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Leisure Time Physical Activities of Older Adults in Senior Housing

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Walden University
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Abstract

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MBA, Keller Graduate School of Management, 2008

BA, Villanova University, 2006

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Services

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Abstract

Increasing physical activity levels of older adults is a public health priority given the associated risks with sedentary lifestyles. Exercise such as walking may positively affect older adults as they age decreasing the risk of heart disease, stroke, or death. The purpose of this study was to examine physical activities of older adults in senior housing and to determine if age correlates with the amount of physical activity. Physical activity studies on older adults are limited due to time and resources. The health belief model and transtheoretical model frames this study theorizing that older adults will take positive steps towards achieving recommended physical activities based on their perceived threats and benefits. A correlational research design provided systematic information about physical activities of older adults in senior housing and aided in determining if age relates to the amount of physical activity. The study used a convenience sampling of 62 older adults in senior housing and data collected from the Community Health Activities Model Program for Seniors questionnaire. The make-up of the sample included 36 females and 26 males aged 65 to 84 years old. The age of older adults in a senior housing community is not related to the amount of physical activity completed per week. The results of the descriptive analyses show that 53% of older adults in senior housing are not meeting physical activity guidelines of at least 150 minutes of physical activity per week. However, this is not statistically significant since all p-values for physical activity are greater than .05% level of significance at .776. Additional services such as providing leisure activity support to older adults through peer monitoring or adequate recreational facilities in the community can aid in helping older adults achieve physical activity recommendations.

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Dedication

I dedicate my research to my grandmother Barbara Sanders. She inspired me to pursue research that helps promote leisure activity and the quality of life of older adults. Grandma, I thank you for your dedication and compassion to help others. I would not be the woman I am today without your guidance and wisdom.

Acknowledgments

It was my faith that helped me through this journey but also a few important people who had direct influence on my success. I would like to thank my family and friends for enduring this journey with me. You all played a special role in helping me to stay on track. Also thanks to the study participants and the Senior Housing Communities.

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Special thanks to Dr. JaMuir M. Robinson. The time commitment and effort you put into reviewing my study allowed me to put forth my best work. Thank you for your commitment to seeing me excel and helping me to think critically and objectively while reviewing my dissertation. I am grateful for the ability to fill a gap in leisure research.

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Chapter 1: Introduction to the Study

Physical activity (PA) is associated with improved health, including a lower risk for premature death, coronary heart disease, Type 2 diabetes, and depression (Plotnikoff, Lippke, Johnson, & Courneya, 2010).). As older adults age their physical activity levels decline (Jefferis et al., 2014). Decreases in PA are linked with deterioration of physiological systems, which are critical to maintaining mobility, independent living, and overall quality of life in older adults (King, Sallis, Frank, Sasiens, Cain, Conway, & Kerr, 2011; McMurdo et al., 2012). Physical Activity may increase the likelihood of living longer while a decline in PA may affect the ability to be functionally independent (Stessman et al., 2009). Therefore, older adults are encouraged to participate in PA programs to improve their health and overall quality of life.

An overarching goal in Healthy People 2020 is to create social and physical environments that promote the health of older adults and increase participation in LTPA (Scheers, Philippaerts & Lefevre, 2013; Thompson et al., 2012). Increasing PA has become a public health priority given the associated risks with physical inactivity (Scheers et al., 2013). Previous guidelines focused primarily on improving overall health and reducing the risk of chronic diseases to combat the risks of physical inactivity (Scheers et al., 2013). These updated guidelines from Healthy People 2020 provide more encompassing factors to include context about older adults' daily activities and their way of living.

Globally, recommendations for PA are at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity PA throughout the week for older adults (Jefferis et

al., 2014; Scheers et al., 2013). PA encompasses both leisure time activity and activities completed daily. Although there is a plethora of research on community dwelling older adults, there is limited current research that identifies if older adults are meeting the PA recommendations specifically in senior housing.

Researchers reported that adherence to PA guidelines were low and based on self-reported PA (Jefferis et al., 2014). Older adult memory skills in leisure research studies may be problematic due to the ability of older adults to recall information, the time and resources required by researchers, and surveys that excluded work or household chores (Jefferis et al., 2014; Scheers et al., 2013). To address this issue, researchers used monitoring devices to track older adults' activities, although these types of devices might miss PA details that may be relevant to older adults in senior housing (Jefferis et al., 2014). Thus, use of a validated self-reported measure could enable researchers and health professionals to determine if older adults are meeting PA guidelines that are inclusive of leisure activities, such as playing board games or attending social events.

This study promotes positive social change by determining if older adults meet PA guidelines in senior housing, providing a basis for future LTPA initiatives. Recommendations for increasing PA in senior housing may be provided to older adults that do not meet PA guidelines. Additionally, this study may provide older adults with knowledge of local activities that promote LTPA, which is a goal supported by health professionals.

In Chapter 1, I provide background on physical activities of older adults. In addition, I discuss the research problem, purpose of the study, and research questions I

used to address the gap in literature. Afterwards, I provide a brief overview of the theoretical foundation and the nature of the study. Next, I review the operational definitions, assumptions, limitations, and delimitations. Finally, I provide a discussion on the significance of the study and summarize the chapter.

Background

LTPA is important in today's mechanistic world around us, specifically for older adults 65 or older. Engagement in physical activities has been shown to improve the overall health of older adults (Simone et al., 2009). Still, there is limited documented research on whether older adults are taking advantage of physical activities as they age in senior housing.

One common place where older adults typically gather for leisure activities is the Community Senior Center (CSC). Hickerson et al. (2008) found that the CSC environment helped older adults gain physical health and improved social interaction. Although CSCs play an important role in PA, this does not encompass all of the leisure activities that may be performed by older adults.

Noticeably, with the national attention to physical inactivity, researchers are seeking various intervention programs for health promotion. Pekmezi and Jennings (2009) focused on the promotion of physical activities through intervention methods with African Americans. African Americans encounter numerous issues related to social, environmental, and organizational obstacles while pursuing a physically active life style (Pekmezi &Jennings, 2009). Older adults were provided multilevel cultural interventions, which helped to increase health awareness as well as reinforce active life style

requirements, especially in old age in Pekmezi and Jennings (2009) study. The presence of health promotion programs targeted at improving health and increasing PA was an effective approach.

Similarly, Cheadle, Egger, LoGerfo, Schwartz, and Harris (2009) reported evidence based findings on a PA program in the Southeast Seattle Senior Physical Activity Network. There were multiple aims of establishing network-based connections between older adults. Two broad based conclusions from the study included networking between smaller older adult communities and identifying organizational champions to develop sustainable PA programs for older adults. Pekmezi and Jennings, (2009) argued that tailored interventions were better suited for older adults in need of PA.

Carlson et al. (2008) found that short-term programs could help improve cognitive functioning and PA. Hughes, Seymour, Campbell, Whitelaw, and Bazzarre (2009) used the Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire and it showed significant benefits to those who participated in a PA exercise program. The benefits reflected positively on self-efficacy and program participation. Most researchers agree that short term tailored intervention-based programs could help older adults with meeting PA guidelines (Carlson et al., 2008; Simone et al., 2009).

In another study, Kerr, Rosenberg, and Frank (2012) assessed the role of a built environment in developing and promoting PA programs. Walking and health were associated positively to the built environment in which older adults resided (Pekmezi and Jennings, 2009). Creation and preservation of walkable communities is important in reducing chronic illness in older adults (Kerr et al., 2012). Supportive factors such as

availability of walking tracks and availability of health fitness centers may also benefit older adults.

Mobility may decrease as a person grows old; so this places emphasis on community design factors. Reductions in social network, social support, and increased fragility in the old age are common health and social issues faced by older adults. Yen, Michael, and Perdue (2009) conducted a study synthesizing existing literature on environmental factors of older adults' health. The researchers reported that poor older adults living in high status vicinities had poor health issues. In addition, poor older adults had decreased cognitive ability, increased functional limitation, worst self-rated health, and poorer physical functioning (Yen, Michael & Perdue, 2009). Interventional studies around community design factors may be beneficial to older adults.

McNeill and Emmons (2012) also followed the intervention framework to address PA requirements by using a technological tool called Geographic Information Systems to develop maps for the community residents to identify PA areas as well as local businesses and destinations within the reach of a walk-able distance (half mile). The most significant impact occurred with residents of public housing and low-income minority groups who were encouraged by the availability of Geographic Information Systems maps to perform physical activities.

Assessment of LTPA in senior housing is the primary goal of this study. Senior housing is a common communal dwelling for older adults. The older adults spend the majority of their time doing scheduled activities in their senior housing community or in the area where they live. An important aspect in senior housing living is the social

interaction that takes place within the community of these housing units, which might not be documented by CSC or traditional PA surveys. The CHAMPS Questionnaire provides context in to a variety of leisure activities that might take place among older adults and the amount of time spent on physical activities.

Problem Statement

Increased PA has become a public health priority given the associated risks with sedentary lifestyles (Scheers et al., 2013). PA behaviors of older adults vary according to individual, social, and environmental factors (McMurdo et al., 2012). Jefferis et al. (2014) documented the shortfall of self-reported leisure experiences of older adults due to time and resources. Increasing LTPA is still one of the top objectives for the Healthy People 2020 initiative (Scheers et al., 2013). Therefore, the problem is that while it is known that PA of at least 150 minutes per week can have a positive impact on older adults (Jefferis et al., 2014; Scheers et al., 2013), it is not known if older adults are achieving this goal in senior housing. If I can show that older adults are meeting global activity recommendations, then I can identify a registry of the type of activities and the amount of time spent on achieving the targets recommended by health professionals.

Purpose of Study

The purposes of this quantitative study were to examine physical activities of older adults in senior housing and to determine if the amount of PA is related to senior age. In this study, PA, measured as the number of minutes of PA per week, was the dependent variable. Senior age was the independent variable. I administered the CHAMPS Questionnaire to the older adults in senior housing. The CHAMPS

Questionnaire provided insight into the physical activities of older adults over a 4-week period. A correlational quantitative research design provided systematic information about physical activities of older adults in a senior housing community and aided in determining if age is related to the amount of PA.

Research Questions/Hypotheses

Research Questions

There are three research questions in this study. The first research question is descriptive and is answered using responses to the CHAMPS Questionnaire. This included a descriptive examination of the amount of time spent in various physical activities as well as the proportion of seniors who adhere to the 150 minutes per week recommendation for PA as assessed in the 41 items on the CHAMPS Questionnaire. I used non-parametric and inferential statistics to determine if the observed differences among the older adults are dependent on factors such as age and to determine the significance of the findings.

Research Question 1: How many hours of LTPA do older adults complete in senior housing per week as assessed by the CHAMPS Questionnaire?

Research Question 2: Are older adults in Senior Housing meeting the Physical Activity guidelines recommended by health professionals of at least 150 minutes of physical activity per week?

Research Question 3: To what extent, if any, is the age of the senior in a senior housing community related to the amount of PA in which they engage per week?

Hypotheses

The first research question is descriptive and therefore no hypotheses were tested. For the second research question, the null and alternative hypotheses are as follows:

H_{01}: Older adults in Senior Housing are meeting physical activity guidelines recommended by health professionals of at least 150 minutes of physical activity per week.

H_{a1}: Older adults in Senior Housing are not meeting physical activity guidelines recommended by health professionals of at least 150 minutes of physical activity per week.

For the third research question, the null and alternative hypotheses are as follows:

H_o2: The age of the senior in a senior housing community is not related to the amount of PA in which they engage.

H_a2: The age of the senior in a senior housing community is related to the amount of PA in which they engage.

Theoretical Foundation

The health belief model (HBM) and transtheoretical model (TTM) were used as the theoretical frameworks for this study. Recommendations for improving the lives of older adults are centered on these two models based on the results from this study. The HBM tells us that when individuals believe that they have or will have health problems and believe that engaging in PA has the potential alleviate these current or future health problems, they are more likely to engage in PA (Prochaska & Diclemente's, 1982).

According to the TTM, if the majority of participants engage in the recommended amount of PA, this indicates that the participants have passed through the precontemplation, contemplation, and preparation phases and are either in the action of

maintenance stages (Prochaska & Diclemente's, 1982). Thus, if it is determined in the study that the majority of participants engage in the recommended amount of PA, this will be taken as evidence that the particpants perceive threats to their health (Prochaska, Norcross, & DiClemente, 1994). If participants believe that PA will help (according to the HBM), then they have moved beyond the early stages of the TTM to the latter stages in which behavior has changed.

If, however, the opposite is true and it is determined that the participants are not engaging in the recommended amount of PA, then the HBM and TTM provide a framework for increasing their PA. Specifically, if the participants are not engaging in the recommended amount of PA, efforts to convince seniors that PA will reduce threats to their health and efforts to move them from the early stages of the TTM to the latter stages will provide a framework for assisting seniors in obtaining the PA they require.

Nature of Study

The purposes of this quantitative study are to examine physical activities of older adults in senior housing and to determine if the amount of PA is related to senior age. The first research question of this study is descriptive, and therefore there are no independent and dependent variables although the focus is on the characteristics of the PA engaged in by the participants. For the second research question, senior age is the independent variable, and the total amount of time spent in PA per week is the dependent variable. To measure the variables in this study, I used the CHAMPS Questionnaire. The CHAMPS Questionnaire measures common activities done by older adults within a 4-week period such as walking, visits with family and friends, or playing games such as

bingo or cards. The quantitative methodology is similar to Levasseur et al. (2008) using a questionnaire to collect the data at a senior housing community.

The study took place in two senior housing communities in a common room with tables and chairs. Upon arrival to the room, the seniors completed their consent paperwork and responded to the demographic questions. My role was to explain the study and procedures and then pass out and collect all study materials from the participants. The participants completed the questionnaire on their own while in the room during the day of the study.

Operational Definitions

In this study, I used several key terms that are common but may be interpreted or conceptualized differently. For clarity, these terms are described below.

Leisure time physical activity (LTPA): Understanding LTPA is important in this study since older adults might not be in the workforce allowing more time to do their own activities. I used Stebbins's (2005) definition of leisure as uncoerced activity undertaken during free time, which brings personal satisfaction.

Older adult: For the purpose of this study, the term older adult refers to adults 65 years of age or older using the definition adapted by Tudor-Locke et al. (2011) that includes older adults who are physically active or living with a disability. Older adults with disabilities that prevent PA were excluded for this study.

Senior age: The independent variable for the second research question of this study is senior age. This is defined as the number of years old at the time of CHAMPS Questionnaire completion.

Assumptions, Limitations, and Delimitations

This research study is limited to older adults in senior housing and might not be representative of the population. Most residents in the complex used in the study have the ability to perform some type of leisure activity either on their own or with assistance from family and friends. These activities might take place inside their apartment, senior housing surroundings, or in the community; yet this may not be the case for all since some older adults may be more limited in their functioning.

I assumed that older adults who are functionally able have access to some form of LTPA. In addition, the community offers opportunities for the older adults to socialize and partake in leisure time physical activities through CSCs. Finally, I also assumed that older adults are aware that they need to be active but may not have knowledge of resources or support to meet activity recommendations.

In this study, I focused on two senior housing communities due to time constraints, and this impacts generalizability. The questionnaires were collected at the same time, and I did not address the older adults in an individual setting. These decisions were purposefully made primarily due to time and resources.

The study limitations included the choice of questionnaire, which requires the older adults to self-report information. Other limitations included the method for recruiting people from the senior housing community. Finally, the study population is low-income older adults 65 years of age or older residing in Pennsylvania senior housing, which is also a limitation that may affect generalizability.

Significance of Study

Older adults self-reporting on LTPA in senior housing is limited in previous research to my knowledge. Documented reporting of LTPA of older adults using the CHAMPS Questionnaire could determine if older adults are meeting the global recommendation of at least 150 minutes of PA per week. Therefore, this study can provide evidence based research on LTPA needs and interests of older adults in senior housing.

Summary

In Chapter 1, I provided a brief introduction on LTPA of older adults and the rationale for the study, and I presented the problem, research questions, and methodology. In the following chapter, I examine the strengths and weaknesses of research on theories as they relate to PA. In addition, I critically analyze recommendations for PA, older adults' motivation, and social and environmental influences on LTPA.

Chapter 2: Literature Review

Introduction

The literature presented in this review was drawn from the following EBSCO databases: Academic Search Premier, MasterFILE Premier, PsycINFO, and PsycARTICLES. Keywords used either individually or in conjunction included *older adults, physical activity, physical exercise, leisure, social interactions, social relationships, social support, neighborhood, environment, community, walkability, health, health beliefs, health promotion, attitudes, intentions, behaviors, actions, adherence, programs, interventions, self-efficacy, health belief model, transtheoretical model*, and *stages of change*. The literature review for this study included articles published as early as 2005 for background on the topic while the primary focus of this review covered articles from 2010-2016

A physically active lifestyle carries substantial physical and psychosocial benefits at all stages of life. World Health Organization (WHO) suggests that regular PA reduces the risks for cardiovascular disease, Type 2 diabetes, hypertension, stroke, obesity, osteoporosis, breast cancer, colon cancer, and disability (Bickmore et al., 2013; WHO, 2010; Vann Bree et al., 2013). Conversely, physical inactivity has become the fourth major risk factor for mortality worldwide (WHO, 2010). Across age groups and national boundaries, only a minority of adults adhere to the recommended guidelines for PA. This lack of activity is especially prominent among older adults, who are the least physically active age group and the most vulnerable to chronic health conditions and disability.

Beyond the protective effect of PA against disease, older adults who are physically active enjoy higher levels of functional health (Simmonds et al., 2014; Wanderley et al., 2011; WHO, 2010; Yorston, Kolt, & Rosenkranz, 2012) as well as quality of life (QOL), self-esteem, mastery, and psychological well-being (Cairney, Faulkner, Veldhuizen, & Wade, 2099; Phillips, Wojcicki, & McAuley, 2013; White, Wojcicki, & McAuley, 2009). The benefits of regular PA are sustained even in the very old (Stessman, Hammerman-Rozenberg, Cohen, Ein-Mor, & Jacobs, 2009).

To address the escalating public health problem of physical inactivity, WHO (2010) has outlined guidelines for PA levels for children and adolescents, adults between the ages of 18 and 64, and adults age 65 and older. The recommended levels of exercise are the same for all adults regardless of age. The only distinction between adult age groups lies in the recognition that older adults may have mobility problems (which can be improved through balance exercises) or health conditions that may require a modified exercise regimen. The presence of mobility problems does not preclude regular PA but rather magnifies its importance and potential benefits (Rejewski et al., 2008; Yeom, Keller, & Fleury, 2009).

World Health Organization's (WHO) *Global Recommendations on Physical Activity for Health* (2010) grew out of two resolutions drawn by the World Health Assembly Resolution. The 2004 *Global Strategy on Diet, Physical Activity and Health* was followed in 2008 by *Prevention and Control of Noncommunicable Diseases: Implementation of the Global Strategy and the Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases.* Both resolutions call on national

governments to create PA plans and policies designed to increase PA in their respective populations.

The action plan from WHO (2010) proposes that governments adopt a three-pronged approach to combating physical inactivity. The first approach is to develop and implement national guidelines on PA for health. Next is to introduce transportation policies that promote active and safe modes of traveling to and from schools and workplaces such as walking or cycling. Finally, ensuring that physical environments support safe and active commuting and create space for recreational activity (WHO, 2010). The literature reviewed in this chapter covers all three facets of these global recommendations.

Despite increasing attention to the connection between neighborhood features and health behaviors, some authors have observed that there are relatively few studies focused on older adults (King et al., 2011; Yen et al., 2009). Researchers in Belgium have examined how the physical environment influences walking and cycling among older adults (Van Cauwenberg et al., 2012, 2013). In the United States, there is scant attention to the health, recreational, and practical benefits of cycling for any adult age group. Walking for pleasure is the most popular LTPA among older adults (Martin et al., 2014). This consistent finding has important implications for the design of PA programs and health promotion campaigns as well as creating local environments that are more desirable.

Social relationships (or their absence) represent another important influence on PA (Chang, Wray, & Lin, 2014; Hawkley, Thisted, & Cacioppo, 2009; Litwin, 2012;

Watt et al., 2014). Researchers identified three types of leisure activities that are key contributors to successful aging: social engagement, physical exercise, and mental stimulation (Simone & Haas, 2009). These three activity types are often interrelated. Aerobic exercise has a protective effect against mental decline. Active older adults enjoy a variety of sports and games that are challenging mentally and physically (Martin et al., 2014). Interactive PA video games (such as Wii Tennis) are easily accessible, user-friendly, and enjoyable, with both physical and cognitive benefits (Maillot, Perrot, & Hartley, 2012). Experience Corps, a community program enlisting retired adults to support elementary school children in literacy learning and classroom behavior combines social engagement, PA, and mental stimulation within a real world setting (Carlson et al., 2008).

As the population ages, the number of senior housing communities is expected to increase exponentially (Geller, Mendoza, Timbobolan, Montjoy & Nigg, 2012). These communities provide an excellent venue for promoting healthful changes in behavior among older adults. Residents have partners for PA, social support for maintaining PA, and collectively, they can advocate for improvements in the local environment so it is more conducive to PA.

Most adults are aware of the health benefits of being physically active and the consequences of being sedentary. Theoretical models used in health psychology are built on recognition that information per se is insufficient for inducing behavior change. Furthermore, the adoption of a healthy lifestyle entails sustaining the new behaviors over time. The theoretical models chosen for this study were the HBM and the TTM, known

as the stages of change model (Prochaska, Norcross, & DiClemente, 1994). Both models are aligned with social cognitive theory. Bandura's (1997) self-efficacy theory, a cornerstone of health and educational psychology, is an integral component of each one. In the following section, I cover the theoretical framework guiding this research project.

Theoretical Framework

Health Belief Model

The HBM dates back to the 1950s, when it was developed in response to the poor success of public health campaigns to promote disease screening (Strecher & Rosenstock, 1997). Based on careful analyses of probability samples of adults in cities that had offered tuberculosis screening, Strecher and Rosenstock (1997) identified the basic beliefs, specifically perceived susceptibility and perceived benefits of action, on which the model is built. The researchers also recognized the role of intrinsic and extrinsic cues or triggers in motivating people to take action although they never explored that feature empirically.

More than 5 decades later, the HBM has been refined and expanded and has a sound empirical foundation (Strecher & Rosenstock, 1997). The model has several key components. *Perceived susceptibility* refers to the person's subjective perception of experiencing a health or medical condition. This dimension encompasses susceptibility to illness in general as well as vulnerability to a specific condition. A related factor is *perceived severity,* denoting the seriousness of experiencing the condition or allowing it to remain untreated. This component includes both medical consequences (such as pain, disability, and death) and social consequences (for example, the impact of the condition

on work and on family and social relationships). Together, perceived susceptibility and perceived severity can be understood as *perceived threat.*

While the acceptance of a perceived personal threat is prerequisite for taking action, the particular course of action the person chooses to take is contingent on the *perceived benefits* of the available options (Strecher & Rosenstock, 1997). An important concern for encouraging older adults, and especially those in the more advanced age groups, to engage in regular physical exercise is informing them that the benefits of PA accrue regardless of the age that activity is initiated (Stessman et al., 2009; WHO, 2010).

Even despite awareness of the potential benefits of a given health behavior or behaviors, *perceived barriers* can arise as obstacles to taking the recommended actions. In fact, a comprehensive research review of the HBM found perceived barriers to be the single most decisive factor in health behaviors across all the studies and all the behaviors examined (Strecher & Rosenstock, 1997). Barriers to PA can be broadly conceptualized as physiological, psychological, and environmental (Bethancourt, Rosenberg, Beatty, & Arterburn, 2014; Grodesky, 2008; Wallace, Lees, Minou, & Stratton, 2014). Overcoming initial resistance by people who are unaccustomed to PA can be challenging. Once that happens, however, factors that were originally barriers can be converted into facilitators (Grodesky, 2008).

Cues to action are recognized as important factors in health behaviors but have not been systematically investigated (Strecher & Rosenstock, 1997). This continues to be the case. This lack of attention is not surprising as cues are often subtle and highly individual. For example, a person may be inspired to begin an exercise program by a

sudden muscular twinge, awareness of weight gain, difficulty arising from a chair, a loved one's heart attack, a daughter or son's upcoming wedding or graduation, or simply passing a vivid health campaign poster. For other people, these events will have no effect on behavior. On the other hand, cues and triggers were studied extensively in the context of relapses or reversion to unhealthy behaviors (Prochaska et al., 1994).

Strecher and Rosenstock (1997) stressed the importance of integrating self-efficacy beliefs into the HBM to enhance its effectiveness as a tool for explaining health behaviors. Indeed, self-efficacy is arguably the most widely used concept in health psychology. Subjective perceptions underlie both the HBM and self-efficacy theory. Bandura (1997) emphasized that self-efficacy does not necessarily depend on people's knowledge and skills per se but rather on their critical assessment that they have the ability to apply them successfully to attain the desired goals.

Transtheoretical Model

Originally designed to aid intervention for substance abuse and dependence, the TTM of behavior change has achieved widespread popularity in health psychology and health promotion. The stages of change delineated by the model are precontemplation, contemplation, preparation, action, and maintenance (Prochaska et al., 1994). Each stage marks a change in attitudes that influences behavior. Self-efficacy and decisional balance guide the progression through the stages (Prochaska et al., 1994). In the precontemplation stage, behavior change is not even considered. The contemplation stage is marked by ambivalence; behavior change is considered but no decision is made. (Prochaska et al., 1994) claims preparation provides the foundation for the behavior

change, which is initiated in the action stage. In the maintenance stage, the person attempts to sustain the behavior. Inherent in this stage, however, is awareness of the potential for relapse or regression (Prochaska et al., 1994). Self-efficacy plays an important role in overcoming setbacks and challenges that often occur in the maintenance stage.

There is some debate over the applicability of the stages of change model to physical exercise (Dishman, Vandenberg, Motl, & Nigg, 2010; Plotnikoff, Lipke, Johnson, & Coureya, 2010). Dishman et al. (2010) noted that the model has been used to inform the design of at least 20 physical exercise programs, yet there is insufficient evidence that the processes underlying the model are valid and helpful for understanding changes in PA. In particular, most of the research using the model has been cross-sectional rather than longitudinal, which precludes the ability to discern patterns and variations over the maintenance stage.

To address this issue, Dishman et al. (2010) explored the relationship of transtheoretical constructs to changes in meeting the Healthy People 2010 guidelines for regular moderate or vigorous PA. Using a random multiethnic sample of Hawaii adults, a cohort of 497 adults was assessed at intervals of 6 months at least three times over 2 years. Dishman et al. concluded that overall, the finding supports the utility of the transtheoretical constructs for predicting increases in and maintenance of PA in the general public.

Plotinikoff et al. (2010) tested the application of transtheoretical constructs to PA in a longitudinal study of adults with Type 1 or Type 2 diabetes. Compared to the

research of Dishman et al. (2010), Plotnikoff used a much larger sample (517 adults with Type 1 diabetes and 1,157 with Type 2 diabetes). The focus of their research was to examine stage transitions over 6 months.

The findings revealed that self-efficacy, pros, and behavioral processes of change had strong predictive power for stage transitions over the 6-month period (Plotnikoff et al., 2010). Similar to Dishman et al. (2010), Plotnikoff et al. (2010) saw merit in using transtheoretical constructs to guide health promotion for PA. Although this study was limited to adults with diabetes, the findings parallel a general population study conducted by Plotnikoff and his colleagues.

The Current Study in Context to the HBM and TTM

The HBM developed by Strecher and Rosenstock (1997) focuses on the medical and social perceived threats of PA, such as consequences from injuries or relationships. In the current study, the HBM is applied to the issue of the amount of PA in which senior housing community members engage. According to the HBM as applied to the current study, when individuals believe that they have or will have health problems and believe that engaging in PA has the potential alleviate these current or future health problems, they are more likely to engage in PA. The second research question in this study addresses whether older adults are engaging in the recommended amount of 150 minutes of PA per week. If the answer to this research question is that older adults do, in fact, engage in at least 150 minutes of PA per week, then applying the HBM would mean that the majority of participants perceived potential threats to their health. In addition, that

would mean that participants believed the health professionals guidelines that engaging in physical activities would have benefits to them.

The second theoretical model used for this study is Prochaska and Diclemente's (1982) TTM. The TTM is used to help understand the process of behavior change through five stages (i.e., precontemplation, contemplation, preparation, action, and maintenance). In assessing leisure activity, theoretical interpretations helped to conceptualize perceptions of older adults. The TTM was applied in the current study to the question of the amount of PA in which senior housing community members engage.

Recommendations for PA

The recommendations for PA outlined by WHO (2010) are driven by recognition that noncommunicable diseases (NCDs) account for nearly half the total disease burden worldwide. A sedentary lifestyle has been implicated as the major cause for roughly 21% to 25% of the prevalence of breast cancer and colon cancer, 27% of diabetes, and roughly 30% of the prevalence of ischemic heart disease. Conversely, engaging in regular PA diminishes the risk for breast cancer and colon cancer, coronary heart disease and stroke, diabetes, hypertension, depression, and overweight and obesity. In adults over age 70, PA reduces the risks for physical functional limitations and hospitalizations (Simmonds et al., 2014). For older adults with impaired mobility, there is compelling evidence that regular PA decreases the risk of falls almost 30% (WHO, 2010).

As previously stated, the WHO (2010) guidelines for PA are virtually the same for adults of all ages. The term *PA* encompasses recreational or LTPA, physically active modes of transportation (typically walking or cycling), workplace PA for those who are

not retired from work, household tasks, play, games, sports and structured exercise routines undertaken in the context of everyday, family, and community activities. All adults are advised to engage in at least 150 minutes of moderately intense aerobic activity, or alternately, at least 75 minutes of vigorous aerobic PA, or an equivalent combination of moderate and vigorous PA throughout the week. For enhanced health benefits, moderate PA should be increased to 300 minutes per week, vigorous activity to 150 minutes per week, or the combination of moderate and vigorous activity should be increased accordingly.

For aerobic activity, WHO (2010) recommends a minimum of 10 minutes per session. Muscle-strengthening activities involving the major muscle groups should be performed at least two days per week. For older adults, men and women with poor mobility are advised to perform exercises that improve balance and prevent falls at least three days per week. Those who are unable to adhere to the recommended guidelines due to health conditions are advised to be as active as they are physically capable.

Motivation and Behavior

The WHO (2010) guidelines set minimum standards for the health benefits of PA, but are deliberately broad so that people can incorporate these recommendations into their daily lives. The extent that they do so depends on a complex interplay of a variety of factors. Using the transtheoretical model (Prochaska et al., 1994) and self-determination theory (Deci & Ryan, 2008) as a framework, Grodesky (2008) conducted a phenomenological exploration of PA in older adults. The 12 participants were selected based on their responses on the Stage of Exercise Change Scale (SECQS). Three

categories were discerned from the responses: inactive, initiators of PA, and maintainers of PA for at least six months. Two women and two men were chosen to represent each category.

Four themes arose from the interviews: *conceptualizing PA and exercise, benefits of PA, self-regulation,* and how *active people successfully negotiate barriers* (Grodesky, 2008). The terms "PA" and "physical exercise" are often used interchangeably, presumably to reflect the idea, embedded in PA guidelines, that being physically active does not necessitate taking exercise classes, attending a gym, or engaging in any other type of structured regimen. PA requires energy expenditure and involves any activity that makes you move your body and can be planned, structured or repetitive to increase physical fitness. (Grodesky, 2008). Interestingly, the sedentary older adults could neither define the two terms nor distinguish between them, the initiators could describe the terms more coherently and the maintainers displayed precise understanding of the two terms and the differences between them.

It is possible that lack of understanding of the two terms causes sedentary individuals to equate PA with a demanding regimen perhaps beyond their capacity rather than recognize they could be walking or gardening for pleasure. Then as people become more active, they also become more informed and come to recognize the distinction between PA and physical exercise and often combining the two, as did the initiating and maintaining older adults (Grodesky, 2008).

Regardless of activity level, the participants could all describe the physical benefits of PA (Grodesky, 2008). The initiators and the maintainers were more articulate

in describing the physiological benefits, but the maintainers were distinguished by a holistic conceptualization that fused mental and physical benefits including pleasure in PA. The responses of the maintainers bolster the argument that it is essential to consider affective states in understanding PA behaviors (Gellert et al., 2012; Kiviniemi et al., 2007). The focus on physical benefits by the sedentary and the initiating groups may reflect the over-emphasis on the health benefits of PA in health promotion while ignoring that being physically active makes people feel good and can be fun in itself.

Not unexpectedly, there were marked differences between the three groups on self-regulation (Grodesky, 2008). Sedentary participants admitted that it would take a powerful external influence to motivate them to be physically active or that they relied on excuses not to be active. Those who were initiating describe external and internal motivation, while the maintainers displayed strong intrinsic motivation (the cornerstone of self-determination) combined with integrated regulation, the highest level of extrinsic motivation (Deci & Ryan, 2008). Notably, the descriptions of what motivates them to be active by the maintainers were replete with affective associations (Kiviniemi et al., 2007).

Regarding the theme of overcoming barriers, some of the responses illustrated how barriers to PA can be transformed into facilitators over time (Grodesky, 2008). Bethancourt et al. (2014) focused on barriers and facilitators in a qualitative study of managed Medicare clients. Lack of access to recreational facilities and an unsafe physical environment for outdoor activity are two common barriers to being more active (Grodesky, 2008). Medicare clients had free access to the PA programs *Silver Sneakers* and *EnhanceFitness*, but did not make use of them (Bethancourt et al., 2014).

Overall, the 13 men and women interviewed by Bethancourt et al. (2014) were physically active. They were also a highly educated group. The predominant barriers to joining the exercise programs were physical limitations, the absence of professional guidance, and inadequate information on available and suitable program options. The facilitators included strong motivation to stay physically and mentally healthy and access to affordable, convenient, enjoyable programs with high quality instructors.

The findings suggested that improving information and support could make a critical difference in encouraging the Medicare clients to explore and make use of the available PA options (Bethancourt et al., 2014). Physical limitations often inhibit people from becoming more active when in fact regular PA will improve their functional performance and prevent further decline (Chalé-Rush et al., 2010; Rajeski et al., 2008). There are programs specifically designed for this group. Health promotion programs must recognize and address the fears of older adults with health or mobility programs to encourage PA. Knowledge of how the sources of self-efficacy influence the PA of older provides valuable guidance for providing support and information as well as designing effective PA programs (Warner et al., 2014).

The maintainers were driven by the positive benefits they experienced from regular physical exercise and expressed resentment at any potential obstacles (Grodesky, 2008). Regular PA was an essential part of their lives. Ideally, people reach this stage regardless of the nature and intensity of their activities. Indeed, people who exercise regularly are often described as "habitual" exercisers in the literature. The term *habit* per se does not imply that the behavior is performed at the recommended levels.

Van Bree et al. (2013) discovered this somewhat paradoxical effect of habit in research with 1,836 older adults designed to explore whether habit moderates the relationships between intention and PA within the framework of the theory of planned behavior (TPB) and the attitude-social influences-efficacy model (ASE). Intention exerted a strong influence on PA only in participants with low to medium habit strength. When habit strength was high, intention did not significantly affect PA behavior. The most stroking finding was that roughly half the participants classified as having high habit strength for PA did not meet the recommended guidelines.

According to van Bree et al. (2013), people who display a strong habit for PA may not be aware that they are engaging in a sufficient level of activity. In that case, raising awareness would be an important part of PA health promotion or intervention. Habits are notoriously difficult to break, techniques for raising awareness and encouraging intentional control of PA would have to be carefully tailored to as not to provoke resistance.

Participation in PA

Sun, Norman, and While (2013) conducted a secondary review of research on Physical Activities of older adults. Their search, which was limited to studies conducted since 2000, produced 53 studies that met their inclusion criteria. Substantial variations were found in the recommended PA guidelines and measurements and thus the results. The proportion of older adults meeting activity guidelines ranged from a scant 2.4% to a remarkable 83%. The two most consistent findings were generally that older adults were less physically active than younger groups and men were more likely than women to

engage in regular PA were. On a positive note, trend lines suggest that increasing numbers of older adults in the U.S. as well as Australia are achieving the recommended levels of PA.

Jefferis et al. (2014) investigated adherence to PA guidelines among older adults in the United Kingdom using accelerometer measurements of PA. The men were drawn from the British Regional Heart Study and the women from the parallel Women's Hearth Health Study. All participants were aged 70 and older. Using guidelines specific to that age group, 15% of the men and 10% of the women achieved the level of 150 minutes or more per week of moderate to vigorous PA (defined as >1040 cpm) in sessions lasting at least 10 minutes. When moderate to vigorous PA was defined as >1952 cpm, the percentages dropped to 7% for men and 3% for women.

The profiles of the men and women who met the PA guidelines were marked by characteristics routinely associated with greater PA in the literature. That is, the more active older adults were younger, had fewer health conditions and less serious mobility impairments, and were less likely to be depressed (Jefferis et al., 2014). In addition, they rated their neighborhoods more favorably on social activities and leisure facilities, felt safer after dark, had nice places to walk, and were more likely to walk or cycle for transportation and walk a dog on a regular basis. These attributes appear prominently in the literature reviewed for this project. A major challenge for health promotion is targeting interventions to the majority of older adults who do not meet even standards for PA.

Dutch researchers investigated the effects of sociodemographic, medical, and social cognitive influences on PA in adults ranging in age from 45 to 70 (Mesters, Wahl, & Van Keulen, 2014). The Community Healthy Activities Model Program for Seniors (CHAMPS) was used to assess PA. In contrast to the findings of van Bree et al. (2013), participants who displayed stronger habitual PA behavior were more active (Mesters et al., 2014). At the same time, overestimating one's level of PA led to being less active. Also contrary to many studies, women were more physically active than men were. Smokers, participants who were older, had higher BMI, and were employed were less active, while those with higher educational levels were more active.

A paradoxical finding was that individuals who were exposed to physically active role models were less active. Mesters et al. (2014) noted that this effect has been found in other studies but defies explanation. Possibly, sedentary adults are intimated by physically active role models. On the other hand, perceiving more advantages in being physically active, having high perceived behavioral control, devising an action plan, and having stronger intentions were all linked with being more actions, consistent with social cognitive models. Despite the array of factors examined, 75% of the variance in PA behavior could not be accounted for. Sociodemographic and medical factors explained 20% of the variance, while social cognitive attitudinal factors added only 4% and intention combined with actual control added a scant 1%.

Mesters et al. (2014) emphasized the importance of understanding individual attributes that may explain differences in PA behavior. Amotivation, which is simply lack of intention and motivation (Deci & Ryan, 2008) is common in sedentary adults

(Grodesky, 2008). Affective influences merit more attention in research on PA behavior (Gellert et al., 2012; Kiviniemi et al., 2007).

PA and Physical Function

The 45 and Up Study is a general population longitudinal study of members of that age group living in New South Wales, Australia. Yorston et al. (2012) analyzed baseline data from that study to investigate the association between PA and physical function. The study deliberately over-sampled individuals aged 80 and older. Only adults aged 65 and older were included in the analysis. While there was substantial variation in PA among the respondents, close to three-quarters met the recommended guideline of at least 150 minutes per week of moderate to vigorous intensity PA. With advancing age, both men and women became more sedentary, with a 9% difference in men and a 16% difference in women between the youngest and oldest age groups. More than half the participants (53%) had no functional limitations and only 15% experienced significant or severe limitations. As expected, this proportion grew with advancing age, producing a 40% increase among men and a 45% increase among women.

The findings revealed a strong positive relationship between participation in PA and physical function (Yorston et al., 2012). Those who fell into the middle and higher activity levels of PA had superior functioning compared to those who were more sedentary. Notably, this association remained significant even after controlling for an array of personal and lifestyle factors, thus highlighting the vital importance of regular PA in preventing or delaying functional decline.

Psychological distress as well as advancing age was linked with limited PA. According to Yorston et al. (2012) and earlier study reported that adults aged 45 and older who were highly distressed had about six times the risk for developing a functional limitation as those who were not distressed. Cairney et al. (2009) found that roughly 30% of decreases in PA and psychological distress resulted from functional limitations and chronic health problems. At the same time, the relationship is bidirectional. Regular PA has a protective effect on depression (WHO, 2010). Cairney et al. (2009) advocate integrating techniques to enhance mastery or self-worth into PA interventions to maximize their ability to alleviate psychological distress.

PA in the Very Old

Adults over age 80 represent a rapidly growing age group and they are excluded from most research exploring the benefits of a physically active lifestyle. Thus apart from anecdotal reports of fit and athletic octogenarians, very little is known about the effects of PA on health and longevity in the oldest age group. To examine this issue, Stessman et al. (2009) used data from Phases I, II, and III of the Jerusalem Cohort Study from 1990 to 2006 when the participants (born June 1, 1920 through May 31, 1921) were 70, 78, and 85 years old. A total of 605, 1,021, and 1,222 participants were enrolled at each stage. The study is ongoing.

The findings from this large, representative sample of older adults provides compelling evidence that continuing PA, even if it is initiated late in life, delays functional decline and increases longevity in older adults (Stessman et al., 2009). Particularly striking is the findings that with advancing age, the amount of sedentary

people actually increase. While Stessman et al. noted that the survival benefit of PA is probably multifaceted; they were particularly impressed with the sustained protective benefit of PA against functional loss. They also emphasized that the benefits of being active extended to those who had been sedentary at the onset of the study. Both increasing and sustaining PA contributed to survival while decreasing activity (which is common in advancing age) diminished its benefits. Participants who decreased PA had similar trajectories to those who were sedentary.

More than three-quarters (76.9%) of the participants were physically active at 78. Stessman et al. (2009) noted that this phenomenon contrasts sharply with studies of older adults in North America. According to the researchers, the high activity levels of elderly Israelis reflect a culture that embraces PA at all ages. Moreover, the benefits of PA were apparent regardless of origin, SES, and educational attainment. A culture that discourages PA in older adults, and in particular older women, contributes to low levels of PA (Sun, Norman, & While, 2013). If the findings the Jerusalem study cannot be generalized to the U.S., they can serve as inspiration for promoting a culture of PA across sociodemographic groups.

Social Relationships and PA

Although some people prefer solitary activities, many older adults prefer group activities. Social interaction in exercise classes creates a sense of community and camaraderie that can prove highly motivational (Bethancourt et al., 2014; Wallace et al., 2014). One factor often neglected in studies that focus on social interactions among members of an exercise class is the instructor. Having the right instructor which is

someone who is engaging and fun can be pivotal for encouraging people to stay in class and increases the probability of returning for more classes (Bethancourt et al., 2014). Conversely, the wrong type of verbal persuasion tends to be counterproductive (Bethancourt et al., 2014; Warner et al., 2014).

Social relationships influence many health-related behaviors (for better or worse). Using data from three waves of the National Health and Nutrition Examination Survey (NHANES), Watt et al. (2014) investigated the association between social relationships and health-related behaviors in adults aged 60 and older. The most striking finding was that respondents with a larger social network were most likely to be physically active. Interestingly, emotional support was associated with PA but not with any of the other health-related behaviors (smoking, drinking, and visiting a dentist).

Litwin's (2012) study, which focused on social networks, confirmed the NHANES finding that older adults (aged 65 to 85) with larger social networks were more physically activity. Litwin examined different types of social networks and found that being embedded in both restricted networks (marked by few life partners, few children and close relatives, low or non-attendance at a place of worship, and limited social contacts) and family networks (few social ties outside the family) tended to have limited involvement in PA. Social network type exerted a stronger effect on depression than PA. Physical Activity has the potential to counteract depression in older adults in family and restricted networks. After controlling for sociodemographic and health factors, the findings demonstrated that age did not restrict PA or increase depressive symptoms.

The converse of the significant positive influence of social relationships on PA is the negative impact of loneliness (Hawkley et al., 2009). Hawkley et al. examined this effect in a sample of adults between the ages of 50 and 68 who were involved in the first year of the Chicago Health, Aging, and Social Relations study (CHASRS). Cross-sectional and longitudinal analyses both confirmed the depressive effect of loneliness on PA. Not only did loneliness at the onset of the study decrease the probability of being physically active, but over three years loneliness was linked with going from being active to being sedentary.

Self-regulation of emotion was implicated in this effect. In particular, lonely adults were less inclined to express joy and positive feelings or summon pleasant thoughts or memories to relieve a bad mood (Hawkley et al., 2009). This finding provides additional support for including affective factors in understanding PA (Gellert et al., 2012; Kiviniemi et al., 2007). It is also bolsters the importance of reducing negative emotional states in enhancing self-efficacy for PA (Warner et al., 2014). Indeed, self-efficacy is a theory of self-regulation (Bandura, 1997). Hawkley et al. (2009) proposed that poor self-regulation and lack of social support could both be involved in the dampening effect of loneliness on PA. Increasing opportunities for leisure activities that promote social interactions, whether or not they are directly related to PA, could improve both emotional states and PA levels of lonely adults.

Leisure Activities

Chang et al. (2014) analyzed data from the 2006 and 2010 waves of the U.S. Health and Retirement Study to examine associations between social relationships,

leisure activities, and health in the 2,695 older participants. According to the researchers, despite a large body of research documenting a connection between social relationships and health, the role of leisure activities in this equation is scarcely examined. The findings illustrated that the associations between physical and psychological health are enhanced by the mediation of leisure activities. Leisure time physical activities, in particular, mediated the connection between social relationships and health.

Physical Activity Interventions

Bethancourt et al. (2014) illustrated, the availability of Physical Activity programs does not guarantee that people will take advantage of them. PA interventions take a variety of forms, many using innovative approaches. Pedometer-based strategies abound and are effective for encouraging leisure walking (Bickmore et al., 2013, Kolt et al., 2013). The use of a Pedometer-based strategy does not necessarily enhance overall levels of PA and the increases in walking may diminish over time.

Neighborhood Walking

On the other hand, a focus on walking can be an excellent starting point to becoming physically fit, especially in the context of a well-designed program. Jancey et al. (2008) conducted a mixed methods study of a neighborhood-based walking program for older adults in living in the Perth, Australia metropolitan area. In total, 260 healthy but relatively sedentary adults between the ages of 65 and 74 were enrolled in the program and 65% completed the program. The program was designed within a social cognitive framework of *predisposing, enabling,* and *reinforcing* factors that recognizes motivators and barriers to PA.

Careful attention was given to the physical environment in the design of the program (Jancey et al., 2008). The meeting points were selected for their aesthetic qualities and accessibility and the team visited the sites to ensure they are appropriate. Local councils gave the group permission to use facilities, which assured the participants had access to toilets and spaces to rest. This is precisely the type of collective effort WHO (2010) and other international bodies envision for promoting PA on a global scale (in fact it embodies the maxim "think globally, act locally").

Walk leaders (dedicated university volunteers) were given diligent training, which equipped them to respond to individual differences in fitness, provide customized feedback, and encourage camaraderie (Jancey et al., 2008). Chosen for personal qualities such as personality, leadership, enthusiasm, and empathy, the leaders were given a prescribed progressive weekly exercise regimen that included stretching exercises and ball drills as well as walking. This mix of exercises to increase flexibility, balance, and endurance is recommended for older adults (Yeom et al., 2009). A hallmark of the program was a flexible approach that allowed the walk leaders to adapt the program to individual needs (Jancey et al., 2008). The walking groups met twice weekly over 26 weeks.

Jancey et al. (2008) noted that the completion rate of 63% is relatively high; moreover, at least half the sessions had 93% attendance and 70% of the sessions had more than 85% attendance over the six-month period. At the onset of the program, the mean recreational walking time was one hour, increasing to 2.69 hours per week over time. Survey data showed that the overwhelming majority (81%) of the participants "felt

fitter" and were more attuned to health and well-being (77%). Most recognized that they became more active (68%) and could accomplish more in a day (59%). At the same time, only 26% became more involved in other physical activities.

Most participants expressed a desire to continue walking twice a week after the program (80%). Although that number dropped to 70% after six months, that figure is still impressive (Jancey et al., 2008). Among respondents who completed surveys 12-months after the program, the average walking time per week was 2.51 hours. The participants who maintained their activity were most likely to respond to the follow-up survey. Strategies to promote sustained PA were built into the program. The financial investment would be more than paid for by decreases in health care costs resulting from physical inactivity (Simmonds et al., 2014; WHO, 2010). It should not be difficult to replicate the recreational walking program in many communities in the United States. Moreover, the program seems an excellent choice for implantation in a senior living community.

Peer Mentoring

It is possible that a program with trained peer walk leaders will have equivalent or superior benefits to the original design with university student volunteers. Dorgo, Robinson, and Bader (2009) examined changes in perceived physical, mental, and social function in older adults who were trained by peer mentors compared to a group trained by kinesiology student mentors. Trained peer mentors have proven effective in a number of clinical settings with patients who have various health conditions. Dorgo et al. point out that older adult peer mentors are respectful and empathic toward one another. Empathy

for older adults was one of the defining qualities of the student mentors (Jancey et al., 2008). According to self-efficacy theory, the effects of role modeling should be maximized by a peer mentor (Bandura, 1997). Jancey et al. (2008) proposed that a peer mentored physical exercise program might be particularly attractive to older adults and more effective in facilitating adherence.

Recruitment for the program was restricted to adults over age 60. In total, 87 participants were assigned to the peer-mentored group and 44 to the student-mentored group (Dorgo et al., 2009). Both groups participated in identical 14-week physical exercise programs that involved three 75-minute training sessions per week. The program included a variety of exercises to increase cardiovascular endurance, muscular strength, muscle mass, balance, and flexibility. The mentors were trained in the prescribe regimen, taught techniques for support and assistance, and paired with a mentee. The SF-36 was utilized to assess physical and psychosocial functioning.

The peer-mentored participants enjoyed significant gains in physical, mental, and social functioning that were not apparent in the student-mentored group (Dorgo et al., 2009). Exercising with peer mentor support produced improvements in general physical and mental well-being, the ability to perform physical and emotional roles, social functioning, and vitality. The exercise program (which was conducted under professional supervision) was much more complex than the recreational walking program described by Jancey et al. (2008). A program of that type seems especially suitable for peer mentoring.

Best Practices

Hughes, Seymour, Campbell, Whitelaw, and Bazzarre (2009) examined the impact of PA programs that were designated as the 10 best-practice programs for older adults offered by community organizations. The programs were selected based on several criteria including a firm history of PA programming, program development and supervision, instructor training, collection and analysis of outcomes data, and sustainability. A research team visited the 10 best practice sites to learn more about their specific features. The programs included in the National Impact Study presented by Hughes et al. were selected based on the site visits.

A randomized trial was used to evaluate program impact over five and 10 months (Hughes et al., 2009). Intermediate outcomes assessed were self-efficacy for exercise and outcome expectations for exercise. The main outcomes were adherence to physical exercise, lower extremity muscle strength, upper body strength, upper body flexibility, the six-minute walk test (6MWT), BMI, depression, and health-related QOL. In total, 544 participants (289 in the intervention group and 255 in the control group) were enrolled across three sites. A substantial majority were overweight or obese (72%) and had at least one chronic health condition (75%). At the five- and 10-month assessments, the PA intervention participants experienced significant gains in self-efficacy for exercise adherence, adherence in the face of obstacles, upper and lower body strength, and exercise involvement. The results affirmed the success of a well-designed multi-component program for promoting adherence to physical exercise among older adults and producing positive gains.

Maintaining PA

Sedentary older adults typically enjoy rapid gains in fitness when they begin a structured physical exercise program. The participants in a 12-week gym-based exercise program quickly made gains in strength and power especially, and reported improvements in mobility, flexibility, balance, energy, and self-confidence as well as physical strength (Wallace et al. 2014). These improvements provide powerful incentive to continue with exercise. Assessment with the Senior Fitness Test and focus group interviews confirmed that the participants remained fit 6 and 12 months after beginning the program staying physically active. Compared to control group members who were often neutral or negative toward physical exercise, the program participants were extremely positive and enthusiastic about continuing. Short-term benefits are common (Bickmore et al., 2013); however, few studies of PA interventions extend their data collection beyond one year (Hobbs et al., 2013; Kolt et al., 2012). Elderly participants in the Jerusalem study who ceased being active experienced declines similar to those who were sedentary throughout (Stessman et al., 2009).

Hobbs et al. (2013) investigated the effectiveness of behavioral interventions in increasing PA in older adults over one to three years through a systematic research review and meta-analysis. For inclusion, the studies had to involve randomized controlled trials designed to promote PA, involve adults roughly between the ages of 55 and 70, report results for at least a 12-month period on objective or self-reported PA published from 2000 to 2010. In total, 32 studies were included involving 21 individual trials.

Most of the interventions were multifaceted and combined PA with lifestyle counseling (Hobbs et al., 2013). In general, PA programs that are theory-based and multi-component tend to be more effective (Weber, 2011). All the best practice programs are multi-component (Hughes et al., 2009). Van Stralen, de Vries, Muhde, Bolman, and Lechner (2011) found computer-tailored programs to be successful in producing long-term improvements in PA among older adults. Awareness and intention emerged as the key predictors of behavioral change over time.

Although no there was no clear evidence that certain features made one program more effective than others, Hobbs et al. (2013) suggested that individually tailored programs with personalized activity goals or programs that provide information about opportunities for PA in the local environment might be most effective. The recreational walking program fits this description (Jancey et al., 2008).

Overall, the programs proved effective at one year but there was no compelling evidence that their effectiveness was sustained at two years (Hobbs et al., 2008). The studies confirmed the benefits of walking but did not necessarily articulate the intensity. Hobbs et al. concluded that far more research is needed on the long-term effects of PA interventions for older adults. In particular, research on multi-component interventions would be valuable for determining which program components are most effective.

Mobility Limitations

The Lifestyle Interventions and Independence for Elders Pilot Study (LIFE-P) was designed for comparing the effectiveness of a PA program versus a successful aging program for preventing mobility disability in at-risk mobility impaired adults aged 70 to

89 (Chalé-Rush et al., 2010; Rajeski et al., 2008). Rajeski et al. (2008) investigated PA and self-efficacy in a sample of 412 LIFE-P participants. The participants were randomized to one of the two interventions for a 12-month period. Two key outcome measures were self-efficacy for a 400-meter walk and satisfaction with physical functioning. The CHAMPS Questionnaire was used to assess PA.

Participants in the PA program engaged in aerobic, strength, balance, and flexibility exercises (Rajeski et al., 2008). The program was divided into three stages: adoption (which took place primarily at a center), transition (to exercising at home), and maintenance. Walking was the dominant mode of PA. The participants were given supplemental materials to enable them to perform strength training at home. The aging program covered a variety of health education topics. It included a brief (5-10 minutes) session of upper body stretching led by the instructor.

Compared to their peers in the successful aging program, the participants in the PA intervention scored significantly higher on self-efficacy for the 400-meter walk and satisfaction with physical functioning. Rajeski et al. (2008) acknowledged that the differences between the two groups were relatively small in magnitude, but smaller treatment effects are common in populations with chronic conditions. Additionally, the health information and stretching exercises seemed to increase satisfaction with physical functioning in the successful aging group despite their lower task-specific self-efficacy.

Notably the benefits of the PA program transcended age, gender, and baseline scores on balance, chair stands, and self-paced 4-meter walking speed (Rajeski et al., 2008). Rajeski et al. emphasized the critical importance of self-efficacy, which has been

documented in numerous studies, including research with older adults (Phillips et al., 2013; Warner et al., 2014; White et al., 2009). Rajeski et al. (2008) demonstrated that a PA intervention could successful benefit older adults with mobility limitations.

In further study of the LIFE-P participants, Chalé-Rush et al. (2010) compared the effects of moderate intensity with more vigorous physical exercise on physical performance and examined sociodemographic, psychosocial, and disease-related factors that might compromise physical performance. Physical performance was assessed via scores on the Short Physical Performance Battery (SPPB) and the ability to complete a 400-meter walk in 15 minutes. The number of minutes of PA per week (above or below 150 minutes per week) as assessed by the CHAMPS distinguished between moderate and more vigorous PA.

Performance on the SPPD and the 400-meter walk test was significantly higher among the LIFE-P participants who engaged in vigorous PA. According to Chalé-Rush et al. (2010), no prior study had investigated the relationships between SPPB and vigorous PA. The number of minutes of more vigorous PA was also linked with times on the 400- BMI, depressive symptoms and the number of medications the participants were taking all formed a constellation of factors associated with physical performance. Chalé-rush et al. concluded that these factors should all be considered in efforts to prevent mobility disability.

Obesity and Cardiovascular Disease

In a study that largely paralleled the research of Rajeski et al. (2008), Brawley, Rajeski, Gaukstern, and Ambrosius (2012) explored the impact of group cognitive-

behavioral interventions on performance self-efficacy, satisfaction with functioning, and appearance among 288 participants who attended sessions at Community Cooperative Extension Centers in North Carolina. The participants were younger than the LIFE-P study (aged 60 to 79) and were overweight or obese with poor cardiovascular health. The evidence-based 48-session PA program was based on principles drawn from Bandura's (1997) social cognitive theory and group dynamics. This framework was selected because both perspectives use techniques that effectively promote adherence (Brawley et al., 2012). The six-month program was designed with a six-month intensive phase followed by a maintenance phase. A second intervention added a dietary weight loss component to the PA program. The control group attended successful aging education.

The participants in the PA plus weight loss program achieved superior results compared to PA alone or successful aging education (Brawley et al., 2012). Participants in the combined intervention enjoyed the greatest increases in walking self-efficacy and satisfaction with physical functioning and appearance, although significant gains were also observed in those in the PA intervention. The cognitive-behavioral and group mediated techniques facilitated maintenance of the regimens over 18 months. Notably walking self-efficacy at the six-month assessment mediated the effects of the intervention on mobility as assessed by 400-meter walk time at one year. The intervention was not designed specifically to improve mobility, but the development of self-efficacy clearly had that effect. This study adds to the large body of research demonstrating the central role of self-efficacy in the success of PA interventions, especially over time.

PA and Quality of Life

PA has been consistently linked with higher QOL (White et al., 2009). The participants in the 12-week exercise program felt their QOL had improved substantially because of increased fitness (Wallace et al., 2014). Walderley et al. (2011) explored the connections between health-related (HR) QOL, objectively measured PA, and physical fitness indicators in a sample of 85 adults ranging in age from 60 to 83. Accelerometers were used to assess regular PA. Aerobic fitness was assessed by the 6MWT and a dynamometer test measured handgrip strength. The Portuguese version of the popular SF-36 was used to assess HRQOL. Additional assessments included BMI and health history.

Nearly 71% of the participants had one or two chronic conditions and all but 15 were either overweight or obese (Wanderley et al., 2011). Although men and women both scored above the norm for aerobic fitness and grip strength, men were fitter than women were and scored higher on general health, mental health, physical functioning, and vitality. Overall, the most active and fit participants enjoyed higher HRQOL. Moreover, the association between physical fitness and HRQOL remained even after adjusting for BMI, chronic conditions, and education.

Self-Efficacy and Self-Esteem

According to White et al. (2009, few studies have examined the precise nature of the association between PA and QOL. The researchers proposed that PA affects global QOL via self-efficacy and health status. Their study involved 320 adults aged 50 and older. PA was assessed with the Godin Leisure Time Exercise Questionnaire (GLTEQ)

and the PA Scale for the Elderly (PASE) and self-efficacy with an adapted version of the Exercise Self-Efficacy Scale. Physical health status was captured by an eight-item subscale assessing disability limitations and mental health status was conceptualized as self-esteem, specifically physical self-worth captured by the physical self-worth scale of the Physical Self-Perception Profile. The Satisfaction with Life Scale was used to measure global QOL.

The findings confirmed the significant role of self-efficacy in the relationship between PA and QOL and produced an expanded model of QOL, encompassing health status factors and global QOL. White et al. (2009) noted that self-efficacy is important as both an outcome of PA and an antecedent of certain QOL indicators. They suggest designing PA programs that offer psychoeducation on the elements of PA most likely to enhance physical self-worth as well as provide as provide older participants with master experiences that are likely to override misconceptions about physical limitations and activity. Targeting mastery experience, self-persuasion, and reduction of negative states is likely to be effective (Warner et al., 2014).

Phillips et al. (2013) extended the research of White et al. (2009) by conducting an 18-month follow-up. The longitudinal analysis tested the model derived from the cross-sectional study over the 18-month period. As expected, the findings confirmed that PA indirectly affects global QOL over time by means of self-efficacy and the health status measures of disability limitations and physical self-worth. A detailed analysis of cross-lagged reciprocal relationships implied that the model fit could be enhanced by the addition of a path from baseline self-efficacy to PA at 18 months.

The findings reinforced in the important role of self-efficacy. Reiterating the recommendations of White et al. (2009), Phillips et al. (2013) advocate designing PA programs for older adults that specifically target self-efficacy. Although women reported, fewer physical limitations than men did, men were more likely to increase their PA over time, and for the older adults in general, PA declined over the course of the study. Gender differences in PA and decreasing activity over time are both consistent findings in research involving older adults (Sun, Norman, & While, 2013). Increasing self-efficacy may be especially important for encouraging older women to be more physically active. In the context of the transtheoretical model, self-efficacy tends to be most important in the maintenance stage, in particular for transcending setbacks (Prochaska et al., 1994).

Protecting older adults who may already have problems with mobility from the physical inactivity that could lead to a "downward spiral of psychological well-being, and physical functioning and, ultimately, disability should be a priority" (Rejeski et al., 2008, p. P24). In an analysis of longitudinal data from the Canadian National Population Health Survey to determine the relationship between changes in PA and psychological distress among older adults, physical health status accounted for 30% of the variation, while mastery and global self-esteem accounted for 39% of the explained variation (Cairney et al., 2009). These findings led Cairney et al. to conclude that PA interventions that target mastery or self-esteem along with physical fitness may be particularly successful in relieving psychological distress.

Quality of Life, Activity, and the Environment

Levasseur, Desrosiers, and Tribble (2008) included features of the environment in their study of QOL and activity in older adults. A convenience sample of 156 older adults (77% women with a mean age of 73.7 years) was recruited to reflect different levels of activity limitations (none, slight to moderate, and moderate to severe). The assessment tools included the Quality of Life Index (QLI), which has four dimensions (Health and functioning, Socio-economic, Psychological/spiritual), and Family), the Assessment of Life Habits (Life-H), capturing daily activities and social role participation and satisfaction with accomplishments in those domains, and the Measure of the Quality of the Environment (MQE). This instrument captures perceptions of six dimensions of the social and physical environments: social support and attitudes; income, labor, and income security; government and public services; equal opportunities and political orientations; physical environment and accessibility; and technology.

As expected, QOL declined with increased activity limitations. The decline in QOLwas attenuated after controlling for income, residential status, and mood, and ultimately the differences were only clinically significant between older adults with no activity limitations and those with moderate to severe limitations (Levasseur et al., 2008). The overall pattern suggested that many people adapt to activity limitations and may have high QOL in spite of them.

If activity limitations did not necessarily diminish QOL, they did decrease levels of participation in this sample of older adults (Levasseur et al., 2008). Those with more physical limitations and lower activity levels also perceived more obstacles in the

physical environment. Physical limitations and activity level did not affect perceptions of facilitators in the physical or social environment. Combined with the findings of White et al. (2009) and the overall literature on self-efficacy, it would seem that strategies aimed at enhancing physical self-efficacy would be useful for altering perceptions of obstacles in older adults with physical limitations and help them become more active by enhancing their sense of self-confidence.

Neighborhood Environment

According to Yen et al. (2009), the literature on neighborhoods and health reveal relationships between the two for four types of health outcomes: overall mortality, chronic condition mortality or disease prevalence, mental health, and health behaviors such as PA and diet. Policymakers as well as researchers have come to take an interest in the influence of neighborhood characteristics on health, which is essential for realizing global recommendations for creating neighborhoods that are conducive to PA (WHO, 2010). Environmental features that encourage activity in one group may not be applicable to other demographic groups. For examples, playgrounds and teen programs may increase PA in youth, but may even be a deterrent to park use for older adults (Moore et al., 2010). Yen et al. (2009) suggest that older adults may be especially sensitive to environmental conditions due to factors such as decreased physical mobility, smaller social networks and limited social support, physical fragility, and cognitive decline.

To assess the relationship between neighborhood effects and the health of older adults (age 55 and older), Yen et al. (2009) conducted a review of research published

from 1997 to 2007. Out of 538 relevant articles, 33 met the researchers' inclusion criteria. These included 25 cross-sectional studies and in addition 8 longitudinal studies employing different conceptualizations of neighborhood and examining a wide array of health outcomes. For analytic purposes, the studies were described in terms of six prospective neighborhood characteristics: socioeconomic composition, racial composition, other demographic characteristics, perceived resources and/or problems, physical environment, and social environment.

The overall findings did not support the prevalent assumption (intrinsic to theories of environmental aging) that neighborhood characteristics become more important for health and well-being as people age (Yen et al., 2009). The findings from Yen et al., (2009) did highlight the importance of neighborhood level socioeconomic status (SES), which emerged as the most powerful and consistent predictor of various health outcomes. This finding is hardly surprising given the documented impact of SES on health and health disparities. Another consistent and a not surprising finding was the positive relationship between the physical environment and PA. In general, the research suggests that the neighborhood environment plays an important role in the health of older adults.

Walkability, PA, and Weight

King et al. (2011) explored the associations of both walkability and neighborhood SES to PA and obesity in older adults. The areas chosen for study were census block groups in Seattle-King County, Washington and the Baltimore, Maryland-Washington, D.C. area, selected for their diversity in income and walkability. In total, 719 adults aged 66 and older constituted the sample for the study. PA was assessed by the CHAMPS and

objectively measured by accelerometer readings. BMI was calculated from self-reported height and weight.

Neighborhood walkability was associated with both self-reported and objectively measured PA as well as with BMI. King et al. (2011) found that residents in high walkability neighborhoods engaged in 22 to 40 more minutes per week of active transportation than those in less walkable neighborhoods regardless of neighborhood income. This pattern parallels findings for younger adults. While there was no relationship between neighborhood walkability and recreational outdoor aerobic activity, King et al. acknowledged that the walkability index they used focused on utilitarian outdoor activity.

With respect to PA guidelines, the difference in minutes per week of walking (roughly 30 minutes) depending on neighborhood walkability implied that residents of high walkability neighborhoods engaged in 400% more walking for transportation, translating into 20% of the recommendation for weekly PA (King et al., 2011). According to accelerometer readings, the difference in moderate and vigorous activity between the two groups was approximately 17 minutes per week, implying that residents or more walkable neighborhoods were about 33% more active in terms of those activities. The additional energy expenditure of the high walkability neighborhood residents translated into roughly one BMI unit, a difference of about six pounds (2.7 kilograms).

The study included assessment of mobility limitations. Notably, people with the highest degree of mobility limitations living in more walkable neighborhoods engaged in active transportation at levels comparable to less impaired residents of less walkable

neighborhoods (King et al., 2011). This finding further reinforces the importance of making neighborhoods more walkable for the health benefits of older adults.

King et al. (2011) demonstrated the impact of walkability on PA and BMI in older adults. Li et al. (2009) investigated the relationship of neighborhood characteristics (walkability and density of fast food restaurants) and individual PA and eating behaviors to changes in body weight and girth over one year in a sample of middle-aged and older adults (aged 50 to 75 years) residing in Portland, Oregon. The survey of 1,145 residents of 120 neighborhoods was part of the Portland Neighborhood Environment and Health Study. The findings revealed a significant interaction between the built environment and individual lifestyles related to changes in body composition.

Both high density of fast food restaurants and frequent fast food meals produced increases in body weight and waist circumference over one year (Li et al., 2009). This effect is predictable and reported in numerous studies. The pattern for walkability, PA, and body composition is less consistent. Notably, the interplay of neighborhood walkability and vigorous physical exercise resulted in decreases in weight and waist circumference over the one-year period; however, no comparable effect for walkability and moderate PA was found. While these finding highlight the effectiveness of vigorous PA for weight loss (especially in individuals who may be at risk for health conditions related to overweight or obesity), they do not negate the health benefits of moderate physical exercise. Rather, they imply either that moderate PA is insufficient for losing weight or that it would take a longer period than a year to induce measurable differences.

Apart from their focus on weight loss, Li et al. (2009) noted that their findings are generally consistent with other studies reporting a connection between neighborhood walkability and walking for various purposes. In fact, they suggest that neighborhood features conducive to walkability may even override the negative effects of fast food density. They call on urban planners to increase key attributes of neighborhood walkability, including land use, transit locations and walkable community that support healthy lifestyles. They frame walkability as especially important in view of the growing numbers of overweight, sedentary middle-aged and older adults.

Walking and Cycling

The Belgian Aging Studies (BAS) focus on adults age 60 and older, drawn from the population registries of participating municipalities, who are randomly sampled and stratified according to age and gender (Van Cauwenberg et al., 2012, 2013). A notable feature of the project is the reliance on peer researchers. Participants who volunteered for this role were given training and actively involved in the research process. One advantage of this technique is that it typically results in a high response rate. Two successive studies examined the relationship of the physical environment to walking and cycling, and walking for transportation, respectively.

The study of walking and cycling involved 48,879 Flemish older adults, with data collected from 2004 to 2010 (Van Cauwenberg et al., 2012). Overall, roughly 40% of the participants walked for transportation on a daily basis. Compared to rural or semi-urban residents, urban residents were most likely to walk every day. While this finding, also reported in other studies, is presumed to reflect the shorter distances to shops and services

in urban areas, there were no differences in the perceived distances to shops and services reported by urban, rural, and semi-urban participants. Having local shops translated into more walking for transportation for all subgroups with the exception of rural residents aged 75 and older.

Participants who were more satisfied with public transit also engaged in more walking for transportation (Van Cauwenberg et al., 2012). Studies generally find that access to reliable public transportation encourages walking to and from public transit. Conversely, participants who perceived their neighborhoods as unsafe were less likely to walk for transportation. Better street lighting tends to encourage more walking in women and the oldest age groups. Associations between the presence of street crossings and walking differed according to locale and were not always clear.

Close to one-quarter of the participants reported cycling for transportation each day (Van Cauwenberg et al., 2012). Residents of semi-urban areas were the most likely to cycle daily, probably because they had to commute longer distances than urban residents did and cycling allowed them to cover those distances quickly and efficiently. Parallel to the effects reported for walking, the presence of more shops and greater satisfaction with public transit was both associated with daily cycling. The precise distance between the participants' homes and the railway station determined the preference for walking or cycling (1.5 kilometers or less versus 1.5 to 3.5 kilometers, respectively). Perceived lack of safety decreased cycling in women but not men, and street lighting only affected the cycling habits of rural women and women aged 75 and older.

Roughly, half the participants engaged in weekly walking or cycling for recreation (Van Cauwenberg et al., 2012). As with walking and cycling for recreational, feelings of being unsafe decreased recreational walking and cycling. In the case of recreational walking and cycling, however, the association with perceived safety was not limited to specific subgroups, but rather affected men and women, older and younger age groups, and rural, urban, and semi-urban residents. In general, residence did not influence recreational walking or cycling.

This study of older adults' walking and cycling is especially intriguing because in the U.S., there is scant attention to cycling among older adults. Furthermore, in most areas cycling for transportation is unusual and is largely encouraged by environmental groups and by local efforts such as New York City's bike lanes and bike sharing program (both recent innovations). Ideally, senior living communities could be designed to be conducive to walking and cycling, and those activities encouraged among members for transportation and recreation.

Van Cauwenberg et al. (2013) delved more deeply into the environmental conditions that influence walking for transportation among older adults. The sample consisted of 50,685 older adults living in Flanders. An environmental index was devised for calculating the cumulative influence of positive environmental factors. The index was composed of seven factors: (1) absence of high curbs, and presence of (2) various shops and services, (3) benches, (4) crossings, (5) bus stops, (6) street lighting, and (7) safety from crime. These seven factors were derived from the earlier study of walking and cycling (Van Cauwenberg et al., 2012).

The findings partly confirmed the assumption of Van Cauwenberg et al. (2013) that favorable environmental factors would have a cumulative impact on walking for transportation. The presumed cumulative effect was found only for participants who resided within a short to medium distance of their destinations. The effect was especially pronounced for medium distances, yet, there was no similar cumulative effect for participants who lived a long distance to destinations. Regardless of the presence of other environmental features, people whose distance to destinations was short were most likely to walk for transportation each day. For moderate distances, a marked cumulative effect emerged.

According to the findings, at least four positive environmental factors had to be present to exert a significant impact on older adults' walking for transportation (Van Cauwenberg et al., 2012). Increasing the number of factors from four did not produce a parallel increase in walking. At the same time, focusing on a single factor (such as improving street lighting) is unlikely to have a substantial effect. A key implication is that efforts designed to encourage walking among older adults should target multiple features of the physical environment along with other individual and social characteristics that influence PA.

Parks and Recreational Spaces

Hanibuchi, Kawachi, Nakaya, Hirai, and Kondo (2011) used data from the Aichi Gerontological Evaluation Study (AGES) to assess leisure time sports activity and walking per day in urban, rural, and suburban residents aged 65 and over. The sample consisted of 9,414 older adults living in eight Japanese municipalities. The neighborhood

features examined were residential density, street connectivity, number of local destinations, accessibility of recreational facilities, and land slope. Recreational facilities included parks, green spaces, and local schools with grounds accessible to the public.

Although less than half the respondents engaged in athletic activities, many of those who did reported frequent involvement (Hanibuchi et al., 2011). Roughly, one-third of the group spent less than 30 minutes per day walking, though there was considerable variation in the time spent walking. Certain neighborhood characteristics were linked with PA. Population density and the presence of parks or green spaces were linked with greater sports activity regardless of the geographic locale. Land slope discouraged sports activity, although it was only significant as a continuous variable. The number of destinations had some relationship to sports activity.

Interestingly, there was less relationship between walking and environmental features and most of those associations were in the unexpected direction (Hanibuchi et al., 2011). In some cases, these findings seemed to reflect the unique characteristics of a specific region. Hanibuchi et al. noted that there are few studies the relationship of the environment to PA among older adults in Japan. Most of the research comes from the U.S. and Australia. Researchers in the U.S. seem to be more concerned with neighborhood walkability and pay less attention to recreational spaces and sports activity.

Moore et al. (2010) emphasize the documented positive impact of parks and recreational spaces on physical, psychological, and social well-being. They note that park use can be especially therapeutic for older adults. Their research, explored relationships among park use, social participation, neighborhood age composition, and

age using data from the 2008 Montreal Neighborhood Social and Organizational Environments study (MoNSOE). The sample included 787 adults living in 299 Montreal neighborhoods.

Younger adults were more inclined to make use of their local parks than their older counterparts did (Moore et al., 2010). Among respondents with a park within walking distance from their home, park use tended to decline with age. Older adults involved with neighborhood, political, or environmental organizations (instrumental-type organizations) were less likely to go to park than those involved with organizations such as hobby groups or religious organizations (expressive organizations). Moore et al. proposed that involvement in instrumental organizations may arise from perceptions that the neighborhood is unsafe or disheveled, which would make people less inclined to use public parks. On the other hand, expressive organizations may be more common in more stable neighborhoods. Furthermore, parks provide a venue for socializing with other members of expressive community groups.

A notable finding was that older adults residing in neighborhoods with a younger age composition were less inclined to use public parks than those in areas populated by older age groups (Moore et al., 2010). Studies have found that neighborhoods with younger residents tend to have less residential stability and may have higher crime rates, which could lead older adults to feel that parks are unsafe. Neighborhoods with a younger age composition may also have more limited resources to invest in the upkeep of public parks. Additionally, parks in these areas may be designed to serve families with

children and teenagers, with amenities such as playgrounds and teen programs and few facilities that attract older adults.

Irrespective of age, Montreal residents with more informal community ties were more likely to use public parks (Moore et al., 2010). Park use was also more common among adults who were married or cohabiting rather than single or widowed, further highlighting the influence of social relationships. Neighborhood education also proved influential. That is, the overall level of education was positively related to park use. This finding is intriguing since education rather than income were significant. Adults that are more educated might be more concerned with protecting the environment or with the quality of local parks; however those explanations are speculative. This study raises important issue for making parks more amenable, in particular, for older adults.

Conclusion

Older adults have the highest risks for negative physical and mental consequences of a sedentary lifestyle, but are the least likely age group to participate in regular PA (WHO, 2010). Furthermore, within older populations, PA tends to decline with advancing age (Sun et al., 2013). Initiating or increasing PA in late life has enduring benefits (Stessman et al., 2009). Encouraging PA in older adults is challenging and even more significant is promoting adherence. PA interventions that are likely to be effective in this endeavor typically have multiple components designed to improve cardiovascular endurance, mobility, strength, balance, and flexibility and are individually tailored (Hobbs et al., 2013; Hughes et al., 2009; Weber, 2011). Flexibility is a hallmark of a successful PA program for older adults (Jancey et al., 2008).

Effective programs are also likely to be theory-driven (Weber, 2011). Virtually all health promotion and PA interventions include elements derived from social cognitive theory. Self-efficacy consistently arises as a key factor as both antecedent and outcome (Dishman et al., 2010; Hughes et al., 2009; Phillips et al., 2013; Plotinikoff et al., 2010; White et al., 2009). Targeting the influences on self-efficacy could be a pivotal factor in the effectiveness of an intervention for older adults (Warner et al., 2014).

Neighborhood characteristics influence PA behavior. Even among older adults who engage in various sports, recreational walking is very popular (Martin et al., 2014). The structured recreational walking program described by Jancey et al. (2008) seems especially promising for maximizing PA and its benefits and promoting long-term adherence in older adults. More research is needed in programs of this type as well as on the enduring effects of PA interventions for older adults. Prior to embarking on intervention based programs, a baseline need to be established to determine how older adults fare when it comes to meeting current PA recommendations by health professionals.

Chapter 3: Research Method

Introduction

The purpose of this study was to examine physical activities of older adults in senior housing and to determine if the amount of PA is related to age. Chapter 3 includes a brief overview of the study's methodology, including the research methods and design, a description of the participants, sample size supporting rationale, a description of the instrument and materials as well as the study's procedures. In addition, in this chapter, I describe the data analysis approach used to develop informed answers to the above-stated research questions. A discussion concerning validity and reliability is included, followed by a description of the methodological assumptions involved in the study as well as its limitations and delimitations. Finally, I conclude this chapter with a review of ethical considerations involved in conducting the study.

As noted in the introductory chapter, this study had three overarching research questions:

1. How many hours of LTPA do older adults complete in senior housing per week as assessed by the CHAMPS Questionnaire?
2. Are older adult's achieving the PA guidelines recommended by health professionals of at least 150 minutes of PA per week?
3. To what extent, if any, is the age of the senior in a senior housing community related to the amount of PA in which they engage per week?

Participants/Setting

This study took place in two senior housing communities located in an urban community in Pennsylvania. Participants met in the community room at the selected locations to participate in the study. The room had tables and chairs to accommodate the participants and my assistant and I was present.

The participants consisted of adults aged 65 years and older residing in the senior housing community of interest that consented to participation in the research study. The older adults were provided an option to have a family member or caretaker complete the questionnaire and to consent if they had any limitations. The consenting individual acted as a proxy and completed the questionnaire based on their personal understanding of the older adult's LTPAs.

The eligibility criteria did not affect recruitment since the study was open to all older adults in the senior housing communities who were able to consent the study. Participants needed to be present during the day of the study in order to be recruited in the study. In addition, to aid in recruitment efforts, a convenience sampling process was used in addition to marketing materials and support from the building manager on outreach efforts.

A statistical power analysis was conducted to determine the sample size required for this study using the G*Power computer program. A non-parametric and inferential test was performed in this study, which consisted of a single sample t-test (for the second research question), and an ANOVA (for the third research question). For the power analysis, two-tailed tests, an alpha level of .05, desired power of .80, and medium effect

sizes were specified. The t-test criteria included a confidence interval of 95% and the variables were the sum of physical activities against 150 minutes. For the ANOVA physical activity was analyzed in comparison to age. The Senior Housing Community A had a population of about 39 residents while Senior Housing Community B had 25. Using a .05% margin error at a 95% confidence level, the sample size for this study was 55 participants.

Research Design and Rationale

A study's research design provides a detailed overview concerning the undertaking of a research project (Mauch & Park, 2003). In addition, a well-described research design indicates how the findings that emerge will develop relevant conclusions concerning the accuracy of a guiding hypothesis, theory, or the correct answer to research questions (Mauch & Park, 2003). In this study, a cross sectional survey research design was used to assess leisure activities of older adults over a 4-week period.

Role of Researcher

I do not have any affiliation or personal relationships with any of the residents of the senior housing community. My role in this study was to explain the research to the older adults, collect and analyze the data, and then follow up with the participants by providing an abstract of the research findings after completion of the study. I will also make myself available to present the findings to the older adults in a formal manner, such as a presentation, if requested.

Participant Selection

Participants 65 years or older residing in the senior housing communities had to be available during the day of the study and agree to participate via written consent. In order to complete the questionnaire, the older adults needed to be functionally able to respond to the questions verbally or in writing. I used convenience sampling to recruit participants by posting a flyer in the senior housing community. Fifty-seven people met the criteria for the study currently residing in the senior housing communities.

Instruments/Materials

The paper materials used for this study included the consent forms, CHAMPS Questionnaire, demographic questionnaire that included age, gender, marital status, education, number of children, and ethnicity, and the informational flyer. Anita L. Stewart designed the CHAMPS Questionnaire in 1998 and the instrument is available publicly. Moore et al. (2008) documented that CHAMPS was the most reliable PA instrument for older adults. Additional details regarding the reliability and validity of the survey instrument is described in the Validity and Reliability section of this chapter. In addition, a pen was provided to participants to record their responses on the questionnaires and to complete the consent forms. Finally, a lidded container was used to collect the consent forms and questionnaires from participants.

Procedures

Prior to conducting the study, I submitted a request for IRB approval. Walden IRB granted approval under study # 04-11-16-0134806. After receiving IRB approval, I contacted the manager of the communities and scheduled a meeting to discuss the study.

The housing manager provided written permission to enter the housing communities to perform the research study. Once I received written permission from Institution Review Board (IRB), I posted several flyers about the research project and a description of its purpose on the notice bulletin board to inform residents of the upcoming study. I conducted the study on a Saturday. All interested participants received a copy of the consent document, their confidentiality rights, volunteer options, the purpose of the research study, and their ability to withdraw from the research project at any time with no repercussions whatsoever. In addition, all participants were informed that their participation would require about 30 to 45 minutes.

On the day of the study, I distributed consent documentation, the demographic and CHAMPS Questionnaire. Once participants were seated, I introduced the study and explained the procedures. I asked participants to complete consent document prior to beginning the questionnaires. Once they completed consent, I collected those documents and asked that they complete the demographics questionnaire and then the CHAMPS Questionnaire. Although no monetary compensation was included in this study, all participants received healthy refreshments and store bought lunch (water, fruit, pretzels, and wraps) when they completed the questionnaire. Participants who were interested in completing the questionnaire had to be available during the specified time from 9:00 am to 5:00 pm since it was only conducted once due to the request of the building manager. This information was provided in the posted information flyer as well as when informed consent was obtained. Following the completion of the CHAMPS Questionnaire, I

collected the questionnaires and placed them in a lidded container. All questionnaires collected were scanned electronically and saved via a cloud service.

Data Analysis

Quantitative Data Collection Analysis

I scanned the data collected from the quantitative phase directly into my personal computer under a password protected secured folder. Responses from the CHAMPS Questionnaire were hand scored. Afterwards, I extracted details into an Excel document so I could prepare to analyze the data. In order to log the data for analysis, I created a codebook using SPSS software to describe each data type. Outputs from this codebook included the variable name, description, format, variable location, instrument used to collect the data, date and time collected, and participant number.

The first research question of this study addressed how many hours of LTPA older adults complete in senior housing per week as assessed by the CHAMPS Questionnaire. I used descriptive statistics to describe the basic characteristics of the data. To measure dispersion and central tendency of the variable, mean, median, mode, standard deviation, variance, and range, I used the descriptive tab in the SPSS program.

For the second and third research questions, inferential statistical analyses were used. Two tailed tests and an alpha level of .05% was used for the inferential tests by convention. The second research question was to determine if older adults in senior housing meet PA guidelines recommended by health professionals of at least 150 minutes of PA per week using a single sample t-test. The corresponding null hypothesis was as follows:

$H_0$1: Older adults in senior housing are meeting PA guidelines recommended by health professionals of at least 150 minutes of PA per week.

To test this null hypothesis, a t-test was performed. The independent variable was the total amount of time spent on various physical activities whereas the dependent variable was 150 minutes. If the p-values for the total amount of time spent on various physical activities is greater than .05% level of significance than the null hypothesis will be rejected and this would conclude that older adults in senior housing are not meeting PA guidelines recommended by health professionals of at least 150 minutes of PA per week.

The third research question was about to what extent, if any, the age of the senior in a senior housing community is related to the amount of PA in which they engage per week. The null hypothesis for the third research question is as follows:

$H_0$2: The age of the senior in a senior housing community is not related to the amount of PA in which they engage.

In order to test this null hypothesis, an analysis of variance was computed between age and the total amount of PA (i.e., the number of minutes of PA per week). ANOVA was used for this analysis since the dependent variable was quantitative and the independent variable was qualitative with multiple factors. Rejection of the null hypothesis indicates that the correlation is statistically significant between the age of the senior in a senior housing community and the amount of PA in which they engage.

Validity and Reliability

The term *reliability* is used to describe the consistency with which a tool or method relates to a subject (Waltz & Strickland, 2005). Conversely, the term *validity* determines whether a tool is useful for the intended purpose (Waltz & Strickland, 2005). According to Uljin (2000), validity and reliability are two key concepts in measuring the quality of any research. In this context, validity refers to the establishment of sufficient evidence that a given measurement is actually addressing its intended purpose (Chandler & Lyon, 2001). With respect to the quantitative component, there has been direct evidence established concerning the validity of the CHAMPS Questionnaire (Moore et al., 2008). Moore et al. (2008) suggested that the CHAMPS Questionnaire is the most valid PA self-report questionnaire for culturally diverse older adults.

Moore et al. (2008) performed a construct validation of the CHAMPS Questionnaire, which provides evidence of reliability and validity. During a 24-month recruitment period, 54 older adults from an urban community center were consented to participate. Results showed group differences on physical function and self-reported PA measures by race, education level, and income The CHAMPS Questionnaire supported the hypothesis that PA data showed at least moderate correlations with physical function performance (Moore et al., 2008).

Reliability was demonstrated by using test-retest coefficients showing that individuals tended to provide the same responses to the survey when completing it repeatedly over short periods. In addition, the validity of the CHAMPS Questionnaire was demonstrated both in terms of internal validity (showing that the questionnaire was

assessing the PA constructs that it was designed to asses) and in terms of external validity (showing that the measures of PA from the CHAMPS Questionnaire were correlated as expected with other measures.

Issues of Trustworthiness

I have made significant effort to ensure the rigor of this study. The procedures outlined are exact to how I collected the data and interact with the participants. It is important for me to write these procedures in a simple manner that is understandable to someone who may not be an expert in the field. I offered trustworthy methods that a researcher could replicate.

Methodological Assumptions, Limitations and Delimitations

In this study, I focus on two Senior Housing communities due to time constraints, resources and commitment from building manager. The study limitations include the choice of questionnaire, which requires the older adults to self-report information using a predefined survey of physical activities. Other limitations include the method for recruiting people from the Senior Housing Community, which was convenience sampling. Finally, the study population is low-income older adults 65 years of age or older residing in Pennsylvania Senior Housing, which is also a limitation that may affect generalizability to other communities.

Ethical Considerations

The older adult's population is growing rapidly and there is a need to focus research on vulnerable populations. To provide older adults with respect and autonomy, I address some important ethical concerns. Such ethical issues included obtaining

permission from the building manager to work with the older adults. In addition, ensuring that all participants completely understand the informed consent procedures involved and that they recognize that there is no anticipated harm involved by virtue of their participation. Finally, that they are aware they can withdraw from the research project at any time with no repercussions whatsoever and that the data they provided remains anonymous and confidential.

Summary

This chapter delivered a more complete description of the methodology that I used during this research project, including the research methods and design, a description of the participants, the sample size with supporting rationale concerning the anticipated limited number of older adult participants. In addition, I provided a description of the CHAMPS Questionnaire, recording procedures, SPSS or comparable software to facilitate coding and synthesis of the resultant data. I described the procedures that I followed during the research study, and how I analyzed the quantitative data to formulate informed answers to the guiding research questions. Subsequently, I discussed the ways I enhanced the study's validity and reliability and how I verified these concepts during the research. Finally, I provided a description of the methodological assumptions, its limitations and delimitations followed by a discussion concerning the ethical considerations involved in conducting research with this vulnerable population. In the following section, I provide the results from the analysis of the data on leisure time physical activities older adults.

Chapter 4: Results

Introduction

The chief determination of the study was to examine the existence of various physical activities experienced by older adults in senior housing. In addition, I examined whether the amount of physical activities in which the adults engage are related to the senior age. I also sought to determine whether older adults in senior housing are achieving the goal of PA of at least 150 minutes per week. Moreover, I attempted to answer the following research questions:

1. How many hours of LTPA do older adults complete in senior housing per week as assessed by the CHAMPS Questionnaire?
2. Are older adults in senior housing meeting PA guidelines recommended by health professionals of at least 150 minutes of PA per week?
3. To what extent, if any, is the age of the senior in a senior housing community related to the amount of PA in which they engage per week?

The research questions were answered by conducting descriptive and inferential statistics. I ran the initial analysis on physical activity, providing some baseline descriptive data, a t-test for physical activity against 150 minutes, and an ANOVA for physical activity as a function of age. A 5% level of significance was used to validate the hypothesis. The chapter includes the description of the sample and the research questions.

Recap of Data Collection Methodologies

Recruitment of Participants

On average, the data collection process took approximately one hour. The study participants were recruited from two senior housing communities situated in an urban community in Pennsylvania. I advertised about the survey process 3 weeks in advance, which contributed to high turnout. The participants selected were 65 years and older and also resided in the two senior housing communities. The study participants were recruited based on a convenience sampling and with the help of the community manager who informed participants about the upcoming study. The participants were also provided the informed consent document prior to participating. Participants who agreed to participate in the study met at the community rooms at the selected locations. The respondents participating in the study were given questionnaires to complete. The participants were required to have the ability to write in order to complete the questionnaires effectively. A total of 62 participants submitted questionnaires for this study/

Demographic Characteristics

The demographic characteristics that facilitated the data collection included the gender and age of the respondents. The make-up of the sample consisted of 62% females and 38% males. In addition, I selected participants who were aged 65 years and above. Thirty-eight percent of the participants in the sample were aged 65 to 69 years, 40% aged 70 to 74 years, 18% aged 75 to 79 years, and 4% represented participants aged 80 to 84 years. The population of the study focused on older adults in senior housing. The sample chosen is representative as it includes both male and female respondents with ages

ranging from 65 to 84 years old. In addition, Moore et al. (2008) have testified the validity of the CHAMPS Questionnaire as used by older adults. See Appendix for Descriptive Output details.

Description of the Sample

Figure 1 indicates the findings of the gender of the participants. The findings indicate that a majority of the participants were females (62%) while fewer of the participants were male (38%).

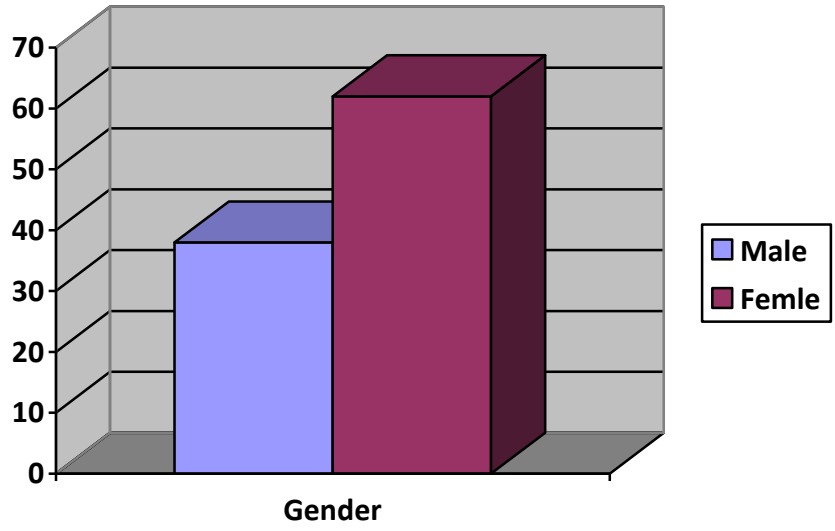

Figure 1. Gender of respondents.

Figure 2 depicts the age bracket of the participants in the sample. The findings show that most of the participants (40%) were aged 70 to 74 years followed closely by respondents aged 65 to 69 years at 38.2%. The findings also show that 18.2% of the respondents were aged 75 to 79 years while few of the participants (3.6%) were aged 80 to 84 years.

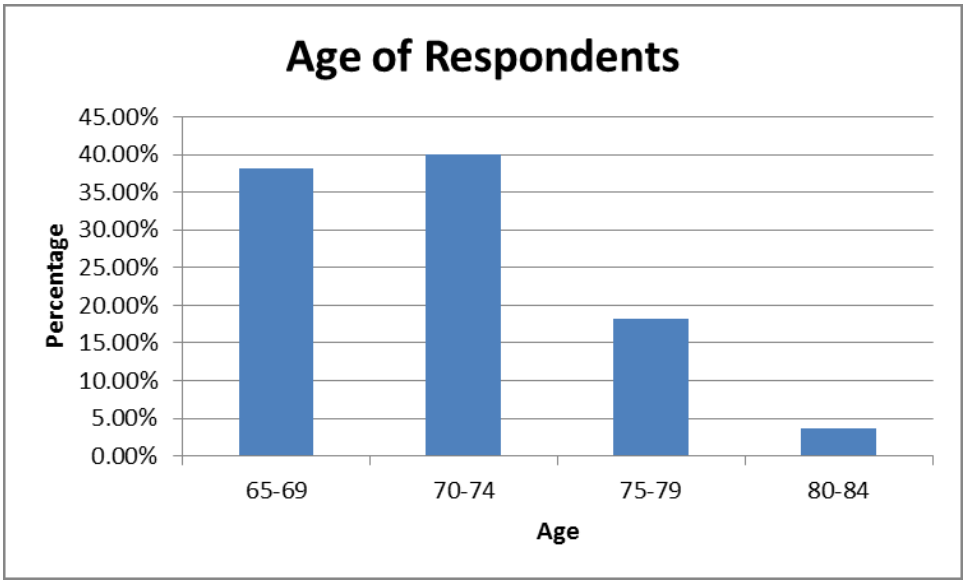

Figure 2. Age of respondents.

Figure 3 describes the highest level of education of the participants. The results show that more than half of the participants' highest level of education was high school while 45% of the respondents attained education level of elementary to middle school.

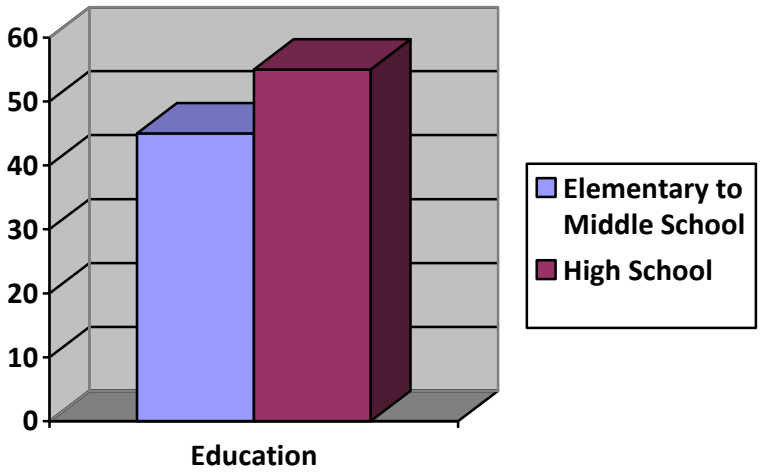

Figure 3. Highest level of education of the participants.

Figure 4 depicts the respondents' marital statuses. The findings revealed that a majority (61.2%) of the respondents' marital status was single or never married followed by 18.2% who were widowed, and 9.1% of the respondents were married or had a domestic partnership and divorced respectively. The remaining participants around (1.8%) indicated separated as their marital status.

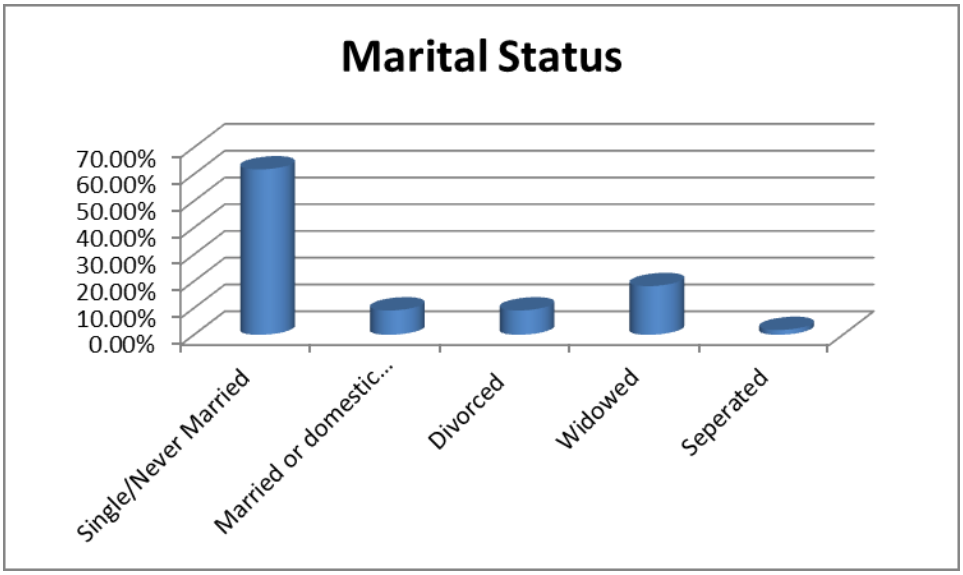

Figure 4. Marital status of the participants.

Table 1 indicates the number of children reported by each respondent. The findings revealed that more than half of the participants had no children whereas 27.3% had one to two children. A number of the participants (12.7%) had four to five children, while few of the participants (5.5%) had more than five children.

Table 1. *NUMBER OF CHILDREN PER RESPONDENT*

Number of children	Frequency	Percentage
0	30	54.5
1-2	15	27.3
3-4	0	0
4-5	7	12.7
5+	3	5.5
Total	55	100

Research Question 1

Research Question 1 was descriptive in nature and was designed to be answered using responses from the CHAMPS Questionnaire. The research question was designed to examine the amount of time spent on various physical activities. The research question addressed the number of hours of LTPA older adults complete in senior housing per week as assessed by the CHAMPS Questionnaire. This question addressed various physical activities conducted by the adults as well as whether the seniors adhere to the 150 minutes per week recommendation for PA.

Visiting Friends and Families

The findings indicated that the majority (58.2%) do not visit their friends while (41.8%) visiting friends and families. Table 2 indicates the amount of time spent on visiting friends. The findings revealed that a majority (43.5%) spend 3 to 4½ hours visiting family and friends while few (8.7%) spend 5 to 6½ hours.

Table 2. *VISITING FRIENDS OR FAMILY*

Visit friends or family	Frequency	Percentage
Less than 1 hour	6	26.1
1-2½ hours	5	21.7
3-4½ hours	10	43.5
5-6½ hours	2	8.7
Total	23	100

Going to the Senior Center

The results illustrated that more than two-thirds did not go to the senior center while 30.9% went to the senior center. Table 3 illustrates the amount of time spent going to the senior center. Findings show that more than half of the participants spent 1 to 2½ hours going to the senior center whereas few (17.6%) spent less than 1 hour.

Table 3. *GOING TO THE SENIOR CENTER*

Go to senior center	Frequency	Percentage
Less than 1 hour	3	17.6
1-2½ hours	9	53
3-4½ hours	5	29.4
Total	17	100

Doing Volunteer Work

The findings revealed that 94.5% do not do volunteer work while only 5.5% engage in volunteer work. Table 4 describes the time spent on doing volunteer work. The results show that two-thirds of the participants spend 1 to 2½ hours doing volunteer work while a third spend less than 1 hour.

Table 4. *DOING VOLUNTEER WORK*

Do volunteer work	Frequency	Percentage
Less than 1 hour	1	33.3
1-2½ hours	2	66.7
Total	3	100

Attend Church or Take Part in Church Activities

The results depicted that more than two-thirds do not attend church or take part in church activities while 21.8% attend. Table 5 depicts the time spent in engaging in church activities. Findings indicate that more than half of the adults spent 3 to 4½ hours engaging in church activities while few (16.7%) spent 5 to 6½ hours.

Table 5. *ATTENDING OR TAKE PART IN CHURCH ACTIVITIES*

Take part in church activities	Frequency	Percentage
1-2½ hours	3	25
3-4½ hours	7	58.3
5-6½ hours	2	16.7
Total	12	100

Use a Computer

The findings indicated that 87.3% do not use a computer while only 12.7% uses a computer. Table 6 illustrates the time spent on using computers. The results show that the majority of the adults (42.9%) spend 1 to 2½ hours and 3 to 4½ hours on a computer, respectively. Few of the participants (14.2%) spend less than 1 hour.

Table 6. *USING A COMPUTER*

Use a computer	Frequency	Percentage
Less than 1 hour	1	14.2
1-2½ hours	3	42.9
3-4½ hours	3	42.9
Total	7	100

Dance (Such as Square, Folk, Line, and Ballroom)

In this case, the aerobic dance was not considered. The findings show that 94.5% do not dance while online 5.5% engage in the dance. The findings reveal that an equal

number of adults (33.3%) engage in dancing for less than 1 hour, 1 to 2½ hours and 5 to 6½ hours respectively.

Table 7. *DANCE (SUCH AS SQUARE, FOLK, LINE, AND BALLROOM)*

Dance	**Frequency**	**Percentage**
Less than 1 hour	1	33.3
1-2½ hours	1	33.3
5-6½ hours	1	33.3
Total	3	100

Doing Woodworking, Needlework, Drawing, or Other Arts or Crafts

The findings indicate that 96.4% do not engage in woodworking, needlework, drawing, or other arts or crafts whereas only 3.6% engage in crafts and arts. Table 8 illustrates the amount of time spent on doing woodworking, needlework, drawing, or other arts or crafts. The findings reveal that an equal number of adults (50%) use less than 1 hour and 3 to 4½ hours doing woodworking, needlework, drawing, or other arts or crafts respectively.

Table 8. *DOING WOODWORKING, NEEDLEWORK, DRAWING, OR OTHER ARTS OR CRAFTS*

Arts and Craft	**Frequency**	**Percentage**
Less than 1 hour	1	50
3-4½ hours	1	50
Total	7	100

Attend a Concert, Movie, Lecture, or Sport Event

The findings indicate that 98.2% of the participants do not attend a concert, movie lecture or sports event whereas only 1.8% attends concerts, movie, lecture, or sports event. Moreover, the participants that attend the concerts, movie, lecture, or sports event spend less than 1 hour.

Play Cards, Bingo, or Board Games with Other People

The findings indicate that most of the adults (76.4%) play cards, bingo, or board games with other people whereas few (23.6%) do not play cards, bingo, or board games. Table 9 illustrates the time spent on playing cards, bingo or board games with other people. The findings show that most of the participants (61.5%) spent 1 to 2½ hours playing cards, bingo or board games with other people while few (15.4%) spent 5 to 6½ hours.

Table 9. *PLAY CARDS, BINGO OR BOARD GAMES*

Play cards, bingo or board games	**Frequency**	**Percentage**
1-2½ hours	8	61.5
3-4½ hours	3	23.1
5-6½ hours	2	15.4
Total	13	100

Reading

The findings reveal that majority (72.7%) of the respondents engage in reading activities whereas few (27.3%) do not engage in reading. Table 10 shows the amount of

time spent by adults on reading. The findings describe that most of the adults spend 3 to 4½ hours reading followed by 25% who spend 1 to 2½ hours. Few of the participants (2.5%) take 7 to 8½ hours reading.

Table 10. *ADULTS READING*

Reading	**Frequency**	**Percentage**
Less than 1 hour	8	20
1-2½ hours	10	25
3-4½ hours	18	45
5-6½ hours	3	7.5
7-8½ hours	1	2.5
Total	40	100

Do Light Work around the House

The survey clarified that light work around the house included sweeping and vacuuming. The findings show that more than half of the participants engaged in doing light work around their houses whereas 43.6% do not engage in doing light work around their houses. The amount of time spent in conducting the light work is illustrated in table 11 as shown below. The findings depict that more than half of the adults take 1 to 2½ hours in doing light work followed by 29% who take 3 to 4½ hours. However, only 3.2% take 5 to 6½ hours.

Table 11. *DOING LIGHT WORK AROUND THE HOUSE*

Do light work around the house	**Frequency**	**Percentage**
Less than 1 hour	3	9.7
1-2½ hours	18	58.1
3-4½ hours	9	29
5-6½ hours	1	3.2
Total	31	100

Walk Fast or Briskly for Exercise

Walking leisurely or walking uphill was not counted for this physical exercise. From the study findings, it is evident that 96.4% of the adults do not walk fast or briskly for exercise whereas only 3.6% engage in the PA. Moreover, time spent on the PA is examined. The findings reveal that an equal number of adults (50%) take less than 1 hour and 1 to 2½ hours to engage in the PA.

Walk to Do Errands

The variable examines the walking time only involving walking to/from a store or to take children to school. The findings reveal that majority (81.8%) do not walk to errands whereas few (18.2%) engage in the PA. Table 12 describes the time spent to do the PA. The findings reveal that more than two-thirds take 1 to 2½ hours to walk to do errands while few (10%) take 3 to 4½ hours to engage in the PA.

Table 12. *WALKING TO DO ERRANDS*

Walk to do errands	**Frequency**	**Percentage**
Less than 1 hour	2	20
1-2½ hours	7	70
3-4½ hours	1	10
Total	10	100

Walk Leisurely for Exercise or Pleasure

The study results reveal that more than two-thirds do not walk leisurely for exercise or pleasure while few of the adults (29.1%) participate in walking leisurely for exercise or pleasure. In addition, approximately 60.9% who engage in PA take less than 1 hour while a third of the adult's take1 to 2½ hours.

Ride a Bicycle or Stationary Cycle

The majority of the adults (98.2%) indicated that they do not ride a bicycle or stationary bicycle. Older adults that engage in riding bicycles take less than 1 hour to engage in the PA.

Swim Gently

The findings reveal that majority of the participants (98.2%) do not swim gently whereas only 1.8% engage in the PA. Moreover, the respondents that engage in the PA of swimming take less than 1 hour.

Do Stretching or Flexibility Exercises

The physical exercise does not include yoga or tai chi physical exercises. Most of the participants (98.2%) do not engage in the PA whereas only 1.8% who engage in doing stretching or flexibility exercises. Moreover, the adults that engage in the PA take less than 1 hour in conducting the exercise.

Do Moderate to Heavy Strength Training

The moderate to heavy strength training included physical activities such as hand-held weights of more than 5 lbs., weight machines, or push-ups. The majority of the adults (98.2%) do not do moderate to heavy strength training while only 1.8% engages in the PA. Moreover, the adults that do moderate to heavy strength training take 5 to 6½ hours.

Do Light Strength Training

The PA entails exercises such as hand-held weights of 5 lbs. or less or elastic bands. The results show that majority (98.2%) do not engage in such PA. Few of the adults (1.8%) do light strength training. The adults that conduct the PA take 5 to 6½ hours.

Do General Conditioning Exercises

The general conditioning exercises involved light calisthenics or chair exercises. The findings depict that 89.1% do not engage in the PA while 10.9% engage in the PA. The findings that a third of the adults take less than 1 hour and 5 to 6½ hours respectively to do general conditioning exercises; however, 1.6% of the adults take 1 to 2½ hours and 3 to 4½ hours respectively. Table 13 illustrates the findings.

Table 13. *DO GENERAL CONDITIONING EXERCISES*

Do general conditioning exercises	**Frequency**	**Percentage**
Less than 1 hour	2	33.3
1-2½ hours	1	16.7
3-4½ hours	1	16.7
5-6½ hours	2	33.3
Total	6	100

The study findings reveal that majority of adults above 65 years and above do not engage in physical activities. None of the participants attended clubs or group meetings, played golf, shot pool or billiards, did not play single or double tennis and did not skate or play musical instruments. Moreover, all participants surveyed do not do heavy work around the house, do not do heavy and light gardening, do not jog or run, do not do other aerobic machines such as rowing, or step machines, do not do yoga or tai chi, do not do aerobics. They also do not do water exercises or swim moderately or fast and do not play basketball, soccer, or racquetball. The findings show that on average 8% of participants adhered to the 2 ½ hours of PA per week. In addition, 39% of the respondents spent 3 hours and above across various physical activities, which mean that, 47% of older adults engage in 2 ½ hours or more of PA per week.

Research Question Two

The research question focused on examining whether the older adults in Senior Housing are meeting the Physical Activity guidelines recommended by health

professionals of at least 150 minutes of physical activity per week. The research question was assessed by formulating a hypothesis.

Hypothesis One

H_{01}: Older adults in Senior Housing are meeting physical activity guidelines recommended by health professionals of at least 150 minutes of physical activity per week.

H_{a1}: Older adults in Senior Housing are not meeting physical activity guidelines recommended by health professionals of at least 150 minutes of physical activity per week.

The validity of the hypothesis was assessed using a one-sample t-test to analyze physical activity against 150 minutes. Table 14 details the results from the t-test analysis. The findings show that all the p-value for physical activity is greater than .05% level of significance at .776. The null hypothesis cannot be rejected; there is not a statistically significant difference in physical activity when compared against 150 minutes.

Table 14. *T-TEST*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
SumPhysicalActivity	62	157.26	199.788	25.373

One-Sample Test

	Test Value = 150					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
SumPhysicalActivity	0.286	61	0.776	7.258	-43.48	57.99

Research Question 3

The research question assessed whether the ages of the senior in a senior housing community are related to the amount of PA in which they engage per week. A hypothesis was developed to assess the research question.

Hypothesis 2

H_{o2}: The age of the senior in a senior housing community is not related to the amount of PA in which they engage.

H_{A2}: The age of the senior in a senior housing community is related to the amount of PA in which they engage.

The validity of the research hypothesis was evaluated by conducting a One-Way ANOVA. The test was conducted to assess any relationship between age of the adults and the amount of PA represented by the overall number of minutes of PA spent per week. The results are represented in Table 15, which shows the output of the ANOVA analysis. The significance value is .454, which is greater than .05% level of significance. The null hypothesis is not rejected. The age of older adults in a senior housing community is not

related to the amount of PA completed per week. Although it appears to be some correlation (Age 65-69 completed more minutes of physical activity on average than other groups), it is not statistically significant. Moreover, for the physical activities involving attending a concert, movie, lecture or sports event, swimming gently and doing stretching or flexibility exercises age was not related to the amount of time of PA. In addition, when comparing other physical activities to age such as visits with family, volunteer work or going to the senior center; the results are not statistically significant.

Table 15. *ANOVA*

Sum Physical Activity

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	106628.277	3	35542.759	0.885	0.454
Within Groups	2328205.594	58	40141.476		
Total	2434833.871	61			

Summary

The main aim of the study was to examine the physical activities associated with older adults in Senior Housing and assessing whether the older adults achieve the recommended 150 minutes of PA per week. The first research question focused on determining the number of hours of PA the older adults take per week as assessed by the CHAMP questionnaire. The findings indicated that the older adults engage in physical activities involving walking, socializing such as taking part in church activities, reading,

doing volunteer work, doing light to moderate strength training, engaging in creative arts and conducting games such as playing cards and bingos. The older adults in this study did not engage in aerobic physical activities, water exercises and sport events such as athletics.

The second research question focused on determining if at least 50% of older adults in Senior Housing are meeting PA guidelines recommended by health professionals of at least 150 minutes of PA per week. The descriptive findings indicated that 53% of older adults in Senior Housing fail to meet PA guidelines recommended by health professionals of at least 150 minutes of PA per week, but this result was not statistically significant. . The third research question aimed at assessing whether the age of the senior in a senior housing community is related to the amount of PA in which they engage per week. The findings did not show a significant relationship between age of the senior in a senior housing community and the amount of PA in which they engage per week. The majority of older adults in these Senior Housing communities spend many hours engaging in physical activities involving walking. Older adults can benefit from additional support address barriers that affect older adult's ability to target the recommended guideline of 150 minutes of physical activity per week.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The main aim of the study was to examine physical activities of older adults in senior housing and to determine if the amount of PA is related to senior age. I begin the chapter by including a summary of the main findings and results. I also discuss the major findings and the relationship to the literature review in Chapter 2. In addition, this chapter includes the implications of theory and practice, study limitations, conclusions, and recommendations.

Summary of Findings

In the study, I examined the physical activities of older adults in senior housing as well as determined whether the older adults achieve the goal of at least 150 minutes of PA per week. I discovered that the majority of the adults in the make-up of this study were female older adults, and the greater sample was aged 70 to 74 years. A large number of adults were single, and most did not have children. I discovered several physical activities engaged in by the older adults at senior housing. The findings indicated that the physical activities engaged in by older adults at senior housing include visiting friends or families, going to the senior center, doing volunteer work, attending church or taking part in church activities, using computers, and dancing, such as square, folk, line, and ballroom. They also engaged in woodworking, needlework, drawing or other arts or crafts, and attending a concert, movie lecture, or sport events. Moreover, the older adults at senior housing engage in reading, play cards, Bingo, or board games with other people and engage in general conditioning exercises, doing light strength training, and walking.

The findings in this study showed that older adults at senior housing do not engage in physical activities involving playing musical instruments, attending clubs or group meetings, gardening activities, aerobic exercises, playing basketball, jogging or running, and playing tennis, among other identified physical activities. The findings showed that 53% of older adults in senior housing do not meet the PA guidelines recommended by health professionals of at least 150 minutes of PA per week. In addition, the correlation analysis indicated that the age of the older adults in a senior housing community is not related to the amount of PA in which they engage, which is represented by the number of minutes of PA per week.

Link to Literature

Sun, Normaniser, and While (2013) research on PA of older adults showed a very wide range on whether older adults were meeting PA guidelines from 2% to 83% from the 53 studies the researchers reviewed. In comparison, in this study, I was able to provide evidence that 53% of older adults are still not meeting recommended guidelines. Sun, Norman, and While (2013) found that men were also more likely to complete PA then women; however, in this study, gender differences in PA were not significant.

Jefferis et al. (2014) also investigated adherence to PA guidelines among older adults and also showed a very low number of older adults meeting PA recommendations at around 10% to 15% who were able to achieve the recommendation. Even with this lower range of older adults achieving PA recommendations, Jefferis et al. provided evidence that indicated that the participants rated their neighborhoods more favorably. This affected the use of the community and walkability of the neighborhood. The location

selected for this study was in an urban setting where participants did not have some of the benefits of a walkable community. Yen et al. (2009) suggested that older adults might be especially sensitive to environmental conditions. Given the importance of having a walk friendly neighborhood, older adults in senior housing may benefit from having close access to a trail with landscaping that is attractive and promotes PA.

Based on the results of this study showing that 53% of older adults are not fail to meet recommended guidelines of at least 150 minutes of PA per week, I suggest more tailored PA interventions for the community. These programs should be performed in a group or peer setting to improve adherence and attendance. Previous researchers suggested that PA interventions would be beneficial for older adults to help improve cardiovascular endurance, mobility, strength, balance, and flexibility and need to be individually tailored (Hobbs et al., 2013; Hughes et al., 2009; Weber, 2011). Although creation of environments that are walk friendly is a great solution to helping older adults with activity guidelines, during winter or extreme heat seasons, indoor friendly activities need to be created to increase the number of older adults who are achieving PA recommendations.

Implications of Theory and Practice

Research Question 1

In relation to the HBM, the majority of individuals in this study believed that physical activities had the ability to alleviate their health problems. The HBM describes that people may perform physical activities due to the thought of threats to their health. The findings correspond to the theoretical concepts of the HBM and the TTM.

Approximately 8% of the older adults engaging in LTPAs achieved at least 1 to 2.5 hours of physical activities while another 39% achieved 3 hours or more across all activities. The results depict that older adults may perceive some threats to their health and were more likely to engage in physical activities.

Health care professionals are able to provide older adults information on the benefits of engaging in LTPA. Notably, 47% of the older adults in this study in senior housing achieved the 150-minute target of PA. Stessman et al. (2009) indicated that it is wise to encourage older adults, especially those in advanced age groups, to engage in regular physical exercise. Encouraging the older adults involves informing them about the benefits of physical exercise regardless of the individual's age. Engagement in physical activities has both social and medical benefits towards the health of older adults. LTPA is associated with lower risks of major diseases, such as heart disease, colon and breast cancer, and diabetes. Moreover, adults above 70 years of age who engage in PA reduce chances of hospitalizations and risks for physical functional limitations (Simmonds et al., 2014).

The WHO (2010) recommends at least 150 minutes of moderate engagement in aerobic activities and at least 75 minutes of vigorous aerobic activity. The findings in this study show that older adults do not engage in aerobic exercises. Aerobic exercises help in reducing major risks associated with heart diseases and hypertension as the exercises are associated with the strengthening of muscles that contributes to constant and consistent blood flow (WHO, 2010). My findings showed that older adults are less likely to engage in sport activities such as playing basketball. The results are consistent with Hanibuchi et

al. (2011), who indicated that older adults are discouraged to engage in sport activities due to land terrains and the existence of few recreational facilities.

I examined the various physical activities engaged in by older adults in senior housing. I found that walking was a PA engaged in by older adults during their leisure time. Moreover, walking fast or briskly for exercise, walking to do errands, and walking leisurely for exercise or pleasure were among the identified physical activities. The findings concur with Martin et al. (2014) who observed that walking for pleasure was the most recognized LTPA for older adults. The implications for walking as LTPA is that there need to be health promotion campaigns to promote walking as a PA for older adults. Moreover, it is highly recommended to create local environments that encourage walking as LTPA.

The findings are also consistent with Jefferis et al. (2014), who indicated that older adults are performing diverse physical exercises. Older adults engaged in walking or cycling and some walked a dog on a regular basis (Jefferis et al. (2014). The findings in the current study indicated that the respondents in the senior housing did not attend clubs and group meetings. The findings are inconsistent with the studies of Bethancourt et al. (2014) and Wallace et al. (2014) who observed that older adults prefer group activities. The social interactions observed in-group meetings encouraged the seniors to engage and increase their physical activities. Moreover, the right instructor in the group meetings motivates the adults to engage in more physical activities. The instructor is expected to be fun, motivating, and knowledgeable, which leads the adults to attend more classes on a regular basis (Bethancourt et al., 2014). My findings may have differed from

Bethancourt et al. due to the urban setting or lack of programs available in senior housing.

In addition, engagement in social networks is associated with physical activities. Litwin (2012) indicated that limited social access such as less interaction and visiting between family members, low attendance to church and engaging in church activities, and few life partners often contribute to low physical activities. The findings indicated that the older adults in the senior housing who attended church and had visits with family and friends spent more time engaging in PA. The findings concur with the study of Litwin (2012).

Research Question 2

The second research question focused on assessing whether older adults in senior housing met the PA guidelines recommended by health professionals of at least 150 minutes of PA per week. The findings indicated that 53% of older adults in the senior housing do not meet the recommended guidelines of at least 150 minutes of PA per week. The findings are inconsistent with Jefferis et al. (2014), who conducted a study on older men and women aged 70 and older. Jefferis et al. found that the older men and women adhered to at least 150 minutes per week of physical activities. Achieving the recommended 150 minutes per week of physical activities is associated with several factors such as one's physical abilities, social or family influence, and mental belief that PA has some benefit from a health perspective. Mesters et al. (2014) indicated that smokers were less likely to be active in physical activities whereas older adults with high educational levels were actively engaging in physical activities. Moreover, Sun, Norman,

& While (2013) and Jefferis et al. (2014) observed that men were more likely than women to meet the recommended 150 minutes of physical activities per week.

Yorston et al. (2012) observed that three-quarters of older adults aged 65 years and above achieved the recommended target of at least 150 minutes of PA per week. The findings from Yorston et al. (2012) showed that women were more likely than men to achieve the recommended 150 minutes, whereby these findings are inconsistent with the findings of Sun et al. (2013) and Jefferis et al. (2014).

Achievement of the recommended 150 minutes per week of physical activities provides positive benefits to the health standards of older adults. Physical activities increase the longevity of the older adults. Implications of practice suggest that achieving of the 150 minutes of physical activities per week reduces major health problems associated with the elderly. Bethancourt et al. (2014) indicated that consistent engagement in physical exercises improves the functional performance of the older adults. Moreover, benefits of physical activities are evident regardless of the attainment of education levels and origin (Stessman et al., 2009).

The lack of attainment of the recommended 150 minutes of physical activities per week may be contributed by physical limitations, inadequate information on suitable physical programs, and absence of professional physical guidance, as indicated by Bethancourt et al. (2014). The majority of respondents indicated that they did not attend meetings or meet in groups, which indicated that they might have lacked additional professional guidance in senior housing to support their PA needs. In addition, Yorston et al. (2012) observed that psychological distress such as advancing age was associated with

less functional activity and, hence, lowered physical exercises. In addition, the older adults may not have achieved the recommended 150 minutes of physical activities due to lack of peer monitoring. Peer monitoring helps the older adults to attain physiological functioning that enables them to engage in physical exercises. Moreover, peer monitoring improves the social, physical, and mental abilities of the older adults, which enables them to engage in physical exercises (Dorgo et al., 2009). The implication for such hindrances is that improving information and support towards the older adults engaging in physical activities motivates and encourages them to engage in optional physical programs. Identifying physical limitations would be of importance since physical limitations hinder older adults from being active (Chalé-Rush et al., 2010; Rajeski et al., 2008).

Research Question 3

The research question focused on determining whether the ages of the seniors in a senior housing community are related to the amount of PA in which they engage per week. A hypothesis was developed to assess the research question. The findings of the study indicated that the age of the senior in a senior housing community is not related to the amount of PA in which they engage as represented by the number of minutes of PA per week. The findings indicated a positive relationship between age and level of physical activities where an increase in the age of seniors resulted in an increase in the level of physical activities. According to Geller et al. (2012), the numbers of members in the senior housing are expected to increase with an increase in aging population of adults. The increase of adults in the senior housing was attributed to the fact that physical activities were associated with benefits. Stessman et al. (2009) indicated that advanced

aged adults were encouraged to engage in physical activities by information them the associated benefits of physical exercises regardless of age.

Stessman et al. (2009) added that the magnitude difference in physical activities between physically active and sedentary people increased with age. This implied that physical activities increase with an advanced age of seniors. Sun et al. (2013) added that the undermining of physical activities in the older generation contributes to low levels of physical activities. WHO (2010) recommended equal levels of physical exercises of adults regardless of age.t

Moore et al. (2010) found that neighborhoods that are composed with more of aging adults, as opposed to young people, encourages engaging in walking exercises in places such as parks. Moreover, aging adults are more likely to engage in physical activities with the aim of improving their quality of life. As the age of adults increases, the majority are encouraged to engage in physical activities to improve their quality of life (Levasseur et al., 2008). Most of the aging population is prone to life-threatening diseases such as diabetes, cancer, heart attacks, and hypertension. Increasing physical activities improves the Basal Metabolic Indices that contributes to quality life with advanced age (Levasseur et al., 2008). In addition, Phillips et al. (2013) observed that the physical activities of older adult's decreases as their age progresses, indicating that the age of seniors are negatively related to physical activities.

Implications of Positive Social Change

Positive social change is understood as the "procedure of transforming patterns of thought, behavior, social relationships, institutions, and social structure to generate

beneficial outcomes for individuals, communities, organizations, society, and/or the environment beyond the benefits for the instigators of such transformations" (Stephan, Patterson, Kelly & Mair, 2016). The positive social change is aimed at transforming the society and establishing positive societal effects in a collective manner. The positive social change deals with changes in behaviors and describes how the effects influence the surrounding environment (Stephan et al., 2016). The findings of this study have positive social implications. The findings indicate that 53% of seniors in senior housing communities do not meet the recommended number of 150 minutes per week of physical exercises. Encouraging seniors to participate in physical activities can be challenging yet beneficial to the health and quality of life of older adults. The increase in flexibility and mobility among the older adults encourages the reduction in cardio-vascular diseases, increase of individual strength and balance as well as improved quality of life (Hobbs et al., 2013; Hughes et al., 2009; Weber, 2011).

Additionally, findings revealed that age of seniors in senior housing is associated with physical activities that the members engage with. Sun et al. (2013) indicated that physical activities decrease with age of the respondents and peer support may help with encouraging older adults to abandon a sedentary lifestyle through constant engagement of physical activities. This is enhanced by locating older adults in environments that encourage engagement of physical activities. Locating of older adults in environments such as parks encourages them to engage in physical activities such as walking, jogging and running and cycling (Moore et al., 2010). Moreover, pressing older adults to adhere to physical activities may improve quality of lives and minimize mortality rates among

the elderly. In addition, by use of the transtheoretical model, seniors may be encouraged to engage in physical activities through the stages of precontemplation, contemplation, preparation, action, and maintenance (Prochaska & Diclemente's, 1994). As a result, threats to health deterioration can be eliminated.

Limitations of the Study

The main limitation of the study was the use of non-probability sampling method. The challenges associated with non-probability sampling methods are that they do not include randomness. As a result, each participant does not have an equal chance of being selected. Moreover, the use of convenience sampling emphasizes on homogenous group of participants. Convenience sampling is likely to be biased and the sample selected is not representative of the population (Etikan, Musa & Alkassim, 2016). Due to the self-selective nature, non-probability sampling is associated with the presence of outliers that contributes to biases in results. Moreover, convenience sampling does not facilitate generalizability of results (Etikan et al., 2016). In addition, the use of close-ended questionnaires was a limitation as the respondents were denied freedom to give free responses and express their feelings and reactions (Bird, 2009).

I am unable to determine if older adults in Senior Housing are being influenced by other professionals in regards to physical activities. About 95% of respondents indicated that the activities listed in the questionnaire represented physical activities that they were performing while 2% of respondents spent time on activities that were not listed in the selected questionnaire. Although this finding is not significant, it would be interesting if additional responses were received on those other activities.

Conclusions

The main focus of the study was to examine the physical activities carried out by older adults in Senior Housing and assessing whether the older adults achieves the guidelines of 150 minutes per week of physical activities. The study observed that 8% of older adults in the senior housing achieved the target of 150 minutes of physical activities per week across all activities. In addition, approximately 39% of participants achieved more than the recommended target of 150 minutes of physical activities per week across all activities. Moreover, the older adults engage in numerous physical activities such as walking leisurely, socializing, doing physical training, reading, volunteering and attending church meetings. The physical activities that the older adults in Older adults in this study, did not engage in physical activities involving sports, aerobics, clubs and group meetings, and gardening activities. Studies indicate that engaging in required 150 minutes involving aerobic activities and sports activities plays a huge role in the quality of life of aging adults. The aerobic activities help in fighting the diseases such heart diseases, diabetes, hypertension and cancer that are prone to major aging adults. Moreover, sport activities such as running or jogging may help to improve the BMI of the aging adults, which can contribute to a healthy life.

Furthermore, the findings indicate that 53% older adults in Senior Housing are not meeting PA guidelines recommended by health professionals of at least 150 minutes of PA per week when considering all activities examined in this study. The challenge may contribute to the onset of various diseases that affects the lifestyle of the aging population. Studies have indicated that the aging adults may not achieve their PA goals

due to lack of peer mentoring, socializing, lack of information and support regarding physical activities as well as inadequate recreational facilities. The identified challenges hinder the older adults from effectively practicing physical activities. The study also found that age of the senior in a senior housing community is related to the amount of PA in which they engage as represented by the number of minutes of PA per week. There exist both positive and negative relationships involving age of seniors and PA. Seniors with advanced age increase their physical activities to improve their quality of life, which depicts a positive relationship. Physical activities also decrease with an increase of age of the seniors due to mobility challenges.

In summary, PA has been shown to be beneficial for health aging (Jefferis et al., 2014; Scheers et al., 2013). Older adults who engage in some form of PA have lower rates of mortality and disease (Yen et al., 2009). Aging seniors benefit from modified physical activities that improve balance and coordination (Yeom et al., 2009). Still, 53% of seniors in this study did not meet the recommended requirement of 2 ½ hours of PA, therefore these findings suggest that additional peer support and PA programs may provide seniors with the opportunity to better manage their health and leisure time physical activities.

Recommendations

The findings indicated that older adults did not engage in aerobic and sports physical exercises. Older adults may need additional education by health care professionals on the benefits of engaging in aerobics and sport activities. Aerobics physical activities help in reducing diseases such as heart diseases, cancers, and

hypertension. Sport activities promote social engagement and accountability helping older adults to attain recommended guidelines of PA while improving their quality of life.

The study showed that majority of aging adults 75 years and older does not meet the 150 minutes of physical exercises per week. Additional efforts to help older adults achieve the goal of 150 minutes of physical exercises per week may be achieved by providing support to the adults through peer monitoring, providing adequate recreational facilities, walkable neighborhoods and providing emotional support to the older adults in Senior Housing.

Recommendations for Further Studies

A clear conclusion has not been established on whether gender differences exist in reference to older adults engaging in more physical activities. Some studies have shown that older males are more likely than females to engage in more physical activities (Sun et al., 2013; Jefferis et al., 2014). Yorston et al., (2012) study indicated that older females are more likely than older males to engage in more physical activities. Conduction of further research may help arrive at a clear conclusion on whether there is a gender difference in physical activities engagement among older adults aged 65 years and above and on whether PA interventions promote better adherence to PA guidelines for older adults.

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Appendix A: Notification Letter CHAMPS Questionnaire

Dear Dr. Anita L. Stewart:

I am a doctoral student from Walden University writing my dissertation tentatively titled "Examining Leisure Time Physical Activities of Older Adults in Senior Housing" under the direction of my dissertation committee chaired by Dr. Lawrence Fulton. I am acknowledging that I will be using your survey instrument CHAMPS Activities Questionnaire for Older Adults in my research study. I will provide full credit to the original source.

CHAMPS: Community Healthy Activities Model Program for Seniors
Institute for Health & Aging, University of California San Francisco
Stanford Center for Research in Disease Prevention, Stanford University
(11/06/00) © Copyright 1998
Contact: Anita L. Stewart, Ph.D., UCSF

I understand that use of this survey is Public. As a courtesy, I am reaching out to acknowledge that I will be using the instrument. Please do not hesitate to contact me via email or phone if you have any questions.

Thank you,

Tamiera Harris

Appendix B: Request for Permission to Conduct Research in Senior Housing

Dear Building Manager:

My name is Tamiera Harris and I am a PhD student at Walden University. The research I wish to conduct for my doctoral dissertation involves examining Leisure Time Physical Activities of Older adults in Senior Housing. I will conduct this study under the supervision of Dr. Lawrence Fulton of Walden University. I am hereby seeking your consent to enter the building and administer a questionnaire to residents who volunteers to participate in the research study.

Upon completion of the study, I will provide an abstract to you and the residents, which will provide the study findings. If you require any further information, please do not hesitate to contact me at XXX. Thank you for your time and consideration in this matter.

Sincerely,

Tamiera Harris

Building Manager's Consent:

_____

Printed Name/Title

_____ _____

Signature Date

Appendix C: Confidentiality Agreement

This study "Examining Leisure Time Physical Activities of Older Adults in Senior Housing" is being undertaken by Tamiera Harris (Principal Investigator) of Walden University.

The study has two objectives:

1. To examine Leisure Time Physical Activities of Older Adults
2. To determine if older adults are participating in LTPA at least 150 minutes per week.

I agree to:

1. Keep all the research information shared with me confidential by not discussing or sharing the research information in any form or format with anyone other than the Principal Investigator.
2. Keep all research information in any form or format secure while it is in my possession.
3. Return all research information in any form or format to the Principal Investigator when I have completed the research tasks.
4. After consulting with the Principal Investigator, erase or destroy all research information in any form or format regarding this research project that is not returnable to the Principal Investigator (e.g. information sorted on computer hard drive).

Recipient:

_____	_____	_____
(Print name)	(Signature)	(Date)

Principal Investigator:

_____	_____	_____
(Print name)	(Signature)	(Date)

If you have any questions or concerns about this study, please contact Tamiera Harris at XXX

Appendix D: Study Recruitment Flyer

WE NEED PARTICIPANTS FOR A RESEARCH STUDY
"Leisure Time Physical Activities of Older Adults"

Description of Project: The purpose of this research study is to examine Leisure Time Physical Activities of older adults in Senior Housing. There are no costs to participate. Some benefits to this study include having your voice represented in leisure research and getting an assessment of the number of hours of leisure time physical activity completed by you and your peers.

To participate: A consent form will be provided to you. You are not required to participate. If you provide written consent, then a questionnaire will be provided to you. This study may take 30-45 minutes.

Participants will receive a snack, lunch, and beverages.

All responses will be confidential and your participation in this study is voluntary.

To learn more, contact the principle investigator of the study, **XXX**

This research is conducted under the direction of Dr. Lawrence Fulton, Health Sciences Department, and has been reviewed and approved by Walden University Institutional Review Board.

Appendix E CHAMPS Activities Questionnaire for Older Adults

CHAMPS Activities Questionnaire for Older Adults

Date:_____

Name or ID:_____

Contact: Anita L. Stewart, Ph.D., UCSF, anitast@itsa.ucsf.edu

This questionnaire is about activities that you may have done in the past 4 weeks. The questions on the following pages are similar to the example shown below.

INSTRUCTIONS

If you DID the activity in the past 4 weeks:

Step #1 **Check the YES box.**

Step #2 **Think about how many TIMES a week you usually did it, and write your response in the space provided.**

Step #3 **Circle how many TOTAL HOURS in a typical week you did the activity.**

Here is an example of how Mrs. Jones would answer question #1: Mrs. Jones usually visits her friends Maria and Olga twice a week. She usually spends one hour on Monday with Maria and two hours on Wednesday with Olga. Therefore, the total hours a week that she visits with friends is 3 hours a week.

In a typical week during the past 4 weeks, did you…								
1. Visit with friends or family (other than those you live with)? ☒ **YES** How many TIMES a week? 2 ➔ ☐ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

If you DID NOT do the activity:

- **Check the NO box and move to the next question**

In a typical week during the past 4 weeks, did you …							
1. Visit with friends or family (other than those you live with)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
2. Go to the senior center? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
3. Do volunteer work? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
4. Attend church or take part in church activities? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
5. Attend other club or group meetings? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
6. Use a computer? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL <u>hours a week</u> did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

In a typical week during the past 4 weeks, did you …							
7. Dance (such as square, folk, line, ballroom) (do not count aerobic dance here)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
8. Do woodworking, needlework, drawing, or other arts or crafts? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
9. Play golf, carrying or pulling your equipment (count walking time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
10. Play golf, riding a cart (count walking time only)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
11. Attend a concert, movie, lecture, or sport event? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
12. Play cards, bingo, or board games with other people? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

In a typical week during the past 4 weeks, did you …							
13. Shoot pool or billiards? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
14. Play singles tennis (do not count doubles)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
15. Play doubles tennis (do not count singles)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
16. Skate (ice, roller, in-line)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
17. Play a musical instrument? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
18. Read? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
19. Do heavy work around the house (such as washing windows, cleaning gutters)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

In a typical week during the past 4 weeks, did you …							
20. Do light work around the house (such as sweeping or vacuuming)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
21. Do heavy gardening (such as spading, raking)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
22. Do light gardening (such as watering plants)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
23. Work on your car, truck, lawn mower, or other machinery? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
****Please note: For the following questions about running and walking, include use of a treadmill.**							
24. Jog or run? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
25. Walk uphill or hike uphill (count only uphill part)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

In a typical week during the past 4 weeks, did you …							
26. Walk fast or briskly for exercise (do not count walking leisurely or uphill)? **YES** How many TIMES a week?____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
27. Walk to do errands (such as to/from a store or to take children to school (count walk time only)? **YES** How many TIMES a week?____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
28. Walk leisurely for exercise or pleasure? **YES** How many TIMES a week?____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
29. Ride a bicycle or stationary cycle? **YES** How many TIMES a week?____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
30. Do other aerobic machines such as rowing, or step machines (do not count treadmill or stationary cycle)? **YES** How many TIMES a week?____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
31. Do water exercises (do not count other swimming)? **YES** How many TIMES a week?____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

In a typical week during the past 4 weeks, did you …							
32. Swim moderately or fast? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
33. Swim gently? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
34. Do stretching or flexibility exercises (do not count yoga or Tai-chi)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
35. Do yoga or Tai-chi? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
36. Do aerobics or aerobic dancing? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
37. Do moderate to heavy strength training (such as hand-held weights of more than 5 lbs., weight machines, or push-ups)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

In a typical week during the past 4 weeks, did you …							
38. Do light strength training (such as hand-held weights of 5 lbs. or less or elastic bands)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
39. Do general conditioning exercises, such as light calisthenics or chair exercises (do not count strength training)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
40. Play basketball, soccer, or racquetball (do not count time on sidelines)? **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours
41. Do other types of physical activity not previously mentioned (please specify)? _____ **YES** How many TIMES a week?_____ ➔ **NO**	How many TOTAL hours a week did you usually do it? ➔	Less than 1 hour	1-2½ hours	3-4½ hours	5-6½ hours	7-8½ hours	9 or more hours

Thank You

Appendix F: Demographics Questionnaire

What is your gender?

- ☐ Male
- ☐ Female

What age range are you in?

- ☐ 65-69
- ☐ 70-74
- ☐ 75-79
- ☐ 80-84
- ☐ 85-89
- ☐ 64 or younger
- ☐ 90 or older

What is the highest level of education you have completed?

- ☐ Elementary to Middle School
- ☐ High school
- ☐ Associate Degree
- ☐ Bachelor's Degree
- ☐ Graduate Degree (Master's degree or higher)

What is your marital status?

- ☐ Single, never married
- ☐ Married or domestic partnership
- ☐ Divorced
- ☐ Widowed
- ☐ Separated

How many children do you have?

- ☐ 0
- ☐ 1-2
- ☐ 3-4
- ☐ 5 +

What is your ethnicity or race?

- ☐ Black or African American
- ☐ White
- ☐ Hispanic or Latino
- ☐ Native American or American Indian
- ☐ Asian/Pacific Islander
- ☐ Other

Appendix G: Descriptive Statistics

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Visit friends/family	62	359.5	0.5	360.0	73.871	13.8673	109.1908
Hours Senior Center	62	360	0	360	47.90	11.091	87.331
Volunteer work	62	120	0	120	6.29	3.318	26.129
Church activities	62	360	0	360	46.94	12.430	97.872
Computer use	62	240	0	240	25.65	8.332	65.602
Dance	62	360	0	360	8.71	6.108	48.094
Crafts	62	240	0	240	8.23	5.440	42.831
Attend concert/movie/lecture	62	30	0	30	0.48	0.484	3.810
Cards	62	360	0	360	39.19	10.943	86.162
Musical instrument	62	120	0	120	1.94	1.935	15.240
Read	62	480	0	480	133.55	15.204	119.714
Light work around house	62	360	0	360	83.71	11.731	92.368
Walk fast for exercise	62	120	0	120	2.42	1.987	15.648
Walk for errands	62	240	0	240	18.39	6.068	47.777
Walk leisurely	62	120	0	120	20.32	5.106	40.203
Ride bike	62	30	0	30	0.48	0.484	3.810
Swim gently	62	30	0	30	0.48	0.484	3.810
Stretch	62	30	0	30	0.48	0.484	3.810
Strength training	62	360	0	360	5.81	5.806	45.720
Light strength training	62	360	0	360	6.29	5.819	45.816
General conditioning	62	360	0	360	18.87	9.080	71.497
SumAllActivity	62	1980.0	0.5	1980.5	550.000	58.6480	461.7950
SumPhysicalActivity	62	1230	0	1230	157.26	25.373	199.788
Valid N (listwise)	62						

Case Processing Summary

		Cases					
		Valid		Missing		Total	
Gender2		N	Percent	N	Percent	N	Percent
SumPhysicalActivity	Female	36	100.0%	0	0.0%	36	100.0%
	Male	26	100.0%	0	0.0%	26	100.0%

Descriptives

Gender2				Statistic	Std. Error
SumPhysicalActivity	Female	Mean		199.17	40.074
		95% Confidence Interval for Mean	Lower Bound	117.81	
			Upper Bound	280.52	
		5% Trimmed Mean		170.74	
		Median		180.00	
		Variance		57813.571	
		Std. Deviation		240.445	
		Minimum		0	
		Maximum		1230	
		Range		1230	
		Interquartile Range		270	
		Skewness		2.377	0.393
		Kurtosis		8.675	0.768
	Male	Mean		99.23	20.022
		95% Confidence Interval for Mean	Lower Bound	57.99	
			Upper Bound	140.47	
		5% Trimmed Mean		90.13	
		Median		120.00	
		Variance		10423.385	
		Std. Deviation		102.095	
		Minimum		0	
		Maximum		390	
		Range		390	
		Interquartile Range		128	
		Skewness		1.099	0.456
		Kurtosis		1.136	0.887

Case Processing Summary

		Cases					
		Valid		Missing		Total	
Age2		N	Percent	N	Percent	N	Percent
SumPhysicalActivity	65-69	22	100.0%	0	0.0%	22	100.0%
	70-74	24	100.0%	0	0.0%	24	100.0%
	75-79	13	100.0%	0	0.0%	13	100.0%
	80-84	3	100.0%	0	0.0%	3	100.0%

Descriptives[a]

Age2				Statistic	Std. Error
SumPhysicalActivity	65-69	Mean		192.27	59.237
		95% Confidence Interval for Mean	Lower Bound	69.08	
			Upper Bound	315.46	
		5% Trimmed Mean		149.09	
		Median		120.00	
		Variance		77199.351	
		Std. Deviation		277.848	
		Minimum		0	
		Maximum		1230	
		Range		1230	
		Interquartile Range		248	
		Skewness		2.706	0.491
		Kurtosis		9.136	0.953
	70-74	Mean		142.50	27.282
		95% Confidence Interval for Mean	Lower Bound	86.06	
			Upper Bound	198.94	
		5% Trimmed Mean		131.11	
		Median		120.00	
		Variance		17863.043	
		Std. Deviation		133.653	
		Minimum		0	
		Maximum		510	
		Range		510	
		Interquartile Range		233	
		Skewness		1.017	0.472
		Kurtosis		1.078	0.918
	75-79	Mean		161.54	43.572
		95% Confidence Interval for Mean	Lower Bound	66.60	
			Upper Bound	256.47	
		5% Trimmed Mean		154.49	
		Median		120.00	
		Variance		24680.769	
		Std. Deviation		157.101	
		Minimum		0	
		Maximum		450	
		Range		450	
		Interquartile Range		255	
		Skewness		0.537	0.616
		Kurtosis		-1.041	1.191

Case Processing Summary

		Cases					
		Valid		Missing		Total	
Education2		N	Percent	N	Percent	N	Percent
SumPhysicalActivity	Elementary to Middle School	31	100.0%	0	0.0%	31	100.0%
	High school	31	100.0%	0	0.0%	31	100.0%

Descriptives

Education2				Statistic	Std. Error
SumPhysicalActivity	Elementary to Middle School	Mean		126.77	25.566
		95% Confidence Interval for Mean	Lower Bound	74.56	
			Upper Bound	178.99	
		5% Trimmed Mean		113.12	
		Median		120.00	
		Variance		20262.581	
		Std. Deviation		142.347	
		Minimum		0	
		Maximum		510	
		Range		510	
		Interquartile Range		240	
		Skewness		1.253	0.421
		Kurtosis		1.094	0.821
	High school	Mean		187.74	43.618
		95% Confidence Interval for Mean	Lower Bound	98.66	
			Upper Bound	276.82	
		5% Trimmed Mean		155.05	
		Median		120.00	
		Variance		58978.065	
		Std. Deviation		242.854	
		Minimum		0	
		Maximum		1230	
		Range		1230	
		Interquartile Range		240	
		Skewness		2.781	0.421
		Kurtosis		10.832	0.821

Case Processing Summary

		Cases					
		Valid		Missing		Total	
marital status		N	Percent	N	Percent	N	Percent
SumPhysicalActivity	Divorced	5	100.0%	0	0.0%	5	100.0%
	Married or domestic partnership	5	100.0%	0	0.0%	5	100.0%
	Seperated	1	100.0%	0	0.0%	1	100.0%
	Single/Never Married	40	100.0%	0	0.0%	40	100.0%
	Widowed	11	100.0%	0	0.0%	11	100.0%

Descriptives[a]

marital status				Statistic	Std. Error
SumPhysicalActivity	Divorced	Mean		174.00	74.940
		95% Confidence Interval for Mean	Lower Bound	-34.07	
			Upper Bound	382.07	
		5% Trimmed Mean		168.33	
		Median		120.00	
		Variance		28080.000	
		Std. Deviation		167.571	
		Minimum		0	
		Maximum		450	
		Range		450	
		Interquartile Range		255	
		Skewness		1.367	0.913
		Kurtosis		2.679	2.000
	Married or domestic partnership	Mean		150.00	93.915
		95% Confidence Interval for Mean	Lower Bound	-110.75	
			Upper Bound	410.75	
		5% Trimmed Mean		140.00	
		Median		30.00	
		Variance		44100.000	
		Std. Deviation		210.000	
		Minimum		0	
		Maximum		480	
		Range		480	
		Interquartile Range		360	
		Skewness		1.268	0.913
		Kurtosis		0.449	2.000
	Single/Never Married	Mean		167.25	35.119
		95% Confidence Interval for Mean	Lower Bound	96.22	
			Upper Bound	238.28	
		5% Trimmed Mean		137.50	
		Median		120.00	
		Variance		49333.269	
		Std. Deviation		222.111	
		Minimum		0	
		Maximum		1230	
		Range		1230	
		Interquartile Range		240	
		Skewness		3.024	0.374
		Kurtosis		12.905	0.733
	Widowed	Mean		130.91	40.909
		95% Confidence Interval for Mean	Lower Bound	39.76	
			Upper Bound	222.06	
		5% Trimmed Mean		123.79	
		Median		120.00	
		Variance		18409.091	
		Std. Deviation		135.680	
		Minimum		0	
		Maximum		390	
		Range		390	
		Interquartile Range		240	
		Skewness		0.653	0.661
		Kurtosis		-0.724	1.279

a. SumPhysicalActivity is constant when marital status = Seperated. It has been omitted.

Case Processing Summary

		Cases					
		Valid		Missing		Total	
Children2		N	Percent	N	Percent	N	Percent
SumPhysicalActivity	0	34	100.0%	0	0.0%	34	100.0%
	1-2	18	100.0%	0	0.0%	18	100.0%
	3-4	7	100.0%	0	0.0%	7	100.0%
	5+	3	100.0%	0	0.0%	3	100.0%

Descriptives

Children2				Statistic	Std. Error
SumPhysicalActivity	0	Mean		102.35	19.708
		95% Confidence Interval for Mean	Lower Bound	62.26	
			Upper Bound	142.45	
		5% Trimmed Mean		94.80	
		Median		45.00	
		Variance		13206.417	
		Std. Deviation		114.919	
		Minimum		0	
		Maximum		390	
		Range		390	
		Interquartile Range		240	
		Skewness		0.750	0.403
		Kurtosis		-0.652	0.788
	1-2	Mean		191.67	35.903
		95% Confidence Interval for Mean	Lower Bound	115.92	
			Upper Bound	267.42	
		5% Trimmed Mean		186.30	
		Median		135.00	
		Variance		23202.941	
		Std. Deviation		152.325	
		Minimum		0	
		Maximum		480	
		Range		480	
		Interquartile Range		173	
		Skewness		0.682	0.536
		Kurtosis		-0.438	1.038
	3-4	Mean		321.43	167.637
		95% Confidence Interval for Mean	Lower Bound	-88.76	
			Upper Bound	731.62	
		5% Trimmed Mean		288.81	
		Median		240.00	
		Variance		196714.286	
		Std. Deviation		443.525	
		Minimum		0	
		Maximum		1230	
		Range		1230	
		Interquartile Range		510	
		Skewness		1.756	0.794
		Kurtosis		3.220	1.587
	5+	Mean		190.00	134.536
		95% Confidence Interval for Mean	Lower Bound	-388.86	
			Upper Bound	768.86	
		5% Trimmed Mean			
		Median		120.00	
		Variance		54300.000	
		Std. Deviation		233.024	
		Minimum		0	
		Maximum		450	
		Range		450	
		Interquartile Range			
		Skewness		1.230	1.225
		Kurtosis			