality improvement project is free to withdraw from the project at any time with no penalty.

PARTICIPANT'S NAME: _____

TITLE OF THE QUALITY IMPROVEMENT PROJECT: The Usefulness of an Individualized Exercise Treatment Plan to Assist Undergraduate College Students with Stress, Anxiety, or Depression to Increase their Level of Physical Activity

QUALITY IMPROVEMENT PROJECT TEAM MEMBERS:

- Timothy Byrd, DNP(c): cell-(904) 525-6188; Email- tbyrd3@jacksonville.edu
- Dr. Theresa Chenot, Project Chair: Office Phone (904) 256-7284; Email- tchenot@ju.edu
- Dr. Kristin Alberts, Director of the Counseling Center
- Dr. Youssef Toubouti, Statistician

All Project Team Members are from Jacksonville University, 2800 University Blvd. N., Jacksonville, FL 32211.

THE PURPOSE OF THE QUALITY IMPROVEMENT PROJECT: The purpose of this quality improvement project is to assist undergraduate students who are not meeting national recommendations for level of physical activity and who have presented to the Student Counseling Center for complaints of stress, anxiety, and/or depression, to alleviate symptoms associated with these complaints by means of increased physical activity.

Physical activity has been proven to have many psychological benefits in addition to the associated physical benefits. The doctoral student will explain many of these benefits to you and will give you a handout describing them to you. It is the goal of this project that, by increasing your level of physical activity beyond what you currently do, you will experience these benefits and be persuaded to adopt a healthier, more active lifestyle.

A therapist at the Jacksonville University Student Counseling Center has recommended this project to you after determining that you meet the inclusion criteria outlined in the first paragraph of this section. Upon your agreement, s/he referred you to the doctoral student and a place & time for assessment and development of recommendations were agreed upon. At this meeting, after this Informed Consent document is signed, the doctoral student will ask you to complete a brief questionnaire to determine if you are eligible to participate in this project or if you will need medical clearance to do so. If medical clearance is necessary, you will be asked to see a medical provider and obtain from her/him signed documentation stating that you are eligible to participate in an increased level of physical activity and to what level of intensity (light, moderate, or vigorous).

Once medical eligibility is determined, you and the doctoral student will discuss your prior level of physical activity, what types of activities you do/would like to participate in, and the various options and opportunities for physical activity that are available for both individual and group participation. These opportunities will emphasize but not be restricted to those available to you as a student at Jacksonville University. The doctoral student will also discuss potential barriers and facilitators of physical activity with you, and how your perceived barriers might be overcome. Based on your prior level of activity, and your stated goals, the doctoral student will recommend certain activity(ies), frequency of participation, and level of intensity to you. Together, you and the doctoral student will develop a plan that increases your current level of physical activity and helps you to meet your stated goals. The doctoral student will create a written plan for you which identifies the type(s), frequency, and intensity of the activity(ies) included in the plan. A copy of the plan will be sent to you by the method of communication you elect, and the doctoral student will retain a copy for his records.

During this project, it will be necessary for the doctoral student to communicate with you to collect data from your activity log and to assist you in addressing barriers or problems that may arise. The doctoral student and Project Chair have determined that the most convenient form of communication for this purpose is via your Jacksonville University email. You may elect not to divulge your email address and choose another method of communication with the doctoral student that allows for him to collect your data and to discuss difficulties or any need that you may have pertaining to this project. Please indicate your consent by providing your email address in the allotted space. You may also withhold consent and indicate your alternate means of communication with the doctoral student in the space provided.

Over the course of 8 weeks, you will be asked to participate in an increased level of physical activity based on the plan developed by you and the doctoral student, and to keep a log of the dates and times of your activities along with the duration, and intensity of each. The doctoral student will contact you weekly to request your activity logs. It is imperative that these logs be accurate. Not participating in the level of activity prescribed will not impact your eligibility to continue in this project and reduced levels of physical activity will be examined when the data is analyzed. At the end of the 8-week project, you will be advised that your role in the project is complete and the doctoral student will not contact you further.

BENEFITS OF THE QUALITY IMPROVEMENT PROJECT: You may benefit from being in this quality improvement project. You may benefit by having an increased physical fitness level, an improvement in stress, anxious, and depressive symptoms and an expanded knowledge of the psychological benefits of exercise as well as an improved skill level in performing certain activities. The doctoral student is expected to benefit by being able to: a) report project results to the JU Keigwin School of Nursing faculty, b) submit project results to a professional journal to

be published, and/or c) submit to a professional organization to present project results to an audience.

RISKS OF THE QUALITY IMPROVEMENT PROJECT: The risks of taking part in this quality improvement project may be possible loss of confidentiality on the health questionnaire. The doctoral student and Project Chair will take appropriate steps to protect any information they collect about you. However, there is a slight risk that information about you could be revealed inappropriately or accidentally. Depending on the nature of the information, such a release could upset or embarrass you, or possibly affect your insurability or employability.

All results of the project will be reported in aggregate. Your individual questionnaire responses will not be shared with your professors or University administrators and will therefore not be included in any student evaluation. This quality improvement project may include risks that are unknown at this time. Participation in more than one project may further increase the risks to you. If you are already enrolled in another project, please inform one of the project team members listed on this form or the person reviewing this consent with you before enrolling in this or any other quality improvement project. If you wish to discuss the information above or any discomforts you may experience, please ask questions now or call one of the team members listed above.

If you become ill or injured (e.g. physically, mentally/emotionally, etc.) from being in the quality improvement project, Jacksonville University will help you to seek medical or psychological treatment. Jacksonville University has not, however, set aside any money to pay you or to pay for treatment. The only exception is if it is proved that your injury or illness is directly caused by the negligence of a Jacksonville University employee or student. “Negligence” is the failure to follow a standard duty of care. If you become ill or injured from being in this quality improvement project, your insurer may be billed for your treatment costs. If you do not have insurance, or if your insurer does not pay, then you would have to pay these costs. If you believe you have become ill or injured from this project, you should contact Timothy Byrd, doctoral student at (904) 525-6188 or Dr. Theresa Chenot, Associate Professor of Nursing at (904) 256-7284.

If you are injured as a direct result of your participation in this quality improvement project, only the professional services that you receive from any Jacksonville University employee will be provided without charge. You will be responsible for any deductible, co-insurance, or co-payments. Jacksonville University and the quality improvement project team members will not be financially responsible for these expenses. Some insurance companies may not cover costs associated with quality improvement projects, research studies, or research/project-related injuries. Please contact your insurance company for additional information. The Project Team Members will determine whether your injury is related to your participation in this quality improvement project and will report to the Jacksonville University IRB for review. No additional compensation is routinely offered. Since this project indirectly addresses symptoms of stress, anxiety, and depression, if you feel that you are experiencing increased symptoms, we encourage you to find a friend to talk to, call a supportive family member, or contact the Student Counseling Center at (904) 256-7180 between the hours of 8:30 am and 5:00 pm, Monday through Friday. After hours and on weekends, Campus Security has been trained in crisis intervention and can assist you if you call (904) 256-7585. Otherwise, there is a National Crisis Line at 1-800-273-TALK (8255) or a Crisis Text Line at 741741 that can assist you. If you feel that your symptoms are severe or are having thoughts of self-harm, harming others, or are considering abusing substances EMS can be activated by calling 911.

NEW INFORMATION: It is possible that the Project Team will learn something new during the project about the risks of being in it. If this happens, they will tell you about it. Then you can decide if you want to continue to be in this quality improvement project or not. You may be asked to sign a new consent form that includes the new information if you decide to stay in the project.

COSTS / COMPENSATION: You will not have to pay nor you will be paid any amount for taking part in this quality improvement project.

ALTERNATIVE TO BE IN THE QUALITY IMPROVEMENT PROJECT: The alternative to taking part in this quality improvement project is opting not to participate in the quality improvement project.

RIGHT TO PARTICIPATE OR WITHDRAW: You are free to stop taking part in this quality improvement project at any time without penalty and without losing any benefits to which you are entitled.

If you stop taking part in this quality improvement project, the logs that you have already submitted will continue to be used in the analysis of the data gathered during the quality improvement project.

You may be withdrawn from the quality improvement project without your consent for the following reasons:

- You do not qualify to be in the quality improvement project, because you do not meet the project requirements.
- You need a medical treatment not allowed in this quality improvement project.
- The doctoral student or Project Chair decides that continuing in the quality improvement project would be harmful to you.
- Quality improvement project activities have a harmful effect on you.
- You are unable to keep appointments or participate in the quality improvement project physical activities as agreed upon by you and the doctoral student.
- Other protocol-specific reasons, for example, the quality improvement project intervention has been found to be unsafe.
- The quality improvement project is cancelled by the doctoral student, project chair, and/or other administrative reasons.

If you decide to stop taking part in this quality improvement project for any reason, you should contact Timothy Byrd at (904) 525-6188. If you have any questions regarding your rights as a project participant, you may call the JU Institutional Review Board (IRB) at (904) 256-7151. Additional questions may be directed to Mr. Byrd's Project Chair, Dr. Theresa Chenot, who can be reached at 904-256-7284 or tchenot@ju.edu

CONFIDENTIALITY: Only the Project Team members and certain Jacksonville University officials have the legal right to review project records, and they will protect the secrecy (confidentiality) of these records as much as the law allows. Otherwise, your project records will not be released without your permission unless required by law or a court order.

Paper-based records will be kept in a secure location (e.g. locked cabinet in a locked space) and only be accessible to personnel involved in the quality improvement project. Your email address, if

provided, will be recorded on the health questionnaire document. That document will be destroyed and all communications with you will be deleted at the time of the completion of the project.

Prior to access to any project-related information, personnel will be required to sign statements agreeing to protect the security and confidentiality of identifiable information as stipulated in the Jacksonville University IRB policies and procedures. No individual participant data or paper forms will be shared with your organization. All data and findings will be reported in aggregate (e.g. group).

The Jacksonville University Keigwin School of Nursing Doctoral Committee will have oversight of the project, in collaboration with the faculty chair. Findings will be shared with the committee in aggregate form upon completion of the project.

Data is de-identified at the completion of the quality improvement project and identifiers are destroyed at this time (paper documents shredded, electronic files deleted) in accordance with Jacksonville University IRB policies.

CONFLICT OF INTEREST: In general, presenting quality improvement project results helps the career of a scientist. The doctoral student and faculty may benefit if the results of this quality improvement project are presented at scientific meetings or published in scientific journals, but your name, individual responses, and/or pictures will not be used. There is no conflict of interest in conducting this quality improvement project.

CONSENT TO PARTICIPATE: You have been informed about this quality improvement project's purpose, procedures, possible benefits, and risks; and the alternatives to being in the quality improvement project. You have been given the opportunity to ask questions before you give consent, and you have been told that you can ask other questions at any time.

You indicate your voluntary agreement to participate by completing and returning this Informed Consent document.

Sincerely,

Timothy Byrd, DNP(c)

[ ] I hereby give consent for the use of my Jacksonville University email for the purposes of communication with the doctoral student and other project team members as need demands.

My email address is: _____

[ ] I do not give consent for the use of my Jacksonville University email address. I prefer that my data be collected, and all other communication occur by the alternate means stated below.

_____

I have read this form and I understand it. I understand that if at any time I become uncomfortable with this project I am free to stop my participation. I understand also that it is not possible to identify all potential risks and I believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

Print Name of Participant	*Date*
Signature of Participant	*Date*

Witness/Person Obtaining Consent

Print Name of Person Witnessing the Consent	*Date*
Signature of Person Witnessing the Consent	*Date*

Appendix H


In Case of Emergency
University Counseling Center
(904) 256-7180
Campus Security (904) 256-7585
National Crisis Line 1-800-273-TALK (8255)
Crisis Text Line 741741
United Way Suicide Crisis Help Line 211
Jacksonville and Duval County (904) 632-0600 or
Toll Free in Northeast Florida
1-800-346-6185
EMS
911