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Mary Amanda Ordonez

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**Perceived Activity Benefits and Barriers in Patients Diagnosed with
Systemic Lupus Erythematosus Between 18 and 44 Years of Age: A
Pilot Study**

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**PERCEIVED ACTIVITY BENEFITS AND BARRIERS IN PATIENTS DIAGNOSED
WITH SYSTEMIC LUPUS ERYTHEMATOSUS BETWEEN 18 AND 44 YEARS OF
AGE: A PILOT STUDY**

by

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Dedication

This dissertation is dedicated to individuals battling lupus. You are strong, you are beautiful, and you can do anything you set your mind to.

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This study employed a cross-sectional, descriptive quantitative approach to identify perceived benefits of physical activity and perceived barriers to physical activity in female patients diagnosed with SLE between 18 and 44 years of age to answer the following research question: “What are the perceived benefits of physical activity and the perceived barriers to physical activity in individuals diagnosed with Systemic Lupus Erythematosus between 18 and 44 years of age?”. The study group consisted of 22 subjects with SLE and the control group was comprised of 40 subjects who were in nursing school with no history of chronic illness or problems with mobility. Subjects in both groups completed a demographics survey, the International Physical Activity Questionnaire, the Short Form-36 version two, and the Exercise Benefits Barriers Scale. There were no statistically significant differences in demographical data, energy expenditure, nor health burden between the study and control groups. However, there were

statistically significant differences between the study and control group among individual perceived physical activity benefits and barriers, and median total perceived benefits and barriers scores. Subjects with SLE did not perceive physical activity as beneficial as the subjects in nursing school, and the subjects with SLE reported more barriers to physical activity than the subjects in nursing school. Nurses and healthcare professionals must continue to monitor patients with SLE for metabolic syndrome, assess level of education regarding physical activity, assess perceived benefits of and barriers to physical activity, and develop patient-centered, disease-specific interventions to eliminate barriers to physical activity participation. Future studies include a larger scale study to develop and implement symptom-specific physical activities, and interventional studies to determine if strategies to promote physical activities and reduce barriers are efficacious in the reduction of physical activity barriers.

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List of Abbreviations

ADN	Associate Degree in Nursing
BSN	Bachelor of Science in Nursing
CDC	Center for Disease Control
SLE	Systemic Lupus Erythematosus
EBBS	Exercise Benefits Barriers Scale
HMP	Health Promotion Model
HMPREVISED	Health Promotion Model REVISED
IPAQ	International Physical Activity Questionnaire
IRB	Institutional Review Board
MCS	Mental Component Score
MET	Metabolic Equivalent
MSE	Missing Score Estimation
MVPA	Moderate to vigorous physical activity
PCS	Principal Component Score
PCOS	Polycystic Ovary Syndrome
RA	Rheumatoid Arthritis
SF-36 V2	Short Form-36 Version 2
SPSS	Statistical Package for Social Sciences
UTMB	The University of Texas Medical Branch

Chapter 1: Introduction

Systemic Lupus Erythematosus (SLE) is a connective tissue disease that may have widespread effects throughout the body. Physical activity may be utilized as an adjuvant therapy to alleviate various symptoms associated with SLE. This study focuses on the perceived benefits of and barriers to physical activity in females with SLE between 18 and 44 years of age. Determining the perceived benefits of and barriers to physical activity participation in individuals with SLE may assist health care providers to create patient-centered care strategies to increase physical activity participation. Key variables within the study are perceived physical activity benefits, perceived physical activity barriers, and physical activity measured in metabolic equivalents.

The first section of chapter one describes the background and significance of physical activity participation in individuals with SLE. The conceptual framework and study variables are described in the following sections. The final sections in chapter one includes the purpose of the study, the research question, and an overview of study design.

Statement of the Problem

There are currently 1.5 million individuals in the United States diagnosed with SLE, and it is estimated that 46% of them are employed (CDC, 2015).

Systemic Lupus Erythematosus occurs two to three times more often in people of color, and 90 percent of individuals are women diagnosed between 18 and 44 years of age (LFA, 2016). Connective tissue diseases, including SLE, accounted for an estimated 13.3 billion dollars in healthcare costs in 2011 (United States

Bone and Joint Initiative, 2014). Approximately 30,000 people have been diagnosed with SLE in Houston, TX (LFA, 2015). While it is known that physical activity improves health outcomes in SLE, what is not known are the perceived benefits of and barriers to physical activity in patients with SLE.

The specific aim of this research study was to determine the perceived benefits of physical activity and the perceived barriers to physical activity in individuals diagnosed with SLE who were between 18 and 44 years of age in Houston, TX and the surrounding Gulf Coast area. The directional research hypotheses are that subjects with SLE (study group) will perceive physical activity as less beneficial than the subjects without a history of chronic illness or mobility problems (control group), have more physical activity barriers than the control group, and the subjects with SLE will report decreased physical activity as compared to the control group.

Background and Significance of the Problem

Patients with SLE have an increased incidence of metabolic syndrome, a cluster of modifiable risk factors which increases the risk for heart disease. Risk factors for metabolic syndrome include abdominal obesity, dyslipidemia, elevated blood pressure, and elevated fasting blood glucose levels (International Diabetes Federation, 2015). Physical activity is beneficial to the patient with SLE because it decreases the incidence of metabolic syndrome (Nascimento et al, 2010), inflammation (Perandin et al, 2014; Perandin et al, 2015), and overall disease activity (Barnes et al, 2014). Although patients with SLE recognize the immense value of physical activity (Mancuso et al, 2010), patients with SLE reported

significantly lower physical activity than healthy controls (Bruce et al, 2003). The perceived benefits of and barriers to physical activity in patients with SLE between 18 to 44 years of age are not known. The lack of knowledge regarding activity barriers in the identified focus group is important because SLE patients with unidentified barriers may be circumventing an important treatment modality. After gaining medical clearance from the healthcare provider, patients with SLE may participate in a range of physical activities including walking, riding a bicycle, swimming, and low impact aerobics (LFA, 2013). The contribution of this study is significant because identification of perceived benefits of and barriers to physical activity in SLE patients is expected to have a broad translational importance in the utilization of an individualized plan to promote physical activity as an intervention to prevent metabolic syndrome, decrease disease activity, and improve quality of life in patients with SLE. In addition, the study provides information that may assist health care providers to develop new methods to individualize resources to overcome barriers to physical activity in individuals with SLE between 18 to 44 years of age.

The status quo as it pertains to physical activity is limited to studies investigating the safety and the effects of physical activity in patients with SLE (Yuen et al, 2013; Ahn et al, 2015; Ramsey-Goldman et al, 2013; Winslow et al, 1993); and, a single study measuring perceived benefits and self-reported physical activity in SLE patients (Mancuso et al, 2010). This research study represents a new and substantive departure from the status quo by shifting focus from studies investigating safety and perceived benefits to identifying perceived benefits of

and barriers to physical activity specific to the patient with SLE between 18 to 44 years of age. This study is expected to open new research horizons, particularly interventions to overcome identified physical activity barriers. Therapeutic horizons to decrease metabolic syndrome and disease activity that have been previously unattainable through traditional treatment modalities may become attainable by overcoming identified obstacles to physical activity; and, integrating a customized plan to encourage an increased level of physical activity in patients with SLE without major organ involvement.

Conceptual Framework

The Health Promotion Model (REVISED)

The Health Promotion Model (REVISED) (HPMREVISED) (Pender, 1996) served as a model to guide the study. The Health Promotion Model (Pender et al, 1990) is an integrated model of nursing and behavioral sciences that focuses on the motivating factors that may engage an individual in a healthy behavior (Pender, Murdaugh, & Parsons, 2015). The original Health Promotion Model was a guide to investigate complex biopsychosocial processes, which included cognitive-perceptual factors and modifying factors that may predict healthy behaviors (Pender, Murdaugh, & Parsons, 2015). The original HPM explores a holistic assessment of a person interacting interpersonally and with the physical environment while engaging in behaviors to obtain better health. The cognitive-perceptual factors of the HPM include, “importance of health, perceived control of health, definition of health, perceived health status, perceived self-efficacy, perceived benefits, and perceived barriers” (Pender et al, 1990). The modifying

factors include, “demographic and biological characteristics, interpersonal influences, situational influences, and behavioral factors” (Pender et al, 1990).

The Health Promotion Model REVISED (Pender, 1996) includes the same factors as the original Health Promotion Model (Pender et al, 1990) with the addition of supplementary variables that include activity-related affect, commitment to a plan of action, and immediate competing demands (Pender, Murdaugh, & Parsons, 2015). Activity-related effects includes the effect prior to, during, and after the activity to determine whether the individual will continue to participate in the activity in the future. Commitment to plan includes commitment to carrying out the plan regardless of internal or outside forces, and identification of strategies to carry out the plan and strategies to reinforce the commitment to the plan (Pender, Murdaugh, & Parsons, 2015).

Application of The Health Promotion Model REVISED

The Health Promotion Model REVISED is utilized in this study as a guide to view an individual interacting interpersonally with the physical environment. Individual characteristics are factors that may affect the likelihood that an individual will maintain or increase physical activity participation including prior related behavior and personal factors. Prior related behavior allows the researcher to examine routine physical activity behaviors, and whether an individual perceives the behavior as positive or negative (Pender, Murdaugh, & Parsons). Personal factors include biologic, psychologic, and sociologic factors including age, perceived health status, race, education, and socioeconomic status. The behavior-specific cognitions include perceived benefits, perceived barriers,

perceived self-efficacy, activity-related affect, interpersonal influences, and situational influences, activity-related affect, commitment to a plan, and immediate competing demands and preferences (Pender, Marduagh, & Parsons). Interventions based on the assessment of the behavior-specific cognitions will allow the health care professional to promote physical activity, and evaluate the interventions to determine whether there was positive change toward increasing physical activity.

Behavior-specific cognitions were assessed in this study utilizing a demographics survey, the Exercise Benefits and Barriers Survey, the Short Form-36 Health Survey, and the International Physical Activity Questionnaire (IPAQ). Behavioral outcome is identified in the Health Promotion Model REVISED to evaluate if the health promoting behavior, physical activity, was increased. The goal of the study was to determine perceived barriers and benefits to physical activity in female individuals with SLE between 18 and 44 years of age. Future studies include implementing patient-centered interventions to promote physical activity, and evaluate physical activity as the behavioral outcome.

Description of Variables

1. Physical Activity: Physical activity was defined as Metabolic Equivalents (METs). One MET for a healthy adult is defined as the energy required for sitting quietly (Harvard, 2016). The total MET-minutes per week for each individual were calculated according to the IPAQ and then compared comprehensively between the study and control groups. Four domains were considered regarding physical activity: job-related, transportation to work,

housework, and recreation sport and leisure time physical activity. Moderate and vigorous job-related physical activity were included. Moderate job-related physical activity included at least 10 minutes of carrying light loads and walking as a part of work-related duties. Vigorous job-related physical activity included activities similar to at least 10 minutes of heavy lifting, digging, heavy construction, or climbing stairs. Physical activity regarding transportation to work addressed how much time was spent walking or bicycling to and from work. Housework-related physical activity included moderate and vigorous physical activities. Moderate housework-related physical activity included activities similar to at least 10 minutes of carrying light loads, sweeping, washing windows, raking, and scrubbing and sweeping floors. Vigorous house-related physical activity included at least 10 minutes of similar activities to heavy lifting, chopping wood, shoveling snow, or digging in the garden. Recreation, sport, and leisure-time activities included leisure activities, moderate activities, and vigorous activities. Leisure-time activity was defined as walking at least 10 minutes. Moderate recreational, sporting, or leisure-time activities were defined as activities comparable to at least 10 minutes of bicycling at a regular pace, swimming at a regular pace, or playing doubles tennis as leisure. Vigorous recreational, sporting, or leisure-time activities were defined as activities similar to at least 10 minutes of participating in aerobics, fast bicycling, or fast swimming (Craig et al, 2003).

- 2. Perceived Physical Activity Benefits:** Perceived benefits of physical activity was defined as, “mental representations of the positive or reinforcing consequences of a behavior” (Pender, Murdaugh, & Parson, 2015, p. 37).
- 3. Perceived Physical Activity Barriers:** Perceived physical activity barriers was defined perceptions about the unavailability, inconvenience, expense, difficulty, or time-consuming nature of a particular action” (Pender, Murdaugh, & Parson, 2015, p. 38).

Purpose and Goals

The purpose of this study was to determine if differences in benefits of and barriers to physical activity exist between females diagnosed with SLE between 18 and 44 years of age and females between 18 and 44 years of age who do not have SLE or a known history of chronic illness. Determining whether differences in physical activity exist was essential to provide a foundation for the development of individualized plans to promote physical activity in individuals with SLE. Promoting physical activity may result in decreased incidence of metabolic syndrome, fatigue, and overall disease activity.

Research Question and Design Overview

This study employed a cross-sectional, descriptive quantitative approach to identify perceived benefits of physical activity and perceived barriers to physical activity in female patients diagnosed with SLE between 18 and 44 years of age to answer the following research question:

“What are the perceived benefits of physical activity and the perceived barriers to physical activity in individuals diagnosed with Systemic Lupus Erythematosus between 18 and 44 years of age?”.

Chapter 2: Literature Review

Chapter two illustrates literature that explores physical activity in individuals with SLE. Physical activity is recommended as an adjuvant intervention in individuals with SLE to improve control of disease manifestations and to decrease the occurrence of comorbidities. This chapter explores measures of physical activity in SLE, and the perceived benefits of and barriers to physical activity in individuals with SLE. Individuals with SLE have similarities in disease manifestations to individuals who have rheumatoid arthritis. Because there is a dearth of literature directly exploring physical activity in SLE, this chapter also examines perceived benefits of and barriers to physical activity in individuals with rheumatoid arthritis (RA).

Measures of Physical Activity in SLE

Physical activity in individuals with SLE has been measured with self-reported and objectively reported instruments. Yuen et al (2013) studied self-reported versus objectively assessed exercise adherence utilizing home-based exercise training. Subjects completed exercise logs that included date, duration, and frequency of exercise, along with a log of objectively measured exercise collected using Wii Fit™. The Wii Fit™ did not have the capability to record exercise intensity. The study consisted of only 11 subjects who kept an exercise log twice each week. The findings indicated that there was slight overreporting in the exercise log and high variability between subjects. Limitations were also noted with the WiiFit™ including the possibility that the subject may have recorded exercise in the activity log that was not captured when physical activity

was performed outside of the WiiFit™ console. Documenting physical activity outside of the WiiFit™ console may have contributed to overreporting. Yuen et al recommended that exercise logs are acceptable, but should be collected with attention to over-reporting by the subject. This study supports a self-reported physical activity instrument when measuring physical activity while considering the possibility of over-reporting.

Ahn et al (2015) investigated self-reported physical activity using the International Physical Activity Questionnaire (IPAQ) to calculate metabolic equivalents (METs) for the measurement of self-reported physical activity. An accelerometer also was utilized to calculate objectively measured physical activity. Data from the IPAQ and accelerometers were reported on 125 subjects. A slight correlation was found between the IPAQ and the accelerometers with the accelerometer being more accurate because of the capability to capture all activity, except when the subject was in water. However, Ahn et al noted that the IPAQ was more descriptive about the activities performed, and may be used in a study considering the type of study and data that is measured. Ahn et al also noted that utilizing an accelerometer may be more significant when evaluating a change or in an intervention study. This study also supports the utilization of a self-reported instrument to assess physical activity when considering the purpose of the study.

The studies by Yuen et al (2013) and Ahn et al (2015) demonstrate that a self-reported physical activity log or questionnaire is acceptable with attention to the type of study and the possibility of over-reporting. The IPAQ was chosen for

this cross-sectional, non-interventional, study. The IPAQ measured self-reported physical activity to determine if there were differences in physical activity participation in individuals with SLE and individuals who do not have a history of chronic illness or other reported problems with mobility. The self-reported IPAQ was also chosen for this study because it assessed the type, amount, and intensity of physical activity performed.

Perceived Benefits and Barriers—SLE

The literature is limited regarding the perceived benefits of and barriers to participation in physical activity by individuals with SLE. Mancuso et al (2010) investigated physical activity regarding physiological and psychosocial variables in patients with SLE. A mixed-method approach was utilized to collect data on 50 participants. The mixed-methods approach included Grounded Theory to ask open-ended question about physical activity, the Paffenbarger Physical Activity and Exercise Index to assess energy expenditure, and a two-minute walk test to measure exercise capacity. Additional variables in the study were Demographics, Fatigue (Fatigue Severity Scale), Social Support (Duke Social Support and Stress Scale), Comorbidities (Charlson Comorbidity Index), a chart review obtained from a Registry, and Depressive Symptoms (Geriatric Depression Scale) (Mancuso et al, 2010).

The participants believed benefits of physical activity were overall general health, cardiovascular health, and improvement in mobility, believed physical activity is beneficial long-term, and were interested in participating more in physical activities. Barriers cited by the participants were a lack of time due to

work or family obligations, environment, lack of motivation, comorbidities, and, a lack of exercise facilities (Mancuso et al, 2010). Physical barriers such as fatigue, joint pain and stiffness, and hematological abnormalities also were noted. The open-ended questions in the study allowed subjects to describe benefits and barriers of physical activity, but Mancuso et al noted that subjects may have more often chosen a variable from a quantitative instrument if given a standardized set of options rather than answering open-ended questions to report barriers.

The current study, *Perceived Activity Benefits and Barriers in Patients Diagnosed with Systemic Lupus Erythematosus Between 18 and 44 Years of Age: A Pilot Study*, included individuals with SLE between 18 and 44 Years of Age (the study group), and individuals who do not have a chronic illness or problems with mobility (the control group). The quantitative Exercise Benefits Barriers Scale (EBBS) (Sechrist, Walker, & Pender, 1987) was utilized in the current study to quantitatively investigate the perceived benefits of and barriers to physical activity in individuals with SLE between 18 and 44 years of age. The current study compared the study group to the control group to determine if differences in physical activity participation exist between individuals with SLE between 18 and 44 years of age and individuals who do not have a chronic illness or problems with mobility between 18 and 44 years of age.

Perceived Benefits and Barriers—RA

Individuals with SLE have similar disease manifestations to individuals with RA because SLE and RA are both autoimmune connective tissue diseases which may affect mobility. Like SLE, patients with RA perceive physical activity

as beneficial, but do not engage in recommended physical activity expenditure compared to controls (Hernandez-Hernandez, V., Ferraz-Amaro, I., Diaz-Gonzalez, F. (2013). Several studies investigating perceived benefits of and barriers to activity participation in individuals with RA were noted in the literature, including qualitative studies and a quantitative study.

Leoppenthin et al (2014) conducted a phenomenological study to explore the experiences of physical activity maintenance in 16 participants with RA from a rheumatology clinic. Several themes were identified including “knowing the body”, “responsibility and challenges”, and “autonomy and social belonging”. The underlying essence synthesized by Leoppenthin et al was that patients with RA may understand that physical activity is a tool to utilize for “liberation from restrictions”, and to “gain access to social participation on equal terms to non-arthritis counterparts” (Leoppenthin et al, 2014, p. 297). Loeppenthin et al concluded that the participants viewed physical activity maintenance as a way to assuage identification with a disability and as an avenue to increase social physical activity participation. This study contributes to the current study because it provides a foundation to demonstrate that individuals with RA do perceive physical activity as beneficial.

Larkin et al (2016) aimed to gain insight into how individuals with RA view physical activity and explored how individuals with RA may increase physical activity participation. Interviews were transcribed, and thematic analysis was utilized to synthesize themes. The first theme, “being active”, was an understanding that physical activity is beneficial. Being active also included the

participants viewing inactivity negatively, the participants understanding that decreased physical activity impacts the mind negatively, and the participants being able to recognize activity limits. The next theme included barriers and facilitators to physical activity. Barriers included “having RA”, financial barriers, environmental barriers, and time constraints. The third theme, advice and information, focused on the participants having a variation of responses of how much physical activity to perform, and a lack of attainable information for individuals with RA. The fourth theme focused on supporting physical activity, and identified areas to increase physical activity participation. The participants identified setting a goal and monitoring physical activity, participating in group activities, and asking for help from family members and caregivers regarding “supporting physical activity”. This study demonstrates that individuals with RA perceive physical activity as a significant factor to improve health. Additionally, this study reveals that individuals with RA need further direction regarding a physical activity regimen to increase confidence to participate in physical activities. The current study utilized the EBBS (Sechrist, Walker, & Pender, 1987) to investigate benefits of and barriers to physical activity participation and explores barriers noted in this study. The current study also investigated the amount of physical activity education the subject with SLE has received from their healthcare providers to determine if lack of information was also a barrier to physical activity participation in SLE.

Baxter et al (2015) investigated the perceived barriers, facilitators, and attitudes to exercise in women with RA. Semi-structured interviews were

conducted utilizing the General Inductive Approach. The two themes that were deduced from the interview transcripts were “social connections” and “fear”. Social connections were described as a determinant to facilitate physical activity participation. Alternatively, social connections could also pose as a barrier to physical activity participation because the participants did not want to cause more distress to family members by participating in physical activities. The theme “fear” was separated into three sub-themes including fear of the unknown in what is a safe level of activity, fear of being too vigorous with physical activity, and fear of what symptoms exercise may exacerbate relating to RA. The participants reported exercising three to four times per week, and felt the amount of exercise was adequate. Baxter et al. recommended that many of the barriers the participants cited may be overcome with increased patient education detailing a physical activity type and duration. This qualitative study demonstrates that a lack of understanding regarding amount and type of physical activity is a barrier in individuals with RA, and supports the need for enhanced patient education about physical activity. The findings by Baxter et al. support the inclusion of a Likert scale item in the current research study to investigate patient education regarding physical activity. The Likert scale item developed for the current study asks the subject to rate the amount of physical activity education received from the healthcare provider. The subject may choose from “none”, “I have received encouragement to participate in physical activity”, “I have been given examples of physical activity to perform”, or “I have been given a detailed physical activity plan”.

Demmelmaier et al, 2013 studied factors that influence exercise among adults with arthritis using a qualitative approach. The participants were organized into three groups: exercisers, insufficiently active adults, and non-exercisers. Benefits of exercise included physical and psychosocial domains. Physical benefits included symptom management, with pain being cited as a benefit by exercisers and insufficiently active adults. Non-exercisers expressed they would have increased motivation to exercise if physical activity did indeed decrease pain. Mobility was an additional benefit expressed by insufficiently active adults, but non-exercisers were cautious about increased mobility as a positive outcome of physical activity participation.

Barriers to exercise among the groups included physical, psychosocial, and environmental barriers. Physical barriers included pain, mobility, comorbidities, and fatigue. Psychosocial barriers included attitudes and beliefs including uncertainty of what types of physical activity participation were appropriate in the insufficiently active group, but was not mentioned by the exercisers or the non-exercisers. Social and environmental barriers were also noted. Competing roles and responsibilities with work and family were described by participants who were in the insufficiently active group. Participants in the insufficiently active and exercisers group described the natural environment as a barrier due to cold or damp weather that may affect joints. Lack of exercise programs and instructors who understand arthritis were noted in all three groups. Variations between the three groups of participants were identified in the study. Like the study describing physical activity participation in SLE by Mancuso et al

(2010), Demmelmaier et al (2013) identified similar benefits to and barriers of physical activity participation. Barriers noted in both SLE (Mancuso et al) and RA (Demmelmaier et al) studies were pain, fatigue, comorbidities, and a lack of available exercise facilities. The similarities of perceived physical activity barriers between SLE and RA were significant to the current research study. The similarities further support the underpinnings of the research question to investigate if there are differences in perceived benefits of and barriers to physical activity participation between individuals with SLE and a sample of individuals who had no health history of chronic illness or problems with immobility.

Greene et al (2006) investigated factors that affected physical activity and exercise behavior in a sample of 77 women who were predominately African America who either had osteoarthritis or RA. Data collection instruments included a demographic questionnaire, the Physical Activity and Disability Survey (PADS), the Arthritis Self-Efficacy Scale, the Outcome Expectations for Exercise Scale, the Health Assessment Questionnaire to assess disability, the visual analogue scale to assess pain, a calculation of the subject's Body Mass Index, and the Medical Outcomes Study to determine social support. Greene et al., utilized linear regression analysis to determine if there were associations with the defined outcome variables of physical activity, self-efficacy, outcome expectations, disability, pain, Body Mass Index, and social support. The most consistent explanatory factor to affect physical activity and exercise behavior was self-efficacy. It was concluded that interventions to increase self-efficacy may be beneficial to increase physical activity participation in women with Osteoarthritis

and RA by determining an activity goal and encouraging interaction with others with arthritis who have increased physical activity participation. Although the models in the study only explained 20 percent of variance, the study is significant to the current study because it elucidates the complexity of physical activity and that different variables may affect physical activity behaviors that are not included in the study.

Bajwa and Rogers (2007) explored physical activity barriers and exercise program preferences among indigent patients with RA. A total of 223 participants with self-reported arthritis were administered a pilot-tested structured interview. Neither validity nor reliability were reported for the pilot-tested structured interview utilized in the study. The major barriers to physical activity participation were pain and bad health. Bajwa and Rogers also noted several exercise preferences, including alone or with a family member, and fun exercises with music when participating in group exercises. Although the study does not demonstrate utilization of a valid or reliable instrument, the physical activity barriers, pain and bad health, support findings from other studies exploring barriers to physical activity in RA (Demmelmaier et al, 2013; Larkin et al, 2016) and SLE (Mancuso et al, 2010). The evidence of similar barriers to physical activity participation in individuals with SLE and individuals with RA provide a foundation in which to compare findings from the current research study to when determining if physical activity barriers exist between individuals with SLE and individuals with no history of chronic illness or problems with mobility.

Gaps in the Literature

There is an obvious gap in the literature regarding the perceived benefits of and perceived barriers to physical activity in individuals with SLE. The dearth of literature is further emphasized when the SLE literature is compared to studies investigating physical activity in RA. Research studies investigating the perceived benefits of and barriers to physical activity in RA (Demmelmaier et al, 2013; Bajwa and Rogers 2007) are concurrent with the barriers noted in the study investigating physical activity in SLE (Mancuso et al, 2010). The aim of the current study was to ascertain perceived benefits of and barriers to physical activity participation in individuals with SLE utilizing a cross-sectional quantitative approach. The results of the current study provide a foundation for health care providers to develop instruments and individualized care plans to promote physical activity participation in individuals with SLE.

Summary

Physical activity augments conventional therapies to decrease overall disease activity in SLE. Although individuals with SLE report physical activity barriers, physical activity is perceived as beneficial (Mancuso et al, 2010). Studies investigating the benefits of and barriers to physical activity in SLE is scarce. Conversely, several studies were noted regarding benefits of and barriers to physical activity in RA. A critical analysis of the literature describing instruments utilized to measure physical activity in SLE was conducted. Furthermore, a critical analysis of the literature regarding the perceived benefits of and barriers to physical activity in SLE and RA was conducted to appreciate what has been

researched, and to evaluate essential variables significant to the progression of increasing physical activity in individuals with SLE.

Self-reported and objectively-measured instruments to assess physical activity are valuable tools with respect to the type of study conducted. Over-reporting may occur when utilizing a self-reported tool to measure physical activity. However, a self-reported physical activity instrument may allow the subject to document more characteristics about the activity performed than an objectively-measured instrument. Objectively-measured instruments such as an accelerometer are more precise, but may not capture all activities or the characteristics of the activity. There was a moderate correlation between the self-reported IPAQ and an objectively-measured accelerometer in a study investigating self-reported and objectively-reported physical activity in SLE (Ahn et al, 2015). The current study utilized the IPAQ to measure self-reported physical activity in individuals with SLE to assess energy expenditure while simultaneously uncovering the perceived benefits of and barriers to physical activity in women with SLE between 18 and 44 years of age.

Physical activity barriers noted in individuals with SLE were family and work obligations, lack of facilities, fatigue, and joint pain (Mancuso et al, 2015). Barriers noted in the literature regarding barriers to physical activity in RA were a lack of information about physical activity, a lack of exercise facilities, familial obligations, being afraid to over-exert or participate in vigorous activities, fatigue, poor health and pain. Pain, familial obligations, poor health, lack of exercise facilities, and fatigue were shared barriers in subjects with SLE and rheumatoid

arthritis (Bajwa and Rogers, 2007; Demmelmair et al; Larkin et al, 2016; Mancuso et al, 2015). The lack of studies investigating physical activity support the aim of the present study to investigate the perceived benefits of and barriers to physical activity participation in individuals with SLE. Understanding the perceived benefits of and barriers to physical activity will provide a foundation to promote future participation of physical activity to reduce comorbidities, inflammation, and overall disease activity in individuals with SLE.

Chapter Three: Methods

Chapter three introduces the framework utilized to guide the study. A cross-sectional descriptive design was utilized to determine if differences existed between individuals with SLE between 18 and 44 years of age and individuals with no history of chronic illness or problems with mobility. Recruitment procedures utilized included the distribution of fliers at rheumatology clinics, presenting fliers in booth at lupus events, and an advertisement on social media. Further details of the study design, recruitment procedures, and the inclusion and exclusion criteria are described in this chapter. A description of ethical considerations, data collection, and data analysis also are discussed.

Study Design

This pilot study utilized a cross-sectional, descriptive approach that aimed to identify perceived benefits of physical activity and perceived barriers to physical activity in female patients diagnosed with SLE between 18 and 44 years of age. The goal was to answer the research question: “What are the perceived benefits of physical activity and the perceived barriers to physical activity in individuals diagnosed with Systemic Lupus Erythematosus between 18 and 44 years of age?”.

Recruitment

The recruitment process was initiated after gaining approval from the Institutional Review Board (IRB) at the University of Texas Medical Branch (UTMB) at Galveston. Several strategies were initiated to recruit individuals into the study group. The study group sample was recruited by emailing study

invitations (Appendix E) that included an embedded survey link through a local non-profit lupus group to individuals who have inquired about lupus. The survey (Appendix F) was created using the survey distribution company, SurveyMonkey©. Fliers (Appendix G) with details of the study were posted in over twenty rheumatology clinics in Houston, TX and surrounding areas. Due to a low response rate from the initial recruitment strategies, a study page (Exhibit H) and advertisement (Exhibit I) were created on a social media website. The advertisement was shared on the social media website through the social media site advertisement manager. The advertisement was set to share with females ages 18 to 44 in the Houston and Galveston, TX surrounding areas. The advertisement was also shared through convenience sampling by any individual on the social media site who shared it. If an individual clicked on the advertisement, the individual was directed to an end destination webpage (Exhibit I) with a description of the study details and a study inquiry box. An individual could type their email into the inquiry box along with any questions about the study. The inquiry was delivered directly to the researcher's email inbox.

Also in response to low recruitment with initial recruitment strategies, the researcher purchased a booth at the Lupus Foundation of America Annual Walk in Houston, TX. Fliers (Appendix J) were distributed at the booth and included study details, a link to the survey, and a QR Code that linked to the survey. Hard copies of the survey (Appendix F) were also available at the booth at the Lupus Walk. Because the study group sample was still low after the Lupus Walk in Houston, TX, IRB approval was obtained to provide compensation with the value

of a \$10 gift card to individuals who entered the study after May 20th, 2017. The researcher also purchased a booth at the Lupus Walk in Dickinson, TX. Fliers (Exhibit K) were distributed at the booth and included study details, a link to the survey, and a QR Code that linked to the survey. Hard copies of the survey (Appendix F) were also available at the booth at the Lupus Walk in Dickinson, TX.

The control group was recruited by sending email invitations (Appendix N) with an embedded link to the survey to Bachelor of Science in Nursing (BSN) and Associate Degree in Nursing (ADN) nursing schools in the Houston, TX and Gulf Coast region. Permission and IRB approval were obtained from the nursing schools in which the students were enrolled prior to dissemination of the study invitation. The survey (Appendix F) was created using the survey distribution company, SurveyMonkey©.

Inclusion/Exclusion Criteria

Inclusion criteria for subjects in the study group included female gender, between 18 and 44 years of age, diagnosed with SLE by a medical doctor, and instructed by a medical doctor to participate in physical activity. Additionally, the subject had to be able to read and write English, have access to the internet, and have an email address. Also, the subject had to dwell in Houston, TX or a surrounding area including Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county. Vulnerable populations including pregnant women, children, and cognitively impaired persons, and inmates were excluded from the study group.

Inclusion criteria for subjects in the control group included female gender, between 18 and 44 years of age, and have had no past or present history of chronic illness or problems with mobility. The subjects in the control group had to be able read and write English because the survey was only in English, the subject had to have access to the internet, and have an email address. The subject also had to live in Houston, TX or a surrounding area including Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county. Subjects in the control group were recruited by asking permission from the nursing schools in Houston, TX and surrounding areas. If permission was granted, the contact person at the school either sent the recruitment email to the students or sent a list of student emails to the researcher. The following are the nursing schools asked to send the survey to the students: University of Texas Medical Branch in Galveston, TX, University of Texas Health Science Center in Houston, TX, Texas Woman's University in Houston, TX, Prairie View A&M in Houston, TX, and Houston Baptist University in Houston, TX, Galveston College in Galveston, TX, College of the Mainland in Texas City, TX, Alvin Community College in Alvin, TX, San Jacinto College in Houston, TX and Pasadena, TX, Houston Community College in Houston, TX, or Lone Star College at the CyFair, Kingwood, Montgomery, North Harris County, or Tomball, TX. Vulnerable populations including pregnant women, children, and cognitively impaired persons, and inmates were excluded from the control group.

Setting

Subjects accessed the survey via Survey Monkey© online. There were no subjects who completed a hard copy of the survey at the Lupus Foundation of America Annual Lupus Walk in Houston, TX or Dickinson, TX. Subjects completed the survey in the location of their choice with a device that could access the internet.

Sampling

Recruitment first began on February 7th, 2017. There were over 1,000 emails sent to potential subjects through a local lupus group asking for their participation in the study. From the 1000 emails, a total of four subjects completed the survey. Recruitment fliers were also distributed to over 20 rheumatology offices in the Houston, TX and Gulf Coast surrounding areas. No responses were received as a result of these recruitment fliers. A social media advertisement to recruit subjects to the study group was first created on May 22nd, 2017. The social media advertisement reached a total of 72,336 people on the social media site, of which 485 people clicked on the advertisement, and 18 subjects completed the survey. Recruitment into the study group ended on July 12th, 2017 with a total of 22 subjects. Recruitment ended before the total sample size was reached due to exhaustion of recruitment techniques.

The control group had a total of 40 subjects. Two additional subjects were included in the control group because the surveys were completed before the collector for the control group was closed in SurveyMonkey©. Email invitations were sent to over 1,000 students attending a BSN or ADN nursing program in the

Houston, TX and Gulf Coast area. Because of a setting on the survey that did not allow incomplete answers, all survey questions presented to the subjects in the study and control groups were completed. Recruitment for the control group ended on June 12th, 2017 when the sample size was reached.

Ethical Considerations

All research studies have the potential to pose risks to participants. This study presented only minimal risks. The researcher was responsible for conducting the study in an ethical manner, and attempted to diminish any identified risks involved. Vulnerable populations were not involved in this study. Subjects were at least 18 years of age, and pregnant women were not allowed to participate. The minimal risks that may have arisen in this study were a loss of privacy, loss of time, and, the subject recalling their illness. To ensure privacy standards were upheld, the researcher completed the required Human Subjects Protection training specified by UTMB. The researcher also obtained expedited IRB approval through the UTMB IRB. The researcher also requested permission to disseminate the survey at the schools of nursing in which control group subjects were recruited.

To protect privacy, the researcher also administered all study instruments through an IRB approved survey distribution company. The subjects in the study group were asked to confirm the previously identified SLE diagnosis, confirm their medical doctor has recommended physical activity, and that she was between 18 and 44 years of age on the study questionnaire. The control group subjects were asked to confirm that she had no significant medical history or

problems with mobility, and was between 18 and 44 years of age. To decrease a breach of the aforementioned subjective medical information, each subject accessed the survey through a survey link, and no questions were asked that would identify the subject. To further heighten protection of the subject's privacy, the researcher stored all soft copy data on a secure computer. All copies of printed data were stored in a locked box in the researcher's home office. The data kept in the locked box included data analysis documentation. The subjects also were given the researcher's contact information in the event that the subject found the questionnaires distressing.

Instruments

Demographic Survey

The first items the subjects completed were included in the demographic survey (Appendix A). The demographic survey included gender, age, highest level of education completed, ethnicity, annual income, employment status, number of individuals in the household, number of children less than 18 years of age in the household, and marital status. The survey was adapted from a suggested survey from Survey Monkey (Survey Monkey©, nd). An additional question asking the subject to rate the amount of physical activity education she has received from healthcare providers was assessed utilizing a Likert Scale with the responses "None", "I have received encouragement to participate in physical activity", "I have been given examples of physical activity to perform", or "I have been given a detailed physical activity plan".

The Exercise Benefits Barriers Scale (EBBS)

The EBBS (Sechrist, Walker, & Pender, 1987) (Appendix B) was developed based on social learning theory to increase vigorous physical activity in adults. The EBBS narrows the focus of social learning theory to the construct, physical exercise, to investigate the determinants of health promotion behaviors and the barriers to physical activity. The EBBS was created by conducting a literature review, and then utilizing the literature to form a survey of possible items to be used on the EBBS. The preliminary study, “Perceptions of Positive and Negative Consequence of Exercise, Weight Control, and Stress Management (Pender & Pender, 1983) was sent to 100 households in a Midwestern community. One adult in each household was asked to complete the survey to identify perceived benefits and barriers to physical exercise (Sechrist, Walker, & Pender, 1987). The survey included 65 items using a Likert scale to assess perceived benefits and an assessment of reversely scored perceived barriers. To assess content validity, the instrument was sent to a panel of four experts, and was also assessed empirically. Subjects were approached in person to participate in the study. The survey consisted of the EBBS and a demographic data sheet. A final sample of 650 subjects returned the survey, and mostly completed instruments were used for the study. If there were only one to three unanswered questions, the median response was used for the answer (Sechrist, Walker, & Pender, 1987). Utilizing the median response for missing data may have inflated or deflated results of the study, and decreases repeatability of the EBBS.

Statistical analysis of the EBBS included item analysis, factor analysis, and reliability measures. Corrected item-total correlation coefficients were analyzed, and four items regarding perceived benefits were deleted to increase internal consistency. Principal components factor analysis was applied to the items, and the final structure resulted in five factors regarding perceived benefits, and four factors pertaining to perceived barriers, with a total of 43 items retained in the instrument. The final factors included life enhancement, physical performance, psychological outlook, social interaction, preventive health, exercise milieu, time expenditure, physical exertion, and, family encouragement (Sechrist, Walker, & Pender, 1987).

In regard to reliability, Cronbach's alpha was used to assess internal consistency for the total instrument consisting of 43 items (.952), benefits scale with 29 items (.953), and, barriers scale with 14 items (.866). Test-retest reliability also was performed by administering the test two weeks apart to 63 subjects with reliability coefficients ranging from .772 to .889 (Sechrist, Walker, & Pender, 1987). The EBBS demonstrates high internal consistency to specifically identify perceived benefits of and barriers to physical exercise. Also, the EBBS encompasses physical, environmental, and psychosocial domains to investigate perceived benefits and barriers in patients with SLE. Additionally, the scale may be used as a total scale; or, the subscales may be utilized independently.

The EBBS contains perceived benefits and physical, environmental, and psychosocial barriers to physical exercise. The EBBS was immensely valuable to the study because it was comprised of relevant barrier items to address the

proposed research question. Administering the EBBS with a scale to also measure energy expenditure provided an adequate assessment of perceived benefits and the physical, environmental, and psychosocial barriers to physical activity in SLE. The EBBS has been utilized in over 53,000 studies demonstrating that the instrument is robust and applicable across multiple settings and populations.

Short Form 36 Health Survey Version 2

To assess the subject's general health, the Short Form-36 Health Survey version 2 (SF-36v2 Health Survey) was chosen (Quality Metric, 2009) (Appendix C). The SF-36 v2 may be administered to individuals 18 years of age and above, among various disease processes, within different languages, and among different cultures. The SF-36v2 Health survey was adapted from the Short Form-36 Health Survey (SF-36 Health Survey) (Ware and Sherbourne, 1992). The SF-36 Health Survey was created to evaluate health status, and includes a multi-item scale with eight domains: physical functioning, physical role functioning, emotional role functioning, bodily pain, social functioning, mental health, vitality, and general health perception..

The SF-36 Health Version 2 was created utilizing the foundations of several scales that measure general health and disease burden, particularly the Medical Outcomes Study Short Form 20 Survey to measure physical functioning, role functioning, bodily pain, social functioning, and mental health (Ware and Shebourne, 1992). The domain, vitality, was added to the SF-36 Health survey to measure energy level and fatigue. The foundations of the domain vitality were

adapted from the five-item mental health scale (Berwick et al, 1991). The SF-36 includes a measure of general health perceptions adapted from the Health Perceptions Question (Davies & Ware, 1981). The domains within the SF-36 were cross-validated with the original instruments and demonstrate high correlations with the original instruments. The SF-36 is the most often used instrument to study patient-reported outcomes (Scoggins & Patrick, 2009).

The SF-36v2 Health Survey was adapted from the SF-36 Health Survey to enhance wording of items and the item responses. The SF-36v2 also has improved instructions, improved layout of questions and answers, better translations and cultural adaptations, and utilizes five options rather than dichotomized options to assess physical function, role functioning, and emotional functioning scales. The SF-36v2 is not often reported in the research as version 2, but more often as the SF-36. The SF-36v2 is a robust instrument appearing in over 22,000 research studies, and also demonstrates reliability with Cronbach's alpha ranging from .83 to .95 (Quality Metric, 2009).

International Physical Activity Questionnaire

The International Physical Activity Questionnaire (IPAQ) was utilized to assess the subject's level of physical activity (Craig et al, 2003) (Appendix D). An International Consensus Group was formed to create four short and four long versions of the IPAQ. Reliability and validity studies were conducted in 12 countries during 2000 (Craig et al, 2003). Short form and long form versions were pilot tested in subjects who also wore an activity monitor for one week after the initial assessment, and completed the same version of the IPAQ three days

after the second assessment for test-retest reliability. Convenience sampling was utilized to form a representative sample regarding “age, education, income, and activity levels (Craig et al, 2003, p. 1382). Additionally, qualitative input was reported by each data collection site. Data was then summed within each domain to determine the amount of total time encompassing all domains for each version of the IPAQ. Metabolic equivalent (MET) energy expenditures were then assigned to weigh each category to determine MET-minutes per week (Craig et al, 2003).

Three types of data analysis were implemented depending on the study site: test-retest reliability across visits, concurrent validity between forms, and, criterion-validity between the IPAQ forms and objective activity measures. Spearman correlation coefficients were used because the sample was not homogenous (Craig et al, 2003). Spearman correlation coefficients to assess test-retest reliability averaged 0.8, which demonstrated repeatability (Craig et al, 2003). The IPAQ short form versions also demonstrated test-retest reliability with “Seventy-five percent of the correlation coefficients observed above 0.65” (Craig et al, 2003, p. 1385).

Assessment between long- and short-form versions of the IPAQ demonstrated concurrent validity by assessing a pooled Pearson coefficient of 0.67, and between different short-form versions at 0.58 (Craig et al, 2003). Also, all correlations of the instrument administered to subjects between each data collection visit were above 0.65 (Craig et al, 2003). In reliability only studies, subjects completed the questionnaire during two visits with one week in between.

In reliability and validity studies, subjects also completed an additional survey instrument three days after the second visit. Correlation coefficients also were not influenced by different methods of administration including how the seven-day recall was presented, or by telephone versus self-reported administration.

The IPAQ long form was most beneficial for the study because the IPAQ long form contains domains to determine physical, environmental, and leisure time activity. The aim of the research was to assess perceived benefits of and barriers to physical activity. Quantified energy expenditure within the domains enabled the researcher to compare energy expenditure between the study and control groups.

Data Collection

After approval for the study was obtained from the UTMB IRB, data collection began. The subjects were sent the demographics survey (Appendix A), the Exercise Benefits and Barriers Survey (Appendix B), the Short Form-36 Health Survey Version 2 (Appendix C), and the International Physical Activity Questionnaire (Appendix D) to subjects through a link created utilizing a survey distribution company. The Exercise Benefits Barriers Scale (Sechrist, Walker, & Pender, 1987) was used to determine perceived benefits of physical activity and barriers to physical activity. The subjects also completed the International Physical Activity Questionnaire (IPAQ) (Appendix D) to assess energy expenditure in the study and control groups. Additionally, the subjects were sent the Short-36 Health Survey Version 2 (SF-36v2) to assess general health and disease burden. A statement detailing the requirements of the informed consent

was provided and the subject was informed. By clicking “begin”, the subject provided consent to participate in the study. Instructions were provided on the first page of the survey. The statement instructed the subject to fully complete the survey. The researcher included a restriction in SurveyMonkey© which did not allow the subject to proceed to the next question without answering the current question to ensure completion of all surveys. The researcher’s contact information was documented within the study invitation and on the informed consent, and the subject was able contact the researcher if there were any technical or personal complications related to the survey instruments. The subject was assigned a number by the survey distribution company to ensure anonymity.

Data Analysis Procedures

The first step in data analyses was to input survey responses from the SF36-v2 (Appendix C) into the Health Outcomes Scoring Software by Quality Metric™. After the SF36-v2 was scored following the scoring methods provided by Quality Metric™, the raw and scored data were entered into the excel spreadsheet. The IPAQ (Appendix D) was scored manually and the summed MET score was entered into Excel. Demographical data (Appendix A), the EBBS (Appendix B) and IPAQ survey responses also were inputted into the excel spreadsheet. After all data were cleaned in the excel spreadsheet, all data were uploaded into SPSS™. After all data were loaded into SPSS™, descriptive statistics including the frequency, mean, and/or percentages were reported for each item in the demographics survey and EBBS. Analyses of difference also was conducted for the SF-36v2 to determine if there were differences in the PCS and

MCS, for the IPAQ to determine if there were differences in energy expenditure, and for the EBBS to investigate if there were differences in perceived benefits of and barriers to physical activity between the study and control groups. Because the proposed research was a pilot study with a small sample size, the researcher utilized the Mann-Whitney U test when indicated to determine if there were differences between the study and control groups (Portney & Watkins, 2009).

Data inputted to SPSS™ was stored on the researcher's secure computer with a secure password. All data printed from SPSS™ for purposes of data analysis was kept in a locked box in the researcher's home office. At the completion of the study, the researcher shredded all printed materials, and placed the shredded information into a recycling receptacle.

The expected outcome of the study is anticipated to benefit patients with SLE who are between 18 to 44 years of age living in Houston, TX and surrounding Gulf Coast areas. The revelation of activity barriers specifically to patients with SLE between 18 to 44 years of age is projected to enable healthcare workers to formulate personalized resources to overcome activity barriers that will benefit patients with similar characteristics to the study sample to increase physical activity participation. Overall, the study may promote physical activity in patients with similar characteristics to the study sample by enriching the literature with information about the benefits of and barriers to physical activity in patients with SLE between 18 to 44 years of age, and may demonstrate limitations to physical activity the practitioner could consider when promoting physical activity. The overall desired outcomes of this study were to increase physical

activity participation. Increasing physical activity is projected to function as an adjuvant modality to decrease inflammation and disease activity, prevent complications associated with SLE, and enhance global health outcomes in patients with SLE.

Chapter Four: Results/Findings

Study findings including sample characteristics, psychometric data, and data analyses are presented in chapter four. Demographical data are described in frequencies and percentages. Descriptive data and tests of differences include the Mann-Whitney U and Student's T-Test for the EBBS, SF-36 V2, and IPAQ.

Sample Characteristics

The study sample included a total of 22 subjects in the study group (individuals with SLE between 18 and 44 years of age), and 40 subjects in the control group (nursing students with no history of chronic illness or problems with mobility) (Table 4.1). Age was similar for the study and control groups. The mean age for the study group was 33.55 years of age and the mean age for the control groups was 29.00 years of age. Ethnicity also was comparable between the study and control groups. The study group sample included 54.5% Caucasian, 22.7% African American, and 22.7% Hispanic. The control group sample included 55% Caucasian, 22.5% African American, 15.0% Hispanic, and 7.5% Asian.

Table 4.1

Sample Characteristics

	Study Group Ages	Control Group Ages	Study Group N	Study Group %	Control Group N	Control Group %
Mean	33.55	29.00				
Range (years)	20-44	18-41				

Ethnicity

Caucasian	12	54.5	22	55.0
African American	5	22.7	9	22.5
Hispanic	5	22.7	5	15.0
Asian	0	0.0	3	7.5
Native American	0	0.0	0	0.0
Household Income				
<\$20,000	8	36.4	24	60.0
\$20,001-\$30,000	4	18.2	7	17.5
\$30,001-\$40,000	0	0.0	3	7.5
\$40,001-\$50,000	3	13.6	1	2.5
\$50,001-\$60,000	2	9.1	1	2.5
\$60,001-\$70,000	1	4.5	1	2.5
\$70,001-\$80,000	1	4.5	0	0.0
\$80,001-\$90,000	2	9.1	0	0.0
\$90,001-\$100,000	0	0.0	1	2.5
>\$100,000	1	4.5	2	7.9
Employment				
Full-Time	12	54.5	2	5.0
Part-Time	3	13.6	17	42.5
Disabled	4	18.2	0	0.0
Not Employed	3	13.6	21	52.5
Marital Status				
Single/ Never Married	5	22.7	23	57.5

Married	14	63.6	13	32.5
Separated/ Divorced	3	13.6	4	10.0
Physical Activity Education				
No Physical Activity Education	2	9.1	8	20.0
Received Encouragement	12	54.5	23	57.5
Given Examples	5	22.7	8	20.0
Given Detailed Plan	3	13.6	1	2.5

Annual household income ranging from less than \$20,000 to \$60,000 was reported more often by subjects in the control group compared to the study group. The percentage of subjects in the control and study groups with an annual household income ranging from less than \$20,000 to \$60,000 was 90.0% and 77.3%, respectively. Annual income greater than \$60,001 was more often reported in the study group than the control group, 22.6% and 12.9% correspondingly. Although subjects in the study group more often reported annual income greater than \$60,001, 7.9% of subjects in the control group reported an income greater than \$100,000 per year.

Employment status ranged from employed full-time, employed part-time, disabled, to unemployed. Subjects in the study group reported being employed full-time more often, and subjects in the control group reported being employed part-time more often. Disability was reported in 18.2% of the study group compared to no reports of being disabled in the control group. Unemployment

was reported by 13.6% of subjects in the study group, which was less than the 52.5% of the subjects in the control group who reported unemployment.

Marital status ranged from single/never married, married, to separated/divorced. There were variations between the study and control groups regarding marital status. Subjects in the control group more often reported being single or never married. There were 57.5% of subjects who identified as single or never married in the control group compared to 22.7% of subjects in the study group. Furthermore, 63.6% of subjects in the study group reported being married compared to 32.5% in the control group. However, 13.6% of the study group were divorced, whereas, 10.0% of the control group were divorced.

Subjects were asked to identify the amount of physical activity provided by their provider. The subjects chose from choices ranging from “none”, “I have received encouragement to participate in physical activity”, “I have been given specific examples of physical activity to perform”, to “I have been given a detailed physical activity plan”. In contrast to the 20% of the control group, 22.7% of subjects in the study group reported being given specific examples of physical activity to perform. Moreover, 13.6% of subjects in the study group compared to only 2.5% of subjects in the control group reported being given a detailed activity plan.

Analyses of Sample Differences

IPAQ

Physical activity was quantified utilizing the IPAQ (Appendix D). Subjects were asked about the amount and intensity of various physical activities.

Physical activity was measured in MET-minutes per week. The control group had higher reports of no vigorous physical activity in the workplace setting. (Table 4.2). There were 36.4% of the study group who reported no physical activity compared to 57.5% of the control group who reported no occupational vigorous physical activity. The control and study groups had similar reports regarding moderate physical activity in the workplace setting. There were 63.67% of subjects in the study group and 57.5% of subjects in the control group who reported zero hours per day of moderate physical activity in the work domain.

The number of days and the hours of travel in a vehicle were higher in the control group than the study group. There were 75% of subjects in the control group who travelled in a motor vehicle seven days each week compared to 31.8% of subjects in the study group. Bicycling from place to place was considered moderate intensity in the transportation domain. There were 90.9% of study group who reported no bicycling as a form of transportation, which was similar to the 92.5% of the control group who reported no bicycling. There were 17.5% of subjects in the control group who reported walking seven days per week as a form of transportation compared to zero subjects in the study group. Additionally, 35% of subjects in the control group reported walking 60 minutes or greater each day compared to 13.6% of the study group. Subjects in the control group reported walking seven days per week and walking more hours per day as form of transportation than the study group.

The domestic domain included outside vigorous and moderate yard work, and moderate work inside of the home. There were 77.3% of the study group who

reported no vigorous outside yard work compared to 81.5% of the control group. The study group more often reported no moderate yard work at 50% of the study group compared to 31.6% of the control group. There were 36.3% of the study group who reported 5 or more days of moderate intensity work inside the home versus 25% of the control group who reported 5 or more days of moderate intensity work inside the home. Additionally, 63.7% of the study group reported 30 minutes or more of moderate intensity housework compared to 57.5% of the control group.

The leisure-time domain included vigorous, moderate, and walking intensities. There were 45.5% of the study group who reported zero walking compared to 57.5% of the control group. There were 77.3% of the study group who reported no cycling as a moderate intensity physical activity compared to 77.5% of the control group. Additionally, there were 81.8% of the study group who reported no vigorous leisure-time physical activity compared to 60.0% of the control group.

Table 4.2

IPAQ Descriptive Statistics

Items	Response	Study Group Frequency	Study Group %	Control Group Frequency	Control Group %
Do you currently have a job or unpaid work outside your home?	Yes	14	63.6	17	42.5
	No	8	36.4	23	57.5
During the last 7 days, on how many occasions did you do vigorous activities like heavy lifting, digging, heavy construction, or climbing	0	12	54.5	33	82.5
	1	1	4.5	2	5.0
	2	2	9.1	2	5.0
	3	3	13.6	0	0.0
	4	1	4.5	1	2.5
	5	2	9.1	2	5.0

up-stairs as part of your work? Think about only physical activities that you did for at least 10 minutes at a time.	7	1	4.5	0	0.0
How much time did you usually spend on one of those days doing vigorous exercise activities as part of your work?	0.0	12	54.5	33	82.5
	20.00	1	4.5	0	0.0
	30.00	2	9.1	1	2.5
	60.00	1	4.5	0	0.0
	120.00	2	9.1	2	5.0
	180.00	1	4.5	0	0.0
	240.00	2	9.1	1	5.0
	360.00	1	4.5	1	2.5
	480.00	0	0.0	1	2.5
Again, think about only those physical activities that you did for at least 10 minutes. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads as part of your work? Please do not include walking.	0.0	14	63.6	29	72.5
	1.00	1	4.5	2	5.0
	2.00	2	9.1	3	7.5
	3.00	2	9.1	1	2.5
	4.00	1	4.5	1	2.5
	5.00	1	4.5	1	2.5
	7.00	1	4.5	3	7.5
How much time did you usually spend on one of those days doing moderate physical activities as part of your work?	0.0	14	63.6	30	75.0
	25.00	1	4.5	0	0.0
	30.00	1	4.5	1	2.5
	60.00	2	9.1	0	0.0
	120.00	2	9.1	3	7.5
	180.00	0	0.0	2	5.0
	240.00	1	4.5	2	5.0
	300.00	1	4.5	0	0.0
	480.00	0	0.0	2	5.0
During the last 7 days, on how many days did you walk for at least 10 minutes at a time as part of your own work? Please do not count walking you did to travel to and from work.	0.0	13	59.1	28	70.0
	1.00	2	9.1	2	5.0
	2.00	1	4.5	4	10.0
	3.00	0	0.0	2	5.0
	4.00	2	9.1	2	5.0
	5.00	4	18.2	0	0.0
	7.00	0	0.0	2	5.0
How much time did you usually spend on one of	0.0	13	59.1	28	70.0
	7.00	1	4.5	0	0.0
	15.00	1	4.5	1	2.5

those days walking as part of your own work?	20.00	0	0.0	0	0.0
	30.00	0	0.0	1	2.5
	60.00	2	9.1	0	0.0
	120.00	0	0.0	1	2.5
	180.00	0	0.0	1	2.5
	240.00	2	9.1	2	5.0
	300.00	2	9.1	1	2.5
	360.00	0	0.0	1	2.5
	420.00	1	4.5	0	0.0
	480.00	0	0.0	2	5.5
	540.00	0	0.0	1	2.5
During the last 7 days, on how many days did you travel in a motor vehicle like a train, bus, car, or tram?	0.0	1	4.5	1	2.5
	2.00	2	9.1	0	0.0
	3.00	1	4.5	1	2.5
	4.00	3	13.6	3	7.5
	5.00	6	27.3	4	10.0
	6.00	2	9.1	1	2.5
	7.00	7	31.8	30	75.0
How much time did you usually spend on one of those days traveling in a train, bus, car, tram, or other kind of motor vehicle?	0.0	1	4.5	4	10.0
	15.00	2	9.1	0	0.0
	20.00	1	4.5	1	2.5
	30.00	3	13.6	1	2.5
	45.00	2	9.1	0	0.0
	50.00	0	0.0	1	2.5
	60.00	7	31.8	7	17.5
	85.00	0	0.0	1	2.5
	90.00	0	0.0	4	10.0
	105.00	0	0.0	1	4.5
	120.00	2	9.1	10	25.0
	122.00	0	0.0	1	2.5
	150.00	0	0.0	1	2.5
	180.00	2	9.1	6	15.0
	210.00	0	0.0	1	2.5
	240.00	1	4.5	1	2.5
	300.00	1	4.5	0	0.0
During the last 7 days, on how many days did you bicycle for at least 10 minutes at a time to go from place to place?	0.0	20	90.9	37	92.5
	1.00	0	0.0	1	2.5
	2.00	1	4.5	0	0.0
	3.00	0	0.0	1	2.5
	4.00	0	0.0	1	2.5
	5.00	1	4.5	0	0.0
How much time did you usually spend on one of	0.0	20	90.9	37	92.5
	10.00	0	0.0	1	2.5
	30.00	1	4.5	1	2.5

those days to bicycle	60.00	1	4.5	0	0.0
from place to place?	120.00	0	0.0	1	2.5
During the last 7 days,	0.0	9	40.9	14	35.0
on how many days did	1.00	2	9.1	3	7.5
you walk for at least 10	2.00	3	13.6	3	7.5
minutes at a time to go	3.00	1	4.5	4	10.0
from place to place?	4.00	2	9.1	5	12.5
	5.00	4	18.2	3	7.5
	6.00	1	4.5	1	2.5
	7.00	0	0.0	7	17.5
How much time did you	0.0	11	50.0	12	30.0
usually spend on one of	3.00	0	0.0	1	2.5
those days walking from	5.00	1	4.5	0	0.0
place to place?	7.00	0	0.0	1	2.5
	10.00	3	13.6	3	7.5
	15.00	1	4.5	2	5.0
	20.00	0	0.0	2	5.0
	25.00	1	4.5	0	0.0
	30.00	2	9.1	4	10.0
	40.00	0	0.0	1	2.5
	60.00	2	9.1	7	7.5
	75.00	0	0.0	1	2.5
	90.00	1	4.5	0	0.0
	120.00	0	0.0	2	5.0
	240.00	0	0.0	2	5.0
	300.00	0	0.0	1	2.5
	720.00	0	0.0	1	2.5
Think about only those	0.0	17	77.3	31	81.6
physical activities that	1.00	2	9.1	4	10.5
you did for at least 10	2.00	1	4.5	1	2.6
minutes at a time.	3.00	0	0.0	2	5.3
During the last 7 days,	4.00	0	0.0	1	2.6
how many days did you	5.00	1	4.5	0	0.0
do vigorous physical	7.00	1	4.5	0	0.0
activities like heavy					
lifting, chopping wood,					
shoveling snow, or					
digging in the garden or					
yard?					
How much time did you	0.0	17	77.3	32	82.5
usually spend on one of	15.00	1	4.5	0	0.0
those days doing	20.00	0	0.0	1	2.5
vigorous physical	45.00	1	4.5	1	2.5
	50.00	1	4.5	0	0.0

activities in the garden or yard?	60.00	0	0.0	1	2.5
	120.00	1	0.0	2	5.0
	180.00	1	4.5	0	0.0
	240.00	0	0.0	2	5.0
	420.00	1	4.5	0	0.0
Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard?	0.0	11	50.0	12	31.6
	1.00	1	4.5	3	7.9
	2.00	2	9.1	6	15.8
	3.00	3	13.6	6	15.8
	4.00	0	0.0	3	7.9
	5.00	3	13.6	5	13.2
	6.00	0	0.0	1	2.6
	7.00	2	9.1	2	5.3
How much time did you usually spend on one of those days doing moderate physical activities in the garden or yard?	0.0	11	50.0	17	42.5
	1.00	0	0.0	1	2.5
	3.00	0	0.0	1	2.5
	5.00	0	0.0	1	2.5
	15.00	1	4.5	1	2.5
	20.00	1	4.5	1	2.5
	30.00	2	9.1	3	7.5
	45.00	1	4.5	2	5.0
	60.00	1	4.5	5	12.5
	69.00	1	4.5	0	0.0
	90.00	1	4.5	0	0.0
	120.00	0	0.0	3	7.5
	180.00	0	0.0	2	5.0
	240.00	0	0.0	2	5.0
	300.00	0	0.0	1	2.5
	330.00	1	4.5	1	2.5
	420.00	1	4.5	0	0.0
	540.00	0	0.0	1	2.5
Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, washing	0.0	3	13.6	8	20.0
	1.00	2	9.1	4	10.5
	2.00	5	22.7	11	28.9
	3.00	4	18.2	4	10.5
	5.00	3	13.6	5	13.2
	6.00	1	4.5	1	2.6

windows, scrubbing floors and sweeping inside your home?	7.00	4	18.2	6	15.0
How much time did you usually spend on one of those days doing moderate physical activities inside your home?	0.0	3	13.6	11	27.5
	5.00	0	0.0	1	2.5
	10.00	0	0.0	2	5.0
	15.00	0	0.0	1	2.5
	20.00	2	9.1	2	5.0
	30.00	3	13.6	2	5.0
	40.00	1	4.5	0	0.0
	45.00	0	0.0	1	2.5
	60.00	3	13.6	5	12.5
	90.00	0	0.0	3	7.5
	120.00	2	9.1	6	15.0
	125.00	0	0.0	1	2.5
	180.00	2	9.1	3	7.5
	240.00	1	4.5	1	2.5
	300.00	1	4.5	0	0.0
	390.00	1	4.5	0	0.0
	420.00	1	4.5	0	0.0
	540.00	0	0.0	1	2.5
Not counting any walking you have already mentioned, during the last 7 days on how many days did you walk for at least 10 minutes at a time in your leisure time?	0.0	10	45.5	14	35.0
	1.00	4	18.2	5	12.5
	2.00	1	4.5	6	15.0
	3.00	3	13.6	7	17.5
	4.00	0	0.0	2	5.0
	5.00	1	4.5	2	5.0
	7.00	3	13.6	4	10.0
How much time did you usually spend on one of those days walking in your leisure time?	0.0	10	45.5	14	35.0
	10.00	1	4.5	3	7.5
	20.00	3	13.6	3	7.5
	25.00	1	4.5	2	5.0
	30.00	4	18.2	4	10.0
	42.00	1	4.5	0	0.0
	45.00	0	0.0	2	2.5
	60.00	2	9.1	6	15.0
	65.00	0	0.0	1	2.5
	90.00	0	0.0	2	5.0
	120.00	0	0.0	3	7.5
Again, think about only those physical activities that you did for at least	0.0	17	77.3	30	76.3
	1.00	0	0.0	2	5.0
	2.00	1	4.5	1	2.5

10 minutes at a time.	3.00	1	4.5	4	5.0
During the last 7 days,	4.00	1	4.5	3	7.5
on how many days did	7.00	2	9.1	0	0.0
you do moderate					
physical activities like					
bicycling at a regular					
pace, swimming at a					
regular pace, and					
doubles tennis in your					
leisure time?					
How much time did you	0.0	17	77.3	31	78.9
usually spend on one of	7.00	1	4.5	0	0.0
those days doing	15.00	0	0.0	1	2.5
moderate physical	20.00	1	4.5	0	0.0
activities in your leisure	30.00	2	9.1	2	5.0
time?	45.00	0	0.0	2	5.0
	55.00	0	0.0	0	0.0
	60.00	0	0.0	3	7.5
	240.00	0	0.0	1	2.5
	0.0	18	81.8	23	57.5
Think about only those	1.00	2	4.5	3	7.5
physical activities that	2.00	0	0.0	2	5.0
you did for at least 10	3.00	1	4.5	4	10.0
minutes at a time.	4.00	1	4.5	5	12.5
During the last 7 days,	5.00	0	0.0	2	5.0
on how many days did	7.00	1	4.5	1	2.5
you do vigorous physical					
activities like aerobics,					
running, fast bicycling,					
or fast swimming in your					
leisure time?					
How much time did you	0.0	18	81.8	24	60.0
usually spend on one of	7.00	1	4.5	0	0.0
those days doing	10.00	0	0.0	1	2.5
vigorous physical	15.00	0	0.0	1	2.5
activities in your leisure	20.00	0	0.0	1	2.5
time?	25.00	0	0.0	1	2.5
	30.00	0	0.0	1	2.5
	45.00	0	0.0	3	7.5
	55.00	1	4.5	0	0.0
	60.00	2	9.1	2	5.0
During the last 7 days,	65.00	0	0.0	0	0.0
how much time did you	120.00	1	4.5	1	2.5
usually spend sitting on a	180.00	2	9.1	4	12.5
weekday?	240.00	6	27.3	3	13.2

	300.00	2	9.1	4	7.9
	360.00	3	13.6	5	15.8
	420.00	1	4.5	5	5.3
	480.00	5	22.7	6	15.8
	540.00	0	0.0	1	5.3
	600.00	1	4.5	2	10.5
	720.00	1	4.5	3	2.6
	840.00	0	0.0	1	2.5
	900.00	0	0.0	2	5.0
	960.00	0	0.0	1	2.5
	1080.00	0	0.0	1	2.4
	1200.00	0	0.0	1	2.5
During the last 7 days,					
how much time did you usually spend sitting on a weekday?	60.00	1	4.5	0	0.0
	120.00	0	0.0	3	7.5
	180.00	1	4.5	2	5.0
	240.00	7	31.8	5	15.0
	300.00	3	13.6	3	7.5
	360.00	4	18.2	4	10.0
	420.00	0	0.0	2	5.0
	480.00	4	18.2	8	20.0
	540.00	0	0.0	2	5.0
	600.00	1	4.5	5	12.5
	720.00	1	4.5	1	2.5
	1380.00	0	0.0	1	2.5
	1440.00	0	0.0	1	2.5
	1800.00	0	0.0	1	2.5
	2160.00	0	0.0	1	2.5

In summary, the control group more often reported no physical activity in the work domain of the IPAQ. The control group more frequently reported more days per week and hours per day of walking as a form of transportation. However, the study group more often reported zero days per week and zero minutes per day of vigorous and moderate yard work while the study group and control group were similar with moderate-intensity yard work inside of the home. Additionally, the study group more often reported no physical activity in the vigorous leisure

activity domain, but less often reported zero physical activity in the walking and moderate leisure domains.

IPAQ MET-minutes Per Week

MET-minutes per week were calculated by multiplying the number of days the activity was performed by the total minutes each day and an assigned value for the type of activity. The mean Total MET-minutes per week for the control group was 6,630 +/- 7575.84657, which was less than the Total MET-minutes per week mean for the study group, 8,390 +/- 11,727.98654 (Table 4.3). The median MET-minutes per week were higher in the work domain, the leisure domain, and the transportation domain in the control group compared to the study group. The median MET-minutes per week were higher in the study group than the control group in the domestic and gardening domain. The median MET-minutes per week were greater in the control group than the study group for walking intensity, however, the study group median was higher for the moderate to vigorous physical activity intensity. Moreover, the total median MET-minutes per week were greater in the study group than the control group.

Table 4.3

Metabolic Equivalents (METs)

	Study Group Mean +/- SD MET minutes/week	Study Group Median (IQR) MET minutes/week	Control Group Mean +/- SD MET minutes/week	Control Group Median (IQR) MET minutes/week
Domains				
Work	3651.2 +/- 6327.0	0.0 (0.0--19968.0)	2446.7 +/- 5302.1	0.0 (0.0--22361.0)

Transportation	213.1 +/- 354.7	24.7 (0.0--1116.0)	939.2 +/- 1961.2	318.0 (0.0--9504.0)
Domestic and Garden	4041.4 +/- 8138.6	1080.0 (0.0--36750.0)	2127.8 +/- 2839.6	930.0 (0.0--13884.0)
Leisure	484.6 +/- 799.7	82.5 (0.0--3102.0)	1116.9 +/- 1496.7	444.0 (0.0--5040.0)
Intensities				
Walking	1482.6 +/- 2185.2	528.0 (0.0--7062.0)	2132.6 +/- 3161.0	775.0 (0.0--11088.0)
Moderate to Vigorous	6973.5 +/- 10204.3	3697.5 (0.0--46177.0)	4498.0 +/- 64.3	2310.0 (0.0--31169.0)
Total	8390.7 +/- 11727.9	3690.0 (33.0--52179.70)	6630.7 +/- 7575.8	3581.2 (318.0--33139.1)

MET=metabolic equivalent; IQR = Interquartile range.

Tests of Analyses

A population pyramid was assessed to examine if the distribution of the study group and the control group were similar. The distributions were similar, and the Mann-Whitney U test was conducted to determine if there was a difference in energy expenditure between the study and control groups in the work, transportation, domestic and gardening, and leisure domains. The Mann-Whitney U was also conducted to test if a difference existed in walking intensity and moderate to vigorous intensity physical activity (MVPA) domains.

Furthermore, the Mann-Whitney U was utilized to investigate if there was a

difference in the median total MET-minutes per week (Table 4.4). Results of the Mann-Whitney U demonstrate that the null hypothesis must be retained for all domains, intensities, and median total MET-minutes per week. The p-value was greater than .05 indicating that there was not a significant difference between the study and control groups in the median MET-minutes per week for the work, transportation, domestic and gardening, nor the leisure domains. There also was not a significant difference in MET-minutes per week between the study and control groups in the walking nor the moderate to vigorous physical activity intensities.

Table 4.4

Mann-Whitney U

	Study Group Median	Control Group Median	U	z-score	p-value
Domain					
Work	0.0	0.0	378.000	-1.066	.288
Transportation	24.7	318.0	562.000	1.843	.065
Domestic and Garden	1080.0	930.0	415.000	-.362	.718
Leisure	82.5	444.2	558.500	1.774	.076
Intensities					
Walking			527.500	1.289	.197
Moderate to Vigorous			379.500	-.891	.373
Total MET			417.000	-.338	.735

Short Form-36 Version 2

The Short Form-36 v2 was used to investigate mental and physical health burden. The study group mean of 3.32 +/- 1.086 was greater than the control group mean of 3.28 +/- .933 indicating that both groups overall felt their health was “good” (Table 4.5). The study group mean of 3.14 +/- 1.153 was greater than the control group mean when rating present health compared to health one year ago. However, the greater mean score indicates health somewhat worse than a year ago. The study and control group means were similar when rating ability to perform vigorous activities, moderate activities, lifting or carrying groceries, climbing several flights of stairs, bending kneeling, or stooping, walking more than a mile, walking several hundred yards, walking one hundred yards, and bathing or dressing oneself. The mean scores also were similar at 3.73 +/- 1.420 and 3.98 +/- 1.209, respectively, for the study and control groups when asked whether they had to cut down on the amount of time spent on work or other activities due to physical health. The mean scores demonstrated that both, the study group and the control group, have either only cut down activities some of the time, a little of the time, or none of the time. The mean scores were also similar when the subjects were asked if their physical health caused them to accomplish less than they would like, if physical health limited the kind of work or activities performed, and if the subject had a difficult time performing work or other activities. The mean scores ranged from 3.41 +/- 1.563 to 3.98 +/- 1.209.

The study and control groups had similar mean scores when asked if physical or emotional problems has interfered with normal social activities. The

study group did have a higher mean score of 3.18 +/- 1.563 compared to the control group of 2.53 +/- 1.485 when asked how much bodily pain has occurred over the past 4 weeks. The higher mean score suggests more severe pain in the study group. The study group also had a higher mean score than the control group when asked if pain interfered with normal work inside and outside of the home. The study group mean was 2.52 +/- 1.569 compared to the control group with a mean of 2.08 +/- 1.289.

Mean scores were similar for the study and control groups when asked if they felt full of life demonstrating that both groups felt full of life “some of the time”. The study group had a lower mean score of 2.68 +/- 1.068 when asked if she has been nervous suggesting that subjects in the study group had more subject who reported feeling nervous. The mean for the study and control groups were similar with a mean response of “some of the time” to “a little of the time” when asked if they have felt so down in the dumps that nothing could cheer them up, when asked if they felt calm and peaceful, if they had a lot of energy, if they felt downhearted and depressed, if they felt worn out, if they have been happy, and if they felt tired.

The study group mean of 3.09 +/- 1.231 was less than the control group mean of 3.55 +/- 1.300 when asked how much physical health or emotional problems had interfered with social activities during the past four weeks. The higher mean score for the control group suggests that physical or emotional health interfered with social activities less than in the study group. Neither the study group nor the control group were asked four of the questions in the General

Health subscale. The omitted questions were whether the subject gets sick a little easier than other people, whether the subject was as healthy as anyone they knew, if the subject expected their health to get worse, or whether the subject felt that their health was excellent. Because one question in the General Health subscale was on the survey, the General Health subscale was still utilized to calculate the physical and mental component scores because the Quality Metric Scoring Software© used a full missing score estimation (MSE) by assuming the missing item responses are the same as the scale's (the General Health scale) answered item (Quality Metric, 2011).

Table 4.5

SF-36 Descriptive Statistics

Item	Study Group Frequency	Study Group %	Study Group Frequency	Control Group %	Study Group Mean	Control Group Mean
In general, would you say your health is:					3.32 +/- 1.086	3.28 +/- .933
Excellent	1	4.5	1	2.5		
Very Good	4	18.2	7	17.5		
Good	7	31.8	15	37.5		
Fair	7	31.8	14	35.0		
Poor	3	13.6	3	7.5		
Compared to one year ago, how would you rate your health in general now?					3.14 +/- 1.153	2.98 +/- 1.025

Much better now than one year ago.	2	9.1	2	5.0
Somewhat better now than one year ago.	4	18.2	12	30.0
About the same as one year ago.	6	27.3	14	35.0
Somewhat worse than one year ago.	7	31.8	9	22.5
Much worse now than one year ago.	2	9.1	3	7.5

The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

Vigorous activities, such as running lifting heavy objects, participating

2.05	2.05
+/-	+/-
.844	.876

in strenuous sports.

Yes, limited a lot.	7	31.8	14	35.0
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Yes, limited a little.	7	31.8	10	25.0
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No, not limited at all.	8	36.4	16	40.0
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Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.

2.36	2.70
+/-	+/-
.848	.516

Yes, limited a lot.	5	22.7	1	2.5
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Yes, limited a little.	4	18.2	10	25.0
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No, not limited at all.	13	59.1	29	72.5
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Lifting or carrying groceries.					2.50	2.73
					+/-	+/-
					.740	.506

Yes, limited a lot.	3	13.6	1	2.5
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Yes, limited a little.	5	22.7	9	22.5
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No, not limited at all.	14	63.6	30	75.0
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Climbing several flights of stairs					2.27	2.28
					+/-	+/-
					.827	.716

Yes, limited a lot.	5	22.7	6	15.0		
Yes, limited a little.	6	27.3	17	42.5		
No, not limited at all.	11	50.0	17	42.5		
Climbing one flight of stairs.					2.45 +/- .739	2.80 +/- .405
Yes, limited a lot.	3	13.6	0	0.0		
Yes, limited a little.	6	27.3	8	20.0		
No, not limited at all.	13	59.1	32	80.0		
Bending, kneeling, or stooping					2.32 +/- .894	2.60 +/- .591
Yes, limited a lot.	6	27.3	2	5.0		
Yes, limited a little.	3	13.6	12	30.0		
No, not limited at all.	13	52.1	26	65.0		
Walking more than a mile					2.32 +/- .839	2.53 +/- .640
Yes, limited a lot.	5	22.7	3	7.5		
Yes, limited a little.	5	22.7	13	32.5		
No, not limited at all.	12	54.5	24	60.0		
Walking several hundred yards					2.50 +/- .740	2.70 +/- .608

Yes, limited a lot.	3	13.6	3	7.5		
Yes, limited a little.	5	22.7	6	15.0		
No, not limited at all.	14	63.6	31	77.5		
Walking one hundred yards					2.68 +/- .568	2.75 +/- .588
Yes, limited a lot.	1	4.5	3	7.5		
Yes, limited a little.	5	22.7	4	10.0		
No, not limited at all.	16	72.7	33	82.5		
Bathing or dressing yourself.					2.59 +/- .666	2.88 +/- .335
Yes, limited a lot.	2	9.1	0	0.0		
Yes, limited a little.	5	22.7	5	12.5		
No, not limited at all.	15	68.2	35	87.5		
During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as						

a result of
your
physical
health?

Cut down
on the
amount of
time you
spent on
work or
other
activities

3.73 3.98
+/- +/-
1.420 1.209

All of the time	2	9.1	2	5.0
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Most of the times	3	13.6	3	7.5
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Some of the time	4	18.2	8	20.0
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A little of the time	3	13.6	8	20.0
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None of the time	10	45.5	19	47.5
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Accomplish ed less than you would like.					3.41 3.55 +/- +/- 1.563 1.395
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All of the time	4	18.2	4	10.0
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Most of the times	3	13.6	7	17.5
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Some of the time	3	13.6	6	15.0
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A little of the time	4	18.2	9	22.5
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None of the time	8	36.4	14	35.0
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Were limited in the kind of work or other activities					3.45 +/- 1.654	3.85 +/- 1.350
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All of the time	4	18.2	3	7.5
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Most of the times	4	18.2	4	10.0
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Some of the time	2	9.1	9	22.5
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A little of the time	2	9.1	4	10.0
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None of the time	10	45.5	20	50.0
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Had difficulty performing the work or other activities (for example, it took extra effort)					3.55 +/- 1.535	3.78 +/- 1.330
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All of the time	3	13.6	3	7.5
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Most of the times	3	13.6	5	12.5
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Some of the time	5	22.7	7	17.5
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A little of the time	1	4.5	8	20.0
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None of the time	10	45.5	17	42.5
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During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)

Cut down on the amount of time you spent on work or other activities

3.00	3.75
+/-	+/-
1.345	1.214

All of the time	3	13.6	2	5.0
Most of the times	6	27.3	5	12.5
Some of the time	5	22.7	8	20.0
A little of the time	4	18.2	11	27.5
None of the time	4	18.2	14	35.0

Accomplish ed less than you would like					2.86 +/- 1.457	3.63 +/- 1.275
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All of the time	5	22.7	2	5.0
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Most of the times	4	18.2	8	20.0
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Some of the time	7	31.8	6	15.0
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A little of the time	1	4.5	11	27.5
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None of the time	5	22.7	13	32.5
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Did work of activities less carefully than usual					3.82 +/- 1.181	3.88 +/- 1.223
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All of the time	1	4.5	2	5.3
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Most of the times	2	9.1	4	10.0
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Some of the time	5	22.7	8	20.0
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A little of the time	6	27.3	9	22.5
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None of the time	8	36.4	17	42.5
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During the last 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

3.09
+/-
1.444

2.08
+/-
1.163

Not at all	4	18.2	16	40.0
Slightly	4	18.2	12	30.0
Moderately	5	22.7	7	17.5
Quite a bit	4	18.2	3	7.5
Extremely	5	22.7	2	5.0

How much bodily pain have you had during the past 4 weeks?

3.18
+/-
1.563

2.53
+/-
1.485

None	4	18.2	14	35.0
Very Mild	4	18.2	10	25.0
Mild	5	22.7	2	5.0
Moderate	3	13.6	9	22.5
Severe	5	22.7	5	12.5
Very Severe	1	4.5	0	0.0

During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

2.52
+/-
1.569

2.08
+/-
1.289

Not at all	9	40.9	21	52.5
A little bit	2	9.1	4	10.0
Moderately	3	13.6	7	17.5
Quite a bit	4	18.2	7	17.5
Extremely	3	13.6	1	2.5

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been

feeling.

How much
of the time
during the
past 4
weeks...

Did you feel
full of life?

2.86 2.83
+/- +/-
1.082 .958

All of the time	3	13.6	3	7.5
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Most of the time	4	18.2	11	27.5
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Some of the time	9	40.9	18	45.0
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A little of the time	5	22.7	6	15.0
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None of the time	1	4.5	2	5.0
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Have you been very nervous?					2.68 3.15 +/- +/- 1.086 1.051
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All of the time	2	9.1	2	5.0
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Most of the time	10	45.5	11	27.5
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Some of the time	4	18.2	8	20.0
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A little of the time	5	22.7	17	42.5
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None of the time	1	4.5	2	5.0
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Have you
felt so down
in the
dumps that
nothing
could cheer
you up?

3.55 3.70
+/- +/-
1.184 1.114

All of the 1 4.5 1 2.5
time

Most of the 3 13.6 6 15.0
time

Some of the 7 31.8 8 20.0
time

A little of 5 22.7 14 35.0
the time

None of the 6 27.3 11 27.5
time

Have you
felt calm
and
peaceful?

3.45 3.03
+/- +/-
.858 1.050

All of the 0 0.0 0 0.0
time

Most of the 3 13.6 17 42.5
time

Some of the 8 36.4 9 22.5
time

A little of 9 40.9 10 25.0
the time

None of the 2 9.1 4 10.0
time

Did you
have a lot of
energy?

3.27 3.35
+/- +/-
1.241 1.145

All of the time	1	4.5	1	2.5
Most of the time	5	22.7	10	25.0
Some of the time	9	40.9	11	27.5
A little of the time	1	4.5	10	25.0
None of the time	6	27.3	8	20.0

Have you felt downhearted and depressed?

3.59
+/-
1.182

3.50
+/-
1.132

All of the time	1	4.5	2	5.0
Most of the time	3	13.6	6	15.0
Some of the time	6	27.3	10	25.0
A little of the time	6	27.3	14	35.0
None of the time	6	27.3	8	20.0

Did you feel worn out?

2.18
+/-
.853

2.33
+/-
.997

All of the time	5	22.7	8	20.0
Most of the time	9	40.9	18	45.0
	7	31.8	7	17.5

Some of the time						
A little of the time	1	4.5	7	17.5		
None of the time	0	0.0	0	0.0		
Have you been happy?					2.59 +/- .959	2.60 +/- .810
All of the time	2	9.1	3	7.5		
Most of the time	9	40.9	15	37.5		
Some of the time	8	36.4	17	42.5		
A little of the time	2	9.1	5	12.5		
None of the time	1	4.5	0	0.0		
Did you feel tired?					2.09 +/- 1.109	2.23 +/- 1.143
All of the time	9	40.9	13	32.5		
Most of the time	5	22.7	12	30.0		
Some of the time	5	22.7	10	25.0		
A little of the time	3	13.6	3	7.5		
None of the time	0	0.0	2	5.0		

During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

3.09 3.55
+/- +/-
1.231 1.300

All of the time	3	13.6	3	7.5
Most of the time	3	13.6	7	17.5
Some of the time	8	36.4	7	17.5
A little of the time	5	22.7	11	27.5
None of the time	3	13.6	12	30.0

How TRUE or FALSE is each of the following statements?

I seem to get sick a little easier than other people

.00 .00
+/- +/-
.00 .00

0	0.0	0	0.0
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Definitely true						
Mostly true	0	0.0	0	0.0		
Don't know	0	0.0	0	0.0		
Mostly false	0	0.0	0	0.0		
Definitely false	0	0.0	0	0.0		
I am as healthy as anybody I know					.00 +/- .00	.00 +/- .00
Definitely true	0	0.0	0	0.0		
Mostly true	0	0.0	0	0.0		
Don't know	0	0.0	0	0.0		
Mostly false	0	0.0	0	0.0		
Definitely false	0	0.0	0	0.0		
I expect my health to get worse					.00 +/- .00	.00 +/- .00
Definitely true	0	0.0	0	0.0		
Mostly true	0	0.0	0	0.0		
Don't know	0	0.0	0	0.0		
Mostly false	0	0.0	0	0.0		
Definitely false	0	0.0	0	0.0		
My health is excellent					.00 +/- .00	.00 +/- .00

Definitely true	0	0.0	0	0.0		
Mostly true	0	0.0	0	0.0		
Don't know	0	0.0	0	0.0		
Mostly false	0	0.0	0	0.0		
Definitely false	0	0.0	0	0.0		
					46.83	49.33
					+/-	+/-
Mean PCS					13.709	11.073
					36.47	40.57
					+/-	+/-
Mean MCS					13.709	10.079

SF-36 Reliability

Cronbach's alpha was calculated for seven of the eight subscales that comprise the SF-36 v2. Cronbach's alpha was not calculated for the General Health subscale because the subjects were only asked one question on the subscale. There were no items removed from the subscales because all reliability coefficients were greater than .70. The Physical Functioning reliability statistic was .945 (Table 4.6). Again, no items were removed from the scale because Cronbach's alpha was sufficient.

Table 4.6

Reliability Statistics for SF-36 Version 2—Physical Functioning

	Cronbach's alpha	Cronbach's alpha Based on Standardized Items	N Items
Physical Functioning	.945	.949	10

<i>SF-36—Physical Functioning</i>	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
The following questions are about physical activities you might do during a typical day. Does your health now limit you in these activities? If so how much?	23.26	23.670	.657	.948
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	22.73	24.301	.783	.939
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	22.66	24.719	.801	.938
Lifting or carrying groceries	23.03	23.278	.835	.936
Climbing several flights of stairs	22.63	24.795	.847	.937
Climbing one flight of stairs	22.81	23.765	.800	.938
Bending, kneeling, or stooping	22.85	23.274	.882	.934
Walking more than a mile	22.68	24.484	.762	.940
Walking several hundred yards	22.58	25.231	.745	.941
Walking one hundred yards	22.53	26.056	.713	.943

The Role Physical subscale also was deemed reliable with a Cronbach's alpha of .965 (Table 4.7).

Table 4.7

Reliability Statistics for SF-36 Version 2—Role Physical

	Cronbach's alpha	Cronbach's alpha Based on Standardized Items	N Items
<i>Role Physical</i>	.965	.966	4

<i>SF-36—Role Physical</i>	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
<i>During the past 4 weeks, how much of the time have you had any of the following problems with your work or with other regular daily activities as a result of your physical health?</i>				
Cut down on the amount of time you spent on work or other activities	10.90	16.974	.923	.953
Accomplished less than you would like	11.29	15.947	.894	.960
Were limited in the kind of work or other activities	11.08	15.551	.924	.951
Had difficulty performing the work or other activities (for example, it took extra effort	11.10	16.089	.921	.952

Cronbach's alpha for Bodily Pain was also reliable with a reliability statistic of .927 (Table 4.8).

Table 4.8

Reliability Statistics for SF-36 Version 2—Bodily Pain

<i>SF-36—Bodily Pain</i>	Cronbach's alpha	Cronbach's alpha Based on Standardized Items	N Items
Bodily Pain	.927	.930	2

<i>SF-36—Bodily Pain</i>	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation
How much bodily pain have you had during the past 4 weeks?	2.23	1.946	.869
During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework?)	2.75	2.389	.869

The subscale, Vitality, was the lowest among the measures subscales of the SF-36. However, the scale was considered reliable with a Cronbach's alpha of .766 (Table 4.8).

Table 4.9

Reliability Statistics for SF-36 Version 2—Vitality

<i>SF-36—Vitality</i>	Cronbach's alpha	Cronbach's alpha Based on Standardized Items	N Items
	.766	.766	4

	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Did you feel full of life?	10.8710	6.639	.580	.704
Did you have a lot of energy?	10.3871	5.717	.628	.675
Did you feel worn out?	9.9839	7.196	.497	.745
Did you feel tired?	9.8871	6.167	.568	.709

Cronbach's alpha was .844 for the Social Functioning subscale (Table 4.10). No items were removed from the Social Functioning subscale.

Table 4.10

Reliability Statistics for SF-36 Version 2—Social Functioning

<i>SF-36—Social Functioning</i>	Cronbach's alpha	Cronbach's alpha Based on Standardize d Items	N Items	
	.844	.845	2	
	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors or groups.	2.6129	1.651	.732	.535
During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social life (like visiting friends, relatives, etc...)?	2.4355	1.824	.732	.535

Cronbach's alpha was .902 for Role Emotion (Table 4.11). All items on the Role Emotion subscale were retained.

Table 4.11*Reliability Statistics for SF-36 Version 2—Role Emotion*

SF-36—Role Emotion	Cronbach's alpha	Cronbach's alpha Based on Standardized Items		N Items
	.902	.901		3

Item	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?				
Cut down on the amount of time you spent on work or other activities	7.21	5.513	.888	.787
Accomplished less than you would like	7.34	5.277	.861	.812
Did work or activities less carefully than usual	6.84	6.892	.685	.955

The Mental Health subscale had a reliability coefficient of .847 (Table 4.12).

Again, all items were retained to be included in the analysis of the component scores.

Table 4.12*Reliability Statistics for SF-36 Version 2—Mental Health*

<i>SF-36—Mental Health</i>	Cronbach's alpha	Cronbach's alpha Based on Standardized Items	N Items
	.847	.848	5

Item	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Have you been very nervous?	10.5968	12.179	.485	.860
Have you felt so down in the dumps that nothing could cheer you up?	11.2581	9.932	.810	.769
Have you felt calm and peaceful?	10.4355	11.594	.646	.818
Have you felt downhearted and depressed?	11.1452	10.323	.732	.793
Have you been happy?	11.0161	12.442	.630	.824

SF-36 Analyses of Differences

Overall health burden was measured to analyze if differences existed in the physical component score (PCS) and the mental health component score (MCS) between the study group and the control group (Table 4.13). According to Quality Metric (2009), an average score when utilizing the SF-36V2 to measure health burden for the PCS and the MCS is approximately a score of 50. Scores higher than 50 on the PCS and MCS indicate decreased health burden.

The mean PCS of 46.83 +/- 13.709 and the mean MCS of 36.471 +/- 10.980 were lower in the study group compared to the control group (Table 4.5). The control group mean PCS was 49.339 +/- 11.073, and the mean MCS was 40.905 +/- 10.079. The lower mean PCS and the lower mean MCS in the study group indicates greater disease burden physically and mentally in the study group compared to the control group sample.

A Mann-Whitney U was utilized to determine if there was a difference in the median PCS between the study group and the control group. A boxplot was created in SPSS™ to determine if there were outliers within each group. There were no extreme outliers detected in the study group nor the control group.

Prior to conducting the Mann-Whitney U, a population pyramid was utilized to determine if the shape of distributions for the study group and control group were similar by visual inspection for the PCS. The distributions were similar in the pyramid distribution by visual inspection, and the Mann-Whitney U was conducted to determine if there were differences in the median PCS between females with SLE between 18 and 44 years of age females with no history of chronic illness or problems with mobility between 18 and 44 years of age (Table 4.13). The median PCS was higher in the control group indicating less disease burden, however, the median PCS were not significantly different between the study group and the control group. The Mann-Whitney U also was conducted to determine if there was a difference in the median MCS between the study and control groups. Outliers were not noted in the mean MCS for the study group nor the control group upon visual inspection of the boxplot. The median MCS were

normally distributed for the study and control groups. The null hypothesis was retained indicating that there was not a significant difference in the median MCS between the study and control groups.

Table 4.13

	Study Group Median + (IQR)	Control Group Median + (IQR)	U	z- score	p-value
PCS	52.2800 (21.5600 – 65.1200)	51.5450 (21.5600 – 65.1200)	471.500	.463	.643
MCS	39.7500 (14.3400 – 56.5200)	40.9050 (14.3400 – 56.2900)	536.000	1.412	.158

Confidence Interval 95%

Research Question

“What are the perceived benefits of physical activity and the perceived barriers to physical activity in individuals diagnosed with Systemic Lupus Erythematosus between 18 and 44 years of age?”.

Exercise Benefits Barriers Scale

The EBBS (Appendix B) was used to determine if differences existed in perceived benefits of and barriers to physical activity in females with SLE between 18 and 44 years of age and females with no history of chronic illness between 18 and 44 years of age. The EBBS total scale consists of 43 items. The perceived benefits subscale consists of 29 items and the perceived barriers to physical activity subscale consists of 14 items.

Descriptive statistics including frequencies, percentages, and means were conducted for each item on the EBBS perceived benefits subscale and the perceived barriers subscale. Psychometric values also were calculated to evaluate

the reliability of the EBBS subscales. Finally, tests of differences were conducted for the EBBS perceived benefits scale, and for the EBBS barriers subscale.

EBBS Descriptive Statistics

The control group had a higher mean for all items on the perceived EBBS perceived benefits subscale except for “Exercise is a good way for me to meet new people” (Table 4.14). The study group had a higher mean for items, “Places to exercise are too far away”, “I am too embarrassed to exercise”, and “I think people in exercise clothes look funny”, “It costs too much to exercise”, “Exercise facilities do not have convenient schedules for me”, “There are few too places to exercise”, “My family does not encourage me to exercise”, “My spouse or significant other do not encourage exercising”, “Exercise tires me”, “I am fatigued by exercise”, and “Exercise is hard work for me” (Table 4.14). The control group had higher means for the items on the perceived benefits subscale, and the study group had higher means for the items on the perceived barriers subscale.

Table 4.14

EBBS Descriptive Statistics

	Study Group Frequency	Study Group %	Control Group Frequency	Control Group %	Study Group Mean +/- .671	Control Group Mean +/- .778
I enjoy exercise.					2.55	3.10
Strongly Agree	1	4.5	13	32.5		
Agree	11	50.0	19	47.5		

Disagree	9	40.9	7	17.5
Strongly Disagree	1	4.5	1	4.5

Exercise decreases feelings of stress and tension for me.

3.05
+/-
.722

3.45
+/-
.667

Strongly Agree	5	22.7	22	55.0
Agree	14	63.6	14	35.0
Disagree	2	9.1	4	10.0
Strongly Disagree	1	4.5	0	0.0

Exercise improves my mental health.

3.27
+/-
.703

3.60
+/-
.545

Strongly Agree	8	36.4	25	62.5
Agree	13	59.1	14	35.0
Disagree	0	0.0	1	2.5
Strongly Disagree	1	4.5	0	0.0

Exercising takes too much of my time.

2.23
+/-
.612

2.45
+/-
.815

Strongly Agree	2	9.1	5	12.5
Agree	13	59.1	11	27.5
Disagree	7	31.8	21	52.5

Strongly Disagree	0	0.0	3	7.5		
I will prevent heart attacks by exercising.					3.09 +/- .610	3.40 +/- .591
Strongly Agree	5	22.7	18	45.0		
Agree	14	63.6	20	50.0		
Disagree	3	13.6	2	5.0		
Exercise tires me.					3.36 +/- .848	2.65 +/- .770
Strongly Agree	1	4.5	7	17.5		
Agree	2	9.1	12	30.0		
Disagree	7	31.5	21	52.5		
Strongly Disagree	12	54.5	0	0.0		
Exercise increases my muscle strength.					3.00 +/- .690	3.55 +/- .504
Strongly Agree	4	18.2	22	55.0		
Agree	15	68.2	18	45.0		
Disagree	2	9.1	0	0.0		
Strongly Disagree	1	4.5	0	0.0		
Exercise gives me a sense of personal						

accomplishm
ent.

3.09 3.58
+/- +/-
.811 .549

Strongly Agree	7	31.8	24	60.0
Agree	11	50.0	15	37.5
Disagree	3	13.6	1	2.5
Strongly Disagree	1	4.5	0	0.0

Places for me
to exercise
are too far
away.

2.14 1.70
+/- +/-
.834 .791

Strongly Agree	1	4.5	1	4.5
Agree	6	27.3	5	12.5
Disagree	10	45.5	15	37.5
Strongly Disagree	5	22.7	19	47.5

Exercising
makes me
feel relaxed.

2.59 3.23
+/- +/-
.796 .733

Strongly Agree	3	13.6	16	40.0
Agree	8	36.4	17	42.5
Disagree	10	45.5	7	17.5
Strongly Disagree	1	4.5	0	0.0

Exercising
lets me have
contact with
friends and
persons I
enjoy.

					2.45 +/- .800	2.55 +/- .815
Strongly Agree	1	4.5	4	10.0		
Agree	11	50.0	18	45.0		
Disagree	7	31.8	14	35.0		
Strongly Disagree	3	13.6	4	10.0		
I am too embarrassed to exercise.					2.77 +/- .813	1.88 +/- .822
Strongly Agree	5	22.7	1	2.5		
Agree	7	31.8	8	20.0		
Disagree	10	45.5	16	40.0		
Strongly Disagree	0	0.0	15	37.5		
Exercising will keep me from having high blood pressure.					3.09 +/- .610	3.38 +/- .586
Strongly Agree	5	22.7	17	42.5		
Agree	14	63.6	21	52.5		
Disagree	3	22.7	2	5.0		
Strongly Disagree	0	0.0	0	0.0		
It costs too much to exercise.					2.09 +/- .811	1.80 +/- .911
Strongly Agree	5	22.7	3	7.5		

Agree	11	50.0	4	10.0
Disagree	5	22.7	15	37.5
Strongly Disagree	1	4.5	18	45.0

Exercising increases my level of physical fitness.

3.23
+/-
.752

3.60
+/-
.496

Strongly Agree	8	36.4	24	60.0
Agree	12	54.5	16	40.0
Disagree	1	4.5	0	0.0
Strongly Disagree	1	4.5	0	0.0

Exercise facilities do not have convenient schedules for me.

2.32
+/-
.780

1.93
+/-
.797

Strongly Agree	2	9.1	12	30.0
Agree	13	59.1	21	52.5
Disagree	5	22.7	5	12.5
Strongly Disagree	2	9.1	2	5.0

My muscle tone is improved with exercise.

3.05
+/-
.722

3.60
+/-
.552

Strongly Agree	4	18.2	26	65.0
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Agree	18	81.8	14	35.0
Disagree	0	0.0	0	0.0
Strongly				
Disagree	0	0.0	0	0.0

Exercising
improves
functioning
of my
cardiovascular system.

3.18
+/-
.395

3.65
+/-
.662

Strongly Agree	11	50.0	26	65.0
Agree	8	36.4	14	35.0
Disagree	2	9.1	2	0.0
Strongly Disagree	1	4.5	0	0.0

I am fatigued
by exercise.

3.32
+/-
.839

2.35
+/-
.552

Strongly Agree	5	22.7	1	2.5
Agree	12	54.5	15	37.5
Disagree	4	18.2	21	52.5
Strongly Disagree	1	4.5	3	7.5

I have
improved
feelings of
well-being
from
exercise.

2.95
+/-
.785

3.45
+/-
.911

Strongly Agree	5	22.7	19	47.5
Agree	12	4.5	20	50.0
Disagree	4	18.2	1	2.5

Strongly Disagree	1	4.5	0	0.0		
My spouse (or significant other) does not encourage exercising.					2.27 +/- .935	1.88 +/- .911
Strongly Agree	4	18.2	3	7.5		
Agree	1	4.5	5	12.5		
Disagree	14	62.5	16	40.0		
Strongly Disagree	3	12.5	16	40.0		
Exercise improves my stamina.					2.77 +/- .752	3.43 +/- .549
Strongly Agree	3	13.6	18	45.0		
Agree	12	54.5	21	52.5		
Disagree	6	27.3	1	2.5		
Strongly Disagree	1	4.5	0	0.0		
Exercise improves my flexibility.					2.91 +/- .684	3.25 +/- .588
Strongly Agree	3	13.6	13	32.5		
Agree	15	68.2	24	60.0		
Disagree	3	13.6	3	7.5		
Strongly Disagree	1	4.5	0	0.0		

Exercise
takes too
much time
from family
relationships.

1.91
+/-
.526

1.95
+/-
.639

Strongly Agree	2	9.1	7	17.5
Agree	16	72.2	24	60.0
Disagree	4	18.2	9	22.5
Strongly Disagree	0	0.0	0	0.0

My
disposition is
improved
with
exercise.

2.82
+/-
.664

3.30
+/-
.648

Strongly Agree	2	9.1	16	40.0
Agree	15	68.2	21	52.5
Disagree	4	18.2	4	10.0
Strongly Disagree	1	4.5	0	0.0

Exercising
helps me
sleep better
at night.

2.73
+/-
.827

3.33
+/-
.616

Strongly Agree	3	13.6	16	40.0
Agree	12	54.5	21	52.5
Disagree	5	22.7	3	7.5
Strongly Disagree	2	9.1	0	0.0

I will live
longer if I
exercise.

3.32
+/-
.568

3.38
+/-
.774

Strongly Agree	8	36.4	21	52.5
Agree	13	59.1	14	35.0
Disagree	1	4.5	4	10.0
Strongly Disagree	0	0.0	1	2.5

I think
people in
exercise
clothes look
funny.

1.64
+/-
.581

1.60
+/-
.293

Strongly Agree	9	40.9	20	50.0
Agree	12	54.5	17	42.5
Disagree	1	4.5	2	5.0
Strongly Disagree	0	0.0	1	2.5

Exercise
helps me
decrease
fatigue.

2.27
+/-
.883

2.93
+/-
.694

Strongly Agree	2	9.1	8	20.0
Agree	6	27.3	21	52.5
Disagree	10	45.5	11	27.5
Strongly Disagree	4	18.2	0	0.0

Exercise is a
good way for
me to meet
new people.

					2.59 +/- .796	2.43 +/- .813
Strongly Agree	1	4.5	4	10.0		
Agree	14	63.6	13	32.5		
Disagree	4	18.2	19	47.5		
Strongly Disagree	3	13.6	4	10.0		
My physical endurance is improved by exercising.					2.82 +/- .664	3.48 +/- .599
Strongly Agree	0	31.8	21	52.5		
Agree	3	13.6	17	42.5		
Disagree	12	54.5	2	5.0		
Strongly Disagree	7	31.8	0	0.0		
Exercising improves my self-concept.					3.09 +/- .684	3.43 +/- .712
Strongly Agree	5	22.7	21	52.5		
Agree	15	68.2	16	40.0		
Disagree	1	4.5	2	5.0		
Strongly Disagree	1	4.5	1	2.5		
My family members do not encourage me to exercise.					2.18 +/- 1.053	1.95 +/- .846

Strongly Agree	4	18.2	2	5.0
Agree	2	4.5	7	17.5
Disagree	10	45.5	18	45.5
Strongly Disagree	6	27.3	13	32.5

Exercising increases my mental alertness.

2.95
+/-
.722

3.40
+/-
.672

Strongly Agree	4	18.2	20	50.0
Agree	14	63.6	16	40.0
Disagree	3	13.6	4	10.0
Strongly Disagree	1	4.5	0	0.0

Exercise allows me to carry out normal activities without becoming tired.

2.32
+/-
.995

3.15
+/-
.662

Strongly Agree	2	9.1	12	30.0
Agree	9	40.9	22	55.0
Disagree	5	22.7	6	15.0
Strongly Disagree	6	27.3	0	2.6

Exercise improves the quality of my work.

2.41
+/-
.854

3.05
+/-
.662

Strongly Agree	2	9.1	12	30.0
Agree	8	36.4	18	45.0
Disagree	9	40.9	12	30.0
Strongly Disagree	3	13.6	0	0.0

Exercise takes too much time from my family responsibilities.

2.09
+/-
.684

2.03
+/-
.768

Strongly Agree	4	18.2	1	2.5
Agree	12	54.5	9	22.5
Disagree	6	27.3	20	50.0
Strongly Disagree	0	0.0	10	25.0

Exercise is good entertainment for me.

2.05
+/-
.722

2.58
+/-
1.035

Strongly Agree	0	0.0	10	25.0
Agree	6	27.3	9	22.5
Disagree	11	50.0	15	37.5
Strongly Disagree	5	22.7	6	15.0

Exercise increases my acceptance by others.

2.09
+/-
.750

2.35
+/-
.893

Strongly Agree	1	4.5	5	12.5
Agree	4	18.2	10	25.0
Disagree	13	63.6	19	47.5
Strongly Disagree	4	18.2	6	15.0

Exercise is hard work for me.

3.36
+/-
.953

2.63
+/-
.774

Strongly Agree	14	63.3	6	15.0
Agree	3	13.6	14	35.0
Disagree	4	18.2	19	47.5
Strongly Disagree	1	4.5	1	2.5

Exercise improves overall body functioning for me.

2.59
+/-
1.008

3.38
+/-
.628

Strongly Agree	4	18.2	18	45.0
Agree	9	40.9	19	47.5
Disagree	5	22.7	3	7.5
Strongly Disagree	4	18.2	0	0.0

There are too few places for me to exercise.

2.09
+/-
.921

1.75
+/-
.707

Strongly Agree	2	9.1	15	37.5
Agree	4	18.2	21	52.5
Disagree	10	45.5	3	7.5

Strongly Disagree	6	27.3	1	2.5		
Exercise improves the way my body looks.					3.23 +/- .752	3.58 +/- .549
Strongly Agree	8	36.4	24	60.0		
Agree	12	54.5	15	37.5		
Disagree	1	4.5	1	2.5		
Strongly Disagree	1	4.5	0	0.0		

Reliability Statistics for EBBS Perceived Benefits Subscale

Cronbach's alpha was conducted to determine reliability of the EBBS.

Cronbach's alpha for the EBBS was .923 (Table 4.15). Cronbach's alpha would increase if the items "Exercising is a good way for me to meet new people", "I have improved feelings of well-being from exercise", and "Exercising improves functioning of my cardiovascular system" were removed from the scale.

Although the scale would increase if the items were removed, the items were not removed from the scale because a reliability coefficient of .923 is considered very good. Moreover, the item was retained to determine if a difference existed between the study and control groups.

Table 4.15

Reliability Statistics for EBBS Perceived Benefits Subscale

<i>EBBS Reliability</i>	Cronbach's alpha	Cronbach's alpha Based on Standardized Items	N of Items

.923	.930	29
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<i>EBBS Benefits Reliability</i>	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
I enjoy exercise.	85.05	137.391	.570	.919
Exercise decreases feelings of stress and tension for me.	84.65	136.626	.678	.918
Exercise improves my mental health.	84.47	137.269	.744	.917
I will prevent heart attacks by exercising.	84.66	142.556	.380	.922
Exercise increases my muscle strength.	84.60	139.228	.595	.919
Exercise gives me a sense of personal accomplishment.	84.55	136.547	.712	.917
Exercising makes me feel relaxed.	84.95	133.817	.747	.916
Exercising lets me have contact with friends and persons I enjoy.	85.44	138.447	.495	.920
Exercising will keep me from having high blood pressure.	84.68	142.681	.375	.922
Exercising increases my level of physical fitness.	84.48	139.172	.610	.919

My muscle tone is improved with exercise.	84.47	141.958	.522	.920
Exercising improves functioning of my cardiovascular system.	85.26	162.555	-.675	.938
I have improved feelings of well being from exercise.	85.94	136.022	-.239	.933
Exercise increases my stamina.	84.76	136.312	.735	.917
Exercise improves my flexibility.	84.82	135.558	.787	.917
My disposition is improved will exercise.	84.82	134.498	.775	.917
Exercising helps me sleep better at night.	84.84	141.687	.772	.916
I will live longer if I exercise.	84.60	135.342	.376	.922
Exercise helps me decrease fatigue.	85.26	144.319	.652	.918
Exercising is a good way for me to meet new people.	85.47	134.898	.181	.925
My physical endurance is improved by exercising.	84.71	135.938	.812	.916
Exercising improves my self-concept.	84.65	134.964	.721	.917
Exercising increases my mental alertness.	84.71	132.777	.780	.916
Exercise allows me to carry out normal activities without becoming tired.	85.10	131.819	.732	.916
Exercise improves the quality of my work.	85.13	134.283	.827	.915
Exercise is good entertainment for me.	85.56	141.396	.593	.919
Exercising increases my acceptance by others.	85.69	132.454	.315	.923
Exercise improves overall body functioning for me.	84.85	141.369	.769	.916
Exercise improves the way my body looks.	84.50	136.022	.436	.921

EBBS Perceived Benefits Subscale Analyses of Differences

Boxplots were first inspected to visualize the distribution for each item on the EBBS. There were several items that appeared normally distributed including, “I enjoy exercise”, “I will prevent heart attacks by exercising”, “Exercise makes me feel relaxed”, “Exercise improves muscle tone”, “Exercise lets me have contact with friends and persons I enjoy”, “Exercising improves functioning of my cardiovascular system”, “Exercising helps me sleep better at night”, “Exercising is a good way for me to meet new people”, “Exercise improves the quality of my work”, and “Exercise is good entertainment for me”. A Shapiro-Wilk Test of Normality was conducted to determine if the items on the EBBS perceived benefits subscale were normally distributed prior to conducting the Student’s t-test (Table 4.16).

Table 4.16

EBBS Perceived Benefits Subscale Shapiro-Wilk Test of Normality

Item	Shapiro-Wilk Sig.
I enjoy exercise.	.000
Exercise decreases feelings of stress and tension for me.	.000
Exercise improves my mental health.	.000
I will prevent heart attacks by exercising.	.000
Exercise increases my muscle strength.	.000
Exercise gives me a sense of personal accomplishment.	.000
Exercising makes me feel relaxed.	.000
Exercising lets me have contact with friends and persons I enjoy.	.000
Exercising will keep me from having high blood pressure.	.000
Exercising increases my level of physical fitness.	.000
My muscle tone is improved with exercise.	.000
Exercising improves functioning of my cardiovascular system.	.000

I have improved feelings of well-being from exercise.	.000
Exercise increases my stamina.	.000
Exercise improves my flexibility.	.000
My disposition is improved will exercise.	.000
Exercising helps me sleep better at night.	.000
I will live longer if I exercise.	.000
Exercise helps me decrease fatigue.	.000
Exercising is a good way for me to meet new people.	.000
My physical endurance is improved by exercising.	.000
Exercising improves my self-concept.	.000
Exercising increases my mental alertness.	.000
Exercise allows me to carry out normal activities without becoming tired.	.000
Exercise improves the quality of my work.	.000
Exercise is good entertainment for me.	.000
Exercising increases my acceptance by others.	.000
Exercise improves overall body functioning for me.	.000
Exercise improves the way my body looks.	.000

The significance level for the items was less than the determined p-value, .05. The p-values less than .05 indicated that the items were not normally distributed (Table 4.16). Therefore, a Mann-Whitney U was conducted for all items on the EBBS perceived benefits scale to determine if there was a difference between the study group and the control group (Table 4.17).

Distributions of scores for all items were similar, as assessed by visual inspection utilizing a population pyramid. The null hypothesis was rejected indicating significance between the study and control groups for the total EBBS mean score. The median was higher in the control group, which demonstrates that the control group more often perceived exercise to be beneficial compared to the study group.

Table 4.17*EBBS Perceived Benefits Subscale Analyses of Differences*

Item	Study Group Median	Control Group Median	U	z-score	p-value
I enjoy exercise.	3.00	3.00	613.00	2.747	.006
Exercise decreases feelings of stress and tension for me.	3.00	4.00	577.00	2.220	.026
Exercise improves my mental health.	3.00	4.00	556.000	1.949	.051
I will prevent heart attacks by exercising.	3.00	3.00	554.000	1.895	.058
Exercise increases my muscle strength.	3.00	4.00	629.000	3.157	.002
Exercise gives me a sense of personal accomplishment.	3.00	4.00	589.000	2.449	.014
Exercising makes me feel relaxed.	2.50	3.00	625.000	2.893	.004
Exercising lets me have contact with friends and persons I enjoy.	3.00	3.00	462.000	.350	.727
Exercising will keep me from having high blood pressure.	3.00	3.00	544.500	1.746	.081
Exercising increases my level of physical fitness.	3.00	4.00	560.000	2.011	.044

My muscle tone is improved with exercise.	3.00	4.00	646.000	3.501	.000
Exercising improves functioning of my cardiovascular system.	3.50	2.00	985.000	-4.287	.000
I have improved feelings of well-being from exercise.	2.00	2.00	331.500	2.014	.084
Exercise increases my stamina.	3.00	3.00	646.000	3.369	.001
Exercise improves my flexibility.	3.00	3.00	525.000	1.890	.059
My disposition is improved with exercise.	3.00	3.00	598.000	2.609	.009
Exercising helps me sleep better at night.	3.00	3.00	614.500	2.838	.005
I will live longer if I exercise.	3.00	4.00	485.000	.733	.463
Exercise helps me decrease fatigue.	2.00	3.00	624.000	2.895	.004
Exercising is a good way for me to meet new people.	3.00	2.00	369.000	-1.123	.261
My physical endurance is improved by exercising.	3.00	4.00	658.500	3.514	.000
Exercising improves my self-concept.	3.00	4.00	565.000	2.054	.040

Exercising increases my mental alertness.	3.00	3.50	586.000	2.361	.018
Exercise allows me to carry out normal activities without becoming tired.	2.50	3.00	644.000	3.242	.001
Exercise improves the quality of my work.	2.00	3.00	615.500	2.735	.006
Exercise is good entertainment for me.	2.00	2.00	563.500	1.193	.056
Exercising increases my acceptance by others.	2.00	2.00	509.000	1.104	.270
Exercise improves overall body functioning for me.	3.00	3.00	636.000	3.108	.002
Exercise improves the way my body looks.	3.00	4.00	553.500	1.891	.059
Total Benefits Sum	85.0000	92.0000	672.500	3.425	.001

The null hypothesis was rejected for the items “Exercise decreases feelings of stress and tension for me”, “Exercise gives me a sense of personal accomplishment”, “Exercise makes me feel relaxed”, Exercise increases my level of physical fitness”, “Exercise increases my muscle strength”, “My muscle tone is improved with exercise, “Exercise helps me decrease fatigue”, “Exercise improves my quality of work”, “My physical endurance is improved by

exercising”, “Exercise improves my self-concept”, “Exercise makes me feel relaxed”, “Exercise increases my mental alertness”, “Exercise allows me to carry out normal activities without becoming tired”, and “Exercise improves the way my body looks”. Rejection of the null hypothesis and a higher median score for the control group indicates the control group perceived the items as more beneficial than the study group. The study group had a statistically significant higher median score for the item, “Exercise improves functioning of my cardiovascular system”.

There were several items with a statistically significant difference between the study and control groups, however, the median scores were the same. The items were, “I enjoy exercise”, “My disposition is improved with exercise”, “Exercise helps me sleep better at night”, “Exercise increases my stamina”, “Exercise improves overall body functioning for me”, and “Exercise improves my quality of work”.

The null hypothesis also was rejected for the sum of the EBBS perceived benefits subscale indicating there was a statistically significance difference between the study and control groups. The study group median was 85.0000 and the control group median was 92.000. The higher median for the control group demonstrates that the control group had a significantly higher score on the perceived benefits scale than the study group indicating that the control group perceived physical activity as more beneficial than the study group.

EBBS Perceived Barriers Subscale

EBBS Perceived Barriers Subscale Psychometrics

The EBBS Barriers subscale consisted of 14 items to measure the barriers to physical activity. Cronbach's alpha was calculated to determine scale reliability (Table 4.18). Cronbach's alpha for the barriers subscale was .832. No items were noted that would raise the reliability coefficient if deleted.

Table 4.18

Reliability EBBS Perceived Barriers Subscale

Reliability Statistics				
Reliability EBBS Sub Scale				
	Cronbach's alpha	Cronbach's alpha Based on Standardized Items		N of Items
	.832	.835		14
Item-Total Statistics				
Subject Type	Scale Mean if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's alpha if Item Deleted
Exercising takes too much of my time.	28.02	.367	.530	.827
Exercise tires me.	27.48	.556	.613	.814
Places for me to exercise are too far away.	28.53	.508	.505	.818
I am too embarrassed to exercise.	28.19	.560	.456	.814
It costs too much to exercise.	28.48	.581	.572	.812
Exercise facilities do not have convenient schedules for me.	28.32	.441	.457	.822

I am fatigued by exercise.	27.69	.466	.552	.821
My spouse (or significant other) does not encourage exercising.	28.37	.361	.581	.829
Exercise takes too much time from family relationships.	28.45	.618	.802	.815
I think people in exercise clothes look funny.	28.77	.259	.301	.832
My family does not encourage me to exercise.	28.35	.464	.623	.821
Exercise takes too much time from my family responsibilities	28.34	.524	.798	.818
Exercise is hard work.	27.50	.395	.443	.826
There are too few places to exercise.	28.52	.443	.528	.822

Analyses of Difference EBBS Perceived Barriers Subscale Items

The first step to perform the student's t-test for each item in the perceived exercise barriers subscale was to determine if the samples were normally distributed utilizing visual inspection of boxplots. Several outliers were noted. There was a single outlier below the mean in the study group for "Exercise tires me", "I am fatigued by exercise", and "Exercise is hard work". Outliers also were detected above and below the mean in the study group for the items, "My spouse

or significant other does not encourage me to exercise” and “Exercise takes too much time from my family relationships”. Outliers also were noted above the mean in the control group including, “Places to exercise are too far away”, “I am too embarrassed to exercise”, “Places to exercise cost too much”, “My spouse or significant other does not encourage me to exercise”, “I think people in exercise clothes look funny”, “My family does not encourage me to exercise”, “There are too few places to exercise”, and “Exercise facilities do not have convenient schedules for me”. Therefore, a Mann-Whitney U was conducted to determine if there were differences between the study and the control groups regarding the individual items which make up the construct, barriers to exercise (Table 4.19). Distributions were similar between the study group and control group on all items assessed by visual inspection utilizing a distribution pyramid.

The null hypothesis was rejected for the items, “Exercise tires me”, “I am too embarrassed to exercise”, “I am fatigued by exercise”, “Exercise is hard work for me”, and “Places for me to exercise are too far away”. Median scores were higher in the study group than the control group for “Exercise tires me”, “I am too embarrassed to exercise”, “I am fatigued by exercise”, and “Exercise is hard work”. The median score was the same for the study and control groups for the item, “Places for me to exercise are too far away”.

Table 4.19

Analyses of Difference—Perceived Barriers Sub Scale Median Score

Item	Study	Control			
	Group	Group	U	z-score	p-value
	Median	Median			
Exercising takes too much of my time.	2.00	2.00	495.000	.899	.369
Exercise tires me.	4.00	2.00	232.000	-3.241	.001
Places for me to exercise are too far away.	2.00	2.00	309.000	-2.065	.039
I am too embarrassed to exercise.	3.00	2.00	207.500	-3.611	.000
It costs too much to exercise.	2.00	2.00	341.000	-1.560	.119
Exercise facilities do not have convenient schedules for me.	2.00	2.00	320.000	-1.950	.051
I am fatigued by exercise.	3.50	2.00	985.000	-4.287	.000
My spouse (or significant other) does not encourage exercising.	2.00	2.00	331.500	-1.726	.084
Exercise takes too much time from family relationships.	2.00	2.00	453.000	.225	.882
Í think people in exercise clothes look funny.	2.00	1.50	410.000	-.495	.621

My family members do not encourage me to exercise.	2.00	2.00	396.000	-.692	.489
Exercise takes too much time from my family responsibilities	2.00	2.00	413.000	-.434	.664
Exercise is hard work.	4.00	2.50	238.500	-3.134	.002
There are too few places for me to exercise.	2.00	2.00	351.000	-1.433	.152

To score the EBBS barriers subscale, the Likert scale responses for the items identified as barriers were summed. A student's t-test was conducted to determine if there was a difference in overall perceived barriers between the study and control group. A box plot was first utilized to visually inspect distribution of the study group and control group. Upon visual inspection of a population pyramid, the study group and control group had similarly shaped distributions, but outliers were noted in the study group. The Shapiro Wilk Test of Normality demonstrated a significance level greater than .05 indicating that the distributions were similar (Table 4.20). However, because outliers were noted upon visual inspection of boxplots and the Shapiro Wilk Test of Normality was only slightly greater than .05, the Mann-Whitney U was utilized.

Table 4.20

EBBS Perceived Barriers Subscale Shapiro-Wilk Test of Normality

Item	Shapiro-Wilk Sig.
Barrier Subscale Sum	.565

The null hypothesis was rejected. The EBBS barriers subscale score was statistically different between the study group and the control group. The median was greater in the study group than the control group (Table 4.21).

Table 4.21

EBBS Perceived Barriers Total Subscale Analysis of Difference

	Study Group Median	Control Group Median	U	z-score	p-value
Barriers Sub-Scale Sum	33.0000	28.0000	233.500	-3.043	.002

Chapter Five: Conclusion, Discussion, and Recommendations

Introduction

Chapter five presents the major findings relating to the conceptual framework and the literature. The study conclusion presents the interpretation of data and nursing implications related to the interpretation of study findings. Study limitations and recommendations for future research are also discussed in Chapter Five.

Major Findings

Major findings include the results from the instruments utilized to investigate if differences existed between female subjects with SLE between 18 and 44 years of age and female subjects with no history of chronic illness or problems with mobility between 18 and 44 years of age. Physical activity was quantified with the self-reported IPAQ. Subjects were asked how many days and how many hours each day specific activities were performed. The different physical activity domains included work, transportation, housework, and leisure time activities. Additionally, the self-reported physical activities were classified as either walking or moderate to vigorous intensity physical activities. The null hypothesis was retained for the work, transportation, housework, and leisure time activity domains. The null hypothesis also was retained for the walking and moderate to vigorous physical activity intensities. Moreover, there was no statistically significant difference for total MET-minutes per week between the study and control groups. The study group in the present study had a median walking intensity MET-minutes per week of 528.0 (0.0-7062.0), and the control

group had a walking intensity MET-minutes per week median of 775 (0-11,088.0). The combined moderate to vigorous intensity median for the study group was 3,697.5 (0.0-7062.0) and the combined moderate to vigorous intensity for the control group was 2,310.0 (0-31,169.0).

Results of the present study were comparable to the findings of a study comparing two physical activity questionnaires in cancer survivors (Bertheussen et al, 2012), and a study investigating predictors of obesity in RA (Stavropoulos-Kalinoglou et al, 2009). Total median MET-minutes per week in the study investigating predictors of obesity in RA was 2,190 (1,314-4,899). Total median MET-minutes per week in the study investigating physical activity in cancer survivors was 2,369 (1,959-2,978), and the total MET-minutes per week in individuals with SLE in the present study was 3,690.0 (33.0-52,179.70). Bertheussen et al also reported MET-minutes per week in median interquartile ranges for walking, moderate, and vigorous intensities. The post-test walking intensity median for cancer survivors was 594 (215-1,386) compared to 528.0 (0.0-7062.0) in the study group of the present study. Bertheussen et al reported moderate and vigorous intensities separately with a post-test moderate intensity median of 600 (240-1,230) and a post-test vigorous intensity median of 240 (0-1,920). The present study reported a median of 3,697.5 (0.0-46,177.0) for combined moderate to vigorous intensities as directed in the scoring protocol (The IPAQ Group, nd).

The similitude of quantified physical activity expenditure in the present study and the studies by Bertheussen et al, (2012) and Stavropoulos-Kalinoglou et

al, (2009) supports scale validation for the IPAQ as a self-reported instrument to quantify energy expenditure. Furthermore, support for scale validity and no significant differences in the intensity of physical activity between the study and control groups indicates homogeneity of subjects in the present study regarding physical activity expenditure, which is essential when employing tests of differences between two groups.

The Short Form-36 version two was utilized in this study to assess disease burden. The median Physical Component Score (PCS) for the study group was 52.2800 (21.5600-65.1200) and the control group median PCS was 51.5450 (21.5600-65.1200). The median Mental Component Score (MCS) for the study group was 39.7500 (14.3400-56.5200) and 40.9050 (14.300-56.2900), There was no significant difference between the study and control groups for the Mental Component Score nor the Physical Component Score between the study and control groups. The lack of statistical difference between the study and control groups for the MCS and PCS indicates that there was no difference in health burden between the two groups. However, the United States population norm for the MCS and the PCS is 50 (Quality Metric, 2011). Both, the study group and the control group, fall well below the average score for the MCS. Additionally, the findings from a study investigating instrument sensitivity to changes in quality of life in patients with SLE include a median baseline PCS of 40.7 (33.2-49.9) (Devilliers, H., Bonithon-Kopp, C., Jolly, M., 2017). The reported median baseline was much lower than the study and control group PCS in the present study. However, the median MCS for the study and control groups were slightly

lower than the MCS of 44.9 (36.8-53.7) in the study investigating instrument sensitivity, which may be a result of disease persisting in the study group and the increased psychological stress of nursing school in the control group.

Demographic data was similar for the study and control groups including age, ethnicity, and marital status. Also, there was no statistical difference between the study and control groups for the IPAQ subscales nor total score, the MCS, or the PCS. No statistical differences suggest homogeneity of the total sample included in the study.

Research Question

The EBBS was administered to answer the research question, “What are the perceived benefits of physical activity and the perceived barriers to physical activity in individuals diagnosed with Systemic Lupus between 18 and 44 years of age?”. Results of the EBBS revealed that individuals in the study group perceived physical activity less beneficial than the control group. Moreover, the study group perceived more barriers to physical activity than the study group.

The literature regarding perceived benefits of physical activity included improved overall general health, cardiovascular health, and improvement in mobility (Mancuso et al, 2010). Pain management also was noted in the literature as a benefit of physical activity (Demmelmaier et al, 2013). The highest mean scores for perceived benefits of physical activity in the study group were “Exercise improves my mental health”, “Exercise will keep me from having high blood pressure”, “Exercise increases my level of fitness”, “Exercise improves functioning of my cardiovascular system”, and “I will live longer if I exercise”.

A study investigating perceived benefits and barriers to exercise among persons with physical disabilities or chronic health conditions revealed similar findings to the present study (Malone, Barfield, & Brasher, 2012). The perceived benefits in the study investigating chronic health conditions included, “Exercise increases my level of physical fitness”, “Exercise improves my mental health”, “Exercise gives me a sense of personal accomplishment”, and “Exercising improves functioning of my cardiovascular system”. Additionally, perceived benefits most often reported in a study assessing perceived barriers and benefits to physical activity in female subjects with polycystic ovary syndrome were, “Exercise improves the functioning of my cardiovascular system”, “Exercise improves the way my body looks”, and “Exercise increases my level of physical fitness” (Thomson, Buckley, & Brinkworth, 2016).

Lack of information regarding physical activity was a barrier noted in the literature (Baxter et al, 2015). Although the findings were not statistically significant, subjects in the study group more often reported that they had been given a detailed activity plan or that they were given specific examples of physical activities to perform than the control group. The greater percentage of subjects reporting that they had been given specific information about physical activity opposes study findings by Baxter et al, which concludes that individuals with RA reported needing further physical activity education activity by the provider (Baxter et al). Barriers noted in both SLE (Mancuso et al, 2010) and RA (Demmelmaier et al, 2013) were a lack of exercise facilities, fatigue, and pain. Additionally, the study by Mancuso et al also revealed that barriers to physical

activity in individuals with SLE were joint pain and stiffness, work or family obligations, the environment, lack of motivation, and hematologic abnormalities.

Significant perceived physical activity barriers in the present study include “Exercise tires me”, “I am too embarrassed to exercise”, “I am fatigued by exercise”, and “Exercise is hard work”. Barriers reported in the study investigating perceived benefits and barriers in individuals with chronic conditions included, “Exercise tires me”, “Exercise is hard work for me”, and “I am fatigued by exercise” (Malone, Barfield, & Brasher, 2012). Furthermore, “Exercise tires me”, “Exercise is hard work for me”, and “I am fatigued by exercise” were the perceived barriers with highest agreement among subjects in the study assessing benefits and barriers of physical activity in overweight and obese women with PCOS (Thomson, Buckley, & Brinkworth, 2016).

Conceptual Framework

The Health Promotion Model REVISED (Pender, 1996) guided this study to view an individual interacting interpersonally with the physical environment, and to determine if there were individual factors that may contribute to an individual increasing or maintaining physical activity (Pender, Murdaugh, & Parsons, 2015). Perceived benefits of physical activity and perceived barriers to physical activity were examined to assess how female subjects with SLE between 18 and 44 years of age viewed physical activity. Subjects with SLE perceived physical activity less favorably than nursing students despite no remarkable differences between the two groups regarding demographical descriptive data, self-reported physical activity, nor health burden. The subjects with SLE also

perceived more barriers to physical activity than the subjects in the control group. According to the Health Promotion Model REVISED (Pender, 1996), prior related behavior and personal factors are competing factors regarding the probability of achieving, increasing or maintaining a behavioral outcome. Findings demonstrate that subjects with SLE in the present study perceived physical activity as hard work, are too tired to exercise, become fatigued with exercise, and are too embarrassed to exercise. Fatigue and feeling tired are interpersonal demands that may inhibit individuals with SLE from participating in physical activity. The perceived barriers “Too tired to exercise”, “Become fatigued with exercise”, and “Exercise is hard work” may be minimized by determining underlying causes of feeling tired and becoming fatigued with exercise. Several factors are associated with fatigue in SLE including depression, obesity, poor sleep, pain, and co-morbidities (Ahn, G. & Ramsey-Goldman, 2012). Moreover, several studies reveal that aerobic exercise plays a role in reducing fatigue (Mahieu, et al, 2016; Wu, Yu, & Tsai, 2017). Education and encouragement to increase physical activity may remarkably reduce the perceived physical activity barrier, “I become fatigued with exercise”.

Conclusions

Physical activity is beneficial to the individual with SLE to reduce the incidence of metabolic syndrome (Nascimento et al, 2010). Physical activity may also decrease inflammation and overall disease activity (Perandin et al, 2014; Perandin et al, 2015). The goal of the study was to determine the perceived barriers and benefits to physical activity in females with SLE between 18 and 44

years of age. Females with SLE between 18 and 44 years of age perceive physical activity as less beneficial than female nursing students between 18 and 44 years of age, and the subjects with SLE reported more physical activity barriers than the subjects in nursing school.

Nurses must continue to monitor signs and symptoms of metabolic syndrome and co-morbidities in individuals with SLE during each interaction in the outpatient and inpatient settings. Patient education is imperative to encourage individuals with SLE to increase physical activity by communicating the immense value of physical activity, and by assessing and collaborating with patients about potential barriers to physical activity. Patient-centered strategies to overcome physical activity barriers will promote physical activity in individuals with SLE, and will also ultimately reduce symptoms associated with SLE including inflammation and overall disease activity.

Limitations

Study limitations include a small sample size and a study limited to a small geographic region. Study limitations also included generalizability to only one gender in the study. The absence of a survey item to investigate if the subject's healthcare provider recommended or did not recommend physical activity also was a limitation. The additional survey item may have increased the number of subjects in the study group, and it also may have provided additional data regarding energy expenditure, health burden, and perceived physical activity benefits and barriers in individuals who have not been encouraged by a healthcare provider to participate in physical activity. Additionally, a notable limitation in

this study was the omission of four questions from the General Health sub scale on the SF-36 v2. The omission of the four questions on the SF-36 v2 sub scale decreased assessment of general health, but the General Health sub scale was included in the physical and mental component score by utilizing full missing score estimation.

Although the inclusion criteria limits generalizability of the study to various groups, the inclusion criteria for this pilot study were limited to females to ensure that the study and control groups were similar in demographic data for the tests of differences. Although the sample size for the study group was 22 and the sample size for the control group was 40, statistically significant differences were detected between the study and control group regarding perceived benefits of and barriers to physical activity.

Strengths and Weaknesses

The strengths in this study include the age range selected for the study group and the use of robust instruments. The age range selected was between 18 and 44 years of age. SLE may present at any age throughout the lifespan, however, the illness most often presents during the childbearing years. The ratio of initial disease presentation in individuals of childbearing age compared to initial presentation in individuals after menopause is 12 to 1 (Simard & Costenbader, 2012). The instruments in the study have been utilized in multiple studies, and the IPAQ and SF-36V2 have demonstrated validity and reliability in numerous countries and languages.

Study weaknesses include a risk for decreased physical activity in the control group related to studying and sitting for several hours in class, and a risk for psychological stress. The decreased physical activity due to extensive studying and extended class times may reduce the amount of time an individual in a nursing school program is able to commit to physical activity. Increased psychological stress also frequently occurs in nursing school due to workload expectations, studying for tests, and demonstration of clinical competencies. The increase in psychological stress may have caused the lower median mental component score in the control group compared to a potential median mental component score in healthy controls who are not in a rigorous educational program. Unknown severity of disease in the study group was also a weakness in this study. Quantification of disease severity may have had an impact on quantified energy expenditure, health burden, and perceived physical activity benefits and barriers.

Future Research

Future studies include the addition of items to quantify the severity of illness and the number of years since the initial diagnosis. The additional items may provide more information about the sample, and whether disease severity and length of disease may impact the perception of physical activity benefits and barriers. A larger sample size parallel to this study to determine if there are detectable differences between male and female gender and if there are differences among adult individuals of all age groups is also a consideration for a future study. Future research also includes the development of symptom-specific

physical activities, and interventional studies to determine if strategies to promote physical activities and reduce barriers are efficacious in the reduction of physical activity barriers. Additionally, future studies using anthropometric and disease-specific measures to evaluate the effectiveness of patient-centered physical activity plans to prevent metabolic syndrome and reduction of disease activity in individuals with SLE should be implemented.

Appendix A Demographic Information

What is your gender?	1. Male 2. Female
What is your age?	Subject selects age from 18 to 44 years.
What is the highest level of education you have completed?	Some high school High school graduate Some college Technical/Vocational training College graduate Some postgraduate work Postgraduate degree
Ethnicity	White African-American Hispanic Asian Native American
What is your total annual income?	Below \$20,000 per year \$20,001-\$30,000 per year \$30,001-\$40,000 per year \$40,001-\$50,000 per year \$50,001-\$60,000 per year \$60,001-\$70,000 per year \$71,001-\$80,000 per year \$80,001-\$90,000 per year \$90,001-\$100,000 per year . Greater than \$100,000 per year
What is your current employment status?	Employed full-time Employed part-time Disabled Not employed Retired
What is your current marital status?	Single/Never been married Married Separated/Divorced Widowed
How would you rate the amount of physical activity education you have received from your healthcare providers?	None I have received encouragement to participate in physical activity. I have been given examples of physical activity to perform. I have been given a detailed physical activity plan.

Appendix B Exercise Benefits/Barriers Scale

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 statements by circling SA for strongly agree, A for agree, D for disagree, or SD for strongly disagree.

	Strongly Agree	Agree	Disagree	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. Exercising 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

(Continued on reverse side)

	Strongly Agree	Agree	Disagree	Strongly Disagree
22. Exercise increases 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. Exercising 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. Exercising 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

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EXERCISE BENEFITS/BARRIERS SCALE

Scoring Information

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.

Appendix C Short Form-36 Version 2 (SF-36V2)

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Thank you for completing this survey!

1. In general, would you say your health is:

Excellent	Very Good	Good	Fair	Poor
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Compared to one year ago, how would you rate your health in general now?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. <u>Vigorous activities</u> , such as running, lifting heavy objects, participating in strenuous sports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. <u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Lifting or carrying groceries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Climbing <u>several</u> flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Climbing <u>one</u> flight of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Bending, kneeling, or stooping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Walking <u>more than a mile</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Walking <u>several hundred yards</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Walking <u>one hundred yards</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Bathing or dressing yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Cut down on the <u>amount of time</u> you spent on work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Were limited in the <u>kind</u> of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Had <u>difficulty</u> performing the work or other activities (for example, it took extra effort)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Cut down on the <u>amount of time</u> you spent on work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Did work or activities <u>less carefully than usual</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. How much bodily pain have you had during the past 4 weeks?

None	Very Mild	Mild	Moderate	Severe	Very Severe
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Did you feel full of life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Have you been very nervous?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Have you felt so down in the dumps that nothing could cheer you up?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Have you felt calm and peaceful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Did you have a lot of energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Have you felt downhearted and depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Did you feel worn out?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Have you been happy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Did you feel tired?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a. I seem to get sick a little easier than other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. I am as healthy as anybody I know	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I expect my health to get worse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. My health is excellent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix D International Physical Activity Questionnaire (IPAQ)

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (October 2002)

LONG LAST 7 DAYS SELF-ADMINISTERED FORMAT

FOR USE WITH YOUNG AND MIDDLE-AGED ADULTS (15-69 years)

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) and short (4 generic items) versions for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity.

Background on IPAQ

The development of an international measure for physical activity commenced in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries (14 sites) during 2000. The final results suggest that these measures have acceptable measurement properties for use in many settings and in different languages, and are suitable for national population-based prevalence studies of participation in physical activity.

Using IPAQ

Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.

Translation from English and Cultural Adaptation

Translation from English is encouraged to facilitate worldwide use of IPAQ. Information on the availability of IPAQ in different languages can be obtained at www.ipaq.ki.se. If a new translation is undertaken we highly recommend using the prescribed back translation methods available on the IPAQ website. If possible please consider making your translated version of IPAQ available to others by contributing it to the IPAQ website. Further details on translation and cultural adaptation can be downloaded from the website.

Further Developments of IPAQ

International collaboration on IPAQ is on-going and an *International Physical Activity Prevalence Study* is in progress. For further information see the IPAQ website.

More Information

More detailed information on the IPAQ process and the research methods used in the development of IPAQ instruments is available at www.ipaq.ki.se and Booth, M.L. (2000). *Assessment of Physical Activity: An International Perspective*. Research Quarterly for Exercise and Sport, 71 (2): s114-20. Other scientific publications and presentations on the use of IPAQ are summarized on the website.

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No →

Skip to PART 2: TRANSPORTATION

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ **days per week**

☐

No vigorous job-related physical activity



Skip to question 4

3. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **hours per day**

_____ **minutes per day**

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **days per week**

☐

No moderate job-related physical activity



Skip to question 6

LONG LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised October 2002.

5. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?
- _____ hours per day
_____ minutes per day
6. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.
- _____ days per week
- ☐ No job-related walking → **Skip to PART 2: TRANSPORTATION**
7. How much time did you usually spend on one of those days **walking** as part of your work?
- _____ hours per day
_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?
- _____ days per week
- ☐ No traveling in a motor vehicle → **Skip to question 10**
9. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?
- _____ hours per day
_____ minutes per day
- Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.
10. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?
- _____ days per week
- ☐ No bicycling from place to place → **Skip to question 12**

11. How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ **hours per day**
_____ **minutes per day**

12. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐

No walking from place to place



Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

13. How much time did you usually spend on one of those days **walking** from place to place?

_____ **hours per day**
_____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

_____ **days per week**

☐

No vigorous activity in garden or yard



Skip to question 16

15. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **days per week**

☐

No moderate activity in garden or yard



Skip to question 18

17. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ **hours per day**
_____ **minutes per day**

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ **days per week**

☐

No moderate activity inside home



**Skip to PART 4: RECREATION,
SPORT AND LEISURE-TIME
PHYSICAL ACTIVITY**

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **hours per day**
_____ **minutes per day**

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **days per week**

☐

No walking in leisure time



Skip to question 22

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ **hours per day**
_____ **minutes per day**

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **days per week**

☐

No vigorous activity in leisure time



Skip to question 24

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?
- _____ hours per day
_____ minutes per day
24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?
- _____ days per week
- ☐ No moderate activity in leisure time → **Skip to PART 5: TIME SPENT SITTING**
25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?
- _____ hours per day
_____ minutes per day

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?
- _____ hours per day
_____ minutes per day
27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?
- _____ hours per day
_____ minutes per day

This is the end of the questionnaire, thank you for participating.

Appendix E Study Group Recruitment Email

Thank you for taking the time to read this email. I am currently recruiting individuals with Systemic Lupus Erythematosus (SLE) to further investigate physical activity in individuals with SLE. Participation in the study will include on-line survey instruments that will not take more than 30 minutes to complete. *You will receive a \$10 Visa Gift Card upon completion of the study.*

This is a research project. The purpose of this project is to determine if differences in perceived benefits of and barriers to physical activity participation exist between female patients diagnosed with Systemic Lupus Erythematosus between the ages of 18 to 44 and women who do not have a significant history of chronic illness or problems with mobility. Participation in this research study can be withdrawn at any time.

The University of Texas Medical Branch (UTMB) committee that reviews research on human subjects, the Institutional Review Board (IRB) will answer any questions about your rights as a research subject, and take any comments or complaints you may wish to offer. You can contact the UTMB IRB by calling 409-266-9475.

You may also contact the researcher at any time at:

Mary Amanda McCreight, PhD (c), MSN, RN

(936) 641-7459

mamccrei@utmb.edu

Eligibility to participate in the study:

- Female
- Between 18 and 44 years of age
- Diagnosed by a medical doctor with SLE
- Instructed by a medical doctor to participate in physical activity
- Able to read and write English
- Able to access the internet
- Have an email address
- Not Pregnant
- Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.

Your time is appreciated to further research literature about SLE.

If you are interested in participating in this study, please click on the following link:

<https://www.surveymonkey.com/r/MLGPYKV>

Appendix F Informed Consent and Survey

Informed Consent

The University of Texas Medical Branch at Galveston
Minimal Risk Consent Form

Protocol Title: Perceived Activity Benefits and Barriers in Patients Diagnosed with Systemic Lupus Erythematosus Between 18 and 44 Years of Age: A Pilot Study

IRB Number: 16-0305

Principal Investigator: Mary Amanda McCreight, PhD (c), MSN, RN
301 University Boulevard
Galveston, TX 77555
(936) 641-7459

Why am I being asked to take part in this research study?

You are being asked to participate in this research because you have identified that you either a) are a female between 18 and 44 years of age and have Systemic Lupus Erythematosus, and have gained clearance from your health care provider to participate in physical activities, or b) you are a female between 18 and 44 years of age, have no history of chronic illness or problems with mobility, and are enrolled in a Baccalaureate of Nursing Program or an Associate of Science Degree Nursing Program in the Houston or Gulf Coast region of Texas.

What is the purpose of this research study?

The purpose of the study is to investigate if perceived benefits of and barriers to physical activity participation exist between women with Systemic Lupus Erythematosus between 18 and 44 years of age, and women between 18 and 44 years of age who do not have a history of chronic illness nor problems with mobility.

How many people will take part in this study?

About 76 people will take part in the study within Houston, TX and Gulf Coast regions.

What procedures are involved as part of this research study?

If you agree to take part, you will be asked to give consent to participate in the study. After reading the details of the study, you may contact the researcher at any time if you have any questions or concerns before beginning the study, as well as during the study. After you have read the information, and agree to participate in the study, informed consent will be implied by you starting the survey. The survey contains questions about your health, your physical activity participation, and what you perceive as benefits and barriers to physical activity participation. You also will be asked about demographic information. The time to complete the survey questions is approximately

20 minutes.

Perceived Benefits of and Barriers to Physical Activity

What are the possible risks for choosing to participate in this research study?

All research studies have the potential to pose risks to participants. This research study presents only minimal risks. Vulnerable populations are not included in this study, therefore if you are pregnant you may not participate in the study. The researcher will be responsible for conducting the study in an ethical manner, and will attempt to diminish any identified risks involved. The minimal risks that may arise in the study includes a loss of privacy, loss of time, and, the subject recalling her illness. Any time information is collected, there is a potential risk for loss of confidentiality. Every effort will be made to keep your information confidential; however, this cannot be guaranteed. Your responses will be de-identified by the researcher assigning a number to each research subject. The assigned number will be utilized in the place of your identity. Additionally, the researcher will keep data on a password protected flash drive. If any data is printed, the data will be kept in a locked box in the researcher's home office. To ensure privacy standards are upheld, the researcher has completed the required Human Subjects Protection training specified by University of Texas Medical Branch (UTMB). You may contact the researcher at any time if you feel there has been a breach of privacy, or if you need additional resources regarding the study during or after study completion.

What are the potential benefits for participating in this research study?

Potential benefits to the research subjects, and to others with similar problems, include identifying benefits of and barriers to physical activity participation. Identification of barriers to physical activity in the study group will enable healthcare providers to implement interventions to increase physical activity participation. Ultimately, increasing physical activity is projected to function as an adjuvant modality to decrease inflammation and disease activity, prevent complications associated with SLE, and enhance global health outcomes in patients with SLE. You will receive a \$10 Visa Gift Card upon completion of this study.

Will I be reimbursed for participating in this research study?

You will be compensated with a \$10 Visa Gift Card upon completion of this study.

Is there an alternative treatment/procedure?

The alternative is not to participate in the study.

If I agree to take part in this research study, can I be removed from the study without my consent?

Yes. The researcher may decide to take you off this study if there is a lack of participation in the study.

How will my information be protected?

All results obtained in this study will be kept confidential and only available to the research study team. Your individual information will not be reported, only the results of all participants as a group.

How will my privacy be protected?

We have rules to protect information about you. Federal and state laws and the federal medical Privacy Rule also protect your privacy. By consenting to this study you provide your permission, called your "authorization," for the use and disclosure of information protected by the Privacy Rule.

The research team working on the study will collect information about you. This includes information described in this consent form such as demographic information, perceived benefits of and barriers to physical activity, a short health questionnaire, and amount of physical activity.

The research team will not know your identity. The use and disclosure of your information

If you contact the Principal Investigator by phone, you must follow-up with a written request that includes the study number and your contact information. The Principal Investigator's name, address, phone and information are on page one of this consent form.

If you do cancel your authorization to use and disclose your information, your part in this study will end and no further information about you will be collected. Your revocation (cancellation) would not affect information already collected in the study, or information we disclosed before you wrote to the Principal Investigator to cancel your authorization.

Who can I contact with questions about this research study?

If you have any questions, concerns or complaints before, during or after the research study, or if you need to report a research related injury or bad side effect, you should immediately contact Mary Amanda McCreight at (936) 641-7459 at any time.

This study has been approved by the UTMB Institutional Review Board (IRB). If you have any complaints, concerns, input or questions regarding your rights as a subject participating in this research study or you would like more information about the protection of human subjects in research, you may contact the IRB Office, at (409) 266-9475 or irb@utmb.edu.

Do I have to participate?

Your participation in this study is completely voluntary. You may refuse to participate or stop your participation in this research study at any time without penalty or loss of benefits to which you are otherwise entitled.

CONSENT TO PARTICIPATE:

The purpose of this research study, procedures to be followed, risks and benefits have been explained to you. You have been given the opportunity to ask questions, and your questions have been answered to your satisfaction. You have been told who to contact if you have additional questions.

*** 1. By clicking "begin" to start the survey, you are confirming that you have read this consent form and voluntarily agree to participate as a subject in this study. You also agree that you meet the following criteria:**

a) • Female

- Between 18 and 44 years of age
- Diagnosed by a medical doctor with SLE
- Instructed by a medical doctor to participate in physical activity
- Able to read and write English
- Able to access the internet
- Have an email address
- Are not pregnant
- Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.

or

b) • Female

- Between 18 and 44 years of age
- No past or present history of chronic illness
- No present problems with mobility
- Able to read and write English
- Able to access the internet
- Have an email address
- Are not pregnant
- Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.
- Attends one of the following nursing programs: University of Texas Medical Branch in Galveston, TX, University of Texas Health Science Center in Houston, TX, Texas Woman's University in Houston, TX, Prairie View A&M in Houston, TX, and Houston Baptist University in Houston, TX, Galveston College in Galveston, TX, College of the Mainland in Texas City, TX, Alvin Community College in Alvin, TX, San Jacinto College in Houston, TX and Pasadena, TX, Houston Community College in Houston, TX, Lee College in Baytown, TX, or Lone Star College at the CyFair, Kingwood, Montgomery, North Harris County, or Tomball, TX.

☐ **Begin**

Demographics

* 2. What is your gender?

- ☐ Male
☐ Female

* 3. What is your age?

* 4. What is your ethnicity?

- ☐ White
☐ African American
☐ Hispanic
☐ Asian
☐ Native American

* 5. What is your total annual income?

- ☐ Below \$20,000 per year
☐ \$20,001-\$30,000 per year
☐ \$30,001-\$40,000 per year
☐ \$40,001-\$50,000 per year
☐ \$50,001-\$60,000 per year
☐ \$60,001-\$70,000 per year
☐ \$71,001-\$80,000 per year
☐ \$80,001-\$90,000 per year
☐ \$90,001-\$100,000 per year
☐ Greater than \$100,000 per year

* 6. What is your current employment status?

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Disabled
- ☐ Not employed
- ☐ Retired

* 7. What is your current marital status?

- ☐ Single/Never been married
- ☐ Married
- ☐ Separated/Divorced
- ☐ Widowed

* 8. How would you rate the amount of physical activity education you have received from your healthcare providers?

None	I have received encouragement to participate in physical activity.	I have been given examples of physical activity to perform.	I have been given a detailed physical activity plan.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 9. Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by selecting Strongly Agree, Agree, Disagree, or Strongly Disagree.

	Strongly Agree	Agree	Disagree	Strongly Disagree
I enjoy exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise decreases feelings of stress and tension for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise improves my mental health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising takes too much of my time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will prevent heart attacks by exercising.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise tires me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise increases my muscle strength.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise gives me a sense of personal accomplishment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Places for me to exercise are too far away.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising makes me feel relaxed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising lets me have contact with friends and persons I enjoy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am too embarrassed to exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising will keep me from having high blood pressure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It costs too much to exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising increases my level of physical fitness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise facilities do not have convenient schedules for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My muscle tone is improved with exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Agree	Agree	Disagree	Strongly Disagree
Exercising improves functioning of my cardiovascular system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am fatigued by exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have improved feelings of well being from exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My spouse (or significant other) does not encourage exercising.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 10. Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by selecting Strongly Agree, Agree, Disagree, or Strongly Disagree.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Exercise increases my stamina.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise improves my flexibility.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise takes too much time from my family relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My disposition is improved with exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising helps me sleep better at night.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will live longer if I exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think people in exercise clothes look funny.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise helps me decrease fatigue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising is a good way for me to meet new people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My physical endurance is improved by exercising.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising improves my self-concept.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Agree	Agree	Disagree	Strongly Disagree
My family members do not encourage me to exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising increases my mental alertness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise allows me to carry out normal activities without becoming tired.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise improves the quality of my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise takes too much time from my family responsibilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise is good entertainment for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercising increases my acceptance by others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise is hard work for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise improves overall body functioning for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are too few places to exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise improves the way my body looks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 11. In general, would you say your health is:

Excellent	Very Good	Good	Fair	Poor
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 12. Compared to one year ago, how would you rate your health now?

Much better now than one year ago	Somewhat better now than one year ago	About the same as one year ago	Somewhat worse now than one year ago	Much worse now than one year ago
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 13. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
<u>Vigorous activities</u> , such as running, lifting, heavy objects, participating in strenuous sports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lifting or carrying groceries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Climbing <u>several</u> flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Climbing <u>one</u> flight of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bending, kneeling, or stooping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Walking <u>more than a mile</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Walking <u>several hundred yards</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Walking <u>one hundred yards</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bathing or dressing yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 14. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Cut down on the <u>amount of time</u> you spent on work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Were limited in the <u>kind</u> of work other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Had <u>difficulty</u> performing the work or other activities (for example, it took extra effort)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 15. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Cut down on the <u>amount of time</u> you spend on work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Did work or other activities <u>less carefully than usual</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 16. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 17. How much bodily pain have you had during the past 4 weeks?

None	Very mild	Mild	Moderate	Severe	Very severe
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- * 18. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 19. These questions are about how you feel and how things have been with you during the past 4 weeks. For each questions, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
Did you feel full of life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you been very nervous?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you felt so down in the dumps nothing could cheer you up?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you felt calm and peaceful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Did you have a lot of energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you felt downhearted and depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Did you feel worn out?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Have you been happy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Did you feel tired?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 20. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Activity

I am interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spend being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous and moderate activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

* 21. Do you currently have a job or do any unpaid work outside your home? If the answer is no, please skip to **Question 28**.

☐ Yes

☐ No

The next questions are about all the physical activity you did in the last 7 days as part of your paid or unpaid work. This does not include traveling to and from work.

22. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ days per week.

If no vigorous job-related physical activity in the last 7 days, place a zero in the box and skip to question 32.

23. How much activity did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ hours per day

_____ minutes per day

24. Again think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work** Please do not include walking.

_____ days per week

If no moderate physical activity in the last 7 days, place a zero in the box and skip to question 28.

25. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ hours per day

_____ minutes per day

26. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time as **part of your own work**? Please do not count walking you did to travel to or from work.

_____ days per week

If no job related walking
in the last 7 days, place a
zero in the box and skip
to question 28.

27. How much time did you usually spend on one of those days **walking** as part of your work?

_____ hours per day

_____ minutes per day

PART II: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

- * 28. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

___ days per week

If no traveling in a motor vehicle in the last 7 days, place a zero in the box and skip to question 30.

29. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

___ hours per day

___ minutes per day

Now think only about the bicycling and walking you might have done to travel to and from work, to do errands, or to go from place to place.

* 30. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

___ days per week.

If no bicycling from place to place in the last 7 days, place a zero in the box and skip to question 32.

31. How much time did you usually spend on one of those days to **bicycle** from place to place?

___ hours per day

___ minutes per day

* 32. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

___ days per week

If you did not walk from place to place for at least 10 minutes in the last 7 days, place a zero and skip to question 34.

33. How much time did you usually spend on one of those days **walking** from place to place?

___ hours per day

___ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

- * 34. Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging in the garden or yard?

____ days per week

If you did not do vigorous activity in the garden or yard in the last 7 days, place a zero in the box and skip to question 36.

35. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

____ hours per day

____ minutes per day

- * 36. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard?

____ days per week

If you did not do any moderate activity in the garden or yard in the last 7 days, place a zero and skip to question 38.

37. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

____ hours per day

____ minutes per day

* 38. Once again, think about only those physical activities that you did for at least 10 minutes at a time.
During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**

___ days per week

If no moderate activity
inside home in the last 7
days, place a zero in the
box and skip to question
40.

39. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

___ hours per day

___ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise, or leisure. Please do not include any activities you have already mentioned.

- * 40. Not counting any walking you have already mentioned, during the last 7 days on how many days did you **walk** for at least 10 minutes at a time in your leisure time?

___ days per week

If no walking in leisure time in the last 7 days, please place a zero in the box and skip to question 42.

41. How much time did you usually spend on one of those days **walking** in your leisure time?

___ hours per day

___ minutes per day

- * 42. Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

___ days per week

If no vigorous activity in leisure time in the last 7 days, place a zero in the box and skip to question 44.

43. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

___ hours per day

___ minutes per day

* 44. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

____ days per week

If no moderate activity
in leisure time in the last
7 days, please place
a zero in the box and
skip to question 46.

45. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

____ hours per day

____ minutes per day

PART 5: TIME SPEND SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

* 46. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

___ hours per day

___ minutes per day

* 47. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

___ hours per day

___ minutes per day

48. Please enter the subject ID number given to you by the researcher. If you were not given a subject ID number, please see the following instructions.

If you **have SLE**, please state that you have SLE in the blank.

If you **do not have SLE**, please state the **type of nursing program** in which you are enrolled.

Associate Degree in Nursing Program or Bachelor of Science Degree in Nursing Program

Perceived Benefits of and Barriers to Physical Activity

Thank You!

Thank you for participating!

49. Please enter the email address that you would like for your \$10 Visa Gift Card to be sent:

Lupus Research Study

Make a Difference in Lupus Research!

I am currently recruiting individuals with Systemic Lupus Erythematosus (SLE). Participation in the study will include online survey instruments that will not take more than 20 minutes to complete.

Eligibility to participate in the study:

- **Female**
- **Between 18 and 44 years of age**
- **Diagnosed by a medical doctor with SLE**
- **Instructed by a medical doctor to participate in physical activity**
- **Able to read and write English**
- **Able to access the internet**
- **Have an email address**
- **Not Pregnant**
- **Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.**

Your time is appreciated to further research about SLE.

Survey link: <https://www.surveymonkey.com/r/MLGPYKV>



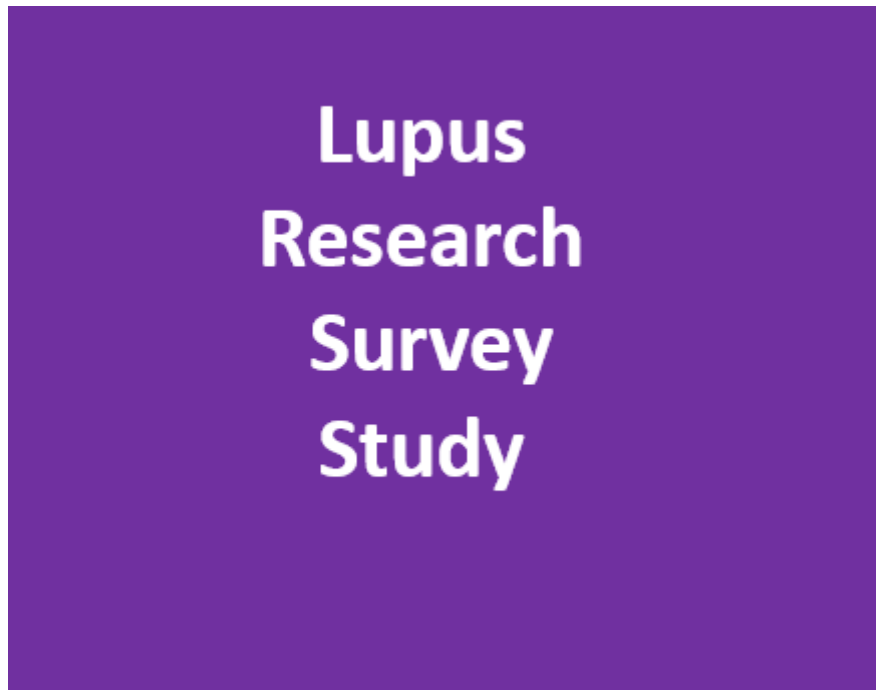
Contact: Mary Amanda McCreight, PhD(c), RN

(936) 641-7459

mamccrei@utmb.edu

Appendix H Social Media Study Page

Profile Picture



Background Picture



Pictures in Carousel Format

Do you Have Lupus?

**Participate in a
One Time Survey Study and
receive a
\$10 Visa Gift Card.**

Research Aims:

**To Investigate
Physical Activity in
Individuals with
Systemic Lupus
Erythematosus**

Study Contact:
Mary Amanda McCreight,
PhD (c), RN
Phone: (936) 641-7459
Click on this ad for more
information.

Research Project

Be a participant in a Lupus research project!

Thank you for taking the time to view this webpage. I am currently recruiting individuals with Systemic Lupus Erythematosus (SLE) to further investigate physical activity in individuals with SLE. Participation in the study will include online survey instruments that will not take more than 20 minutes to complete. You will receive a \$10 Visa Gift Card upon completion of the study.

This is a research project. The purpose of this project is to determine if differences in perceived benefits of and barriers to physical activity participation exist between individuals diagnosed with Systemic Lupus Erythematosus and individuals who do not have a significant history of chronic illness or problems with mobility.

Your time is appreciated to further research literature about SLE.

If you are interested in participating in this study, please contact:

Mary Amanda McCreight, PhD(c), RN
(936) 641-7459
mamccrei@utmb.edu

Lupus Research Study

Make a Difference in Lupus Research!

I am currently recruiting individuals with Systemic Lupus Erythematosus (SLE). Participation in the study will include online survey instruments that will not take more than 20 minutes to complete.

Eligibility to participate in the study:

- **Female**
- **Between 18 and 44 years of age**
- **Diagnosed by a medical doctor with SLE**
- **Instructed by a medical doctor to participate in physical activity**
- **Able to read and write English**
- **Able to access the internet**
- **Have an email address**
- **Not Pregnant**
- **Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.**

Your time is appreciated to further research about SLE.

Survey link: <https://www.surveymonkey.com/r/MLGPYKV>



Contact: Mary Amanda McCreight, PhD(c), RN

(936) 641-7459

mamccrei@utmb.edu

Appendix K Lupus Walk Flier Dickinson, TX

Lupus Research Study

Make a Difference in Lupus Research!

I am currently recruiting individuals with Systemic Lupus Erythematosus (SLE). Participation in the study will include online survey instruments that will not take more than 20 minutes to complete. *You will receive a \$10 Visa Gift Card upon completion of the study.*

Eligibility to participate in the study:

- Female**
- Between 18 and 44 years of age**
- Diagnosed by a medical doctor with SLE**
- Instructed by a medical doctor to participate in physical activity**
- Able to read and write English**
- Able to access the internet**
- Have an email address**
- Not Pregnant**

Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.

Survey Link: <https://www.surveymonkey.com/r/DFMQ275>



QR Code Reader

Contact: Mary Amanda McCreight, PhD(c), MSN, RN

Appendix L Control Group Email Flier

Thank you for taking the time to read this email. I am currently recruiting individuals who are in a Bachelor of Science Degree or an Associate Degree nursing program who have no history of chronic illness or present problems with mobility. The study aims to investigate activity participation in patients with SLE. Your participation in the study will be utilized to compare individuals with SLE against a control group. Participation in the study will include on-line survey instruments that will not take more than 30 minutes to complete.

This is a research project. The purpose of this project is to determine if differences in perceived benefits of and barriers to physical activity participation exist between female patients diagnosed with Systemic Lupus Erythematosus between the ages of 18 to 44 and women who do not have a significant history of chronic illness or problems with mobility. Participation in this research study can be withdrawn at any time.

The University of Texas Medical Branch (UTMB) committee that reviews research on human subjects, the Institutional Review Board (IRB) will answer any questions about your rights as a research subject, and take any comments or complaints you may wish to offer. You can contact the UTMB IRB by calling 409-266-9475.

You may also contact the researcher at any time at:

Mary Amanda McCreight, MSN, RN

(936) 641-7459

mamccrei@utmb.edu

Eligibility to participate in the study:

- Female
- Between 18 and 44 years of age
- No past or present history of chronic illness
- No present problems with mobility
- Able to read and write English
- Able to access the internet
- Have an email address
- Not Pregnant
- Lives in Houston, TX and surrounding areas including one of the following areas: Harris, Galveston, Brazoria, Fort Bend, Chambers, Liberty, Montgomery, or Waller county.
- Attends one of the following nursing programs: University of Texas Medical Branch in Galveston, TX, University of Texas Health Science Center in Houston, TX, Texas Woman's University in Houston, TX, Prairie View A&M in Houston, TX, and Houston Baptist University in Houston, TX, Galveston College in Galveston, TX, College of the Mainland in Texas City, TX, Alvin Community College in Alvin, TX, San Jacinto College in Houston, TX and Pasadena, TX, Houston Community College in Houston, TX, Lee College in Baytown, TX, or Lone Star College at the CyFair, Kingwood, Montgomery, North Harris County, or Tomball, TX.

Your time is appreciated to further research literature about SLE.

If you are interested in participating in this study, please click on the following link:
<https://www.surveymonkey.com/r/MLGPYKV>

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Vita

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