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Physical Activity Improves Depressive Symptoms in Older Adults

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This is to certify that the doctoral study by

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Walden University
2016

Abstract

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Project Submitted in Partial Fulfillment

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Abstract

Engaging in physical activity can help older adults to take part in community activities, maintain relationships, and initiate new friendships, thus preventing loneliness and depression. The purpose of this quality improvement (QI) project was to evaluate whether participation in physical activity improved depressive symptoms in 15 older adults at a local senior center. Pender's health promotion model was used to determine nursing and behavioral science views on components that affect health behavior. The Exercise Benefit/Barrier Scale (EBBS) survey was evaluated before implementation of the walking program to measure the benefits of and barriers to exercise. The EBBS results showed that participants perceived physical activity as beneficial with high percentages in the dimensions of physical performance (90%) and psychosocial aspects (76%). The leading barrier to exercise was fatigue (50%). The 15 elderly participants tracked physical activity by counting the number of steps a day over a 2-month period with a mean number of steps of 3,788/day. The Patient Health Questionnaire-2 (PHQ-2) was administered before and after implementation of physical activity tracking to measure changes in mood and sadness over the past 2 weeks. Forty-seven percent of the participants had depressive symptoms before the program, compared to 13% after the program. Using descriptive statistics via percent difference, results revealed a 34% decrease in depressive symptoms in the program participants. Therefore, this QI project was successful in improving depressive symptoms among older adults. This project paves the way for positive social change through improved quality of life and improved physical/mental health outcomes for older adults who participate in a physical walking activity by decreasing depressive symptoms.

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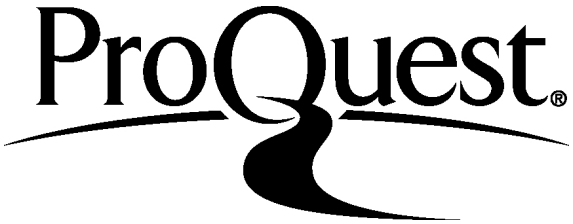

Dedication

To my family, husband Mike, children Michele, Patrick, Chris, and Becky, for all your love and support as I pursued yet another educational endeavor. You are the greatest!

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Introduction

Older adults are at risk for developing depressive symptoms that may be attributed to the inability to perform activities of daily living, living with a disability, lacking a social support network, and experiencing negative life events such as illness or death of spouse or child (Richardson et al., 2012). Additional factors associated with depression include pre-existing mental disorders like alcohol and drug use; mental health treatment; psychiatric care or use of medications for psychiatric issues; and sociodemographic factors, such as age, gender, marital status, educational level, household income, and living arrangements (Richardson et al., 2012). These stressors result in a greater risk for developing depressive symptoms. Physical activity has been found to alleviate depressive symptoms by bringing about an intensive neurobiological adaptation and improving self-concept in depressed people that leads to a decrease in depressive symptoms (Carek, Laibstain, & Carek, 2011). Physical activity triggers endorphins or cortisone that helps people feel good (Carek et al., 2011).

Depression is defined as a loss of interest or pleasure in daily activities for more than 2 weeks (DSM-V Criteria, 2013). Depression in the older adult may be compared to other chronic medical conditions as a risk factor for disability (Meeks, Vahia, Lavretsky, Kulkami, & Jesle, 2011). Late-life depression refers to depressive symptoms experienced in adults 65 years and older (Alexopoulos, 2005). These depressive symptoms may consist of reduced energy, decreased activity, reduced self-esteem and confidence, feelings of worthlessness, sadness or emptiness, irritability, and sleeplessness (Diagnostic

Statistics Manual of Mental Disorders-V Criteria, 2013). Depression may be treated with medication, but these drugs have higher side effect prevalence in the older adult (Bottino, Barcelos-Ferreira, & Ribeiz, 2012). Other methods of treatment like cognitive and behavioral therapy have been found to be effective in decreasing depression, but are used less frequently in older adults (Bottino et al., 2012). Therefore, additional methods to aid in decreasing depressive symptoms in older adults need to be explored.

Regular moderate-intensity physical activity, such as walking, cycling, or sports participation, has benefits for health such as reducing the risk of chronic illness and depression (World Health Organization, 2014). People participate in exercise and physical activity in order to become stronger. Walking is the preferred exercise activity by older adults, but only about 5% of older adults exercise at recommended levels (Petry, Andrade, Barry, & Byrne, 2013). One recommendation to increase physical activity/exercise in older adults is to provide organized activity programs (Task Force on Community Preventive Services, 2002). The goal of this quality improvement project was to evaluate physical activity in older adults to determine whether physical activity improved depressive symptoms.

Older adults with chronic illness may benefit from engaging in a more active lifestyle (Tudor-Locke et al., 2011). The U. S. Advisory Committee Report concluded that there was evidence of higher levels of functional health, lower risks of falling, and better cognitive health in older adults who are physically active (as cited in Tudor-Locke et al., 2011). Guidelines to provide information for older adults about physical activity recommendations were issued in Physical Activity Guidelines for Healthy Americans

(USDHHR, 2008). These guidelines recommend that older adults should maintain at least 5,000 steps/day outside of their normal daily activities of living (USDHHR, 2008). The guidelines for older adults are based on other reasons besides health. Older adults who are active may be more likely to interact with other people, like friends and family, may enjoy the outdoors, and also may cause improvement to their personal appearance.

There are many factors that come into play with physical activity and depressive symptoms. Some factors are age, sex, educational level, marital status, and overall health factors. Lee, Lee, Brar, Rush, and Jolley (2014) investigated physical activity, depressive symptoms, and demographic variables in community dwelling older adults and found that physical activity had a protective effect on depressive symptoms in the older adults. A population of European adults over age 70 had perceived levels of health and quality of life that were positively correlated to increased levels of physical activity (Carek et al., 2011). In spite of these recommendations and methods, older adults have not acted in accordance with the guidelines of physical activity of at least 30 minutes a day (Bravata et al., 2007). Increasing physical activity in older adults may lead to decrease in depressive symptoms.

The project is a QI program initiative, in the form of a walking activity, offered to older adults at the senior center that consisted of a Power Point, brochures, and bulletin boards depicting the benefits of physical activity/exercise. The purpose of the walking program was to determine if participation in physical activity by the older adults decreased depressive symptoms. The population included adults 60 years of age or older from senior centers in West Virginia. The Exercise Benefits Barriers Scale (EBBS) is a

tool that screens for prior knowledge about the benefits and barriers of physical activity/exercise, and it was used to identify what the older adults perceived about exercise (Pender, Murdaugh, & Parsons, 2013). Depressive symptoms were identified with a pretest and posttest using the Patient Health Questionnaire (PHQ-2). The PHQ-2, a standardized tool that screens for depression, is a valid and reliable clinical depression assessment tool (Kroenke, Spitzer, Williams, & Löwe, 2010). The PHQ-2 was found by Maurer (2012) to be up to 97% sensitive in identifying those with depression and 67% specific to correctly identify in adults those without depression with a 38% positive predictive value and 93% negative predictive value. The outcome of the evaluation would be improvement in depressive symptoms of older adults participating in physical activity.

Background

Physical activity engagement in later life is associated with a lower risk of depressive symptoms (Ku et al., 2012). Researchers have supported the protective effects of physical activity on depression for older adults, and physical activity is also associated with a modest improvement in depressive symptoms in poorly responsive older people (Mather et al., 2002; Strawbridge et al., 2002). Exercise is an effective treatment for depression, improving depressive symptoms comparable to pharmacotherapy and psychotherapy (Blumenthal et al., 2010). Regular physical activity may be a tool in the prevention of future depressive symptoms in older adults (Lindwall et al., 2011). Therefore, the promotion of physical activity may aid in decreasing depressive symptoms in older adults.

Problem Statement

Physical inactivity is one of the leading public health issues in the elderly population (Ku, Fox, Chen, & Chou, 2012), and low levels of physical activity in older adults have been associated with depressive symptoms (Matthews et al., 2011). On the other hand, high levels of physical activity have a protective effect on depression in older adults (Strawbridge, Deleger, Roberts, & Kaplan, 2002). The positive effects of physical activity on depression are the result of increased levels of neurotransmitters that are present after exercise (Strawbridge et al., 2002). There is a relationship between high physical activity levels and a decrease in depressive symptoms in older middle-aged women (Brown, Ford, Burton, Marshall, & Dobson, 2005). Late-life depression is prevalent, and it worsens the quality of life and health in older adults and increases cost and service use of health care systems (Litwin, 2011). Depression in the older adult population may be compared to other chronic medical conditions as a risk factor for disability (Meeks et al., 2011). Therefore, the purpose of this project was to assess whether depressive symptoms in older adults were improved by physical activity.

Purpose Statement

The purpose of this capstone quality improvement project was to evaluate if physical activity, like walking, improved depressive symptoms in older adults. The project consisted of an evaluation of a walking program to determine its effect on depressive symptoms. Mental health nurses are in a position to address and promote physical activity as they have the training to answer questions about depression and to assess barriers presented by the consumer (Happell, Platania-Phung, & Scott, 2011).

Prior to the activity program, the EBBS survey was administered to the participants determine the older adults' perceptions about the benefits and barriers to physical activity. Depressive symptoms were measured using the PHQ-2 survey pre and post exercise, and it provided information about the symptoms of depression described by the older adults. The subjects were given pedometers to keep track of steps in the walking program and as a motivational tool to increase continued participation. The project determined whether physical activity led to a decrease in depressive symptoms for older adults.

In order to find a correlation between physical activity and depression in older adults, there are variables that should be investigated. Lee et al. (2014) documented a relationship between physical activity and depressive symptoms among older adults when adjustments were made for age, education, race, body mass index (BMI), smoking status, alcohol use, taking psychotropic medications, and chronic medical conditions. Physical activity in older adults may have a protective factor for decreasing depression (Lee et al., 2014). Jancey, Clarke, Howat, Maycock, and Lee (2009) identified perceptions about physical activity in interviews of older adults, aged 65-74 years. The older adults believed that physical activity provided health benefits, and they felt that they needed more information about the benefits of physical activity (Jancey et al., 2009). Older adults learn by active means and need to acquire skills through demonstration and performance (Davis & Chesbro, 2003). Therefore, through this QI project, I evaluated whether providing information about the benefits of physical activity on depressive symptoms increased awareness of the importance of physical activity in older adults.

Project Question, Goals, and Objectives

The goal of this project was to determine if depressive symptoms described by older adults in a senior center located in a small West Virginia community are decreased if these older adults participated in physical activity. Paxton, Motl, Alyward, and Nigg (2010) found that older adults who participate in physical activity have enhanced self-efficacy beliefs for physical activity, which improves their mental health. The intervention should provide recommendations on when, where, and how a participant may become physically active (Williams & French, 2011). The objectives of this project were as follows:

1. Determine prior behaviors of older adults related to physical activity by administering the EBBS survey to seniors prior to starting the exercise program
2. Evaluate a physical activity walking program
3. Assess improvement in depressive symptoms of older adults pre and post program as determined by the results on the PHQ-2 survey

In this project, I determined whether participating in physical activity improved depressive symptoms in a group of older adults, aged 60 years or older, who attended a senior center in a northern West Virginia community. The QI program consisted of walking 3 times a week for 30 to 60 minutes using pedometers. Participants were given pedometers to track their number of steps and the distance walked. A motivation to walk and setting a goal are possible with use of pedometers (Ryder et al., 2009). Prior to beginning the walking program, participants were administered the PHQ-2 survey that

consisted of two questions that measured depressive symptoms. At the end of the walking program, the PHQ-2 was again administered to measure any improvement in depressive symptoms.

Framework for the Project

The evidence-based practice model that supports the QI efforts and the outcomes of the project was Pender's health promotion model (HPM). The model provides a framework for uniting nursing and behavioral science views on components that affect health behaviors. The HPM offers a guide to explore the complex biopsychosocial processes that motivate individuals to engage in behaviors directed toward enhancing health (Pender, Murdaugh, & Parsons, 2013). According to Pender et al., individual expectations to engage in a particular behavior may hinge on the anticipated benefits. Personal factors are the general characteristics of the individual that influence health behavior, such as age, personality, structure, race, ethnicity, and socioeconomic status. Health promoting behavior is the desired behavioral end point or outcome of health decision making and preparation for action for uniting nursing and behavioral science views on components that affect health behaviors (Pender et al.). According to Pender et al., individual expectations to engage in a particular behavior may hinge on the anticipated benefits. For the purpose of this project, if older adults perceive physical activity as beneficial then they are more likely to participate in the activity.

The approach used to achieve the objectives of this QI exercise program was the plan-do-study-act cycle (PDSA). PDSA is a QI tool that is effective for creating and initiating systems improvements aimed at enhancing patient education and counseling

(author, year). The PDSA model has been used by all types of organizations and groups of people to encourage planning that is based on the theory of knowledge (Moen & Norman, 2006). Using this QI tool will enhance the safety and quality of the program (Varkey et al., 2009). During the plan stage of the PDSA cycle, the objectives of the QI physical activity program were identified and a plan to carry out the exercise program was developed. During the do stage, the adults, aged 60 years and older, who attend a local senior center were educated about the benefits of physical activity on depressive symptoms during a short informational session. The walking program was instituted after the older adults were surveyed for depressive symptoms using the PHQ-2 tool and again 2-months post exercise. The study stage involved analyzing the data that were generated by the survey questionnaires. The percentages of the depressive symptoms of the participants were compared pre and post exercise to determine if an improvement in depressive symptoms resulted. The data were compared to the predicted outcomes. During the act phase, changes were made if needed to the program.

Definitions

Best practices: Sets of guidelines, ethics, or ideas that represent the most efficient or prudent course of action (Natarajan, 2006).

Chronic illness: Any disorder that persists over a long period and affects physical, emotional, intellectual, vocational, social, or spiritual functioning (Nash, Reifsnyder, Fabius, & Pracilio, 2011).

Depressive symptoms: Depressed moods or loss of interest or pleasure in daily activities consistently for at least a 2-week period that is a change from the person's normal mood (Psych Central, 2014).

Exercise: Any physical activity that is done in order to become stronger and healthier (National Institute on Aging, 2011).

Exercise Benefits/Barriers Scale (EBBS): An instrument used to measure the perceived benefits of exercise and the perceived barriers to exercise of adults, and it includes item analysis, factor analysis, and reliability measures (Sechrist, Walker, & Pender, 1987).

Health promotion: The process of enabling people to increase control over, and to improve, their health (World Health Organization [WHO], 2014).

Older adult: A person who is advanced in age beyond middle age or age 60 years and older. This term is used synonymously with elderly, older people, and late-life individuals (WHO, 2014).

Patient Health Questionnaire-2 (PHQ-2): A commonly used and validated screening tool for depression screening that has 97% sensitivity and 67% specificity in adults (Maurer, 2012).

Pedometer: An instrument for estimating the distance traveled on foot by recording the number of steps taken (Bravata et al., 2007).

Physical activity: Any body movement produced by skeletal muscles that require energy expenditure. Regular, moderate intensity physical activity, such as walking,

cycling, or participating in sports, has significant benefits for health. For example, it can reduce the risk of chronic illnesses and depression (WHO, 2014).

Quality improvement (QI): Consists of systematic and continuous actions that lead to measurable improvement in health care services and the health status of target groups. Primary care patients had improved opportunities for depression treatment with the implementation of QI programs (Wells et al., 2000).

Quality of life (QOL): The standard of health, comfort, and happiness that is experienced by an individual or group (Healthy People 2020, 2011).

Assumptions

Many older adults suffer from unrecognized depressive symptoms, and I assumed that physical activity may improve depressive symptoms in this population. It was assumed that some of the older adults at the center who already participated in a walking program may want to join the program. It was assumed in this project that other older adults at the center not in the walking program were interested in participating in the QI program. Finally, the information obtained about depressive symptoms from the PHQ-2 survey was assumed to be valid and reliable in assessing depressive symptoms.

Scope and Delimitations

The practice problem selected for the project was the lack of knowledge about physical activity and its effect on depression in adults, particularly older adults, in the United States. According to Healthy People 2020 (2011), only about half (48%) of all adults get enough aerobic physical activity to improve their health. Walking as a physical activity increased in adults 65 or older, but less than in other age groups. According to

Friis and Sellers (2014), reduced physical activity is a risk factor for many adverse health conditions. One of these psychosocial conditions is depression in older adults as a result of sedentary lifestyles. The practice issue was depression in older adults and why older adults do not participate in physical activity despite evidence that engagement in regular physical activity helps decrease adverse health outcomes. There has been no improvement in the levels of physical activity among older adults over the past 10 years in the United States (Agency for Healthcare Research and Quality, 2013). Therefore, in this project, I focused on whether engaging in physical activity, like walking, decreased depressive symptoms in a small group of older adults, aged 60 years and older, who attended a local senior center. The participants were selected by convenience sampling, and this age group was included due to the prevalence of this population at senior centers. Because the intervention was a walking program, the population was limited to those participants who were able to walk at least 3 times a week.

The United States is expected to have an increase in the aging population in the next 45 years (Ortman, Velkoff, & Hogan, 2014). The aging population may have implications for the country as the population grows older and includes those people 60 years of age and older. As the population becomes older, fewer resources may be spent on education while more funds and manpower will be needed for health maintenance and caregiving (Ortman et al., 2014). By designing programs that increase physical activity, some of these health care outcomes may be improved by decreasing morbidity caused by chronic illnesses, such as obesity and depression.

Limitations

The project involved a small population of older adults and may be limited due to small sample size and the use of one site for program participation. The use of a convenience sample of volunteer participants limited the application of the outcomes to the larger population of older adults. Additionally, convenience sampling may not include individuals who have depressive symptoms.

Evidence-based Significance

There are a number of social and behavioral physical activity approaches that are considered evidence-based interventions for health promotion, and one approach is the delivery of a short physical activity message (Heath et al., 2012). Informing the target population of the benefits of physical activity may motivate older adults to participate in the activity (Heath et al.). Walking as a form of physical activity has been found to decrease the symptoms of depression in some people (Robertson, Robertson, Jepson, & Maxwell, 2012). Programs that are able to increase physical activity in older age have the potential to reduce subsequent incidences of depression (Ku et al., 2012). Physical exercise programs obtain clinically relevant outcomes in the treatment of depressive symptoms in depressed older people (Blake et al., 2009). Therefore, the QI project that focused on walking behavior of older adults and the effect on depressive symptoms could result in a potential positive social change for those participants.

Implications for Social Change to Practice

Include a topic sentence. According to Friis and Sellers (2014), reduced physical activity is a risk factor for many adverse health conditions. One of these conditions is

depression in older adults as a result of sedentary lifestyles. Depressed older adults have a higher mortality rate than older people without depression (Win et al., 2011). Physical activity programs that are tailored to promote increased physical activity opportunities are needed for older adults (Heath et al., 2012). Older people should be encouraged to attend group exercise activities as these types of programs help those with poorly responsive depressive symptoms (Mather et al., 2002). Promoting long-term physical activity over an individual's lifetime would be beneficial in terms of depressive symptoms and somatic diseases, as well as functional ability and quality of life (Korniloff et al., 2012). Continued participation of older adults in the walking program may contribute to better physical and mental health outcomes.

The Healthy People 2020 (2011) initiatives established goals for a health care system that facilitates healthy behaviors and works to make communities, families, home, and workplaces healthier. Healthy People 2020's target for increasing the proportion of older adults with decreased physical activity or cognitive function who engage in light, moderate, or vigorous leisure time physical activity has been set at 35.9%. Understanding the barriers to physical activity in older adults is important to ensure the effectiveness of interventions to improve levels of physical activity. Some of the barriers are low motivation, perception of effort needed for exercise, a lack of time, a lack of motivation, a lack of social support, a lack of transportation to facilities, fear of injury, and cost of programs. Additionally, barriers may be related to decreased physical ability and reduced function due to joint pain and muscle weakness (Healthy People, 2011). By introducing the QI walking activity and its effect on depressive symptoms, some of the risk factors

for developing chronic illnesses may be decreased and could lead to positive social change.

Summary

Physical activity has been shown to decrease depressive symptoms in older adults (Robertson et al., 2012). Older adults have been targeted as a part of the population that needs to increase their physical activity (Healthy People, 2011). Providing the participants with pedometers may add to their awareness of walking by tracking the number of steps and distance walked. The use of the PHQ-2 survey tool was effective in identifying depressive symptoms in older adults both pre and post exercise. This 2-month physical activity program could lead to improved physical and mental health outcomes in older adults. Therefore, it is important to review pertinent literature related to physical activity and depression in the older adult.

Section 2: Review of Literature and Conceptual Framework

Introduction

Physical activity, especially in the older adult population, is decreasing (Ku et al., 2012). These decreased levels of physical activity have been associated with depressive symptoms in older adults (Matthews et al., 2011). The purpose of this QI project was to evaluate whether physical activity, in the form of a walking program, decreased depressive symptoms in older adults. The literature was reviewed to determine the incidence of physical activity in the older population with an emphasis on educational programs. The presence of depressive symptoms in older adults and the effect of physical activity on these symptoms were reviewed. Methods for determining the presence of depressive symptoms were sought, as well as motivating tools to keep older adults engaged in the physical activity program.

Following the development of a project question, an integrated review of the literature is included in order to identify relevant evidence-based studies to support the QI project. The goal of the literature review was to determine if there is sufficient evidence to support the link between physical activity and a decrease in depressive symptoms of older adults. A secondary goal was to identify relevant methods of educating older adults and tools used to screen for depressive symptoms. This review includes strategies used to obtain data, evidence of the findings, and limitations of the research.

Literature Search Strategy

Following the development of a project question, an integrated review of the literature was begun to identify evidence-based studies that support the QI project. The

search was initiated by searching online databases of CINAHL, MEDLINE, Cochrane, and Psych INFO. The inclusion criteria consisted of scholarly, peer-reviewed publications within the past 14 years with full text in the English language. Specific key search words included *depression*, *depression screening tools*, *older adults*, *elderly*, *physical activity*, *exercise*, and *walking programs using pedometers*.

Initially, the search yielded over 1,000 articles containing various combinations of the search terms. Out of the total articles, 71 were selected, and abstracts were reviewed for the mention of older adults and depression, physical activity in older adults, use of pedometers in walking programs, and screening tools for depression. The 71 articles were summarized as defined by Fineout-Overholt et al. (2010) depicting conceptual framework/theory, main finding, research method, outcome measures, intervention, and level of evidence. Sixteen of the articles provided Level I systematic review or meta-analysis. Eleven articles provided Level II randomized control trials, and only two were Level III controlled trial without randomization.

There were seven Level IV case control or cohort studies, no Level V studies, and the majority were Level VI qualitative or descriptive studies, including evidence implementation projects. Finally, the objectives and goals of the Healthy People 2020 (2011) were explored as they relate to physical activity guidelines for people in the United States This review of Healthy People 2020 provided a guideline for science-based objectives that are intended to improve the health outcomes of all people in the United States. The Healthy People objectives address health indicators that are recommended for

all age groups including older adults. The topics of physical activity and mental disorders and the relationship to older adults were topics of special interest.

Specific Literature Related to Depression and Physical Activity

The incidence of depression in older adults is high. The WHO (2000) found that globally, depression accounted for 12% of loss of healthy years and was a factor in causing disability worldwide. Physical health is one of the leading differences in the onset of depressive symptoms in late-life as compared to onset in younger adults because poor health in older adults contributes to depression (Geerlings, Beekman, Deeg, & Tilburg, 2000). Depression is one of the most common causes of emotional turmoil in late life and may decrease the quality of life in older adults. Depression is more likely to occur in women and is seen in those older adults with physical disability, cognitive impairment, and lower socioeconomic status. (Blazer, 2003).

Minor depression, which is characterized by depressive symptoms of depressed mood or anhedonia over a 2-week period, is associated with several adverse health factors. One adverse health factor is major depression (Brennes et al., 2007). In some instances, an association between depression and hospitalization was found and depression increases the short-term risk of hospitalizations in some geriatric patients (Sheeran, Byers, & Bruce, 2000). Rait et al. (2009) suggested that screening instruments should be used to identify and classify depressive symptoms. Identification of depressive symptoms may lead to better health outcomes (Rait et al.). Primary care is where most people are diagnosed and managed for depression. Therefore, using recommended tools

for depression screening is mandatory, as these tools work best for identification and classification of depression.

Although there is some indication that depression may become less common and severe in older age, the symptoms of depression should not be overlooked (Fiske, Wetherell, & Gatz, 2009). The need to develop interventions for secondary prevention of depression was illustrated by Dickerson, Smith, and Ory (2011). While the identification of depressive symptoms may not be generalizable to the population as a whole, it is important to develop an intervention for depression symptoms in older adults (Sahaf, 2007). Exercise could have a short-term effect on depression as the effect may only last as long as the length of the exercise regime (Krogh et al. (2010). To support the use of physical activity to alleviate depressive symptoms, researchers have found a correlation between depression and physical activity. Walking as a form of exercise decreases symptoms of depression in some populations (Robertson et al., 2012). Health care professionals should encourage walking as an intervention for decreasing depressive symptoms. Physical exercise programs show significant outcomes in decreasing depressive symptoms of older people. Incidence of depression after age 60 has been shown to have a seventy percent recurrence in two years while continued exercise activity may prevent recurrence (Blake, Mo, Malik, & Thomas, 2009). Regular physical activity in older people aged 60 and above provides a protection against the risk of developing depressive symptoms and other mental health disorders (Pasco et al., 2010).

Prior to instigating a physical activity program, it is important to find out older adults' perceptions about physical activity (Jancey et al., 2009). The identification of

characteristics that influence adult women's physical activity participation must be determined before interventions can be developed (Plonczynski, 2003). The perceived benefits and barriers to physical activity participation by older adults may be assessed using the EBBS. The EBBS measures the perceived benefits and barriers of physical activity engagement and may aid in designing a physical activity intervention (Brown, 2005). There are limited studies on the use of the EBBS to measure the perceived benefits and barriers in physical activity in older adults. Therefore, additional studies are needed to measure the perceived benefits of and barriers to exercise.

There are many methods for implementing physical activity in the older population. Some of these delivery methods included mailing printed materials, interventions tailored on the computer, delivery of interventions on the Internet, and telephone-delivered interventions (Eakin, Lawler, Vandelanotte, & Owen, 2007). The delivery of a short informational and motivational intervention about physical activity at a key community site, like the senior center, has been proposed (Heath et al., 2012). Using printed materials like brochures, decorating bulletin boards, and presenting a Power Point on the benefits of physical activity will aid in the implementation of the QI project. Conn, Hafdahl, and Mehr (2011) suggested that interventions designed to increase physical activity should emphasize behavior strategies, such as setting goals, self-monitoring, cues, and physical activity feedback. Setting up a plan of when, where, and how to perform the behavior and providing informational instruction may be effective in helping older adults make a positive change in self-efficacy and physical activity behavior (Williams & French, 2011).

The use of assistive device, like pedometers and other tracking monitors, has become a popular tool to motivate individuals to participate in physical activity. Bravata et al. (2007) suggested that the use of pedometers is associated with significant increases in physical activity. Older adults increased their activity when they had a step counting device like a pedometer that provides an opportunity to their monitor daily activity (Bravata et al.). Determining the number of steps necessary to achieve a benefit is determined by the physical ability of the older adult (Tudor-Locke et al., 2011). For a healthy older adult, the average distance walked is about 2,000-9,000 steps/day, and for special populations like those with physical disabilities, it is about 1,200-8,800 steps/day (Sugden et al., 2008). In this QI project, older adults were given pedometers to count the number of steps walked a day. Using pedometers and giving brief instructions about physical activity, through walking programs, has been shown to increase participation in physical activity in sedentary older women (Sugden et al.). The use of pedometers and other monitoring devices acts as an incentive to keep track of number of steps, distance walked, and daily activity. Lending pedometers to older community members may provide them with a motivation to walk and set goals. Pedometers are an effective, low-cost approach to enhance walking in community members. Additionally, Sugden et al. suggested that pedometers provided theory-based advice to community dwelling older women to increase their physical activity. The participants demonstrated good adherence with diary filling and measurement of outcome measures (Sugden et al.). Bravata et al. supported the use of pedometers to increase physical activity and to decrease BMI and blood pressure.

Measuring depressive symptoms before and after exercise involves using a validated screening instrument for distinguishing symptoms of depression in older adults. The PHQ-9 and the PHQ-2 are validated and reliable instruments that detect and measure depression severity in medical populations (Spitzer, Kroenke, & Williams, 1999). The PHQ-2 uses the first two questions of the PHQ-9. The clinical usability of the PHQ-2 is high, and it efficiently identifies depressive disorders. The PHQ-2 can be a useful and timesaving tool in assisting with screening for depression (Arroll et al., 2010).

General Literature Related to Physical Activity and Depression in Older Adults

Evidence supports a correlation between participation in physical activity and depression in older adults. Robertson et al. (2012) concluded that walking as a form of physical activity had a statistically significant effect on depression. However, gaps in communication within the physical activity programs may contribute to attendance lapses by older adults (Nguyen, Koepsell, Unutzer, Larson, & LoGerfo, 2008). Providing the older adults with an education program that delineates the benefits of walking and its effect on depressive symptoms may prove beneficial in encouraging participation in the walking program. Additionally, using pedometers to track steps and distance walked will aid in motivating the participants to continue walking.

An increased focus on making physical activity an enjoyable experience could increase participation (Jancey et al., 2009). Helping individuals overcome barriers is correlated with increased physical activity behavior. Depressive symptoms may cause a negative effect on the person experiencing these symptoms, manifesting in the feelings of sadness and emptiness. The positive effect of physical activity is, therefore, expressed in

more enthusiastic and alert feelings (Mata et al., 2013). Pasco et al. (2010) recommended a higher level of physical activity so that the risk for depression can be decreased.

Some older people do not respond to treatment with psychotherapy and pharmacotherapy alone. Mather et al. (2002) found that exercise was associated with a modest improvement in depressive symptoms. Additionally, Blumenthal, Smith, and Hoffman (2012) concluded that exercise is an effective treatment for improving depressive symptoms that is comparable to pharmacotherapy and psychotherapy. Engagement in physical activity in later life is associated with a lower risk of subsequent depressive symptoms (Ku, Fox, Chen, & Chou, 2012; Lindwall, Larsman, & Hagger, 2011). Once the older adults at the senior center are walking, other older adults may be encouraged to exercise because they will become aware of the benefits of regular exercise. Measuring the effect of walking on depressive symptoms using the PHQ-2 as a before and after tool provided evidence that walking decreases depressive symptoms.

Screening for depressive symptoms required the use of a valid and reliable questionnaire that was available in the public domain. The PHQ-2 is a self-administered questionnaire that assesses the frequency of depressive symptoms over the past 2 weeks (Kroenke et al., 2003). The validity of the PHQ-2 was tested in older people against the criteria of the *Diagnostic and Statistical Manual of Mental Disorders-IV* (Li, Friedman, Conwell, & Fiscella, 2007). Li et al. found that the PHQ-2 is a useful screening tool for identifying depression in people 65 and older. The *DSM-IV* has criteria for identifying major depression, and Li et al. (2007) examined the performance of the PHQ-2 across age, sex, and ethnic groups. The validity of the PHQ-2 was good for depression, and

specificity or ability to correctly identify depression increased with age (Li et al., 2007). Spitzer et al. (1999) found that the PHQ-2 can be a useful and timesaving tool in the determination of depressive symptoms, and a clinician may use the PHQ-2 if he or she wishes to screen for depression (Arroll et al., 2010). Identifying a decrease in the depressive symptoms of older adults at the senior center using the PHQ-2 may lead to continued participation of the older adults in the walking program after the completion of this project

Nurses and other health care providers play a role in the education of older adults. Happell et al. (2011) stated that there is a relationship between physical activity and mental health. Mental health nursing may demonstrate leadership by placing physical activity in everyday mental health care by educating the adults of the benefits of physical activity (Happell et al.). These mental health nurses are in a position to address and promote physical activity as they have the mental health training to answer questions about depression and to assess barriers presented by the general population (Happell et al.). Paxton et al. (2010) concluded that self-efficacy and mental health have intermediary roles in physical activity and quality of life. Paxton et al. examined the relationship between physical activity and quality of life in diverse older adults and claimed that older adults who participate in physical activity may enhance their self-efficacy beliefs for physical activity and improve their mental health. Nurses who believe in health promotion and embrace healthy behaviors are more likely to be positive role models and teach healthy behaviors to their patients (Esposito & Fitzpatrick, 2011).

Therefore, the challenge for this project is to provide the older adults with evidence of the benefits of physical activity and so that they increase their physical activity, which may lead to a decrease in their depressive symptoms. Individuals are more likely to engage in a desired behavior if they perceive the behavior as being more beneficial than a sedentary lifestyle (Pender et al., 2011).

Conceptual Model

The use of a conceptual model enhances the understanding about the relationship of the perceived benefits of and barriers to physical activity. Buija, Ross-Kerr, Cousins, and Wilson (2003) used Pender's revised HPM to provide evidence that the goals of the Seniors ALIVE program promoted independence and quality of life. The study found that environments where an individual feels compatible, connected, and safe provides one of the situational influences that influence health-promoting behavior. The senior center that was the site for the QI project was one such environment. By using the HPM, links between beliefs of the benefits of exercise and exercise behavior may be established for the older adult participants (Esposito & Fitzpatrick, 2011).

Summary

Depressive symptoms in older adults are well documented in the literature and physical activity, such as walking, has been found to be an effective means to decrease these symptoms. Depressed people often report feelings of sadness and hopelessness and the PHQ-2 has been used to reliably screen for depressive symptoms. Depression has often been reported to decrease quality of life in older people and may contribute to disability. One of the most effective methods found to decrease these depressive

symptoms is that of exercise and some form of exercise, whether it is walking or strength training has been found to be effective. This QI project aimed to educate older adults about the benefits of exercise on depressive symptoms so that older adults will participate in the walking program.

Providing the older adults with a short educational presentation to inform them about the benefits of physical activity on depressive symptoms has been documented in a number of studies. However, there is a paucity of studies that address what intervention is most effective to address these symptoms. The value of a nurse-led intervention has been studied but there exists additional opportunities to influence nurses' beliefs about the benefits of exercise. I am a proponent of educating participants of the benefits of physical exercise as an effective means to decrease depressive symptoms and relates to the older adult as a peer. In order to inform the older adults about the value of exercise and its role in decreasing depressive symptoms, I proposed to evaluate a walking program, measure the depressive symptoms of the participants using a validated instrument, and report the outcome by using the plan, do, study, act (PDSA) model.

Section 3: Approach

Introduction

The purpose of this QI project was to determine if older adults who attend a senior center in northern West Virginia and participate in a physical activity, like walking, have a decrease in depressive symptoms. In the project question, I asked whether participating in physical activity improves depressive symptoms in older adults, aged 60 or older, who attended a senior center in northern West Virginia. QI projects are aimed at effecting favorable outcomes in the target population. In order to evaluate the outcome of the QI project for decreasing depressive symptoms in older adults by physical activity, the PDSA model was used (Hughes, 2008). The PDSA model begins with identifying the behavior (in this project the use of physical activity to decrease depressive symptoms of older adults) to determine what needs to be done to encourage the physical activity and measuring the perception of depressive symptoms both before and after beginning the physical activity program. In the program evaluation, I assessed the effectiveness of exercise in reducing depressive symptoms in the older adult. The PHQ-2 was administered pre exercise and post exercise. The PHQ-2 is a validated, concise, self-administered tool for assessing depression. I used the PHQ-2 to inquire about the degree to which an individual has experienced decreased mood and sadness over the past 2 weeks. The PHQ-2 consisted of two questions to which the participants answer yes or no (Spitzer et al., 1999). The results of the depressive symptom screening were reported as percentages of those participants who reported more or less depression before and after

initiation of the physical activity. The demographic frequencies of the participants are displayed in a table.

Approach and Rationale

The quality model used was the PDSA, a QI tool that is effective for creating and initiating system improvements aimed at enhancing patient education and counseling. Using this quality improvement tool enhanced the safety and quality of the program (Varkey et al., 2009). The PDSA consists of four steps and for the purpose of this program the steps were as follows:

Step 1: Plan

With the collaboration of the center director and the activities coordinator, the members of the senior center, older adults aged 60 or older, received a presentation about the benefits of a physical activity program on symptoms of depression. This informational program consisted of a Power Point presentation, a decorated bulletin board, and brochures about physical activity and depression. A convenience sample of volunteer older adult members was used in the project. Convenience sampling generally assumes a homogenous population, and it may be used with the available population and it saves time and cost.

Step 2: Do

The collection of beliefs about the benefits and barriers of physical activity was done using the EBBS survey, and demographic information was obtained after subjects gave their assent. The depressive symptoms of the older adults were measured using the PHQ-2 survey pre and post exercise. The participants tracked walking 3 times a week for

2 months using pedometers to record their number of steps. Participants were asked to record day and times of walking on the forms provided.

Step 3: Study

Data obtained from the EBBS were compiled and reported in the percentages and frequencies of participants who reported more or less knowledge of the benefits and barriers of physical activity. The data from the PHQ-2 were collected before and after initiation of the physical activity program. The demographic frequencies were displayed in a table.

Step 4: Act

The evaluation of the physical activity intervention and determination of any changes or modifications was done as needed. If this project is successful, the physical activity walking intervention will be used for older adults who are inactive and who may demonstrate depressive symptoms.

Population and Sampling

I evaluated a QI physical activity program that was offered to older adults. The senior center participants and target population of this project were, on average, age 75 years, and the majority of them were Caucasian. The project included all seniors over the age 60 years who volunteered to participate in the survey program. Approximately 70% of the participants were women, and half of them lived alone. In comparison to their peers, senior center participants had higher levels of health, social interaction, and life satisfaction and lower levels of income. Seventy-five percent of the participants visited

the senior center one to three times a week and spent an average of 3.3 hours per visit (National Council On Aging, 2014).

In this geographical area of West Virginia, there are 4,003 citizens over the age of 60 years, and the prevalence of physical inactivity was higher than the national average {28.4% to 24.6%} (West Virginia Psychological Association, 2013). The prevalence of physical inactivity in this geographical area increased the incidence of anxiety and depression in the adult population as a whole (WVPA). A convenience sample of older adults (age 60 or greater) who participated in a northern West Virginia senior center was used. Convenience sampling allowed me to obtain a sample of the older adult population at the senior center.

The senior center in this geographical location provided assistance to residents, age 60 and older. The center was open Monday through Friday from 8:00 am to 4:00 pm. Services offered by the senior citizen's center are available to all persons regardless of race, religion, creed, or national origin. The center held satellite meetings throughout the county, and seniors could attend any or all of the various meetings. The senior center provided transportation to doctor appointments as often as needed, beauty shops/barbers, and grocery shopping once a week. Aides are employed to provide up to 60 hours a month of personal care, like bathing, dressing, meal preparation, and some environmental services like laundry and light housekeeping in order to enable elderly and disabled persons to remain in their homes and to be independent as long as possible. Senior citizens with Alzheimer's disease may receive up to 16 hours a week of in-home respite

care for a small fee that is based on income. The center also provided assistance with insurance and Medicare questions (Marshall County Senior Center, 2014).

The senior citizen centers are partially funded by the West Virginia Bureau of Senior Services, Northwest Area Agency on Aging, and the County Commission. The senior center membership fluctuates and consisted of about 25 active members who attend most activities. Older adults who attend senior centers in community settings throughout the United States do so for a variety of reasons. Senior centers offer a range of services such as meals, health education and wellness program, information and referrals as needed, and diverse social activities (Gunta et al., 2012). Most of the older adults who participate in senior center activities tend to be White, non-Hispanic women, and this was the major representation of older adults in this project. White men are less likely to participate in senior center activities.

I recruited members for the walking activity through collaboration with the senior center director and the activities coordinator. The center held a monthly potluck dinner that involved most of the members. In addition to dinner, the monthly meetings consisted of an informational program. It was proposed that the benefits of physical activity, like walking, and its effect on depressive symptoms, be presented during this monthly gathering. This event was suggested by the activities coordinator as the best venue for the presentation of the program as the members of the center are already gathered and available. The criteria for inclusion in the project was any senior center member over the age of 60 year who was able to walk three times a week and who was willing to participate in the walking activity tracking.

Data Collection

Institutional review board approval for the project was sought from Walden University, and permission to conduct the project at the senior center was obtained from the director of the senior center. Participants' data in the project were de-identified. Participation in the study was voluntary, and the subjects could withdraw at any time without penalty or consequence. Most of the older adults attended the monthly potluck dinner meeting at the senior center. This venue was used to invite the seniors to participate in the project and to inform the members about the project. The project director invited seniors to participate who met the program requirements. The director discussed the program with interested seniors and answered any questions. If the subject accepted the pedometer and packet, they deemed their assent to participate in the study.

Any senior wishing to participate was then asked to complete the demographic questionnaire consisting of age, gender, educational status, marital status, and prior exercise activity. Some of the seniors already participated in physical activity, and this information was collected on the demographic form. The frequency of participants' existing exercise participation prior to this project was documented on the demographic table. Beliefs and barriers to physical activity as perceived by older adults were collected via the EBBS questionnaire. These questionnaires were completed at the monthly dinner meeting and took approximately 20 minutes to administer. The subjects answered the questions using a pencil. The information from the survey was reported in the frequencies of the demographics of the participants, and the answers to the EBBS were reported as percentages.

In order to ascertain depressive symptoms, the participants in the activity program were surveyed pre and post exercise using the PHQ-2 tool that had two questions and took approximately 2-3 minutes to complete. The data from the PHQ-2 were reported in frequencies. Demographic forms were coded to match the appropriate pre exercise EBBS and pre/post exercise PHQ-2 questionnaires. The forms were collected by the project director and stored securely in a locked cabinet in the director's office. In order to inform the older adults about the benefits of physical activity on depressive symptoms, a program was then presented to all seniors at the potluck dinner that consisted of a short, informational Power Point presentation supplemented with brochures and a decorated bulletin board. Post program data were collected at the end of the program at a potluck dinner at the senior center, and all participants were asked to attend.

In order to motivate older adults to participate in the walking program, they were given pedometers to assess their current level of physical activity. The pedometer works by a horizontal, spring-suspended lever arm that moves up-and-down with each step, effectively opening and closing an electric circuit that will count steps (Bassett et al., 2010). Participants were instructed to wear the pedometer on their belt or waistband and were told to use the pedometer as they walked during the project. The subjects were also encouraged to record the time they put on and took off the pedometer and to record the number of steps on forms provided in the packet given to the subject (Bassett et al., 2010).

Instruments

EBBS Survey (Appendix B)

The EBBS survey was administered to the older adults prior to the educational component of the quality improvement project. The EBBS measured the perceived benefits and perceived barriers of engagement in physical activity and consists of 43 questions. The EBBS asked 29 questions about the benefits of physical activity, such as physical activity is enjoyable, physical activity makes me feel better, physical activity decreases stress, physical activity prevents heart attacks, physical activity improves muscle tone, physical activity provides relaxation, physical activity improves social contacts with people, and physical activity prevents high blood pressure. In the 14 questions about barriers, I asked participants their perceptions of whether physical activity takes too much time, causes fatigue, distance to physical activity site is too far, causes tiredness, family does not encourage participation, and it is too difficult. The subject was asked to rate his or her agreement to perceived benefits and perceived barriers. The EBBS is a recommended instrument to use to assess the perceptions of benefits and barriers about physical activity (Victor, Ximenes, & de Almeida 2012). I used the EBBS questionnaire to collect information on a 4-point Likert scale (*strongly agree, agree, disagree, strongly disagree*). There were 14 barrier items and 29 benefit items with higher scores on each indicating greater perceived benefits or perceived barriers (Brown, 2005). The reliability and validity of the EBBS was tested in a study of the elderly (Victor et al., 2012). Victor et al. found the EBBS to be reliable and valid, the

Cronbach's alpha was 0.94, and the test-retest reliability was 0.60 when used to measure the perception of the elderly about benefits and barriers of physical activity. The survey results were presented as frequencies and percentages in a table.

The Patient Health Questionnaire (Appendix C)

The PHQ-2 survey included the first two items of the PHQ-9. A PHQ-2 score ranged from 0-6 and 3 was identified as the cutoff score for depression screening. The respondents were asked two questions about whether or not they had been bothered by any of the following problems over the past 2 weeks: (a) little or no interest or pleasure in doing things and (b) feeling down, depressed, or hopeless (Spitzer et al., 1999). The PHQ-2 cutoff score of 2 has 0.86 sensitivity meaning that 86% of the participants who do not have depression will have a positive score. The PHQ-2 has 0.78 specificity meaning that 22% of those without depression will have a positive score (Arroll et al., 2010). The PHQ-2 was administered to those older adults who participated in the physical activity program pre-exercise and again 2 months later post exercise. Older adults who reported depressive symptoms prior to exercising will have improvement in scoring on the post exercise PHQ-2. The desired outcome of the QI project was improvement in the depressive symptoms of older adults after participation in an exercise program.

Demographic Questionnaire (Appendix A)

Demographic information was obtained through use of a self-developed questionnaire. Demographic information related to age, race, educational level, marital status, and prior exercise behavior was collected and coded. The results were reported in a table delineating frequencies and percentages of the demographic information.

Physical Activity Record (Appendix D)

A record of physical activity was self-developed for the participants to use in the documentation of activity. Subjects were asked to record days and times of participation in the exercise program. The data from the physical activity record were reported in a table as frequency and percentages of each participant's activity.

Program Evaluation

The purpose of the program evaluation was to determine if participation by older adults in the physical activity program decreased prevalent symptoms of depression. The goal of the QI program was to decrease depressive symptoms in older adults. To measure the impact of a physical activity intervention on depressive symptoms in older adults, it was necessary to determine if the participants had depressive symptoms prior to physical activity engagement (Brosse, Sheets, Lett, & Blumenthal, 2002). I used the PHQ-2 survey in a pre and posttest design to determine the prevalence of depressive symptoms in the participating older adults. The PHQ-2 survey was administered pre-exercise engagement and again post exercise at the conclusion of the 2-month physical activity program. The desired impact was the older adults who had a positive score on the PHQ-2 survey pre-exercise engagement would have lower scores on the post exercise survey. The primary outcome measure was the change in PHQ-2 scores from baseline (pretest) and 2 months (posttest). If the scores were improved post exercise, then exercise may be effective in decreasing depressive symptoms in older adults.

Conn et al. (2010) found that physical activity was related to positive mental health outcomes. The results produced a standardized mean effect size of 0.372 of 38

supervised physical activity interventions and 0.522 of 22 unsupervised physical activity studies. Conn et al. suggested that unsupervised physical activity might be more effective when used in center-based physical activity. Conn et al. concluded that physical activity interventions reduce depressive symptoms even in those adults who are not clinically depressed. Therefore, the QI program on determining if physical activity decreased depressive symptoms in older adults may promote quality health outcomes.

Summary

A QI physical activity program was introduced to a group of older adults in a West Virginia community senior center to decrease depressive symptoms. The program consisted of a short informational session that educated the older adults about the benefits of physical activity on depressive symptoms. Depressive symptoms were assessed by the PHQ-2 survey using a before and after approach. Knowledge of the benefits and barriers to exercise was determined by administration of the EBBS survey pre-exercise implementation. The results of the surveys were reported as percentages and frequencies. The QI project consisted of an evaluation of a walking program where participants wore pedometers to count steps and involved walking 3 times a week for 2 months. The long-term outcome of the QI project was sustainability of the program over time and a decrease in pervasive depressive symptoms of older adults.

Section 4: Findings, Discussion, and Implications

Introduction

The purpose of this QI program evaluation was to determine if older adults who attended a senior center in northern West Virginia and participated in physical activity, like walking, had an improvement in depressive symptoms. In the project question, I asked whether participation in physical activity improved depressive symptoms in older adults, aged 60 or older, who attended a senior center in northern West Virginia. QI projects are aimed at effecting favorable outcomes in the target population. In order to evaluate the outcome of the QI program for improving depressive symptoms in older adults by the use of physical activity, the PDSA model was used. The PDSA model began with identifying the behavior that for this project was the use of physical activity to improve depressive symptoms of older adults. I wished to determine the strategies to encourage physical activity and to measure the perception of depressive symptoms both before and after the physical activity program. The objectives of this project were as follows:

1. Determine prior behaviors of older adults related to physical activity by administering the EBBS survey to seniors prior to starting the exercise program
2. Evaluate a physical activity walking program
3. Assess for improvement in depressive symptoms of older adults pre and post program as determined by the results on the PHQ-2 survey.

One psychosocial condition was depression in older adults as a result of sedentary lifestyles. The practice issue was depression in older adults and why older adults do not participate in physical activity despite evidence that engaging in regular physical activity helps decrease adverse health outcomes. There has been no improvement in the levels of physical activity among older adults over the past 10 years in the United States (AHRQ, 2013). Therefore, in this project, I focused on whether engaging in physical activity, like walking, improved depressive symptoms in a small group of older adults, aged 60 years and older, who attended a local senior center.

A self-developed demographic tool was used to collect the variables of age, sex, marital status, educational level, and any previous exercise (Table 1). The effectiveness of exercise in reducing depressive symptoms in the older adult was assessed by use of the EBBS. The EBBS consisted of 43 questions that measured the perceived benefits and perceived barriers of engagement in physical activity. The EBBS was administered pre implementation of physical activity monitoring to determine participants' beliefs about benefits and barriers of exercise. The participants found exercise to be beneficial in the areas of physical performance and psychosocial aspects (Figures 1 and 2) with fatigue being the leading barrier to exercise (Figures 3 and 4).

The physical activity record depicted the time and number of steps using pedometers that were accomplished by the participants over the implementation period (Table 4). The PHQ-2 was administered pre exercise and post exercise and inquired about the degree to which an individual had experienced decreased mood and sadness over the past 2 weeks. The PHQ-2 consisted of two questions to which the participants answered

yes or no (Spitzer et al., 1999). The PHQ-2 scores ranged from 0-5 and using a score of 2 or higher resulted in more depressed people being identified. The results of the PHQ-2 (Table 3) in this project indicated that 40% of participants having depressive symptoms pre-exercise had no depressive symptoms post exercise. I found that engagement in physical activity improved depressive symptoms in a small group of older adults attending a local senior center.

Discussion of Findings

Demographics

The participant sample size of older adults aged 60 years and over who attended the local community senior center was 85 members. The participants were asked to volunteer by the senior center activities director. This age group was included due to the prevalence of this population at the senior centers and because the project problem related to this group as well. Because the project involved physical activity, the population was limited to those who were willing to keep track of their activity and who could complete the survey tools over a 2-month period. Of the potential sample pool, 43 older adults volunteered to participate in the project. A total of 15 surveys were returned at the end of 2 months with a total completion rate of 35%.

The analysis included the 15 senior center surveys that were completed by the members. There were 11 females (73%) and four males (27%). The age of the participants ranged from 60-74 years with an average age of 67 years. Over half (53%) of the participants were married, while 13% had never been married, 20% were divorced, and 13% were widowed. Nearly 33% of the respondents had college degrees, 33% had a

graduate degree, and 27% had some college, while the remaining 7% graduated from high school. Eighty percent of the respondents reported having previously participated in some form of exercise, and 20% had no previous exercise. The demographic information from those participants (*n*=15) that completed the project was reported in Table 1.

Table 1

Sample Characteristics (n = 15)

Characteristic	Frequency	Percent
Age		
60	4	27
65	2	13
66	1	7
67	1	7
68	1	7
71	1	7
72	2	13
73	2	13
74	1	7
Sex		
Female	11	73
Male	4	27
Marital Status		
Single	2	13
Married	8	53
Separated	0	0
Divorced	3	20
Widowed	2	13
Educational Level		
Less than High School	0	0
High School	1	7
Some college	4	27
College degree	5	33
Graduate degree	5	33
Previous Exercise		
Yes	12	80
No	3	20

Note: n = number of participants responses

Results of EBBS: Prior Behaviors of Older Adults Related to Physical Activity

The pre implementation data from the EBBS survey instrument results were analyzed to ascertain the participants' beliefs about the benefits of and barriers to exercise. The instrument had a 4-response, forced-choice Likert-type format with responses ranging from 4 (*strongly agree*) to 1 (*strongly disagree*); this instrument along with permission letter from the author are located in Appendix B. The Benefit Scale physical performance items are 7, 15, 17, 18, 22, and 23; psychosocial items are 8, 10, 13, 20, 26, 27, 29, 32, 35, 36, 38, and 39; body characteristics items are 31, 41, and 43; psychological outlook items are 1, 2, and 3; and social interaction items are 11, 25, 30, 34, and 5. Barrier scale items are reverse-scored, and items on the barrier scale exercise milieu items are numbers 12, 14, and 28; family encouragement items are 21, 33, 6, and 19; time expenditure items are 4, 24, and 37; and facility obstacles items are 9, 16, 42, and 40. Scores on the total instrument may range from 43 to 172. The higher the score, the more positively the individual perceives exercise (Sechrist et al., 1985). The participants' actual total score ranges on the EBBS are reported in Table 2.

Table 2

Participants' Actual Scores on EBBS (n=15)

Item	Actual Scores	Scores Possible
Complete EBBS	95-158	43-172
EEBS Benefits	37-107	29-116
EBBS Barriers	35-56	14-56

Note: *n*=number of participant responses

The participants (Table 2) on the complete EBBS (*n*=15) found exercise to be beneficial. The actual question responses (Figures 1 and 2) regarding the physical performance indicated that 90% of the respondents found this benefit of exercise to be the most important. Seventy-six percent of the responses referring to psycho-social aspect were also noted as beneficial. Eighty-two percent of the participants found benefit in body characteristics while psychological outlook elicited 86% and 76% indicated social interaction as beneficial. The higher scores in the benefit range may be accounted to the fact that 80% of the participants had a history of prior exercise. In the Figures 1 and 2 below, blue indicates *strongly agree* and *agree* responses while red indicates *disagree* and *strongly disagree*.

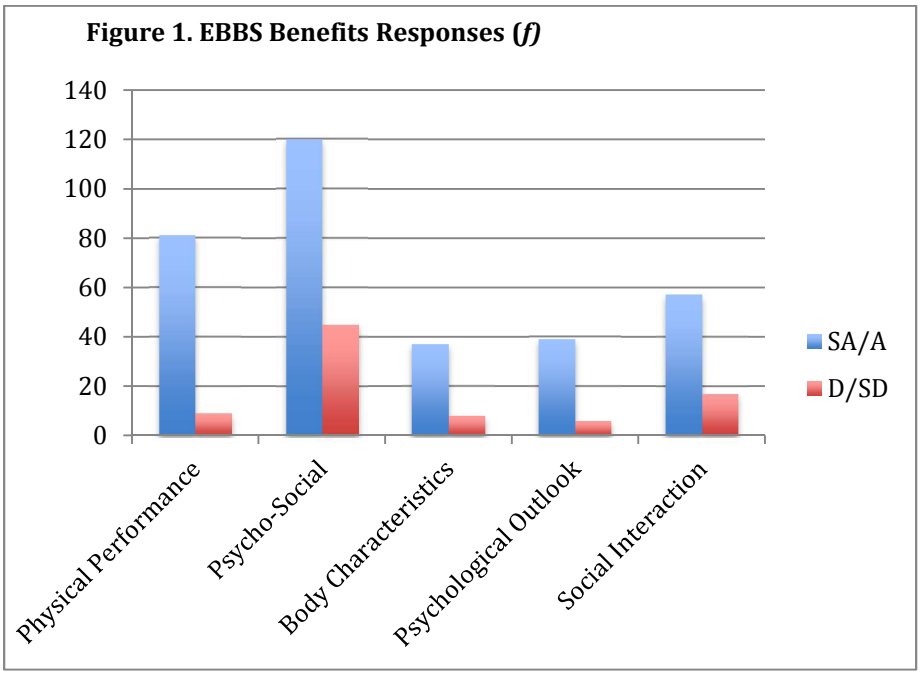

Figure 1. EBSS benefits responses

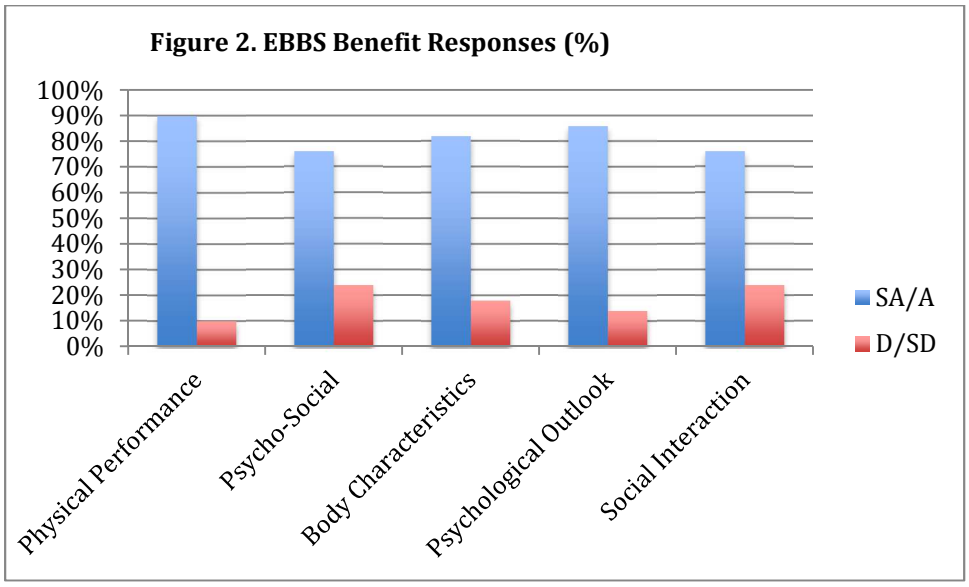

Figure 2. EBSS benefits responses

The range of responses (Figures 3 and 4) on the barrier scale indicated that some participants had barriers to exercise. Fatigue (50%) was the most reported barrier to exercise perceived by these participants. Four (10%) of the participants indicated exercise milieu as a barrier while 41 (90%) responses disagreed. Five (33%) participants reported that lack of family encouragement presented a barrier to exercise and 10 (67%) disagreed. Additionally, four (10%) participants agreed that time expenditure was a barrier while 41 (90%) responses disagreed. Ten (24%) participants indicated that facility obstacles presented a barrier but 45 (76%) disagreed. Because no information was requested on the surveys about the participants' state of health, it is difficult to determine the reason for exercise causing fatigue in these participants. In the Tables 3 and 4 below, responses in blue indicate *Strongly Agree* and *Agree* while responses in red indicate *Disagree* and *Strongly Disagree*.

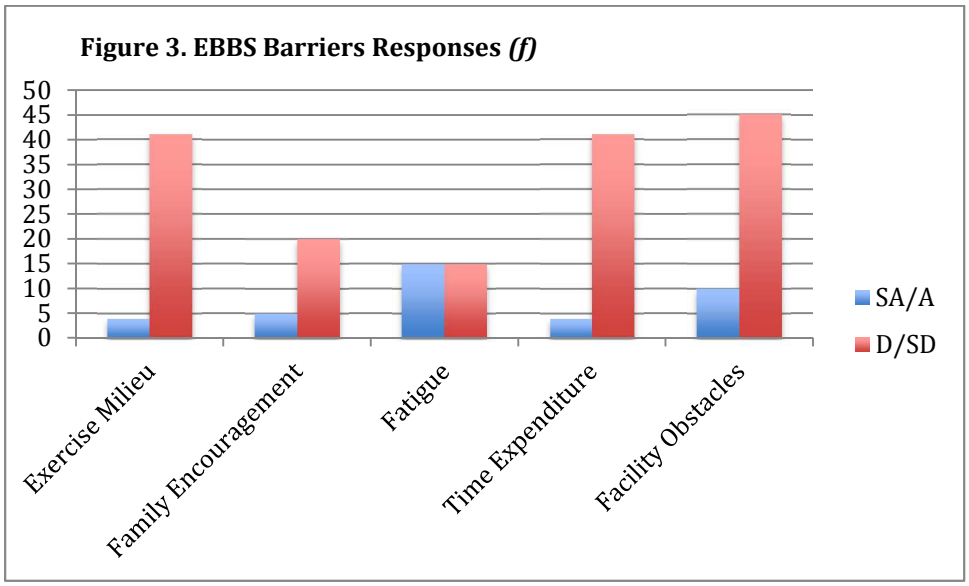

Figure 3. EBBS Barriers Responses

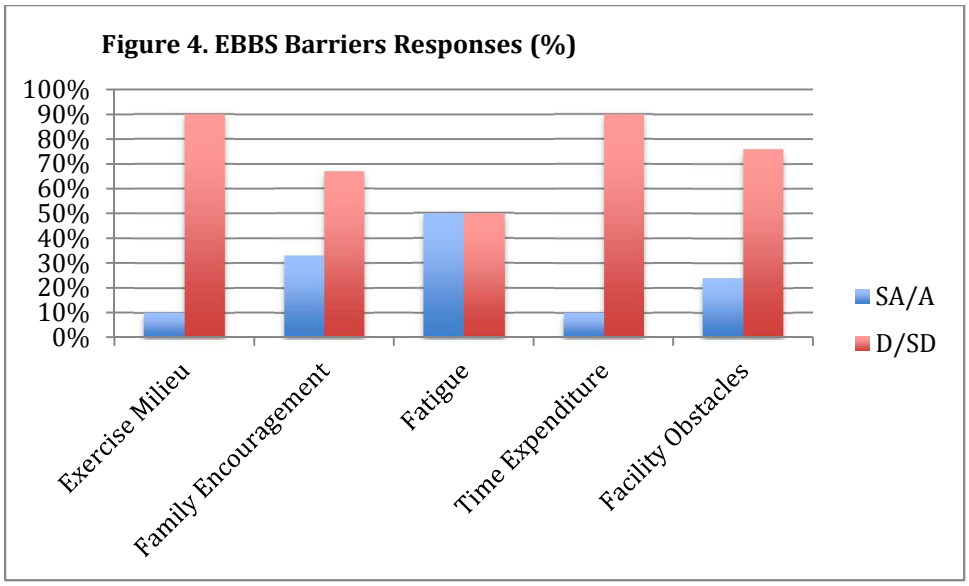

Figure 4. EBBS Barriers Responses (%)

Age does not seem to be a factor in total scores (Figure 5) of participants on the EBBS as the lowest benefit score was reported in a 68 year old with the highest score in a 71 year old. The highest total score on the barrier scale was indicated in a 71-year-old and the lower score in two 60-year-old individuals. Furthermore, history of previous exercise (Figure 6) did not affect the total EBBS scores as the total participant scores are well within the possible range of EBBS scores. It may be presumed that these participants are well informed about the benefits of exercise as 80% had a previous history of exercise.

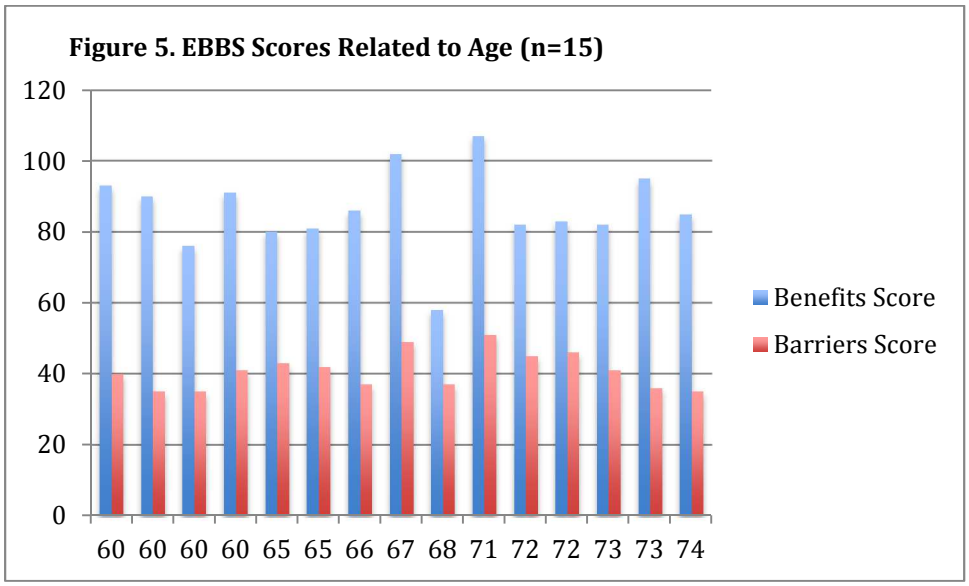

Figure 5. EBBS Scores Related to Age (n=15)

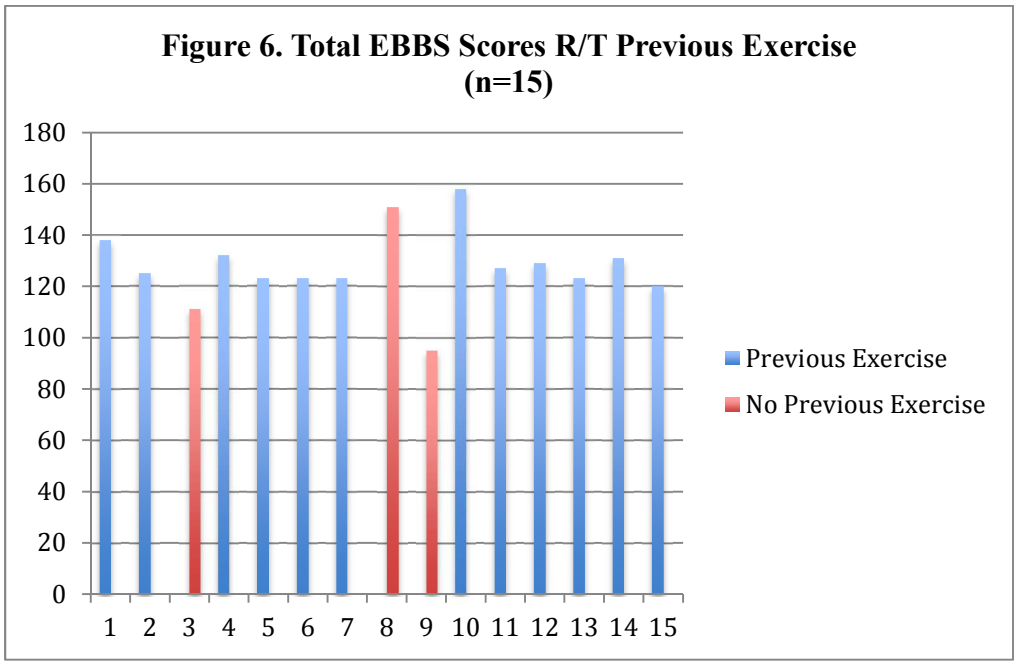

Figure 6. Total EBBS Scores R/T Previous Exercise (n = 15)

Evaluation of the Physical Activity-Walking Program

The Activity Logs of participants were analyzed for the time, number of days exercising, and number of steps and/or distance walked. Interestingly, some participants noted other activity in addition to walking. One respondent spent a considerable amount of time in the two month period "raking leaves" while others reported cycling and working with weights. Two (13%) participants wore the pedometer all day and reported eight hours of activity. Table 6 reports the total number of days with physical activity, average duration of total activity along with type of activity, and average number of steps and/or distance of activity. The goal for the project was tracking activity 3 times a week for two months for an average of 24 days and 5 (33%) participants met this goal. The

lowest number of days reported by a participant in activity tracking was 11 days (46%) and one tracked activity for 28 days (117%). The mean number of days of tracking activity was 20 days (83%). The mean number of active minutes spent walking was 111 minutes. The U. S. Department of Health and Human Services' Physical Activity Guidelines in 2008 recommended that older adults should maintain at least 5,000 steps/day (Elsway & Higgins, 2010). The mean number of steps in this project was 3,788 steps/day. Two of the participants reported 8 hours of activity tracked with a range of the lowest at 324 steps/day and the highest at 5,783 steps/day. Three (20%) of the participants exceeded the recommended goal of 5000 steps/day with step totals of 5,488, 5,783, and 5,210 steps/day.

Table 3

Physical Activity Record of Log Results (n=15)

Average Duration of Total Activity and Average # of Steps or Distance

Participants #	Total of Days	Duration of Activity Total		Steps/Distance Total
1	24	25 min	Walking	3243 steps/day
				1.16 mi./day
2	24	40 min	Walking	2000 steps/day
			Weights	1 mile/day
3	22	179 min	Walking	4116 steps/day
		782 min	Cycling	3 miles/day
4	21	330 min	Raking	
		34 min	Walking	3583 steps/day
5	20	41 min	Walking	4860 steps/day
6	24	30 min	Walking	3 miles/day
7	12	34 min	Walking	4839 steps/day
8	12	33 min	Walking	5488 steps/day
9	24	76 min	Walking	1.75 miles/day
10	24	50 min	Walking	2892 steps/day
11	11	8 hours	Walking	324 steps/day
12	14	36 min	Walking	3494 steps/day
13	28	8 hours	Walking	5783 steps/day
14	19	74 min	Walking	3898 steps/day
15	21	56 min	Walking	5210 steps/day

Outcome Data: Evaluation of PHQ-2 Participant Responses

The participants were surveyed pre- and post-exercise using the PHQ-2 survey instrument. They were asked to complete the PHQ-2 prior to beginning documenting activity and at the end of two months. Fifteen participants completed the activity at the end of two months. The results of those completing the survey are presented in Figure 7. On the pre-exercise PHQ-2 survey, six (40%) participants reported depressive symptoms

on several days a week for a total score of 2 points each while one (6.7%) participant reported depressive symptoms nearly every day for a total score of 5 points. On the post-exercise survey, two (13%) of those participants reported depression on several days a week for a total score of 2 points each while five (33%) others reported no depression at all. The remaining eight (53%) participants reported no depressive symptoms on both pre and post exercise surveys.

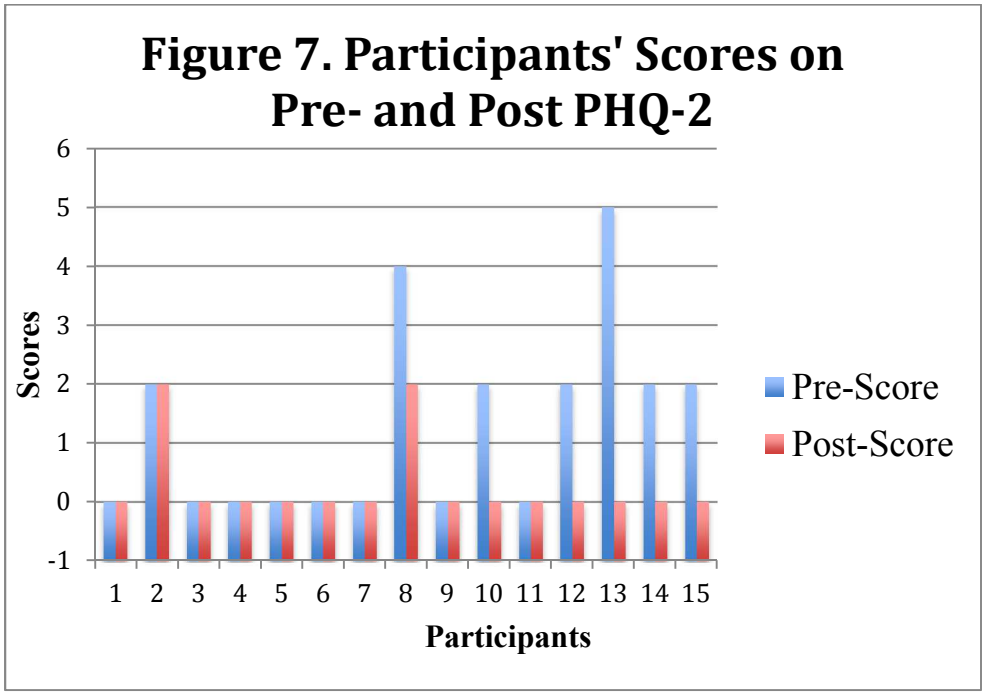

Figure 7. Participants' Scores on Pre and Post PHQ-2

Figure 7 depicts graphic visualization of the pre-exercise and post-exercise of the participants on the PHQ-2. The graph demonstrates the decrease in depressive symptoms of the six (40%) participants that reported depressive symptoms on the pre exercise PHQ-2. Two (13%) of the respondents' scores remained the same with no change in depressive symptoms. The most encouraging result was one participant reporting no depressive

symptoms on the post exercise PHQ-2 after attaining a score of 5 on the pre exercise PHQ-2.

Discussion of Findings in the Context of Literature and Framework

The findings of this QI program lend support to the assertions of Jancey et al (2009) that it is important prior to instigating a physical activity program to find out what perceptions older adults may have about physical activity. If older adults are informed about the benefits of physical activity on depressive symptoms, they are more likely to engage in this activity. The perceived benefits and barriers to physical activity participation by older adults were assessed using the EBBS.

This survey was used in the QI program evaluation reflecting that the majority of these participants found exercise to be beneficial pre-implementation of the activity tracking. Seventy-six percent of the older adult participants in this project perceived that exercise was beneficial to their psychosocial wellbeing while 90% indicated that exercise enhanced their physical performance. The area of improved body characteristics (82%), such as physical endurance, overall body functioning, and improvement in way body looks were also perceived as beneficial. In the psychological sense, 86% of the respondents found exercise enjoyable, perceived exercise decreased feelings of stress and tension, and felt that exercise improved their mental health. Social interaction (76%) was an important aspect of exercise that was perceived as beneficial by the participant by allowing them to have contact with friends and persons they enjoy, improving disposition, meeting new people, increasing mental alertness, and preventing heart attacks by exercising.

Further evidence supported that of Robertson et al. (2012) and Pasco et al. (2010) indicating the benefits of physical activity/exercise as a means for improving depressive symptoms. This project showed improvement in the depressive symptoms of five of the participants that reported pre exercise depressive symptoms. The incidence of depression after age 60 has been shown to have a seventy percent recurrence in two years and exercise activity may prevent recurrence (Blake, Mo, Malik, & Thomas, 2009).

The PHQ-2 can be a useful and timesaving tool in assisting with screening for depression (Arroll, Goodyear-Smith, Crengle et al., 2010). The findings in this QI program evaluation demonstrated that the PHQ-2 is very useful in screening for depression. Although 8 (53%) of the participants in this program did not indicate depression on the survey, the remaining 7 (47%) indicated some days of depressive symptoms. All but 2 (13%) of these participants indicated they had improvement in depression after exercise activity.

Pender's health promotion model is based on theoretical propositions that include the statement that people commit to engagement in those behaviors from which they will derive benefit (Pender et al, 1988). The participants in this quality improvement program evaluation perceived benefit from participation in exercise. Likewise, if the person perceived barriers to exercise than there is constrained commitment to action, thus limiting their actual behavior. Fifty percent of the participants in this quality improvement program evaluation perceived fatigue as the primary barrier to exercise. The 15 participants that completed this quality improvement project had a score range

that was within the possible score range of the EBBS. Therefore, these 15 participants perceived exercise as beneficial and elected to complete the activity program.

Implications

Implications on Practice

Screening for depression in individuals, like older adults, will enable the primary care or public health practitioner to assess patients who do not report symptoms. Using a depression-screening tool, such as the Patient Health Questionnaire, is appropriate for the older adult. The treatment of older adults by a qualified mental health professional may include programs that offer alternatives, such as, physical activity that can be done in the home. Programs like IMPACT (Improving Mood-Promoting Access to Collaborative Treatment) may be offered to patients. Those who receive this program have access to trained professionals, and are urged to engage in physical activity (CDC, 2009). Therefore, older adults should be screened in various settings to evaluate the need for alternative methods of decreasing depression and improving overall wellbeing.

Implications for Future Research

This QI evaluation may serve as a foundation for other nursing professionals to perform more extensive research in the use of physical activity to improve depression in older adults. As the population ages in the United States, there is a tremendous need for research that involves the older adult, especially in the areas of maintaining flexibility, as well as preventing injuries and depression. Future research may use the input of caregivers in screening older adults and assistance with daily physical activity.

Additionally, future studies need to involve longer periods of time and use of a larger population in order to allow generalizability.

Implications on Social Change

A potential positive social change that could result from this project is older adults may achieve better quality of life and improved physical/mental health outcome after walking activity participation due to decreased depressive symptoms. Regular physical activity can maintain function, state of mind, and independence in older adults. Engaging in physical activity can help older adults to take part in community activities, enabling them to maintain relationships and initiate new friendships, thus preventing loneliness and depression (Singh & Misra, 2009). By pursuing better social networks that incorporate physical activity, thus reducing depression, older adults may have improved cognition (Vance et al, 2005).

Project Strengths and Limitations

Strengths

One of the strengths of this project was the willingness of the older adults to participate and complete the surveys over a two-month period. The quality improvement program evaluation relied on data obtained by a local community Senior Center over a two-month period. The data from surveys obtained the members' perceptions of the benefits and barriers to physical activity/exercise, demographic variables, depressive symptoms both pre and post exercise, and physical activity records over 2-months were analyzed. Strengths of the program evaluation were the survey instruments used to evaluate benefits and barriers to exercise (EBBS) and screening for depressive symptoms

(PHQ-2) were reliable and valid instruments. Another strength of the evaluation was the range in age of the older adult participants with ages ranging 60-74 years of age. An additional strength was the variance in age gave a diverse range of perceptions about the benefits and barriers to exercise. The strength of this quality improvement program would benefit from inclusion of a larger number of older adults.

Limitations

The quality improvement program evaluation results were limited due to the small number of participants (n=15) that submitted completed survey items. At the implementation stage, 43 adults agreed to participate in the program but only 15 actually returned the surveys at the end of the 2-months. Another limitation was that some of the participants were not able to keep track of activity over the 2-month period. The majority of the participants did not claim to have depressive symptoms but did perceive exercise as beneficial. Future evaluations could include surveying those older adults that did not have previous exercise experience. The limitations of this quality improvement program would be decreased by inclusion of a larger group of older adults.

Analysis of Self

As Scholar

This DNP project development has immensely increased my skills in developing and implementing quality improvement projects, clinical scholarship, and in scholarly writing. The goal of obtaining a terminal degree has been my dream for most of my professional life. I will be able to fulfill my dream with the completion of the DNP. In the role of DNP, I have become more confident in my academic and practitioner roles. I find

myself researching problems of the patient I see and of the students I teach. I am always looking for new ideas or refining old ones every time I read a research article or study. Therefore, the future is unlimited as I pursue additional clinical scholarship opportunities.

Additionally, I am now involved in a research study with a PhD colleague involving obesity and physical activity in children of rural WV Appalachia. My experience as a DNP scholar has helped in the task of dissemination of knowledge. I have presented a poster about my DNP Project at a rural health conference in West Virginia. As a result, with the completion of the DNP Project, I am more confident to present additional posters and to publish articles about my project topic, disseminating this important information.

As Practitioner

This project has increased my knowledge and skill as family nurse practitioner. I continue to practice as a family nurse practitioner seasonally in the pipeline construction medical clinic. Additionally, I teach full-time online in an FNP program at a small private university in West Virginia. Having a doctoral degree lends credibility to my role as an educator. Furthermore, pursuing a terminal degree is in line with Institute of Medicine's recommendations for a nurse practitioner.

As Project Developer

In the development of this DNP project, I have become proficient in researching topics I am passionate about. Being an older adult led me to choose the topic of my DNP project, that of determining if physical activity improves depressive symptoms in older adults. In reality, it was more difficult to actually implement the project than it was to

write about it. By persevering, the project was implemented and data collected which led to the completion of the project and the doctoral degree. Each course I completed and each paper I revised helped me reach the goal of completing the project. I now feel comfortable in research and feel like performing more studies. The DNP project development has made me be more objective and fulfilled my lifetime goal.

Summary

A DNP QI project was evaluated to determine if the participation of older adults, 60 years of age and older, in physical activity improved depressive symptoms. The older adults in this project were members of a local Senior Center in a WV community. The evaluation included survey tools that collected demographic information on 15 older adults. Perceived beliefs and barriers to physical activity were collected using the EBBS survey. Ninety percent of the respondents perceived physical performance as beneficial while 76% perceived psychosocial aspects of exercise as a benefit. Fifty percent of the participants found fatigue to be a major barrier to exercise. The older adults tracked physical activity 3 times a week for 2 months and logged their steps on activity log sheets. The average number of steps was 3,788/day with average days tracking of 20 days in a two-month period.

The PHQ-2 questionnaire collected outcome data pre- and post-exercise depressive symptoms from the participants. In the final analysis, 8 (53%) of the older adults had no depressive symptoms while 7 (47%) reported depressive symptoms for several days on the pre-exercise survey. On the post-exercise survey only 2 (13%) of the 7 respondents reported depressive symptoms. Participation in physical activity improves

depressive symptoms in older adults. The outcome of this quality improvement project evaluation supported the evidence that physical activity improved depressive symptoms older adults. Therefore, older adults who are physically active will have a positive social change by improving physical/mental health and quality of life.

Section 5: Scholarly Product Project Dissemination

Physical Activity Improves Depressive Symptoms in Older Adults

Manuscript

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Abstract

Purpose- Evaluation of whether participation in physical activity by older adults improves depressive symptoms.

Methods- Surveys obtained from a local senior center were examined. The surveys analyzed were Exercise Benefits Barriers Scale, pre- and post-exercise Patient Health Questionnaire-2, and Physical Activity Records of senior center members. The data is presented according to frequency and percentage of responses.

Findings- The range of scores on the EBBS revealed that the majority of participants perceived exercise as beneficial with psychosocial aspect (80%) and physical performance (73%) while some perceived barriers such as fatigue (50%). The pre-exercise PHQ-2 scores indicated depressive symptoms in seven participants (47%). The post-exercise PHQ-2 scores indicated little pleasure or interest in doing things for only two (13%) participants and five (33%) indicated no depressive symptoms. The participants' physical activity record indicated an average of 20 days tracking activity over a two-month period and average number of steps was 2,000-5,488. Three (20%) participants exceeded the recommended goal of 5,000 steps/day.

Conclusions- Physical activity has a positive effect on depressive symptoms in older adults supporting previous studies indicating the benefits of physical activity on improving depressive symptoms.

Key Words- *depression, exercise, older adults, physical activity*

Physical Activity Improves Depressive Symptoms in Older Adults

Older adults are at risk for developing depressive symptoms that may be attributed to the inability to perform activities of daily living, living with a disability, having lack of a social support network, and experiencing negative life events such as illness or death of spouse or child (Richardson et al., 2012). Additionally, associated factors for depression include pre-existing mental disorders, like alcohol and drug use, mental health treatment, including psychiatric care or use of medications for psychiatric issues, and sociodemographic factors, such as age, gender, marital status, educational level, household income, and living arrangements (Richardson et al.). These stressors result in a greater risk for developing depressive symptoms. Physical activity has been found to alleviate these symptoms by bringing about an intensive neurobiological adaptation and improving self-concept in depressed people that leads to a decrease in depressive symptoms (Carek, Laibstain, & Carek, 2011). Physical activity triggers endorphins or cortisone that helps people feel good (Carek et al.)

Depression is defined as loss of interest or pleasure in daily activities for more than 2 weeks (Diagnostic & Statistical Manual of Mental Disorders-V Criteria, 2013). Depression in the older adult may be compared to other chronic medical conditions as a risk factor for disability (Meeks, Vahia, Lavretsky, Kulkami, & Jesle, 2011). Late-life depression refers to depressive symptoms experienced in older adults 65 years and older (Alexopoulos, 2005). These depressive symptoms may consist of reduced energy, decreased activity, reduced self-esteem and confidence, feelings of worthlessness, sadness or emptiness, irritability, and sleeplessness (DSM-V Criteria). Depression may

be treated with medication but these drugs also have high side effect prevalence in the older adult (Bottino, Barcelos-Ferreira, & Ribeiz, 2012). Other methods of treatment like cognitive and behavioral therapy have been found to be effective in treating depression but are used less frequently in older adults (Bottino et al., 2012). Therefore, additional methods to aid in decreasing depressive symptoms in the older adult needed explored.

Background

Physical activity engagement in later life is associated with lower risk of subsequent depressive symptoms (Ku et al., 2012). Researchers have supported the protective effects of physical activity on depression for older adults and physical activity also associated with a modest improvement in depressive symptoms in poorly responsive older people (Mather et al., 2002; Strawbridge et al., 2002). Exercise appears to be an effective treatment for depression, improving depressive symptoms comparable to pharmacotherapy and psychotherapy (Blumenthal et al., 2010). Regular physical activity may be a valuable tool in the prevention of future depressive symptoms in older adults (Lindwall et al., 2011). Therefore, promotion of physical activity may aid in decreasing depressive symptoms in older adults.

The World Health Organization (2000) found that globally, depression accounted for 12 % of loss of healthy years and was a major factor in causing disability worldwide (Blumenthal, Smith, & Hoffman, 2012). Physical health has been found to be one of the leading differences in the onset of depressive symptoms in late-life as compared to onset in younger adults (Geerlings, Beekman, Deeg, & Tilburg, 2000). Depression is one of the

most common causes of emotional turmoil in late life and may decrease the quality of life in older adults (Blazer, 2003).

Minor depression, which is characterized by depressive symptoms of depressed mood or anhedonia over a 2-week period, is associated with several adverse health factors and one of them is major depression (Brennes et al., 2007). In some instances, an association between depression and hospitalization was found and depression seems to increase the short-term risk of hospitalizations in some geriatric patients (Sheeran, Byers, & Bruce, 2000). One of the few studies examining the incidence of recorded depression in a large cohort of people in primary care was done to determine incidence and sociodemographic variation in depression and depressive symptoms. This study by Rait et al. (2009), suggested that screening instruments should be used to identify and classify depressive symptoms. Identification of depressive symptoms may lead to better health outcomes (Rait et al., 2009).

Although, there is some indication that depression may become less common and severe in older age, the symptoms should not be overlooked (Fiske, Wetherell, and Gatz, 2009). One study illustrated the need to develop interventions for secondary prevention of depression (Dickerson, Smith, & Ory, 2011). While the identification of depressive symptoms may not be generalizable to the population as a whole, it may symptoms may not be generalizable to the population as a whole, it may be important in developing an intervention for decreasing symptoms in older adults (Sahaf, 2007). It has been suggested by Krogh et al. (2010) that exercise could have s short-term effect on depression.

To support the use of physical activity to alleviate depressive symptoms, studies were identified that correlated depression and physical activity. Using walking as a form of exercise has shown a significant effect on decreasing symptoms of depression in some populations (Robertson et al., 2012). This review clarified the optimum role for health care professionals in delivering walking as an intervention for decreasing depressive symptoms. Physical exercise programs show significant outcomes in decreasing depressive symptoms of older people and incidence of depression after age 60 has been shown to have a seventy percent recurrence in two years and exercise activity may prevent recurrence (Blake, Mo, Malik, & Thomas, 2009). Regular physical activity provides a protection against the risk of developing depressive symptoms and other mental health disorders in older people aged 60 and above (Pasco, Williams, Jacka, Henry, & Berk et al., 2010).

It is important prior to instigating a physical activity program to find out what perceptions older adults may have about physical activity (Jancey et al, 2009). The identification of characteristics that influence adult women's physical activity participation must be done before interventions can be developed (Plonczynski, 2003). The perceived benefits and barriers to physical activity participation by older adults may be assessed using the Exercise Benefits/Barriers Scale (EBBS). The EBBS measures the perceived benefits and barriers of physical activity engagement and may aid in designing a physical activity intervention (Brown, 2005). There are limited studies that report the use of the EBBS to measure the perceived benefits and barriers in physical activity in older adults and further assessment was needed.

Many methods have been reported in the literature for implementing physical activity in the older population. Some of these delivery methods included mailing printed materials, interventions tailored on the computer, delivery of interventions on the Internet, and telephone-delivered interventions (Eakin, Lawler, Vandelanotte, & Owen, 2007). The delivery of a short informational and motivational intervention about physical activity at a key community site, like the Senior Center, has been proposed (Heath et al., 2012). Using printed materials like brochures, decorating bulletin boards, and presenting a Power Point on the benefits of physical activity will aid in the implementation of the quality improvement project. Conn, Hafdahl, & Mehr (2011) suggested that interventions designed to increase physical activity should have an emphasis on behavior strategies, such as setting goals, self-monitoring, cues, and physical activity feedback. By setting up a specific plan of when, where, and how to perform the behavior and also providing informational instruction may be effective in helping older adults make a positive change in self-efficacy and physical activity behavior (Williams and French, 2011).

Bravata et al. (2007) suggested that the use of pedometers is associated with significant increases in physical activity. This increase involved those of older age and having a step-counting device like a pedometer provides an opportunity to monitor daily activity. Determining the number of steps necessary to achieve a benefit is determined by the physical ability of the older adult (Tudor-Locke et al., 2011). For a healthy older adult, the average is about 2,000-9,000 steps/day and for special populations like those with physical disabilities, about 1,200-8,800 steps/day. In this quality improvement project, older adults will be given pedometers to count the number of steps walked a day.

Using pedometers and giving brief instruction about physical activity, through walking programs, has been shown to increase participation in physical activity in sedentary older women (Sugden et al., 2008).

Measuring depressive symptoms before and after exercise involved using a validated screening instrument for distinguishing symptoms of depression in older adults. The Patient Health Questionnaire-9 (PHQ-9) and the Patient Health Questionnaire-2 (PHQ-2) are validated and reliable instruments that detect and measure depression severity in medical populations (Spitzer, Kroenke, and Williams, 1999). The PHQ-2 uses the first two questions of the PHQ-9. The clinical usability of the PHQ-2 is high and it efficiently identifies depressive disorders. The PHQ-2 is a useful and timesaving tool in assisting with screening for depression (Arroll, Goodyear-Smith, Crengle et al., 2010). In summary, the literature examined the incidence and screening of depressive symptoms of older adults, physical activity profile of older people, and common methods to motivate older adults to engage in physical activity programs.

Purpose Statement and Project Question, Goals, and Objectives

The primary purpose of this capstone QI project was to evaluate if physical activity, like walking, improved depressive symptoms in older adults. The project consisted of evaluation of a walking program to determine effect on depressive symptoms. Prior to the activity program, the EBBS survey was administered to determine perceptions of older adults about the benefits and barriers to physical activity. Depressive symptoms were measured using the PHQ-2 survey pre and post exercise and provided information about the symptoms of depression described by the older adults. The subjects

were given pedometers to keep track of steps in the walking program and as a motivational tool to increase continued participation. The project determined whether physical activity led to a decrease in depressive symptoms for older adults.

A relationship between physical activity and depressive symptoms among older adults when adjustments were made for age, education, race, BMI, smoking status, alcohol use, taking psychotropic medications, and chronic medical conditions was supported by Lee, Lee, Brar, Rush, and Jolley, (2014). These findings suggested that physical activity in older adults has a protective factor for decreasing depression (Lee et al.). Identification of issues and perceptions about physical activity was accomplished in interviews of older adults, aged 65-74 years, by Jancey, Clarke, Howat, Maycock, and Lee (2009). The older adults believed that physical activity provided health benefits and felt they needed more information about the benefits of physical activity. Older adults learn by active means and need to acquire skills through demonstration and performance (Davis and Chesbro, 2003). Therefore, this QI project evaluated whether providing education about the benefits of physical activity on depressive symptoms increased awareness of physical activity in older adults.

The goal of this project was to determine if depressive symptoms described by older adults in a senior center located in a small West Virginia community were improved if these older adults participated in physical activity monitoring. Paxton et al. (2010) found that older adults who participated in physical activity may enhance their self-efficacy beliefs for physical activity and improve their mental health. The intervention should provide specific recommendations on when, where, and how a

participant may become physically active (Williams and French, 2011). The objectives of this project were as follows:

1. Determine prior behaviors of older adults related to physical activity by administering the Exercise Benefits Barriers Scale survey to seniors prior to starting the exercise program.
2. Evaluate a physical activity-walking program.
3. Assess for improvement in depressive symptoms of older adults pre and post program as determined by the results on the PHQ-2 survey.

In this project, I determined whether participating in physical activity improved depressive symptoms in a group of older adults, aged 60 years or older, who attended a senior center in a northern West Virginia community.

Method

The QI program was implemented by the senior center on October 1, 2015 with the goal of collecting survey data from members over a 2-month period. A secondary data analysis was performed on surveys that elicited the following: demographic information; EBBS scores that delineated members' perceptions of the benefits and barriers to exercise; depressive symptoms both pre and post exercise using the PHQ-2; and, physical activity records with duration of activity and number of steps or distance of physical activity.

Demographic information, including age, sex, marital status, educational level, and previous exercise, was collected using a self-developed tool. The EBBS instrument has a four-response, forced-choice Likert-type format with responses ranging from 4

(*strongly agree*), to 2 (*agree*), 3 (*disagree*), and 4 (*strongly disagree*). Barrier Scale items are reverse-scored. Items on the Barrier Scale are numbers 4, 6, 9, 12, 14, 16, 19, 21, 24, 28, 33, 37, 40 and 42. Scores on the total instrument may range from 43 to 172. The higher the score, the more positively the individual perceives exercise (Sechrist, Walker, & Pender, 1985). The scores were listed according to the frequencies and percentages of responses.

The participants were surveyed pre- and post-exercise using the PHQ-2 survey instrument. They were asked to complete the PHQ-2 prior to beginning documenting activity and at the end of two months. The PHQ-2 is a validated, concise, self-administered tool for assessing depression. The PHQ-2 inquires about the degree to which an individual has experienced decreased mood and sadness over the past two weeks. The PHQ-2 consists of 2 questions to which the participants answer yes or no (Spitzer, Kroenke, and Williams, 1999). The scoring of 0-6 is indicated below:

Over the past two weeks, how often have you been bothered by any of the following problems?

Little interest or pleasure in doing things.

0 = Not at all

1 = Several days

2 = More than half the days

3 = Nearly every day

Feeling down, depressed, or hopeless.

0 = Not at all

1 = Several days

2 = More than half the days

3 = Nearly every day

Total point score: _____

The results of the depressive symptom screening were reported as frequencies of those participants that reported more or less depression before and after initiation of the physical activity.

The Activity Logs of participants were analyzed for the time, number of days exercising, and number of steps and/or distance walked. Interestingly, some participants noted other activity in addition to walking. The goal for the project was tracking activity 3 times a week for 2 months for an average of 24 days. The participants wore pedometers to keep track of steps and distance walked. The results of the physical activity log are displayed in frequencies.

Results

The data analysis included fifteen completed Senior Center surveys. There were 11 females (73%) and four males (27%). The age of the participants ranged from 60-74 years with an average age of 67 years. Over half (53%) of participants were married, while 13% had never been married, 20% were divorced, and 13% were widowed. Nearly 33% of the respondents had college degree, 33% had graduate degree, 27% had some college while the remaining 7% graduated from high school. Eighty percent of the respondents reported having previously participated in some form of exercise and 20%

had no previous exercise. The demographic information from those participants (n=15) that completed the project was reported in Table 1.

Table 1

Sample Characteristics (n=15)

Characteristic	Frequency	Percent
Age		
60	4	26.7
65	2	13.3
66	1	6.7
67	1	6.7
68	1	6.7
71	1	6.7
72	2	13.3
73	2	13.3
74	1	6.7
Sex		
Female	11	73.3
Male	4	26.7
Marital Status		
Single	2	13.3
Married	8	53.3
Separated	0	0.0
Divorced	3	20.0
Widowed	2	13.3
Educational Level		
Less than High School	0	0.0
High School	1	6.7
Some college	4	26.7
College degree	5	33.3
Graduate degree	5	33.3
Previous Exercise		
Yes	12	80.0
No	3	20.0

Note: n=number of participant responses

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The pre implementation data from the EBBS survey instrument results was analyzed to ascertain the participants' beliefs about the benefits of and barriers to exercise. The instrument had a four-response, forced-choice Likert-type format with responses ranging from 4 (*strongly agree*), to 2 (*agree*), 3 (*disagree*), and 4 (*strongly disagree*). Benefit Scale physical performance items are 7, 15, 17, 18, 22, and 23; psychosocial items are 8, 10, 13, 20, 26, 27, 29, 32. 35, 36, 38, and 39; body characteristics items are 31, 41, and 43; psychological outlook items are 1, 2, and 3; and social interaction items are 11, 25, 30, 34, and 5. Barrier Scale items are reverse-scored and items on the Barrier Scale exercise milieu items are numbers 12, 14, and 28; family encouragement items are 21, 33, 6, and 19; time expenditure items are 4, 24, and 37; and facility obstacles items are 9, 16, 42, and 40. Scores on the total instrument may range from 43 to 172. The higher the score, the more positively the individual perceives exercise (Sechrist, Walker, & Pender, 1985). The participants' score ranges were reported in Table 2.

Table 2: Participants' Scores on EBBS (n=15)

Item	Actual Scores	Possible Scores
Complete EBBS	95-158	43-172
EEBS Benefits	37-107	29-116
EBBS Barriers	35-58	14-56

Note: n=number of participant responses

The actual score range of the participants (Table 2) on the complete EBBS indicated the respondents (n=15) found exercise to be beneficial. The question responses (Figures 1 and 2) regarding the physical performance (90%) benefit of exercise proved to be most important. The responses referring to psychosocial (76%) aspect was also noted as beneficial. body characteristics accounted for 82% of the benefit responses while psychological outlook (86%) *and* social interaction (76%) benefits were also consistently rated as important. The higher scores in the benefit range may be accounted to the fact that eighty percent of the participants had a history of prior exercise. In the Figures 1 and 2 below, blue indicates *Strongly Agree* and *Agree* responses while red indicates *Disagree* and *Strongly Disagree*.

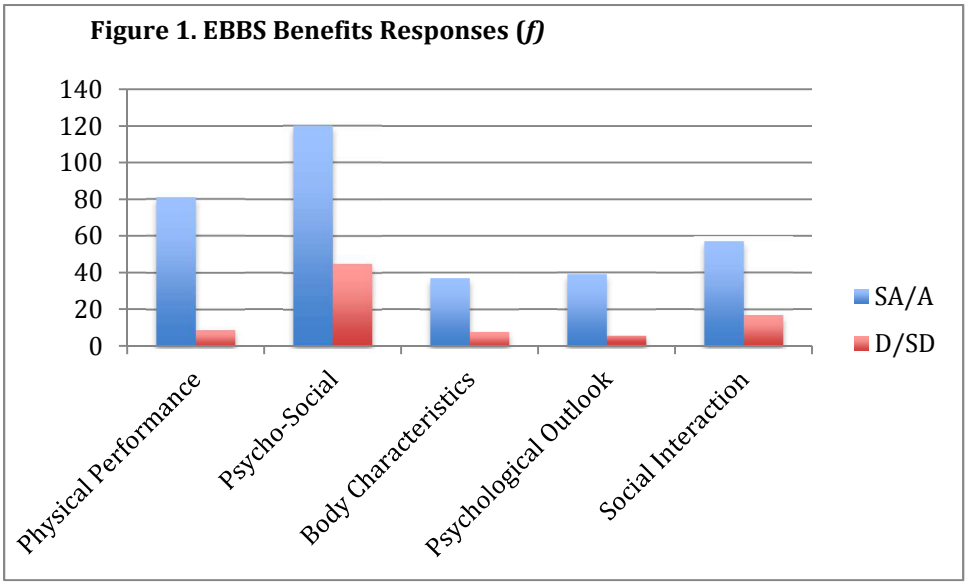

Figure 1. EBBS Benefits Responses

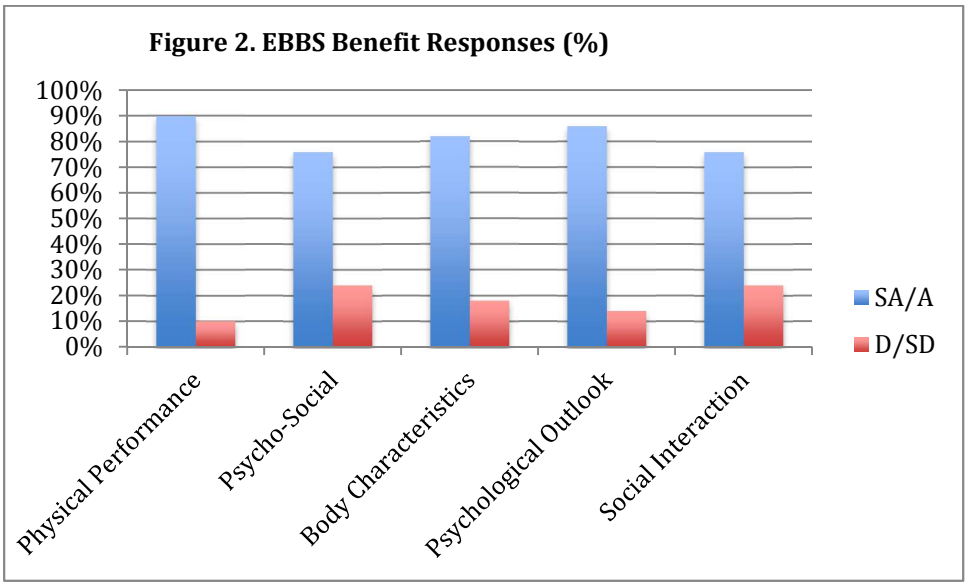

Figure 2. EBBS Benefit Responses

However, the range of responses (Figures 3 and 4) on the barrier scale indicated that some participants had barriers to exercise. Fatigue (50%) was the most reported barrier to exercise perceived by these participants. Four (10%) of the responses indicated exercise milieu as a barrier while 41 (90%) responses disagreed. Five (33%) responses reported that lack of family encouragement presented a barrier to exercise and 20 (67%) disagreed. Additionally, four (10%) agreed that time expenditure was a barrier while 41 (90%) responses disagreed. Ten (24%) responses indicated that facility obstacles presented a barrier but 45 (76%) disagreed. Since no information was requested on the surveys about the participants' state of health, it is difficult to determine the reason for exercise causing fatigue in these participants. In the Figures 3 and 4 below, responses in blue indicate *Strongly Agree* and *Agree* while responses in red indicate *Disagree* and *Strongly Disagree.*

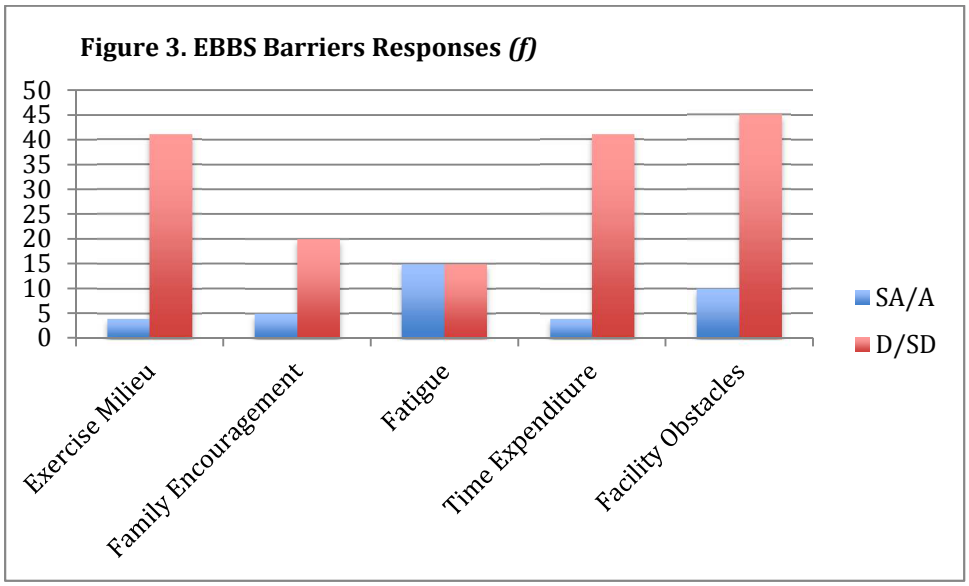

Figure 3. EBBS Barriers Responses

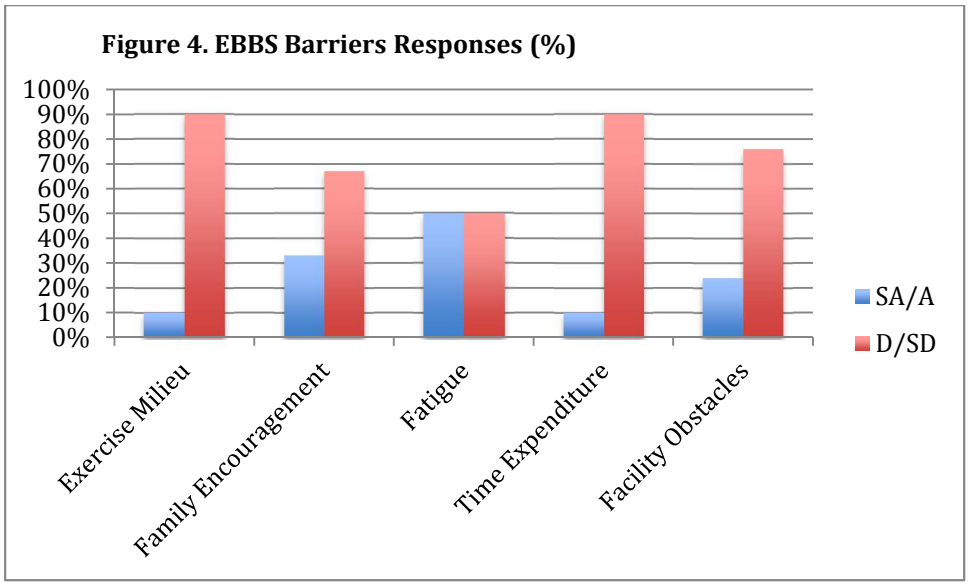

Figure 4. EBBS Barriers Responses

Age does not seem to be a factor in total scores (Figure 5) of participants on the EBBS as the lowest benefit score was reported in a 68 year old with the highest score in a 71 year old. The highest total score on the barrier scale was indicated in a 71-year-old and the lower score in two 60-year-old individuals. Furthermore, history of previous exercise (Figure 6) did not affect the total EBBS scores as the total participant scores are well within the possible range of EBBS scores. It may be presumed that these participants are well informed about the benefits of exercise as 80% of them had a previous history of exercise.

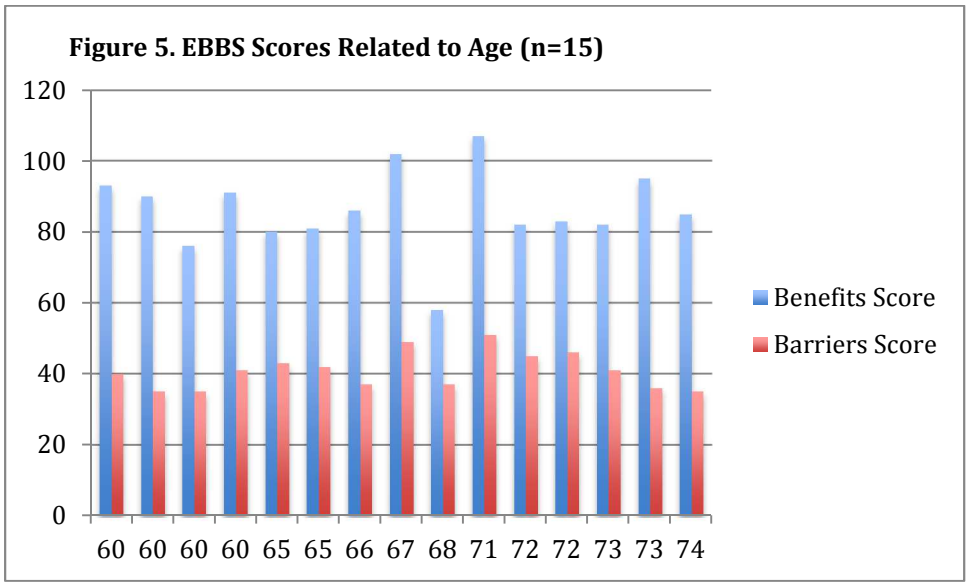

Figure 5. EBBS Scores Related to Age

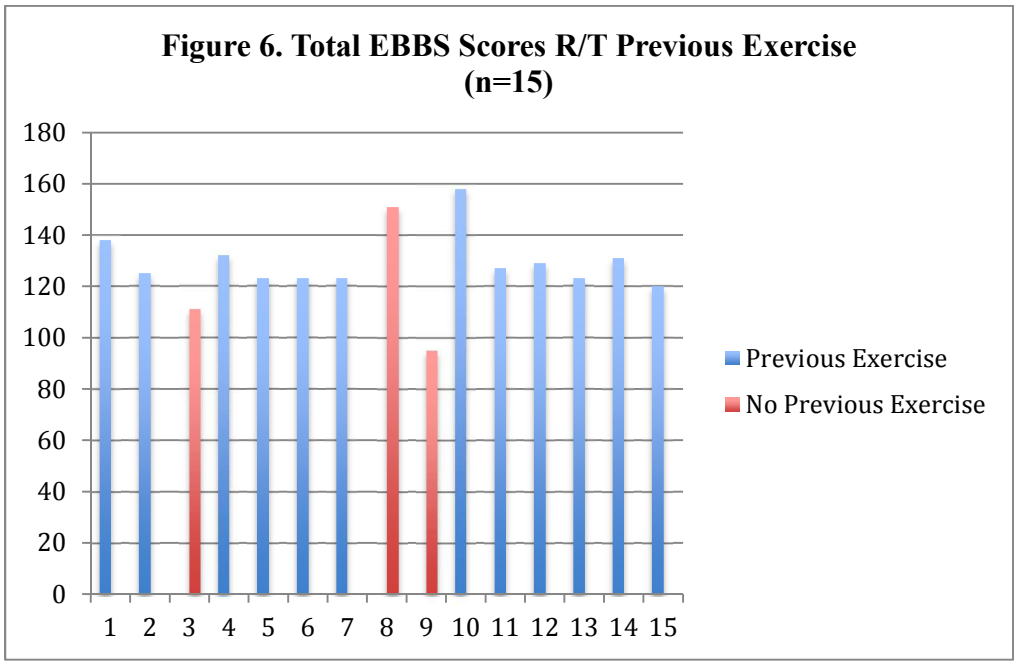

Figure 6. Total EBBS Scores R/T Previous Exercise

The Activity Logs of participants were analyzed for the time, number of days exercising, and number of steps and/or distance walked. Interestingly, some participants noted other activity in addition to walking. One respondent spent a considerable amount of time in the two month period "raking leaves" while others reported cycling and working with weights. Two (13%) participants wore the pedometer all day and reported eight hours of activity. Table 3 reports the total number of days with physical activity, average duration of total activity along with type of activity, and average number of steps and/or distance of activity.

The goal for the project was tracking activity 3 times a week for two months for an average of 24 days and five (33%) participants met this goal. The lowest number of days reported by a participant in activity tracking was 11 days (46%) and one tracked

activity for 28 days (117%). The mean number of days of tracking activity was twenty days (83%). The mean number of active minutes spent walking was 111 minutes. The U. S. Department of Health and Human Services' Physical Activity Guidelines in 2008 recommended that older adults should maintain at least 5,000 steps/day (Elsway & Higgins, 2010). The mean number of steps in this project was 3,788 steps/day. Two of the participants reported 8 hours of activity tracked with a range of the lowest at 324 steps/day and the highest at 5,783 steps/day. Three (20%) of the participants exceeded the recommended goal of 5000 steps/day with step totals of 5,488, 5,783, and 5,210 steps/day.

Table 3

Physical Activity Record of Log Results (n=15)
Average Duration of Total Activity and Average # of Steps or Distance

Participants #	Total of Days	Duration of Activity Total		Steps/Distance Total
1	24	25 min	Walking	3243 steps/day
				1.16 mi./day
2	24	40 min	Walking	2000 steps/day
			Weights	1 mile/day
3	22	179 min	Walking	4116 steps/day
		782 min	Cycling	3 miles/day
4	21	330 min	Raking	
		34 min	Walking	3583 steps/day
5	20	41 min	Walking	4860 steps/day
6	24	30 min	Walking	3 miles/day
7	12	34 min	Walking	4839 steps/day
8	12	33 min	Walking	5488 steps/day
9	24	76 min	Walking	1.75 miles/day
10	24	50 min	Walking	2892 steps/day
11	11	8 hours	Walking	324 steps/day
12	14	36 min	Walking	3494 steps/day
13	28	8 hours	Walking	5783 steps/day
14	19	74 min	Walking	3898 steps/day
15	21	56 min	Walking	5210 steps/day

Outcome Data

The participants were surveyed pre- and post-exercise using the PHQ-2 survey instrument. They were asked to complete the PHQ-2 prior to beginning documenting activity and at the end of two months. Fifteen participants completed the activity at the end of two months. The results of those completing the survey are presented in Figure 7. On the pre-exercise PHQ-2 survey, six (40%) participants reported depressive symptoms on several days a week for a total score of 2 points each while one (6.7%) participant reported depressive symptoms nearly every day for a total score of 5 points. On the post-exercise survey, two (13%) of those participants reported depression on several days a week for a total score of 2 points each while five (33%) others reported no depression at all. The remaining eight (53%) participants reported no depressive symptoms on both pre- and post-exercise surveys.

Figure 7 depicts graphic visualization of the pre-exercise and post-exercise of the participants on the PHQ-2. The graph demonstrates the decrease in depressive symptoms of the six (40%) participants that reported depressive symptoms on the pre-exercise PHQ-2. Two (13%) of the respondents' scores remained the same with no change in depressive symptoms. The most encouraging result was one participant reporting no depressive symptoms on the post-exercise PHQ-2 after attaining a score of 5 on the pre-exercise PHQ-2.

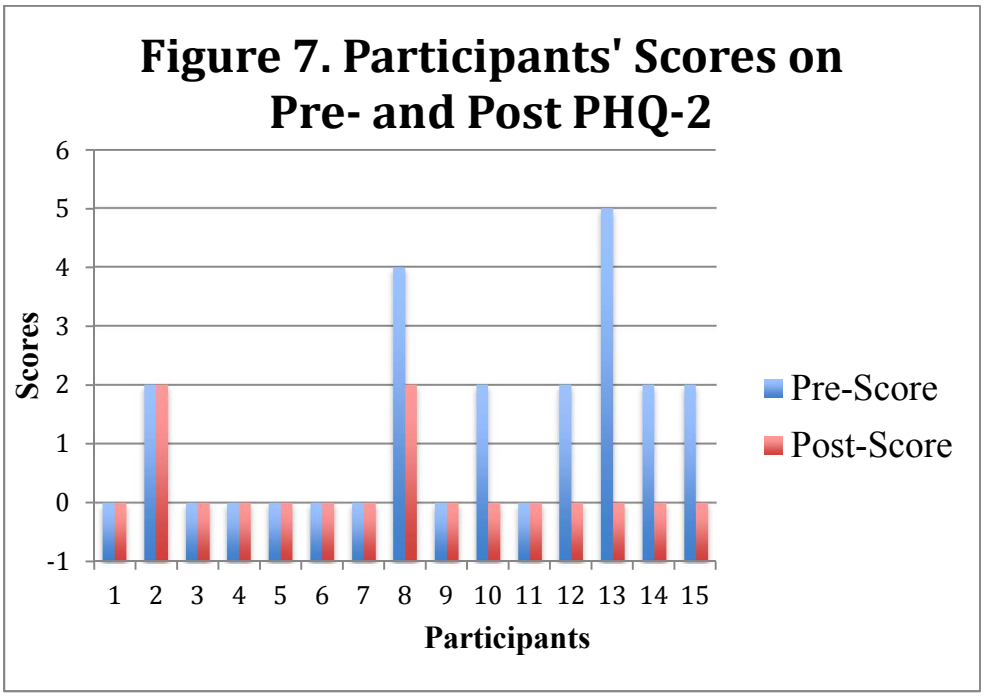

Figure 7. Participants' Scores on Pre and Post PHQ-2

Conclusion

This project evaluated whether physical activity improved depressive symptoms in older adults that attended a Senior Center. The findings of this project support the findings of Jancey et al (2009) that it is important prior to instigating a physical activity program to find out what perceptions older adults may have about the benefits and barriers to physical activity. The perceived benefits and barriers to physical activity participation by older adults were assessed using the Exercise Benefits/Barriers Scale (EBBS). This survey was used in the quality improvement program evaluation reflecting that the majority of the participants found exercise to be beneficial. The findings of this quality improvement program evaluation also lend support to previous research that indicated the benefits of physical activity/exercise as a means of improving depressive

symptoms (Robertson et al., 2012; Pasco, Williams, Jacka, Henry, & Berk et al., 2010). Physical exercise programs show significant outcomes in decreasing depressive symptoms of older people. The incidence of depression after age 60 has been shown to have a 70% recurrence in 2 years and exercise activity may prevent recurrence (Blake, Mo, Malik, & Thomas, 2009).

The PHQ-2 can be a useful and timesaving tool in assisting with screening for depression (Arroll, Goodyear-Smith, Crengle et al., 2010). The findings of this quality improvement program evaluation demonstrated that the PHQ-2 is very useful in screening for depression. Although eight (53.3%) of the participants in this program did not indicate depression on the survey, the remaining seven (46.7%) indicated some days of depressive symptoms, and, all but two (13.3%) of these participants had improvement in depression after exercise activity.

Pender's Health Promotion Model is based on theoretical propositions that include the statement that people commit to engagement in those behaviors from which they will derive benefit (Pender et al, 1988). The participants in this quality improvement program evaluation perceived benefits from participation in exercise. Likewise, if the person perceives barriers to exercise than there is constrained commitment to action, thus limiting their actual behavior. The participants in this quality improvement program evaluation perceived fatigue as the primary barrier to exercise.

This quality improvement evaluation may serve as a foundation for other nursing professionals to perform more extensive research in the use of physical activity to improve depression in older adults. As the population ages in the United States, there is a

tremendous need for research that involves the older adult, especially in the areas of maintaining flexibility, as well as preventing injuries and depression. Future research may use the input of caregivers in screening older adults and assistance with daily physical activity. Additionally, future studies need to involve longer periods of time and use of a larger population in order to allow generalizability.

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Appendix A: Demographic Information

Age: _____

Sex: _____

Marital Status: _____

Educational level: _____

Type of previous exercise, if any: _____

Appendix B: Exercise Benefits Barriers Scale

Directions: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statement by circling SA for strongly agree, A for agree, D
for disagree, or SD for strongly disagree.

1. I enjoy exercise.	SA A D SD
2. Exercise decreases feelings of stress and tension for me.	SA A D SD
3. Exercise improves my mental health.	SA A D SD
4. Exercising takes too much of my time.	SA A D SD
5. I will prevent heart attacks by exercising.	SA A D SD
6. Exercise tires me.	SA A D SD
7. Exercise increases my muscle strength.	SA A D SD
8. Exercise gives me a sense of personal accomplishment.	SA A D SD
9. Places for me to exercise are too far away.	SA A D SD
10. Exercising makes me feel relaxed.	SA A D SD
11. Exercising lets me have contact with friends and persons I enjoy.	SA A D SD
12. I am too embarrassed to exercise.	SA A D SD
13. Exercising will keep me from having high blood pressure.	SA A D SD
14. It costs too much to exercise.	SA A D SD
15. Exercise increases my level of physical fitness.	SA A D SD
16. Exercise facilities do not have convenient schedules for me.	SA A D SD
17. My muscle tone is improved with exercise.	SA A D SD
18. Exercising improves functioning of my cardiovascular system.	SA A D SD
19. I am fatigued by exercise.	SA A D SD
20. I have improved feelings of well being from exercise.	SA A D SD
21. My spouse (or significant other) does not encourage exercising.	SA A D SD
22. Exercise improves my stamina.	SA A D SD
23. Exercise improves my flexibility.	SA A D SD
24. Exercise takes too much time from family relationships.	SA A D SD
25. My disposition is improved with exercise.	SA A D SD
26. Exercising helps me sleep better at night.	SA A D SD
27. I will live longer if I exercise.	SA A D SD
28. I think people in exercise clothes look funny.	SA A D SD
29. Exercise helps me decrease fatigue.	SA A D SD
30. Exercising is a good way for me to meet new people.	SA A D SD
31. My physical endurance is improved by exercising.	SA A D SD
32. Exercising improves my self-concept.	SA A D SD
33. My family members do not encourage me to exercise.	SA A D SD
34. Exercise increases my mental alertness.	SA A D SD
35. Exercise allows me to carry out normal activities without becoming tired.	SA A D SD
36. Exercise improves the quality of my work.	SA A D SD

37. Exercise takes too much time from my family responsibilities.	SA A D SD
38. Exercise is good entertainment for me.	SA A D SD
39. Exercise increases my acceptance by others.	SA A D SD
40. Exercise is hard work for me.	SA A D SD
41. Exercise improves overall body functioning for me.	SA A D SD
42. There are too few places for me to exercise.	SA A D SD
43. Exercise improves the way my body looks.	SA A D SD

Instrument Development and Scoring Information

Instrument Development. The Exercise Benefits/Barriers Scale (EBBS) was developed in response to a need for an instrument to determine perceptions of individuals concerning the benefits of and barriers to participating in exercise. Items for the scale were obtained inductively from interviews and from the literature. The resulting instrument has been tested for internal consistency, validity of its constructs, and test-retest reliability.

A sample of 650 individuals, primarily from northern Illinois, responded to the instrument. Calculation of Cronbach's alpha for the 43-item instrument yielded a standardized alpha of .954. The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866. Factor analysis yielded a nine-factor solution initially which an explained variance of 65.2%. Second order factor analysis yielded a two-factor solution, one a benefits factor and the other a barriers factor. Test-retest reliability was accomplished with a sample of 66 healthy adults at a two-week interval. Test-retest reliability was found to be .89 on the total instrument, .89 on the Benefits Scale and .77 on the Barriers Scale.

Instrument Scoring. The instrument may be scored and used in its entirety or as two separate scales. The instrument has a four-response, forced-choice Likert-type format with responses ranging from 4 (strongly agree) to 1 (strongly disagree). Barrier Scale items are reverse-scored. Items on the Barrier Scale are numbers 4, 6, 9, 12, 14, 16, 19, 21, 24, 28, 33, 37, 40 and 42.

Missing data may be handled in one of two ways. If more than five percent of the items are unanswered, it is recommended that the response be discarded. If the missing item response rate is less than five percent, median substitution prevents falsely low scores.

Scores on the total instrument can range from 43 to 172. The higher the score, the more positively the individual perceives exercise. When the Benefits Scale is used alone, the

score range is between 29 and 116. When the Barriers Scale is used alone, scores range between 14 and 56. If used alone, the Barriers Scale does not need to be reverse-scored. In this instance, the higher the score on the Barriers Scale, the greater the perception of barriers to exercise.

Additional Information. Information about the instrument can be found in the following reference: Sechrist, KR, Walker, SN, & Pender, NJ. (1987). Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. Research in Nursing & Health, 10, 357-365. Further information may be obtained by contacting: Dr. Karen Sechrist, 18 Morningstar, Irvine, CA 92603-3745; e-mail krsech@pacbell.net.

1987

Health Promotion Model - Instruments to Measure HPM Behavioral Determinants :

Exercise Benefits/Barriers Scale [EBBS] (Adult Version)

Sechrist, Karen R.; Walker, Susan N.; Pender, Nola J.

http://hdl.handle.net/2027.42/85354

Health Promotion Model Instrumentation Group

Nola J. Pender, PhD, RN, FAAN • Susan Noble Walker, EdD, RN, FAAN • Karen R. Sechrist, PhD, RN, FAAN

Dear Colleague:

Thank you for your interest in the Exercise Benefits/Barriers Scale (EBBS). The EBBS was developed in response to a need for an instrument designed to determine perceptions

of individuals concerning the benefits of and barriers to participating in exercise. Items for the scale were obtained inductively from interviews and from the literature.

The EBBS is a 43-item summated rating scale consisting of two subscales, Benefits and Barriers. Ratings are obtained using a four-point response system. The EBBS has been tested for internal consistency, validity of its constructs, and test-retest reliability. A sample of 650 individuals over 18 years of age, primarily from northern Illinois, participated in the initial testing of the EBBS. Calculation of Cronbach's alpha for the 43-item instrument yielded a standardized alpha of .954. The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866. Factor analysis yielded a nine-factor solution initially with an explained variance of 65.2%. Second order factor analysis yielded a two-factor solution, one a benefits factor and the other a barriers factor. Test-retest reliability was accomplished with a sample of 66 healthy adults at a two-week interval. Test-retest reliability was found to be .89 on the total instrument, .89 on the Benefits Scale and .77 on the Barriers Scale. Additional information on the development and initial testing of the EBBS can be found at in the following article:

Sechrist, KR, Walker, SN, and Pender, NJ. (1987). Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. *Research in Nursing & Health, 10,* 357-365.

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Best wishes with your research,

Karen R. Sechrist, PhD, RN, FAAN for Pender/Walker/Sechrist

Appendix C: Patient Health Questionnaire-2

Over the past two weeks, how often have you been bothered by any of the following problems?

Little interest or pleasure in doing things.

0 = Not at all

1 = Several days

2 = More than half the days

3 = Nearly every day

Feeling down, depressed, or hopeless.

0 = Not at all

1 = Several days

2 = More than half the days

3 = Nearly every day

Total point score: _____

Appendix D: Physical Activity Record

Date and Time of Activity	**Duration of Activity**	**Number of Steps and Distance Walked**