

2020

Physical activity needs, preferences, perceptions, and current practices of community residing older adults

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**Physical activity needs, preferences, perceptions, and current practices of community
residing older adults**

by

Annette Elise Contrady

A thesis submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Nutritional Sciences

Program of Study Committee:
Sarah L. Francis, Major Professor
Mack Shelley
Rudy Valentine

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2020

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NOMENCLATURE

ACSM	American College of Sports Medicine
CMP	Congregate Meal Program
CVD	Cardiovascular Disease
DC	Washington D.C.
ERS	Economic Research Service
HBM	Health Belief Model
HTN	Hypertension
IA	Iowa
ISU	Iowa State University
PA	Physical Activity
SDOH	Social Determinants of Health
SMT	Social Marketing Theory
T2DM	Type 2 Diabetes Mellitus
US	United States
USDA	United States Department of Agriculture

ACKNOWLEDGEMENTS

First, I would like to thank my major professor, Dr. Sarah Francis for her support, teaching, and encouragement during the last two years. She has been a wonderful mentor and has shaped my interest in pursuing a career in research and academics. I am blessed to have received a mentor to provide encouragement, thoughtful direction, constructive criticism, and the appropriate amount of challenge. I cannot say thank you enough.

I would also like to thank my significant other, Dylan Moore. He has been a rock throughout this degree process, providing laughter when things got tough, always encouraging, and always understanding of my nights spent writing or studying. Next, my family has been such a wonderful source of encouragement throughout my schooling, and each in their own, unique way, continue to challenge me to grow. Thank you to my three pets, all the hair on my schoolwork and research articles was well worth the loving support.

Thank you to my committee members who offered advice and guidance throughout the process of designing and completing my thesis research. I have had the opportunity to meet so many intelligent individuals over the last two years in many locations, including Iowa State University, the Iowa Department of Public Health, and the University of the District of Columbia. The ability to complete this research would not have been possible without the assistance of those individuals.

Finally, I would like to say thank you to the friends I have made during this degree. You all have been strong supports throughout the last two years, having been so uplifting and have filled the graduate student office with great conversations and laughter. I wish each one of you the best!

ABSTRACT

Regular physical activity (PA) is a cornerstone of healthy aging. For older adults, specifically over the age of 65, being physically active protects against a host of health ailments, including frailty, chronic disease, sarcopenia, cognitive loss, etc. Of importance, PA helps maintain muscle, thereby allowing for maintenance of physical function and remain independent.

Study One, a qualitative study, assessed the needs, preferences, and perceptions of PA of a diverse group of older adults in Iowa (IA) and Washington, D.C. (DC). Thirteen focus groups were conducted with 118 older adults. Each completed a sociodemographic questionnaire. Focus groups were audio-taped, transcribed verbatim and analyzed for themes. Participants were diverse (White=42.4%, Black=37.3%) and mostly female (83.1%). Most (82.2%) were food secure; DC had more people categorized as food insecure ($p=0.048$). The majority (84.7%) rated their health as “average or higher”, and 36.4% reported a “somewhat high” PA level. About one third (38.1%) reported that they were not meeting recommendations for moderate or vigorous PA. Overall, PA motivators were health benefits and socialization; however, the health benefits mentioned varied by state. PA barriers for both states were cost, pain, low motivation, and health limitations. Differences in barriers included scheduling challenges (IA) and transportation, weather, and mood (DC). Preferred PA programs were age-appropriate, expert-led, and group-based. These findings will aid efforts for tailoring PA messaging and programming for community-residing older adults.

Study Two was a quantitative study that evaluated the health practices of older adults attending the Iowa Congregate Meal Program. Dietary intake frequencies, nutritional risk, healthy eating self-efficacy, PA perceptions and practices, and food security were assessed.

Twelve meal sites across nine IA counties were surveyed, totaling 176 older adults. Participants

were mostly white (91.8%), educated (89.2%), and female (67.0%). One-third (35.2%) reported having “very good” health. Most (78.5%) considered PA to be “healthy” with 37.4% being “very likely” to “perform 30 minutes of PA at least three days weekly.” Self-reported health ($p=0.001$) and education ($p<0.0001$) significantly impacted PA intentions. These findings can be utilized by community PA programs to create appropriate materials for the literacy and comprehension abilities of the audience, as well as address the general health benefits associated with PA.

CHAPTER 1. GENERAL INTRODUCTION

Background

The aging population (adults over the age of 65) is growing rapidly, and it is anticipated that by the year 2060, the number of older adults in the United States (US) will rise to 96 million (Mather, 2019). Those over the age of 65 currently comprise a sizeable proportion of the US population including 17.1 percent of Iowa's total population (Population Reference Bureau, 2019; US Census Bureau, 2019a) and 12.1 percent of Washington D.C.'s (DC) total population (US Census Bureau, 2019b). As the proportion of older adults in the US grows, public health efforts should work to emphasize health quality to optimize both the quality of aging and quality of life.

Many facets of one's life have the capability to impact their quality of health. The Social Determinants of Health (SDOH) contribute to quality of health and longevity of an individual. The SDOH includes: 1) neighborhood and physical environment, 2) health and health care, 3) social and community aspects, 4) education, and 5) economic stability (Office of Disease Prevention and Health Promotion, 2019a). Each aspect of the SDOH encompasses specific concerns, such as income stability, ability to comprehend health information, food security, nutritional status, housing, etc. (Office of Disease Prevention and Health Promotion, 2019a). Each issue reflected by the SDOH is capable of impacting an older adult's autonomy and independence.

Many aging persons wish to "age in place," however, as one ages there are many factors that could lead to a decline in health (e.g. inability to procure appropriate amounts of food, inability to cook food, or loss of physical ability to bathe or toilet one's self, etc.) thus greatly reducing the ability to age in place (Ahmed & Haboubi, 2010; Curtis, et al., 2015; Whitelock &

Ensaaff, 2018). About 80 percent of US older adults report having at least one chronic disease, and 77 percent report two or more diagnosed chronic diseases (National Council on Aging, 2018). Yet, many of the reported chronic diseases are able to be mitigated via good nutrition and regular physical activity (Biswas, et al., 2015). Thus, it is important to educate older adults on the benefits associated with partaking in healthful activities, such as being physically active and eating a good diet.

The environment in which one lives has the potential to impact an older adult's independence and autonomy. Rural areas can potentially limit access to needed resources, such as public transportation, access to grocery stores, and access to healthcare (Rural Health Information, 2019a). Those in urban areas may have better access to community resources (i.e. food security resources, socialization) and healthcare options as public transportation is often more reliable and available, and such resources may be in closer proximity (Berry & Okulicz-Kozaryn, 2013; Rural Health Information, 2019b). Additionally, walkability of the urban areas may be better, thus potentially increasing the ability to be physically active or travel on foot to needed resources (Berry & Okulicz-Kozaryn, 2013; Rural Health Information, 2019b).

As the older adult population continues to grow, it is anticipated to become more diverse (e.g. racially, ethnically, socially, etc.). For persons of all backgrounds and cultures, the social aspect of one's life has the potential to influence health via multiple avenues (e.g. cultural practices and social support). Thus, the need for research that addresses cultural and social implications of health practices is needed to optimize an aging adult's quality of life via optimization of health behaviors. Additionally, older adults rely on various forms of community support to maintain their health and independence, such as walking paths or community fitness centers, congregate meal sites, senior centers, etc. (National Association for Area Agencies on

Aging, 2011). Therefore, having access to these forms of support is necessary to support successful aging. These necessary community supports provide opportunities to both extend vitality and enable optimal quality of health.

As adults are living longer, there is a growing demand to ensure that the years gained are productive and healthy is prominent. Diet quality and nutritional status are important for all persons, and have many positive aspects, such as reduce risk of disease, weight maintenance, and preservation of physical abilities (Govindaraju, et al., 2018; USDA, 2019; Barnard, et al., 2019). Nutritional status is closely linked with quality of health and vitality for the older adult, and it has the ability to influence diseases states and physical functioning, as well as affect the ability to remain independent (Office of Disease Prevention and Health Promotion, 2019b). Unfortunately, many older adults are not maintaining quality intakes of necessary food groups, such as fruits, vegetables, whole grains, lean proteins, and dairy (USDA, 2016; MacNab, et al. 2018). Thus, educating older adults regarding appropriate dietary intakes and the benefits of quality nutrition is essential. Such education will aid in ensuring that the aging population receives necessary information to remain active, healthy, and independent.

Regular physical activity also supports successful aging and independence. However, older adults are not meeting recommended levels of physical activity (Center for Disease Control and Prevention [CDC], 2013; Keadle, et al., 2016; Zenko, et al., 2019) and spend a great majority of their time in sedentary behaviors (Matthews, et al., 2008; Davis, et al., 2011). Low levels of physical activity and excess sedentary time are strong predictors of physical disability, chronic disease, and limitations among adults (Vaz Fragoso, et al., 2014). Sedentary behaviors are becoming commonplace as cultures are shifting to include more sedentary practices, such as working at a computer, which greatly reduce physically active lifestyles. Excessive sedentary

behaviors increase the risk and onset of chronic disease (Lee, et al., 2012). Large amounts of sedentary behaviors complicate one's ability to remain physically active, further jeopardizing the ability to remain mobile, complete activities of daily living, and potentially jeopardize the ability to remain independent as one ages. Therefore, educating older adults on the importance of remaining physically active and reducing their time spent in sedentary behavior is crucial for healthy aging and the maintenance of independence.

Providing older adults with needs-and-preference-based health education and programming is necessary to improve health, support optimal quality of life, and promote longevity. One way to do this is to apply the Social Marketing Theory (SMT). The SMT is a program development theory that is effective in designing successful older adult-specific, community health programs (Francis, et al., 2004; Francis & Taylor, 2009; Tan, et al., 2010; Roy et al. 2016). Applying the SMT enables researchers to better understand the current nutritional and physical activity needs, preferences and practices of older adults. This results in programming that is 1) well-received by the target audience and 2) effective at addressing observed gaps in knowledge and behavior. Community-health programming that is capable of addressing the observed gaps via application of appropriate educational materials will aid in maintenance of autonomy, improve longevity, and increase one's ability to age in place.

Goals and Objectives

Study 1: Assessing the Physical and Activity Needs and Preferences of Older Adults

Objective: The aim of this study was to use a qualitative focus group design to explore the factors influencing older adults' decisions to be physically active. The following research questions were addressed:

1. What are the perceived motivators and barriers towards being physically active as an older, community residing adult?
2. What are the perceived community supports available that enable community residing older adults to be physically active?
3. What are the preferred physical activity programming attributes for community residing older adults?

Study 2: Physical Activity Behaviors of Community-Residing Older Iowans

Objective: The aim of this study was to conduct a cross-sectional quantitative assessment to determine the PA behaviors of older Iowans attending congregate meal sites. The following research questions were addressed:

1. What are the PA behaviors of older Iowans attending community food and nutrition programs?
2. To what extent is intention to be physically active among older Iowans influenced by sociodemographic factors (e.g. age, health status), nutritional risk, and food security?

Thesis Organization

This thesis begins with a review of literature outlining the US older adult population, the SDOH, and how each are capable of effecting quality of health, nutrition practices of older adults, role of physical activity in healthy aging, nutritional and physical activity interventions for older adults, and the program planning theory, SMT. Following this review of literature, a methodology section will describe the two studies conducted, which will then be followed by two separate manuscripts, which will be submitted to the *Journal of Aging and Physical Activity* and the *Journal of Nutrition and Education Behavior*. Finally, a conclusion, and appendix of supporting documents will conclude this thesis.

CHAPTER 2. REVIEW OF LITERATURE

Introduction

The demographic of the United States (US) is rapidly changing to include older adults (those ages 65 years and older). The number of older adults in the US is expected to rise from 46 million in 2016 to 96 million by 2060, marking a 9 percent increase (Mather, 2019). In the US, the older adult population currently comprises 16.0 percent of the national population (US Census Bureau, 2019a). Iowa's older adult population represents 17.1 percent of the state's total population ranking it as 17th in the nation for the older adult population (17.1%) (Population Reference Bureau, 2019; US Census Bureau, 2019b). Although the older adult population in Washington D.C. (DC) is growing, it is doing so at a slower rate (DC Policy Center, 2019). In 2016, older adults made up 12.1 percent of the DC total population (US Census Bureau, 2019c). With the quickly growing older adult population, it is important that public health efforts focus on the maintenance and/or improvement of health amongst older adults to ensure successful aging and optimal quality of life.

Social Determinants of Health

Health is influenced by many factors outside of healthy dietary practices, regular exercise, and regular physician visits. The environment in which people live, work, and age affects a range of health outcomes and overall quality of life (Center for Disease Control and Prevention, 2019a; Office of Disease Prevention and Health Promotion, 2019a). The Social Determinants of Health (SDOH) greatly impact the health and longevity of an individual person, as well as community (Center for Disease Control and Prevention, 2019a). There are five major components contributing toward the SDOH: (1) neighborhood and physical environment; (2) health and health care; (3) social and community context; (4) education; and (5) economic

stability (Figure 2.1) (Office of Disease Prevention and Health Promotion, 2019). Each major SDOH component further reflects key issues, such as employment, food security, language and literacy, social cohesion, and civic participation, health literacy, access to health care, healthy foods, and quality of housing (Office of Disease Prevention and Health Promotion, 2019). Not being able to meet each SDOH may adversely impact an older adult's ability to remain independent and community-residing.

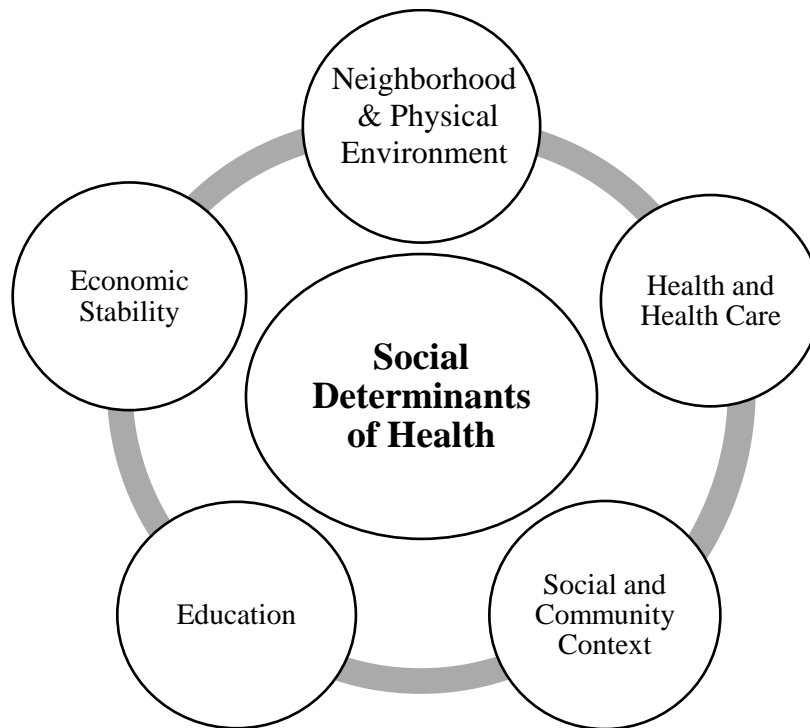


Figure 2.1. Social Determinants of Health Components (Office of Disease Prevention and Health Promotion, 2019)

Neighborhood and Physical Environment

The physical environment in which a person resides is capable of impacting one's health and wellness, as well as access to other resources, including grocery stores, access to healthful foods, wellness facilities, and community supports (Whaley & Haley, 2008; Hilmers, et al., 2012). Further, a person's location of residence has the potential to limit transportation options,

effects public safety, and can promote residential segregation (Del Rio, et al., 2017; Wong et al., 2018). Most older adults wish to reside in their own home for as long as possible, either alone, with a spouse, or family member. Many older adults view long term care facility admission as loss of all independence (Gillsjo, et al., 2011). Over three-quarters of the older adult population intend to live in their own homes for the rest of their lives or “age in place” (National Council on Aging, 2015). In 2018, over three-quarters of community-residing older Americans were living with their spouse/partner (58 percent) or alone (28 percent), leaving a small percentage (7.5 percent) residing in other community-based living situations, such as, group living quarters (e.g., independent living retirement communities, etc.) or with a non-family member or friend (Administration on Community Living, 2018a).

In order to remain in their own home, an older adult must maintain their physical functioning and quality of health. With aging comes the potential for loss of physical function, loss of interest or ability to procure and prepare meals, thus leading to decline in health, nutritional status, and loss of independence, ultimately decreasing the opportunity to age in place (Ahmed & Haboubi, 2010; Curtis, et al., 2015; Whitelock & Ensaff, 2018). Maintaining good nutritional status and remaining physically active could be the determining factor as to whether an older adult is able to remain independent and in their own homes longer. There is a need for research exploring effective strategies that are viewed as appealing by them and improve the longevity of physical function and overall quality of health of older adults.

Living in a rural or urban community has the possibility to further affect an older adult’s ability to age in place. The US Census Bureau defines two types of “urban” areas: “urbanized areas” and “urbanized clusters” (US Census Bureau, 2020). Urbanized areas are comprised of 50,000 people or more, and urbanized clusters are comprised of 2,500 to 50,000 people (US

Census Bureau, 2020). “Rural” areas are considered to be any population, housing, or territory not within an urbanized area or cluster (US Census Bureau, 2020). In more rural areas, aging adults may experience less access to needed resources in order to maintain autonomy as public transportation can be scarce or unreliable, food deserts are often more common in rural areas, and proximity to healthcare can be much lower than urban counterparts (Rural Health Information, 2019a). Conversely, in more urban areas, aging adults may have better access to community resources (i.e. food security resources, socialization) and healthcare options as public transportation can be more reliable and in closer proximity. Walkability of the urban neighborhoods is often better, thus potentially increasing the quality of life (Berry & Okulicz-Kozaryn, 2013; Rural Health Information, 2019d).

About 23 percent of older Americans reside in rural areas (Smith & Trevelyan, 2018). Iowa’s population of rural residing older adults is almost double the national average at 41.1 percent (Smith & Trevelyan, 2018). Many older adults often choose to live in rural and small town destinations due to quality of life considerations, such as a feeling of connectedness to natural aspects (e.g., feelings of being out in nature, quieter areas, etc.) and persons within the community (Smith & Trevelyan, 2018). Yet, many older, urban-residing adults report a more positive outlook than their rural counterparts. In the United States, older adults have reported a greater sense of happiness residing in more populated areas, including city centers and outer-peripheries of rural areas (Berry & Okulicz-Kozaryn, 2013). This is likely attributable to access to social supports. Despite the preference for rural living, it places many older adults farther away from regular medical care and public health resources, potentially leading to a reported lower quality of life (Baernholdt, et al., 2012). Older adults who live in rural areas are more likely to live in poverty, have less access to regular healthcare, higher rates of chronic illness and

disability, lower ability to perform activities of daily living (ADL) and reduced functionality (Baernholdt, et al., 2012; Bennet, et al., 2013). In addition, rural-residing older adults may also have higher levels of social isolation, poorer overall health, and increased cognitive issues, such as memory loss and depression compared to urban counterparts (Baernholdt, et al., 2012; Bennet, et al., 2013).

Urbanization is a major trend across the world, with an estimated 80 percent of the total older adult population in developed countries choosing to move into more urban areas (United Nations Population Fund, 2007). As the aging adult population grows, the livability of urban areas must meet the needs of older adults. For many older adults, residing in urban areas promotes a sense of independence (i.e. walkability, use of public transportation), safety and security, and instills a sense of empowerment among older adults related to the level of socialization opportunities they received in the community (Buffel & Phillipson, 2018). Urban-dwelling older adults tend to report less instances of chronic disease than their rural counterparts, and also report higher levels of physical activity (Baernholdt, et al., 2012). Consequently, the condition and type of environment in which older adults live is capable of determining the process of one's aging.

Health and Health Care

Aging brings the potential for increased needs of healthcare and social services. In 2016, about one-third of community-residing older Americans reported having a disability (35 percent), 22 percent had ambulatory difficulty, and 14 percent had difficulty living independently (US Census Bureau, Administration for Community Living, 2018). However, most aging persons have a goal of staving off admission to long-term care facilities and maintaining their independence, thus relying on healthcare and social services as minimally as possible.

Aging has the potential to: (1) yield changes physically (e.g., hearing and vision loss, changes to body muscle and adipose composition, etc.); (2) increase risk for the onset and diagnosis of chronic disease (e.g., osteoporosis, cardiovascular disease, hypertension, and diabetes); (3) reduce physical function (e.g., decline in walking speed, mobility and activity of daily living difficulties), (4) cause cognitive changes (e.g., dementia, decline in conceptual reasoning, Alzheimer’s disease), and (5) lead to other social and environmental changes (e.g., isolation, long term care placement, etc.) (Evans et al., 2002; Kirkman, et al., 2012; Wisdom, et al., 2012; Cacioppo & Cacioppo, 2014; Maher, et al., 2014; Zalewski, 2015; Davis, et al., 2016; Federal Interagency Forum on Aging Related Statistics, 2016; US Preventative Services Task Force, 2018; Grimmer, et al., 2019). However, lifestyle changes through diet and exercise can mitigate these changes.

Nationally, about 80 percent of older adults report having at least one diagnosed chronic disease, while 77 percent report having two or more diagnoses (National Council on Aging, 2018). According to the National Council on Aging (2018), cardiovascular disease (CVD), type 2 diabetes mellitus (T2DM), cancer, and hypertension (HTN) related outcomes, such as stroke, are the main disease states which greatly impact mortality among older Americans, and account for approximately 75 percent of healthcare spending. Both Iowa and DC have comparable chronic disease rates to those nationally as shown in Table 2.1.

Table 2.1 Chronic Disease Rates Among Older Adults (United Health Foundation, 2019a-e)

Chronic Disease Condition	Nationally (%)	Iowa (%)	DC (%)
CVD	4.2%	12.4%	8.1%
T2DM	10.9%	10.0%	8.4%
HTN	32.3%	31.5%	26.7%

Table 2.1. Continued

Chronic Disease Condition	Nationally (%)	Iowa (%)	DC (%)
Obesity (Body Mass Index [BMI] >30kg/m ²)	30.9%	35.3%	24.7%

Many of the major chronic diseases affecting older adults can be attenuated by nutrition and physical activity. Decreased physical activity (Biswas, et al., 2015), as well as poor diet (Solbak, et al., 2017) are linked to higher incidences of chronic disease among adults. The *2015 Dietary Guidelines for Americans* note that most Americans are not meeting recommended amounts of key nutrients, such as Vitamin D, potassium, and dietary fiber; each of which promote optimal health and reduce risk of chronic disease (United States Department of Agriculture, 2015a). Thus, determining the multiple factors that are preventing older adults from taking part in healthful activities, such as regular physical activity and quality nutrition, is of great importance. By learning more about these barriers, community-based lifestyle interventions can tailor future educational, health related messages to be applicable and appropriate for this population. Providing community residing older adults with applicable health-related education is of great importance and offers this population the knowledge required to improve their nutritional and health status, remain physically viable, thus allowing them to maintain and/or improve their overall quality of life and level of independence.

In regard to healthcare utilization, older adults make up 26 percent of all practitioner office visits (Hing, et al., 2006). In 2018, the National Health and Nutrition Examination Survey (NHANES) noted that 84 percent of Americans between the ages of 65-74, as well as 89 percent of those above 75 years of age, reported being in contact with a medical practitioner within the last six months (CDC, 2018). Routine healthcare use is encouraged for all persons, of all ages,

and of all backgrounds to maintain optimal health and identify any potential issues. Zayas et al. (2016) reported the most common healthcare services used by older adults included home health, pharmacies (to fill prescriptions), hospital inpatient days, and outpatient visits to health practitioners. Healthcare tends to be used more heavily when the patient has health insurance, and has one or more chronic health conditions (e.g. CVD, T2DM, etc.) which require routine monitoring (Zayas, et al., 2016). Additionally, Zayas and others (2016) found the largest users of healthcare services perceived their health to be “fair” or “poor” while those who reported their health status to be good” or “excellent” moderately used healthcare services.

In addition to self-perceived health, there are many other factors such as environment, language barriers, and income, which have the potential to impact healthcare use, potentially limiting utilization and compliance (Mosadeghrad, 2014). Those who tend to have lower incomes and are considered to be less educated have poorer health outcomes than their more educated and more affluent counterparts (Braveman, et al., 2010). The same trend is noted regarding race and ethnicity, with those of different races other than white often having lower health outcomes and overall poorer health status (Braveman, et al., 2010). This health disparity may be due to a myriad of factors, possibly those in lower income or education brackets are not able to receive the same caliber or amount of health care services as those who are more affluent (Becker & Newsom, 2003), and possibly more culturally-based practices that may not be linked to income or education (e.g. differing food safety or dietary intake practices of differing cultures). Hence the need for research to pin-point specific factors that may influence health is important, and its translation into community health programming that is applicable and appropriate for all backgrounds is essential to improving health outcomes.

Social and Community Context

The older adult population is quickly becoming more racially, ethnically, and socially diverse. However, for persons of all ages, ethnicities, and sociodemographic backgrounds, the social and community context of one's life may impact health in multiple forms, such as social support, cultural implications, and nutrition practices. It is anticipated that by 2060, the percentage of White older adults will decrease 22 percent while, the percentage of Black and Latino older adults, will increase to 12.8 percent and 21 percent respectively (Administration on Aging, 2017; Mather, et al., 2019; Administration on Community Living, 2019a). It is also expected the future older adult population will be more educated (29 percent had a bachelor's degree in 2018), remain in the work force longer, and stay in their own homes versus moving to retirement centers or nursing homes (Mather, et al., 2019). Thus, to better enable the changing older adult population to thrive, the need for culturally appropriate research aimed at optimizing health and improving quality of life for persons of this age group is critical.

Older adults rely on multiple forms of support to remain healthy and independent, such as community support via outlets for physical activity (e.g. walking paths, community fitness centers, etc.), access to nutrition services (e.g. congregate meal sites, food pantries, etc.), community connectedness (e.g. senior center), and local health centers or community outreach options (National Association for Area Agencies on Aging, 2011). As many older adults are choosing to remain in their own homes, their proximity to these needed forms of support is important for maintenance of independence. Older adults may find themselves relying on community outreach for health education and programming, while those with more burdensome health needs may find little to no community support for physical activity, nutrition, and services related to mental well-being (e.g. socialization). Having access to appropriate social, community,

and health support is critical for successful aging by allowing the aging population the opportunity to remain viable and enable optimal well-being while aging.

Social support among community residing older adults is becoming a more widely recognized determinant in successful aging. Levasseur et al., (2010) define social participation as one's involvement in activities that provide social interactions within one's community. For many community residing older adults, participation in social events helps prevent the onset of cognitive decline, and encourages maintenance of mobility within the community; both of which impact the overall perception of life satisfaction among community residing older adults (Hwang, et al., 2018; Lee & Choi, 2019). For many persons in this population, social isolation can be a serious issue caused by a variety of factors, such as diminished social circles, lack of community resources for social interactions, and increased disabilities (Charles & Carstensen, 2014). Furthermore, disability is also a strong factor in social participation amongst community residing older adults (Burholt, et al., 2017). Hence, public health programs for this population should include aspects which enhance social participation amongst participants in addition to targeting specific behaviors in order to see beneficial results.

Education

Social aspects regarding education can hold a vital role in health and wellness, encompassing access to educational facilities (e.g. schools, libraries, etc.), quality of education, ability to comprehend health information, literacy, and language comprehension. Quality of health and education level are correlated, noting that generally the higher the education level a person has, the better quality of health/health status (Hahn & Truman, 2015; Kuczmarksi, et al., 2016; Jo, et al., 2018). Within recent years, the education level of older adults has risen by approximately 65 percent from 1970 to 2018 (Administration on Community Living, 2018). In

2018, 29 percent of adults over 65 held a bachelor's degree or higher. Additionally, high school graduation rates were shown to vary by race: 91 percent of older White persons, 78 percent older African Americans, 77 percent of older Asians, 75 percent of older Native Americans/Alaskans, and 57 percent of older Latinos/Hispanics held high school diplomas or GED certificates (Administration on Community Living, 2018). This increase in education is significant compared to 1970 when only 30 percent of older Whites and 9 percent of older African Americans had completed high school (Administration on Community Living, 2018).

Economic Stability

Health quality is closely related to lifestyle, and lifestyle is influenced by socioeconomic status (i.e. occupation, income, education) (Simandan, 2018; Wang & Geng, 2019). Wang and Geng (2019) noted that health is directly impacted by socioeconomic status and lifestyle; both being able to affect both physical and mental health significantly. Income status is consistently correlated with health status and impacts one's access to jobs, potential for food insecurity, homelessness, poverty, and procurement of nutritious food (Nord, 2007; Braveman, et al., 2010; Baggett, et al., 2011; Nord, et al., 2014). Generally, persons with lower incomes report lower levels of general health, and those with higher incomes report high levels of health (Curran & Mahutga, 2018; Wang, et al., 2018). In the US, 9.7 percent of older adults are estimated to live in poverty (Semega et al., 2018). Iowa is slightly lower at 6.6 percent of older adults living poverty (State Data Center of Iowa, 2019). However, in DC, 13.4 percent of older adults are living below the poverty line (Zickuhr, 2018). Low socioeconomic status (e.g. health, income, education, etc.) is often associated with increased nutritional risk, mental health conditions, and a variety of chronic health conditions (Banks, et al., 2017). Aging has the potential to exacerbate these risks, including malnutrition, severe mental health conditions and cognitive loss, as well as sarcopenia

and frailty (Fávaro-Moreira, et al., 2016), all of which greatly reduce one’s ability to remain in their own home, maintain independence, much-less age successfully.

In addition, food security is greatly impacted by one’s economic security (Braverman, et al., 2010; Nord, et al., 2014). The United States Department of Agriculture (USDA) defines food security as a lack of regular and consistent access to appropriate quantities of food for an active and healthy life (USDA, 2019a). Within this definition, there are varying levels of food insecurity, described in Table 2.2 (USDA, 2019a).

Table 2.2 United States’ Department of Agriculture’s Food Security Categories

Category	Definition
High Food Security <i>“Food security”</i>	No reported indications of problems with access or limitations of food procurement.
Marginal Food Security <i>“Food security”</i>	One or two reported instances of anxiety regarding food insufficiency or shortage of food within the household. Little to no report or indication of changes in diet related to food shortages.
Low Food Security <i>“Food insecurity without hunger”</i>	Indications of reduced quality and variety of diet; little to no indication of changes in dietary intake related to food available.
Very Low Food Security <i>“Food insecurity with hunger”</i>	Reports of multiple instances of changes and reduction of dietary intake.
USDA, 2019a	

Often those who are food insecure report inconsistent or lower amounts of funds available for the purchase of food and are forced to choose between rent and food or medications and food, and money for food can often be rated as a lower priority (Grafton & Dean, 2017). Nationally, 7.7 percent of older Americans are food insecure; Iowa reports a slightly lower food insecurity level at 6.3 percent, while DC is nearly three times as high as the national average at

19 percent (Ziliak & Gundersen, 2018; DC Hunger Solutions, 2018). Food insecurity incidence is also higher for those living alone versus with someone. In 2017, about 7.9 percent of households with one or more older adults residing in them were food insecure compared to 8.6 percent of older adults who were living alone (Coleman-Jensen, et al., 2018). Food insecurity is associated with multiple aspects of SDOH, including poverty, ethnicity, access to food and food intake, health status, physical limitations, and poor health management (Lee, et al., 2011; Strickhouser et al., 2016). Other SDOH that may impact food security and nutritional status include health literacy (the ability of one to comprehend and apply health related information) (Kuczmarski, et al., 2016) and employment status (Huang, et al., 2014; Nord, et al., 2014).

Income also influences the intensity and amount of physical activity performed by an older adult. In general, those residing in a higher income household report more intense but less frequent bouts of physical activity and more sedentary time (Shuval et al., 2017). In comparison, those residing in lower income households tend to report both less intense bouts of physical activity and more sedentary time (Shuval, et al, 2017; Xiao et al., 2018). Thus, developing comprehensive public health programming that addresses several aspects of the SDOH is critical to creating effective public health programs for older adults. For many older adults, maintaining their independence is of the utmost importance, but consequences of low activity, malnutrition, and chronic disease onset may lead to the loss of that coveted independence.

Nutrition Practices of Older Adults

Advances in medicine and health care have increased the life span of most individuals, thus the focus is starting to shift to how to effectively ensure that the years gained in life are productive and healthy. Quality nutrition is important for persons of all ages as it has the ability to reduce risk of disease, lower risk of obesity, and maintain physical functioning, (Govindaraju,

et al., 2018; USDA, 2019b; Barnard, et al., 2019). For an aging person, preservation of these things could mean prolonged autonomy, an optimal quality of life and the ability to age in place. Despite these health benefits, many older adults are not meeting the recommended intakes of produce, whole grains, dairy, lean proteins, or fats from seafood and plant proteins, and unsaturated fatty acids (USDA, 2016a; MacNab, et al. 2018). Krok-Schoen et al (2019) noted that if older adults are deficient in the consumption of one macronutrient and/or food group, it is likely the same person is also consuming less than the recommended amount of other food groups, posing the possibility of nutrient deficiency in a variety of micronutrients. Older adults of all sociodemographics who are choosing to consume diets low in nutrients and more energy dense foods are also at a higher risk for malnutrition and chronic disease than those who choose diets that are less energy dense and higher in quality nutrients (MacNab et al., 2018; Granic, et al., 2019).

Nationally, older adults in the US are eating a poor and/or inadequate diet (Wright et al., 2014). The 2015 Healthy Eating Index (HEI) measurements reported that older adults have an average score of 65.5 out of a total possible 100 points (USDA, 2015b). This score indicates that most older adults could improve their dietary intake, as current intakes are not aligned with the 2015 *Dietary Guidelines for Americans* (USDA, 2015a). The SDOH greatly influences nutrition. Diet quality and nutritional status are affected by all SDOH factors (i.e., neighborhood and environment, cultural and social contexts, health status, economic stability, and education). Many older adults across the US of varying gender, ethnicity, income, and education level are consuming diets higher in saturated fat, total fat, and total sugar than is recommended (USDA, 2016b). The literature demonstrates that many older adults consume diets higher in total calories, fat, and refined grains due to more frequent meals and snacks throughout the day, as well as

higher intakes of sugar sweetened and high fat items, convenience items; thus leading to decreases in major nutrient groups, such as whole fruits and vegetables, and whole grains (Piernas & Popkin, 2010; Johnston, et al., 2014). Over consumption of these foods and an overall poor diet quality may lead to unfortunate health outcomes, such as being overweight/obese, CVD, T2DM, depressive symptoms, and potentially loss of mental function (Akbaraly, et al., 2009; Hodge et al., 2014; Center for Disease Control and Prevention, 2020).

Conversely, some older adults may experience a decrease in total dietary intake due to dentition issues, dysphagia, or loss of appetite, also creating potential nutrient deficiencies among this population (Schlip et al., 2011; Castrejon-Perez, et al., 2017; Huppertz, et al., 2018). Poor quality of dietary intake or blunt decreases of intake frequency can lead to increased risk for health ailments and nutrient deficiencies amongst the aging population that may be detrimental to independence (USDA, 2015a). Consequences of nutrient deficiencies and/or low dietary intakes include sarcopenia and calcium deficiency (e.g., osteoporosis) (Bauer, et al., 2013). Both of which can potentially threaten an aging person's ability to be physically active and remain independent.

Nutritional status is closely associated with health and overall quality of life for the aging adult. Nutritional status and dietary intake both have the potential to greatly impact disease states, thus influencing one's ability to remain physically viable, care for one's self, and remain independent. Thus, providing appropriate and applicable nutrition education to the aging person regularly is essential and will aid in ensuring that this population receives the needed information to remain physically active, healthy, and independent.

Malnutrition

Malnutrition is of growing concern amongst older adults. It is estimated that 1 to 15 percent of community-residing older adults, and 25 to 65 percent of hospitalized and/or older adults who are institutionalized are at risk for malnutrition (Soenen & Chapman, 2013; Fávaro-Moreira, et al., 2016). As for the prevalence of diagnosed malnutrition, it is estimated to be lowest in community settings (<5 percent), and highest in long term care/rehabilitation living settings (Cereda et al., 2016).

Malnutrition refers to both undernutrition and over nutrition, impairing health and quality of life (Leslie & Hankey, 2015; WHO, 2018). Malnutrition may manifest due to medical conditions (e.g., cancer, chronic obstructive pulmonary disease, and various gastrointestinal diseases) or treatments (e.g., polypharmacy, radiation) that limit the body's ability to metabolize and absorb nutrients (Gerontological Society of America, 2015), as well as low/inappropriate intake of specific nutrients (Power, et al., 2014). Many factors play a role in malnutrition, such as poor diet, income, food access, recurring infections, poor dentition, and dysphagia (difficulty swallowing) (Leslie, Hankey, 2015; Gerontological Society of America, 2015).

Due to limited screening, malnutrition often goes unrecognized and undiagnosed, leading to a host of health complications, including increased mortality, sarcopenia (loss of muscle mass), loss of skin integrity, loss of functional ability, and potentially loss of independence (Ahmed & Haboubi, 2010; Litchford, et al., 2014; Sieber, 2019). Aging is a significant risk factor alone for malnutrition and other nutrient deficiencies capable of reducing quality of life and functional physical ability (Ahmed & Haboubi, 2010). Weight fluctuation is normal with aging; however, weight change is not the only marker for poor nutritional status (Keller, 2019). Poor nutritional status in aging coincides with overall decreases in food intake, particularly

inadequate intake of proteins, which are associated with declines in nutritional status and muscle mass (Gerontological Society of America, 2015), thereby further reducing the functional ability of older adults, and potentially the loss of independence.

In addition to one's age, malnutrition risk is also impacted by one's economic status. Economic status plays a large role in the amount and quality of food to which one has access. "Healthier" food options tend to be more expensive, and when food budgets shrink, individuals tend to purchase cheaper, less nutrient rich foods (Drewnowski & Eichelsdoefer, 2010). The environment in which one lives also plays a role in the nutrition quality and ability to procure healthful food in adequate amounts. Rural-residing older adults are noted to experience more social isolation and difficulty transporting themselves to purchase healthful foods, leading to increased depression and loneliness, which has also been shown to decrease appetite and overall food intake in the aging population (Jung, et al., 2019). Many rural families experience food insecurity more than urban dwellers. Nationally, 15.5 percent of rural residing households are classified as food insecure compared to 12.5 percent of urban households (Rural Health Information, 2019b). This can result in reduced food intakes and increased risk for malnutrition. The Supplemental Nutrition Assistance Program (SNAP) is the nation's largest, federally funded nutrition assistance program (SNAP, 2018). It is designed to aid in alleviating food insecurity by providing allotted amounts of money to eligible persons below a certain income threshold. Many older adults across the US qualify for SNAP benefits, but generally the program only has moderate participation rates among this age group. Nationally, only 42 percent of eligible persons over the age of 60 participate in SNAP (Food Research and Action Center, 2019). Other states/territories see similar participation rates among this same population. For example, Iowa

and DC report that only 36 percent and 46 percent of eligible older adults receive SNAP benefits respectively (Food Research and Action Center, 2019).

In addition, both rural and urban residing residents of all ages often experience “food deserts”, which is defined as areas that are void of healthful, whole foods (American Nutrition Association, 2019; USDA, 2019c), and are measured by having less than 33 percent of census tract population living more than one mile from a grocery store/super market in urban areas and more than 10 miles from such establishments in rural areas (Dutko, et al., 2012). Food deserts can be especially challenging for many older adults and they often find themselves with little to no means of transportation, reduced ability to travel the distance required to purchase foods, and have little to no alternative options in which to procure food outside of community or familial support, neither of which is guaranteed for older adults living in such an environment (Ver Ploeg, 2010). More urban dwellers report living in food deserts (29.8 percent) and/or have little access to markets at which to purchase fresh and healthful foods (Rural Health Information, 2019c). However, 5.8 percent of rural-residing older adults report having to drive 10-20 miles to the nearest grocery store, potentially limiting their abilities to procure nutritious foods (Rural Health Information, 2019c). Living in an area devoid of places to purchase healthful foods further reduces quality of diet and overall intake of nutrient dense foods thereby leading to poor dietary intake and other diet related conditions, such as malnutrition (Ver Ploeg, 2010).

Proper dietary intake and nutritional status are cornerstones in the process of healthy aging, as they play a large role in mitigating disease risk and maintenance of body composition, ultimately allowing for maintenance of overall health and independence (Office of Disease Prevention and Health Promotion, 2019c). Many community health programs exist to educate the aging population in regard to maintaining autonomy within their own home and community, so

that the older adults are able to make positive lifestyle changes (Homenko et al., 2010; Francis, et al., 2014; Cates, et al., 2014, Lillehoj, et al., 2018). However, quality nutrition and dietary intakes alone will not ensure a successful aging process, as many other important behavioral aspects come into play. Nutrition paired with regular physical activity practices are often cited together as being the optimal form of maintenance of health for persons of all ages and all backgrounds (Elliot & Hamlin, 2018; Office of Disease Prevention and Health Promotion, 2019c); this being especially true for older adults.

Physical Activity for Older Adults

In addition to nutrition, taking part in regular physical activity promotes successful aging and aging in place as well as many other benefits. Physical activity is an essential component of successful aging and is defined as “any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure” (WHO, 2019). Low physical activity and excessive sedentary time in older adults is a strong predictor of physical limitations and disability (Vaz Fragoso, et al., 2014). Staying physically active lowers risk of frailty, which is a “geriatric syndrome that can severely limit physical activity and exercise” (Langlois, et al., 2012), decreases the risk of hip fractures, chronic disease risk (e.g., cardiovascular disease, diabetes), increases bone density, reduces muscle loss, lowers fall risk, improves physical functioning and mobility, lowers depression risk, and improves cognitive function (Musich, et al., 2017; Vasankari, et al., 2017; Belza, 2017; Verhoeven, et al., 2016; Vaz Fragoso, et al., 2014; Giné-Garriga, et al., 2014; Langlois, et al., 2012; Tucker-Seely, et al., 2009). Even moderate increases in physical activity from a complete sedentary state positively impacts health and exercise capabilities (Belza, 2017). Therefore, avoiding sedentary behavior and encouraging regular physical activity and exercise is crucial for healthy aging.

The American College of Sports Medicine and the American Heart Association recommend adults participate in at least 150 minutes of moderate aerobic exercise weekly or 75 minutes of vigorous exercise weekly, as well as muscle strengthening activities at least twice weekly. Older adults who are not able to meet the recommended time for physical activity are encouraged to be as physically active as abilities and chronic conditions allow (*Physical Activity Guidelines for Americans*, 2018). In fact, even short bouts of movement (e.g. walking for five to ten minutes, small amount of stretches, etc.) can be beneficial (*Physical Activity Guidelines for Americans*, 2018). Furthermore, older adults who are physically active, no matter their body types (obese or frail), experience the same health benefits (*Physical Activity Guidelines for Americans*, 2018).

Despite the numerous and well-documented benefits of regular activity, older adults are not meeting the recommended amount of physical activity (CDC, 2013; Keadle, et al., 2016; Zenko, et al., 2019). Nationally only 17.6 percent of adults over the age of 65 meet the physical activity guidelines (CDC, 2017). Iowa and DC rates are similar at 15.6 and 19 percent respectively (CDC, 2017). Physical activity participation among older adults can be negatively impacted by many factors, such ethnicity, environment, means of activity, poverty, disabilities, and issues with physical functioning (e.g., arthritis, weakness, etc) (Watson, et al., 2016). Other factors that may influence an aging person's ability and/or interest in physical activity may include gender, social interaction, commitment to exercise, and level of enjoyment (Sandlund, et al., 2018; Sandlund, et al., 2017). Nationally, older adults report large amounts of sedentary time. About one-third (32.5 percent) of older adults in the US live a mainly sedentary lifestyle; the prevalence is higher amongst those who are Black and Latino (United Health Foundation, 2019).

This high rate of sedentary behavior may also be attributable to higher poverty rates among these racially diverse groups (Semega, et al, 2017).

Sedentary behaviors are becoming more common place among populations as cultures and societies shift to include more technology and reduced need for consistent physical activity, such as walking or carrying objects for lifestyle purposes. Sedentary behaviors include any activity that requires an energy expenditure from 1.0 to 1.5 basal metabolic rate, in either a sitting or reclining position (Pate, et al., 2008). Aging has the potential to bring about a host of health ailments, potentially limiting one's quality of life and overall health. Time spent in sedentary behavior can greatly exacerbate health conditions and/or increase risk of onset amongst older adults, and common sedentary behaviors (Lee, et al., 2012). Older adults tend to spend the majority of their waking time spent in sedentary behaviors (Matthews, et al., 2008; Davis, et al., 2011). Matthews et al. (2008) noted that older adults reportedly spend about 8 to 12 hours a day in sedentary behaviors, such as sitting and lying down. Excessive amounts of sedentary time for all persons is known to lead to poorer health outcomes. Older adults who choose to partake in high amounts of sedentary behavior also have an increased risk of more severe health ailments, such as metabolic syndrome, increased blood lipids, hypertension, increased waist to hip ratio, obesity, poor mental health, and all-cause mortality (Bankoski, et al., 2011; Gardiner, et al., 2011; Gomez-Cabello, et al., 2012; Buman, et al., 2010; Pavey, et al., 2012). Complications related to low physical activity and high sedentary time reduces one's ability to remain physically active. This adversely impacts one's health and quality of life and jeopardizes one's ability to remain independent as their degree of care required increases dramatically related to serious diagnoses. Thus, to encourage successful aging, reduction in sedentary behaviors should be encouraged.

One particularly important barrier towards physical activity for older adults is the environment in which they live. The environment can adopt a more meaningful role as declining health and physical ailments make time spent in the neighborhood more likely. Older adults may become more confined to their immediate environment due to limited physical functioning (Tucker-Seely, et al., 2009), inability to drive, and poor access to and/or reliability of public transportation (Rural Health Information, 2019c).

Physical activity among all age groups is influenced by the perceived safety of a neighborhood or community. Tucker-Seely and others (2009) reported that if there are multiple problems and/or safety concerns reported in a neighborhood, the residents are more likely to be in poorer physical and/or emotional health, be considered obese, and are more likely to be sedentary than others who report neighborhoods with few to no problems which are considered to have a high sense of safety. However, in safer and more affluent neighborhoods, the residents tend to be more active (Tucker-Seely, et al., 2009). In addition, closeness to various facilities for physical activity such as parks, trails, and recreational facilities is associated with higher rates of overall activity among the aging population (Xiao, et al, 2018). Urban and rural areas both have the capability of providing such facilities for physical activity, however much of the ability to provide such facilities depends on the income level of the area, meaning environments can be variable in what they are able to provide to their residents in terms of health promoting facilities.

Diet quality and regular physical activity encourage successful aging and optimal quality of life. Community health and wellness programming focused on educating the older adult population on healthful life practices, such as quality diet and regular physical activity have the potential to reduce the instance of health-related diseases (Miyazaki, et al., 2016). As adults continue to age, educating them regarding quality nutrition practices and encouraging regular

physical activity are essential regardless of outside influences, including all aspects of the SDOH.

Sarcopenia

Sarcopenia is a growing public health concern for the older adult population. Sarcopenia is defined by loss of skeletal muscle function and mass, and can lead to physical disability, poor quality of life, and loss of independence (Santilli, et al., 2014). Sarcopenia can be prevented and/or mitigated through diet (protein intake) and exercise (Robinson, et al., 2018; Ligouri, et al., 2018; Dodd & Tee, 2012).

Sarcopenia risk is influenced by age, various chronic diseases (e.g., CVD, chronic kidney disease, osteoporosis, etc.), nutritional status (malnutrition), and sedentary behaviors (Yoon, et al., 2018; Senior, et al., 2015). An estimated 25-45% of older adults, regardless of status of community residing, institutionalized, or hospitalized, are affected by or are at risk for developing sarcopenia (Brown, et al., 2015). Sarcopenia is diagnosed based on the presence of low muscle mass and low muscle strength or low physical performance (Cruz-Jentoft, et al., 2010).

Older adults are also subject to sarcopenic obesity, which is the presence of excess adipose tissue but significant loss of muscle mass, leading to weakness (Santilli, et al., 2014). Aging adults can experience quick loss of muscle mass, decreasing as much as 30 to 50 percent between ages 40-80 years (Paddon-Jones & Leidy, 2014). Loss of muscle mass and function greatly reduces one's ability to meet physical activity guidelines. This in turn reduces the ability of one to stave off chronic disease, reduces bone mass, increases risk of injury from falling, and potentially may lead to loss of independence and ability to perform regular ADL.

Consuming a protein-rich diet and getting regular physical activity are essential in preventing and treating sarcopenia. It has been recommended in several studies that older adults should consume 30 grams of protein per eating occasion, estimating about 90 grams of protein daily for optimal outcomes in muscle maintenance and/or improvement (Paddon-Jones & Leidy, 2014). This amount is in-line with current medical nutrition therapy suggested protein intakes. The traditional protein intake recommendation for older adults is 1.0 to 1.2 grams of protein per kilogram of body weight daily. For a 150-pound female this would be between 68.2 to 81.8 grams protein daily. Those with an acute or chronic disease are encouraged to consume 1.2 to 2.0 grams of protein per kilogram of body weight daily (e.g. 81.8 grams to 163.6 grams daily for a 150-pound female) (Bauer, et al., 2013). Those with more severe disease states, an intake of up to 2.0 grams per kilogram of body weight daily may be required (Bauer, et al., 2013).

Treatment of sarcopenia among older adults includes regular physical activity and exercise combined with appropriate protein intake and protein supplementation as needed (Martone, et al., 2017). Regular aerobic activity paired with resistance exercise successfully aids in muscle maintenance, maintenance of strength, and maintenance of muscle regeneration as opposed to degradation (Liu & Latham, 2009; Zoo, et al., 2013). Currently in literature, there are no set recommendations as to the amount of time spent in the different types of activity and exercise required to treat sarcopenia. Older adults are encouraged to comply with the American College of Sports Medicine recommendations for physical activity and exercise, and those with ailments limiting their physical ability are encouraged to participate in as much activity as physically possible.

Nutrition and Physical Activity Education Interventions for Older Adults

To best support the health and quality of life of community residing older adults, it is necessary to provide effective, community-based health programming designed to inform older adults how to maintain and/or improve their overall health and wellbeing, nutritional risk, and functional fitness. Doing so will better enable them to remain independent. These community health programs need to be holistic and address the SDOH in their design and implementation (e.g., be taught at the appropriate education level of audience, be culturally relevant, address specific health concerns of the target population, etc.). Community nutrition and physical activity interventions have the potential to influence overall health and independence by providing knowledge, and encouraging/ promoting behavior change (Li, et al, 2016; Mountain, et al., 2017). An effective strategy of providing older adults with the necessary information to maintain their health, wellness, and independence is providing them with strong, research- and evidence-based education. This type of programming is effective in promoting positive health outcomes (Black, et al., 2015; Akanni, et al., 2017; Lee, et al., 2018).

The Supplemental Nutrition Assistance Program (SNAP) Education (Ed) program defines evidence-based approaches for nutrition education and obesity prevention as and integration of research evidence with credible practice-based evidence (SNAP-Ed, 2015). Thus, evidence-based programs for SNAP-Ed have 1) shown through evaluation to be effective in improving the health and well-being and/or reducing incidence of disease, disability, and injury among older adults, 2) proven effective with the older adult population via experimental designs utilizing randomized control trials, and 3) published findings in peer-reviewed journals (USDA SNAP-Ed Connection, 2015). Such programming for older adults is growing and offers

the potential for community health organizations to reach diverse and vulnerable populations (Lee et al., 2018; Smith et al., 2017).

The Supplemental Nutrition Assistance Program -Education (SNAP-Ed)

The SNAP is the largest nutrition assistance program in the United States and provides nutrition assistance to eligible persons, living at or below the poverty line (SNAP, 2018). For many persons living in poverty, food security is a major concern. The goal of SNAP is to provide regular access to healthful food and nutrition education among those with lower incomes (SNAP, 2018). In addition to the SNAP, there is SNAP-Ed. SNAP-Ed provides audiences with limited incomes with health education regarding healthy eating, food resource management, physical activity and reducing sedentary behavior, and food safety on an individual basis for both short and long term bases (SNAP-Ed Toolkit, 2019). Table 2.3 notes the behavioral outcomes of which the Food and Nutrition Services (FNS) encourages states to focus their SNAP-Ed programs (SNAP-Ed Toolkit, 2019).

Table 2.3. Behavioral Outcomes on which SNAP-Ed Programs Focus

Behavioral Outcomes	Influence on Health
Follow a healthy eating pattern	Support a health body weight and nutritional adequacy.
Encourage healthier food and beverage choices	Nutritional adequacy: encourage intake of fruits, vegetables, lean proteins, whole grains, low-fat dairy.
Reduce sodium intake	Encourage nutritional adequacy, reduce incidence of hypertension.
Meet Physical Activity Guidelines for Americans	Healthy body weight, prevention of chronic disease, maintenance of muscle mass and integrity.

SNAP and SNAP-Ed have been successful in influencing behavior change, such as improved dietary intake, decreased food insecurity, reduced hospital visits, and nursing home use in older adults (McClelland, et al., 2013; USDA , 2016; Kim, 2015; Lillehoj, et al., 2018).

Fresh Conversations

In Iowa, the SNAP-Ed program for older adults is *Fresh Conversations* which is offered in 66 out of the 99 Iowa counties. *Fresh Conversations* is designated as “evidence-based” by the national SNAP-Ed program (SNAP-Ed Toolkit, 2020). *Fresh Conversations* is a newsletter-based, monthly nutrition program that provides older adults with education regarding specific lifestyle behaviors, including: nutrition, physical activity, general health, food safety, and food security (Lillehoj, et al., 2018).

Fresh Conversations is based on the Health Belief Model (HBM). The HBM is a behavior-change, theoretical model used in public health programming (Rural Health Information, 2019d). The HBM notes the fundamental considerations that influence health behaviors: 1) one’s perceived threat to disease and/or belief of consequence (perceived susceptibility, perceived severity), 2) potential benefits of behavior change (perceived benefits), 3) perceived barriers to behavior change/action, 4) acknowledgement to elements that prompt behavior/action (cues to action), and 5) confidence in success and accomplishment of behavior change (self-efficacy). Monthly HBM reviews of *Fresh Conversations* indicate that all HBM constructs are being addressed in the newsletters and meetings.

At meetings, participants receive a four-page newsletter and participate in a 30-40 minute facilitative educational meeting regarding the monthly topic. Contents of the newsletter and meeting are aimed at individual perceptions of the behavior (i.e. perceived severity or perceived susceptibility), modifying factors (i.e. knowledge, call to action), and likelihood of action (i.e. perceived benefit). Active reviews of the newsletters are performed by members of the research team to ensure that all topics of the HBM are met in each newsletter. Also at *Fresh Conversations* meetings, participants are involved in both active (e.g. group discussions or

activities) and passive discussions (e.g. refer to education components in newsletter) led by trained, facilitators addressing desired behavior change. Each session is designed to be interactive and include goal setting, a physical activity session, and recipe tasting.

A 2019 program fidelity assessment found the *Fresh Conversations* program to have a high fidelity rating, indicating that the program was being implemented the way it was intended (Francis & Contrady, unpublished report, 2019). In the same study, the majority of *Fresh Conversations* facilitators received a score of “good” or “excellent”, further indicating that topics were being instructed in an appropriate manner (Francis & Contrady, unpublished report 2019).

Fresh Conversations is effective in promoting lifestyle changes. Lillehoj et al. (2018) noted those who attended *Fresh Conversations* four or more times had a better nutritional status than those who did not. Additionally, a *Fresh Conversations* satisfaction survey revealed over 97 percent of participants were either “satisfied” or “very satisfied” with the program as a whole (Contrady, et al., 2019). Also, 86.5 percent of participants in the same study “agreed” or “strongly agreed” that *Fresh Conversations* helped them make healthy lifestyle decisions (Contrady, et al., 2019).

Since the nutritional impacts of SNAP-Ed programming are well documented, SNAP-Ed programming has thus put a greater emphasis on better promoting physical activity. One way in which to design an effective physical activity program is to gain a better understanding of what the target audience needs and wants. One way to achieve this is by applying the Social Marketing Theory (SMT) (Lefebvre & Rochlin, 1997; Storey, et al., 2008).

Social Marketing Theory (SMT)

The SMT is a program development theory used to design client-centered health education programs. It makes use of commercial marketing and promotion strategies for health

purposes (Andreason, 1994), and aims to address the desired health outcomes through promoting health behaviors to the target audience. Applying SMT towards program development helps: 1) emphasize understanding the range of perspectives held by the target audience necessary to bring about behavior change, 2) accentuate the importance of developing a research-based program specific to target audience and desired behavior, and 3) recognize the need to include all elements needed for change to occur within the target audience (Lee & Kolter, 2015). The SMT is comprised of six steps: first, planning and strategy; second, selecting channels of communication and education materials; third, developing and pretesting educational materials; fourth, implementing designed materials; fifth, assessing effectiveness of educational materials; sixth, gathering feedback and revise materials as needed to fit intended outcomes (Lefebvre & Rochlin, 1997; Storey, et al., 2008).

To augment the abilities of SMT to successfully impact the chosen program, it is important to include the audience in both planning and strategy. For example, focus groups and surveys are able to provide necessary information regarding the target audience that can be effectively utilized within the model to develop appropriate materials. Utilization of focus groups to gather information such as needs and preferences has been noted to be particularly useful for development of products associated with the older adult population (Francis, et al., 2004; Hoerr et al., 2016; Roy et al. 2016). The SMT has been employed successfully in many community nutrition programs specific to older adults (Francis, et al., 2004; Francis & Taylor, 2009; Tan, et al., 2010; Roy et al. 2016), thus showing effectiveness of the model and its ability to appropriately recognize needs and preferences of the target audience and fabricate successful educational programming.

Summary

Amongst most aging adults, aging in place is a common goal. However, with aging comes the potential for various changes in physical health and ability that may jeopardize one's autonomy and ability to remain independent. Positive lifestyle behaviors including consuming a nutrient-rich diet and taking part in regular physical activity increase one's ability to remain independent. In order to support healthy aging and maintenance of independence among older adults through community-based lifestyle interventions, it is necessary to: 1) assess the needs of this age group regarding their ability to implement positive lifestyle behaviors (e.g., physical activity, nutrition, etc.) and 2) understand the nutritional practice and physical activity of aging adults. Both will aid in developing a deeper understanding of knowledge and behavior gaps to be addressed via community educational programming and allow for greater implementation of positive lifestyle behaviors that are known to increase one's ability to age in place.

CHAPTER 3. METHODOLOGY

Research Design

A mixed methods research design was used, combining both qualitative and quantitative data, to conduct a comprehensive physical activity needs assessment of community-residing older adults. Study One examined the needs and factors impacting regular physical activity of community residing older adults in Iowa and DC. Study Two explored the physical activity practices of community-residing older Iowans who participate in the congregate meal program. For both studies, the research protocols were reviewed by Iowa State University's International Review Board and classified as exempt (Appendix A). In addition, the University of the District of Columbia Institutional Review Board reviewed the Study 1 protocol applied by the DC research team and classified it as exempt (Appendix A).

The Social Marketing Theory

The Social Marketing Theory (SMT) is a program development theory which makes use of commercial marketing and promotion strategies for health purposes (Andreason, 1994). The SMT has been used to create many effective health programs (Francis, et al., 2004; Hoerr et al., 2016; Roy et al. 2016; MacNab, et al., 2017; Keane & Francis, 2018). The SMT aims to address the desired health outcomes through promoting health behaviors to the target audience via six, cyclical steps: first, planning and strategy; second, selecting channels of communication and education materials; third, developing and pretesting educational materials; fourth, implementing designed materials; fifth, assessing effectiveness of educational materials; sixth, gathering feedback and revise materials as needed to fit intended outcomes (Figure 3.1) (Lefebvre & Rochlin, 1997; Storey, et al., 2008). Applying SMT to the development of public health programming helps: (1) emphasize understanding of the topic held by the target audience, (2)

emphasize the importance of creating a research-based program which is tailored to the needs of the target audience and the desired behavior, and (3) work to include all components needed for behavior change to occur (Lee & Kolter, 2015).

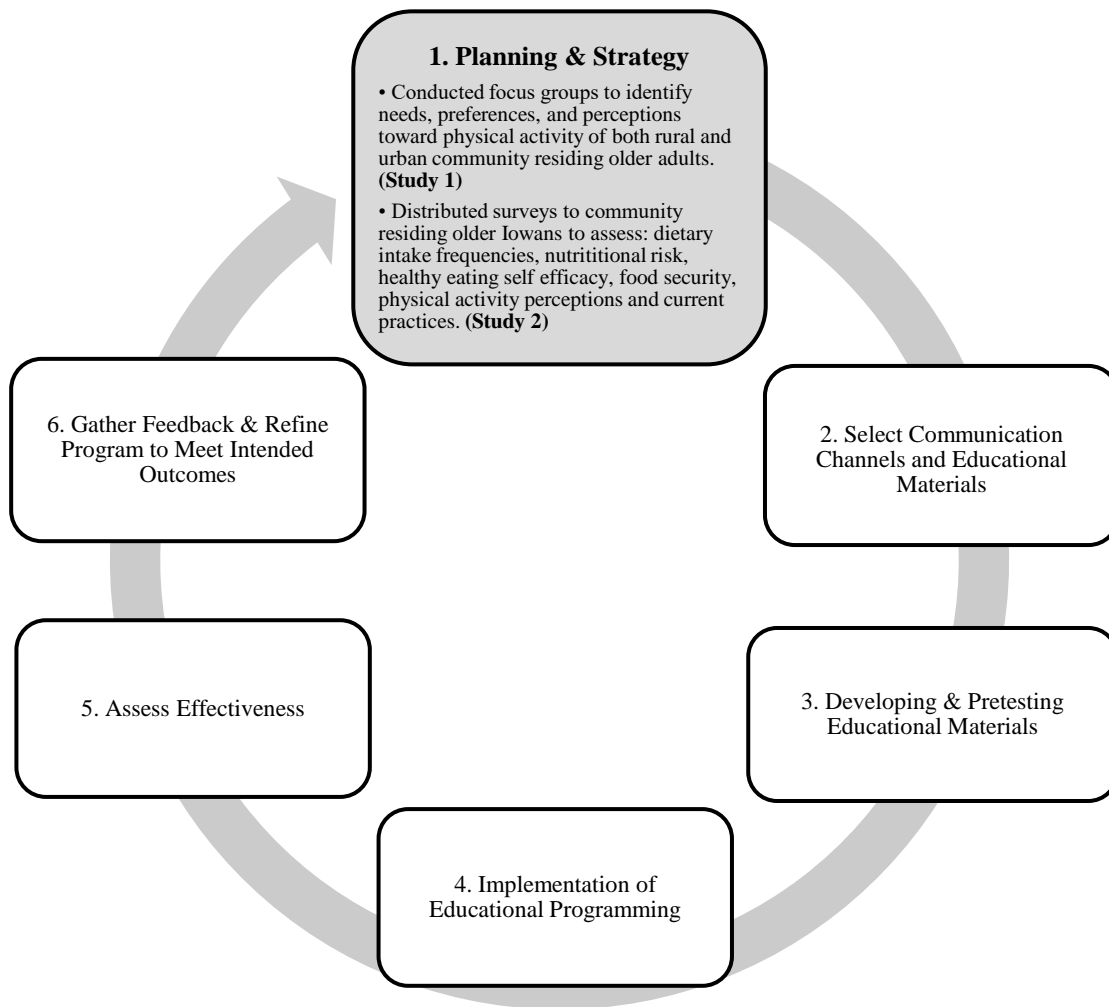


Figure 3.1. Method of Which Programs Utilize Social Marketing Theory (Lefebvre & Rochlin, 1997; Storey, et al., 2008)

The first three SMT steps focus on gathering information and data from the target audience, such as needs, preferences, and perceptions, which will be used to create appropriate and applicable educational materials and/or programming (Lefebvre, & Rochlin, 1997; Storey, et

al., 2008). SMT Step 1 assesses the audiences' preferences, needs, and current practices, which can then be applied by program developers to create client-centered education and programming (Lefebvre & Rochlin, 1997; Storey, et al., 2008). SMT Steps 2 and 3 utilize the information from step 1 to develop and test the intervention, program, and supplemental materials (Lefebvre & Rochlin, 1997; Storey, et al., 2008). SMT Steps 4 and 5 then focus on the implementation of the created programs and educational materials, and evaluating the effectiveness based on intended program outcomes (gathered in step 1) (Lefebvre & Rochlin, 1997; Storey, et al., 2008). Step 6 of the SMT gathers participant feedback regarding the program and materials and improves the program as needed based on intended program outcomes (Lefebvre & Rochlin, 1997; Storey, et al., 2008). Studies 1 and 2 focused on "SMT Step 1: planning and strategy" to assess community residing older adults physical activity needs, preferences, perceptions, and practices which can be applied by community health organizations to develop appropriate and relevant physical activity education for community residing older adults.

Study One: Physical Activity Needs Assessment for Community Residing Older Adults

Study Design

Participants

Adults age 60 years and older who attended the congregate meal program at five meal sites in Iowa (n=52 participants), and Washington D.C.'s (DC) *Senior Companion* and *Respite Aide* programs (n= 66 participants) were invited to take part in focus group discussions. The Iowa locations were comprised of two urban counties (ERS code = 2) and three rural counties (1 with an ERS code = 6 and 2 with an ERS code = 9) while all of the DC focus groups were urban (ERS code = 1) (USDA, 2013).

Data Collection

Participants (n=118) in both states completed a 16-question survey prior to beginning the focus groups (Appendix B). The survey inquired after sociodemographic information and perceived physical activity level. Participants then took part in a discussion lasting up to two hours, consisting of seven questions (Appendix C). Iowa focus groups were conducted in Summer 2018 while the DC focus groups were conducted in Summer 2019.

The focus group questions were initially designed to be interactive; however, during the first Iowa focus group, it was noted the question design was not enabling quality discussion amongst participants and questions were perplexing for some participants. It was also noted that the interactive design did not help participants to provide any new or helpful information. The questions were rewritten using a standardized, open-ended, focus group approach. These questions were used for the remaining four Iowa focus groups, and all DC focus groups. For theme analysis, only one question from the first Iowa focus group was used, as it was asked to each focus group. No other questions from the first Iowa focus group were used for theme analysis. All questions from the DC focus group discussions were used for theme analysis.

All Iowa focus groups were conducted in the English language. In DC, focus groups were held in English, Spanish, and Chinese. The focus groups completed in non-English were conducted through the help of trained translators. All focus groups were audio recorded and transcribed verbatim for theme analysis. The Iowa recordings were transcribed by a graduate research assistant who was not present at the meetings. DC utilized a professional transcription service for the focus groups which were held in English and utilized the focus group facilitators for verbatim transcriptions of the focus groups held in Spanish and Chinese.

Data Analysis

The sociodemographic data from both states were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 25.0. The sociodemographic data of all participants were analyzed using descriptive statistics. We applied the Kruskal-Wallis H Test to determine if there were significant sociodemographic differences between groups.

Transcriptions of the discussions were analyzed for major themes using framework analysis (Rabiee, 2004). Iowa researchers analyzed and reported on themes for Iowa focus groups. DC researchers analyzed and reported on themes for the DC focus groups (Harrison et al., 2020). In Iowa, a team of graduate research assistants (n=3) were trained in thematic framework analysis by Francis and reviewed the transcripts independently to assess major themes within the Iowa focus group discussions. Following independent analysis conducted by the graduate assistants and Dr. Francis, the research team (n=4) met for further discussion of major themes via indexing, charting, and interpreting; group theme analysis utilized for theme analysis using standard protocols (Rabiee, 2004), leading to the development of a codebook used for qualitative analysis. No discrepancies regarding major themes were noted by Iowa research team members. Theme analysis in DC was conducted similarly to Iowa's. DC researchers (n=7) reviewed the DC focus group transcripts on an individual basis for major themes, and then came together as a team to further analyze major themes (Harrison et al., 2020).

Study Two: Physical Activity Behaviors of Older Iowans Attending Community Food and Nutrition Programs

Study Design

Participants

This cross-sectional study explored the physical activity behaviors and dietary intakes of community-residing older adults attending the congregate meal program in Iowa. To be included

in the study, participants needed to attend a meal site involved in the study, be at least age 60 years or older, be English speaking, literate and willing to complete the survey. All participants received a small gift for their time.

The sample size goal was to reach 20 meal sites that were offering the SNAP-ED program, *Fresh Conversations* and 8-12 meal sites not offering it; surveying a total of 28-32 meal sites (Goal number of participants= 280-640). However, due to the COVID-19 pandemic of 2020, this study was cut short for safety of researchers, participants, and meal site workers. Twelve total meal sites were surveyed in March of 2020 (n=176 participants). Eleven offered *Fresh Conversations* (n=165 participants), and one did not (n=11 participants).

Data Collection

Participants completed a nine-page questionnaire comprised of validated tools designed to assess nutritional risk, dietary intake frequencies, healthy eating self-efficacy, physical activity and sedentary behaviors, and sociodemographics (Appendix D). The questionnaires were distributed by *Fresh Conversations* facilitators who were trained by Francis.

Sociodemographics

Sociodemographic questions asked about age, race, gender, highest education level completed, marital status, living arrangement (e.g. alone or with someone, such as a roommate, spouse, family member, etc.), and the county in which the congregate meal site was located.

Food security

For the purpose of this study, food security was defined as the ability of one to have reliable and consistent access to an appropriate amount of food for a healthful and active life (USDA, 2019). To assess the food security level of participants, the two-item food security screening assessment was utilized (Hager, et al., 2010). Participants were asked to note their

ability to procure more food based upon worry that they would run out before they could buy more and that the food they had did not last until they had money to purchase more. Participants were asked to answer: often true (1 point), sometimes true (1 point), never true (0 points) or don't know (0 points). The scores for each response were added to provide a food security score (0= food secure, 1 or 2= food insecure) (Hager, et al., 2010).

Nutritional risk assessments and dietary intake frequencies

Nutritional risk and dietary intake frequencies were measured using the Dietary Screening Tool (DST) (Bailey et al., 2007; Bailey et al., 2009). The DST is a 25-question validated screening tool for use with older adults, with sensitivity ratings of 83 percent and specificity ratings of 75 percent (Bailey et al., 2007; Bailey et al., 2009). The DST assesses dietary intake frequencies of whole fruit, fruit juice, vegetables, total and whole grains, lean proteins, added fats, added sweets, dairy, and processed meat (Bailey et al., 2007; Bailey et al., 2009). The DST categorizes intakes into two different dietary patterns: "Prudent" and "Western" (Table 3.1) (Bailey et al., 2007; Bailey et al., 2009). The "Prudent" dietary pattern reflects the more nutrient dense diet, consisting of whole fruit and fruit juice, vegetables, total and whole grains, dairy, and lean proteins. For the "Prudent" dietary pattern, more points are allotted to greater intakes of these food groups. The "Western" dietary pattern is considered the less nutrient dense dietary pattern, consisting of added fats, added sugars, sweets, and processed meats. More points are allotted for lower intakes of these food groups.

Table 3.1. Dietary Screening Tool (DST) Dietary Intake Categories and Scoring

Dietary Pattern and Dietary Category	Maximum Point Value
Prudent^a	
Whole fruit and juice	15
Vegetables	15
Total and whole grains	15
Lean proteins	10
Dairy	10
Western^b	
Added fats, sugars, sweets	25
Processed meats	10
Supplement use (e.g., vitamin, minerals, or nutritional supplement [e.g. protein shake])	+5
^a Higher scores reflect higher dietary intake frequency (desired)	
^b Higher scores reflect lower intake frequency (desired)	

Points are allotted to each answer within the survey, from which a total score is reached. Participants are categorized into one of three nutritional risk categories, “at nutritional risk” (60 or less points), “at possible nutritional risk” (61-75 points), and “not at nutritional risk” (greater than 75 points) (Bailey et al., 2007; Bailey et al., 2009).

Healthy eating self-efficacy

Nutrition self-efficacy was measured using the Healthy Eating Self-Efficacy Scale (HESES) (Schwarzer & Renner, 2000). The HESES is comprised of five questions asking participants to rank their confidence in being able adhere to a healthy diet given certain circumstances using a 4-point Likert Scale (1=Very uncertain/unconfident, 4=very certain/confident) (Schwarzer & Renner, 2000). Points were then totaled and divided by five to get an average total score (Maximum score = 4).

Measuring physical activity perceptions and intentions

Perceptions of physical activity were measured utilizing the Theory of Planned Behavior (TPB), which suggests that intention to partake in a specific behavior is based on attitude,

subjective norm, and behavioral control, with the largest determinant of an individual taking part in the specified behavior is one's intention to partake in that behavior (Ajzen, 1991). Participants answered a series of six questions, based on the TPB, regarding their opinion towards physical activity (Ghahremani, et al., 2012). These six questions required participants to rate their physical activity perceptions (e.g., usefulness of activity, enjoyable, etc.) using a 7-point Likert scale (1= highest opinion, 7=lowest opinion) (Ajzen, 1991; Ghahremani, et al., 2012). Following these, participants were then asked a series of questions from the National Health Interview Survey (CDC, 2019) which had them rate their likeliness to be physically active and their estimated physical activity practices (CDC, 2019). Participants rated their intention to be physically active for at least 30 minutes a day, three times weekly within the next two months with a 5-point Likert Scale (1=not likely at all, 5=very likely) (CDC, 2019). Participants also reported the number of days per week they participated in various forms of physical activity: walking bouts (≥ 10 minutes), exercises meant to stretch muscles, and exercises meant to strengthen muscles (3-questions; CDC, 2019). For the questions based from the National Health Interview Survey, participants were provided the option to report: "I am unable to do this type of activity." Sedentary time was also assessed via one question inquiring about how participants spent the majority of their day (i.e., sitting, standing, or walking) (CDC, 2019). Furthermore, participants who reported having arthritis rated the severity of the arthritis using a 5-point Likert Scale (1=not at all severe, 3=somewhat severe, 5=very severe) as well as the location (e.g., back, feet, hands, etc.).

Data Analysis

Statistical analyses were completed using IBM SPSS version 26.0. General descriptive statistics were used to determine response frequencies for all survey responses (n=176). A

general linear effects model was used to determine the extent to which gender, race, education, rurality, nutritional risk, healthy eating self-efficacy, and food security affected participants' intentions take part in regular physical activity. The significant variables from this model, education and self-reported health, were then included in a general linear effects model block regression analysis to examine which variables influenced participants' intentions take part in regular physical activity. Level of significance was set to $p \leq 0.05$.

CHAPTER 4. ASSESSING THE PHYSICAL AND ACTIVITY NEEDS AND PREFERENCES OF OLDER ADULTS

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Modified from a manuscript to be submitted to the *Journal of Physical Activity and Aging*

Introduction

The United States (US) older adult population is growing rapidly. It is estimated that by the year 2060, there will be about a 9% increase since 2016. (Mather, 2016). Over three quarters of the aging population intend to age in place (i.e. remain in their own homes versus moving to a retirement community or nursing home) (National Council on Aging, 2015a). However, with aging comes the potential for a myriad of health conditions, including loss of physical function related to chronic disease and/or disability, increased risk for frailty and sarcopenia, potentially leading to loss of independence and ability to care for one's self (Favaro-Moreira, et al., 2016). To remain independent, maintaining physical function is imperative for this population to retain the highest level of autonomy.

Physical activity provides substantial health benefits to persons of all ages, particularly for the aging person, making it one of the most important things an aging adult can do to support healthy aging. Regular bouts of activity and exercise aid in reducing the risk and/or onset of various chronic diseases (Vaz Fragoso, et al., 2014; Vasankari, et al., 2017), aids in preservation of muscle and bone mass (Vaz Fragoso, et al., 2014; Verhoeven, et al., 2016), promotes

maintenance of one's ability to perform activities of daily living (Fielding et al., 2017), lessen arthritis symptoms, and reduces inflammation (Verhoeven, et al., 2016). The American College of Sports Medicine (ACSM) recommends a minimum of 150 minutes of moderate physical activity (i.e. brisk walking) or 75 minutes of vigorous physical activity (i.e. running, biking) weekly, and additionally two days of muscle strengthening activities weekly (*Physical Activity Guidelines for Americans*, 2018). Despite the benefits of regular physical activity, only 17.6% of older adults nationally meet the minimum physical activity guidelines. (CDC, 2017).

Low physical activity and excessive sedentary time in older adults is a strong predictor of physical limitations and disability (Vaz Fragoso, et al., 2014), thus adversely affecting the ability to age in place. Residing in a rural or urban community has the potential to affect an older adult's physical activity level and ability to age in place. Proximity to community resources for physical activity such as parks, trails, and recreational facilities are associated with higher rates of overall activity among the aging population (Xiao, et al, 2018). Urban and rural areas both have the capability of providing such facilities for physical activity, however the provision of such facilities depends on specific characteristics of the area (e.g., space, tax base, community support, etc.). Needs- and preference- assessments of older adults as well as community agencies provide valuable insight related to the need and desire for appropriate physical activity resources for community-residing older adults.

Needs- and preference-based physical activity programs are important in order to promote physical activity for older adults regardless of urban or rural residence. Doing so may lead to a reduction in sedentary behaviors and increase in physical activity, thus promoting independence and successful aging. The Social Marketing Theory (SMT) is an effective program planning tool when developing needs- and preference-based lifestyle programs (Francis, et al.,

2004; Francis & Taylor, 2009; Tan. et al., 2010; Roy et al. 2016). The SMT uses commercial marketing and promotion strategies for health purposes (Andreason, 1994; Lefebvre & Rochlin, 1997; Storey, et al., 2008). The SMT: (1) emphasizes understanding the range of perspectives held by the target audience necessary to cause behavior change, (2) accentuates the importance of developing a research-based program specific to target audience and desired behavior, and (3) recognizes the need to include all elements required for change to occur within the target audience (Lee & Kolter, 2015). The SMT utilizes six, cyclic steps in the planning and dissemination of health and wellness programs (Figure 4.1). This qualitative study applied SMT principles to assess the physical activity needs and preferences of community-residing older adults attending community-based health programs for older adults. “Step 1: Plan and Strategize” of the SMT cyclic model was utilized to gather information regarding behaviors, resources, preferences, and other physical or social factors that influence the target audience to take part in regular physical activity via focus groups.

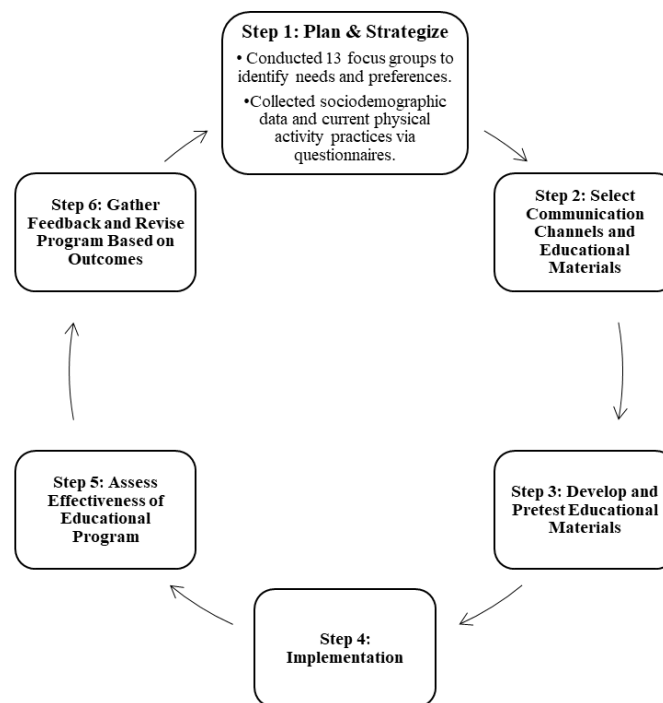


Figure 4.1. Social Marketing Theory Model (Lefebvre & Rochlin, 1997; Storey, et al., 2008)

For the purpose of this study, physical activity was defined as “any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure” (World Health Organization, 2019). Exercise was defined as physical activity that is planned, structured, and repetitive for the purpose of conditioning one or more parts of the body (World Health Organization, 2019). The present study examined the physical activity needs and preferences of older adults from both urban and rural communities. The study was approved and classified as exempt by the Iowa State University’s and the University of the District of Columbia’s Institutional Review Boards.

Methodology

Thirteen focus groups were conducted in Iowa and Washington D.C. (DC) for adults ages 60 years and older. The five Iowa focus groups were completed in the five Area Agency on Aging (AAA) regions where the statewide Supplemental Nutrition Assistance Program-Education (SNAP-Ed), *Fresh Conversations* was offered in summer 2018; 52 older adults participated. Two of these focus groups took place in more urban areas (Economic Research Service [ERS] code = 2) and the remaining three in more rural areas (ERS codes= 6 and 9) (United States Department of Agriculture: Economic Research Service [USDA ERS], 2013). In summer 2019, eight DC focus groups (n=66 participants) were conducted (Harrison et al., 2020). DC participants were recruited from two older adult volunteer programs (i.e. *Respite Aide* or *Senior Companion*) (Harrison et al, 2020). All DC focus groups were considered urban (ERS code = 1) (USDA ERS, 2013).

Data Collection

All participants (n=118) completed the same 16-question sociodemographic questionnaire prior to the focus group discussion. Each focus group session was about 1.5 to 2

hours and centered on seven questions. Iowa focus groups were led by S. Francis with a graduate research assistant present to take notes. The DC focus groups were facilitated by a team of seven trained facilitators, each of which were conducted by a different facilitator (Harrison et al., 2020). Focus group questions were initially written to be interactive, per the request of the funding agency in Iowa. However, during the first Iowa focus group, it was noted by the research team this question format was perplexing to some participants and hindered a robust discussion regarding the question topics. The focus group questions were then re-written using a typical focus-group format of open-ended questions. Table 4.1 outlines the focus group questions. The remaining four Iowa focus groups and all DC focus groups used the re-written questions. All Iowa focus groups were conducted in English while the DC focus groups were held in English, Spanish, and Chinese through the help of trained translators (Harrison et al., 2020). All focus groups were recorded and transcribed verbatim. Iowa participants received a small gift (\$5 value) for their time.

Table 4.1 Focus Group Questions by State

Question Theme	Iowa Focus Group Questions	DC Focus Group Questions (Harrison, et al., 2020)
Individual Perceptions and Experiences with Physical Activity	<ul style="list-style-type: none"> • We would like you to think for a few minutes and select up to two images that best capture your feelings about exercise or physical activity either now or in the past (e.g. memories, emotions, thoughts, positive or negative experiences, etc.) • Is there anything else these pictures (i.e. pictures conveying different emotions like disgust, happiness, ambivalence, etc.) are not capturing that anyone would like to share? 	<ul style="list-style-type: none"> • Tell us about your adult experiences with physical activity?

Table 4.1 Continued

Question Theme	Iowa Focus Group Questions	DC Focus Group Questions (Harrison, et al., 2020)
Barriers	<ul style="list-style-type: none"> • What things get in the way—or prevent you, your friends, or family members from being as active as you'd like to be? • What feelings might you, your family members, or friends be experiencing as a result of these obstacles? • What could help you, or them, feel more encouraged? 	<ul style="list-style-type: none"> • What gets in the way, or prevents you, your friends, or family member from being as active as you'd like to be?
Motivators	<ul style="list-style-type: none"> • What motivates you and your peers to be active? What does not? 	<ul style="list-style-type: none"> • What are the things that motivate you to engage in physical activities? • What type of physical activity do you enjoy the most?
Perceived Benefits	<ul style="list-style-type: none"> • Describe the benefits you experience from this activity (e.g. physical, emotional, health, etc.) • How do you feel being physically active will impact your future? 	Non-applicable ^a
Community Support	<ul style="list-style-type: none"> • In what ways do you feel supported by your community (i.e. your local county, city, and neighborhood) to be active every day? • How could your community be more supportive? 	<ul style="list-style-type: none"> • In what way do you feel supported by your community?
Ideal Programming Attributes	<ul style="list-style-type: none"> • Some people like to have a leader or trainer when doing physical activity. What kind of leadership, if any, do you like to have for physical activity? • If you were given the money and the power to create something that would help you and your friends be active, what would it be? What would it look like? Who would come and why? 	<ul style="list-style-type: none"> • Some people like to have a leader or trainer when doing physical activity. What kind of leader or trainer do you like to have for physical activity? • What would be the ideal physical activity or exercise program?

Table 4.1. Continued

^a This theme had no direct question (Harrison, et al., 2020). Perceived benefits were noted in association to other questions asked in DC and were addressed in the theme report (Harrison, et al., 2020).

Data Analysis

Sociodemographic data were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) version 25.0. Sociodemographics of all participants were analyzed using descriptive statistics. Kruskal –Wallis H Tests were conducted to assess for differences between states. Framework analysis was utilized to identify recurring themes within group discussions (Rabiee, 2004). Each member of the research team in their respective state completed a theme analysis on an individual basis. Following the individual review, the researchers came together for group analysis in their respective states (i.e., Iowa researchers reviewed only Iowa data, DC researchers reviewed only DC data). Only one question from the first Iowa focus group was used for theme analysis, since it was asked to each group. No other questions from this initial Iowa focus group session were used in theme analyses. Following independent reviews, the Iowa and DC teams met in their respective groups for further theme analysis (i.e., indexing, charting, and interpreting) using standard focus group protocols to create a codebook used for qualitative analysis (Rabiee, 2004; Krueger & Casey, 2009). There were no disagreements among team members regarding the identified themes. The DC theme report was sent to A. Contrady of Iowa State University for further analysis, including identifying similarities and differences between identified themes by state.

Results

Collectively, this racially diverse (White=42.4%, Black=37.3%) group was mostly female (83.1%) and between ages 70 and 79 years (46.4%). The DC groups were more

racially diverse than the Iowa groups ($p < 0.0001$). The majority had at least a high school education (37.3%); however, Iowa reported higher levels of educational attainment ($p < 0.0001$) (Table 4.2). Approximately one-third were widowed (30.5%), and most (82.2%) were considered to have high food security (Table 4.2). Despite most being classified as food secure, DC had more participants classified as food insecure than Iowa (12.1% vs. 1.9%; $p = 0.048$). The vast majority (84.7%) rated their health as “average or higher” (Table 4.2). Collectively, commonly reported health conditions included high blood pressure (16.9%), arthritis (13.4%), high cholesterol (12.5%), and knee issues (9.7%).

Table 4.3 describes the physical activity attributes of the participants. Collectively, most participants (63.6%) reported being physically active in the past three months with 36.4% reporting a “somewhat high” physical activity level. However, the majority from both states did not meet recommended moderate (38.1%) or vigorous (42.84%) physical activity levels regularly. More Iowans reported meeting the moderate physical activity recommendations while more DC participants reported meeting the vigorous physical activity recommendations. The frequency of DC participants responding “Not sure” to meeting time spent in moderate or vigorous physical activity was greater than the frequency of those who did respond (Table 4.3). To accurately assess the percentage of participants from each state meeting both moderate and vigorous physical activity recommendations, those who responded “Not sure” from Iowa and DC were removed from the Kruskal-Wallis H test. No statistical differences between states for participants who reported having met moderate or vigorous physical activity guidelines. One-third of all participants preferred having a regular physical activity routine. Home was the most cited location of regular exercise. Despite home being the primary location of regular exercise, more than one-third of participants preferred exercising in groups.

Table 4.2. Sociodemographics of Participants (n=118)

Sociodemographic Characteristic	OVERALL (n=118)		DC (n=66)		IOWA (n=52)	
	Number (N)	Percent (%)	Number (N)	Percent (%)	Number (N)	Percent (%)
Age (in years)						
60-69	32	27.0	26	39.4	6	11.4
70-79	55	46.4	30	45.4	25	47.9
80-89	27	22.6	9	13.6	18	34.6
90 and greater	3	2.4	1	1.5	2	3.8
Missing	1	0.8	--	--	1	1.9
Gender						
Female	98	83.1	54	81.8	44	84.6
Male	18	15.1	10	15.2	8	15.4
Missing	2	1.7	2	3.0	--	--
Race^a						
Asian	8	6.8	8	12.1	0	0.0
Black	44	37.3	43	65.2	1	1.9
Hispanic	8	6.8	8	12.1	0	0.0
White	50	42.4	0	0.0	50	96.2
Other	3	2.5	2	3.0	1	1.9
Missing	5	4.2	5	7.6	--	--
Marital Status						
Divorced	23	19.5	16	24.2	7	13.5
Married	33	28.0	12	18.2	21	40.4
Separated	3	2.5	3	4.5	0	0.0
Single, never married	18	15.3	14	21.2	4	7.7
Widowed	36	30.5	16	24.2	20	38.5
Missing	5	4.2	5	7.6	--	--

^a p<0.0001

Table 4.2 Continued

Sociodemographic Characteristic	OVERALL (n=118)		DC (n=66)		IOWA (n=52)	
	Number (N)	Percent (%)	Number (N)	Percent (%)	Number (N)	Percent (%)
Highest Degree Completed^b						
Less than high school	22	18.6	20	30.3	2	3.8
High school/GED	44	37.3	25	37.9	19	36.5
Some college	21	17.8	10	15.2	11	21.2
Associate's degree	3	2.5	2	3.0	1	1.9
Technical school	6	5.1	1	1.5	5	9.6
Bachelor's degree	9	7.6	3	4.5	6	11.5
Graduate degree	8	6.8	0	0.0	8	15.4
Missing	5	4.2	5	7.6	--	--
Perceived Level of Food Security^c						
Low Food Security	9	7.6	8	12.1	1	1.9
High Food Security	97	82.2	46	78.7	51	98.1
Missing	12	10.2	12	18.2	--	--
Self-Reported Health Status						
Very poor	3	2.5	1	1.5	2	3.8
Somewhat poor	13	11.0	8	12.1	5	9.6
Average	38	32.2	19	28.8	19	36.5
Somewhat good	34	28.8	23	34.8	11	21.2
Very good	28	23.7	13	19.7	15	28.8
Missing	2	1.7	2	3.0	--	--

^b p<0.0001; ^c p=0.048

Table 4.3. Reported Physical Activity (PA) and Exercise Levels and Preferences

Self-Report PA Levels and Preferences	OVERALL (n=118)		DC (n=66)		IOWA (n=52)	
	Number (N)	Percent (%)	Number (N)	Percent (%)	Number (N)	Percent (%)
Participated in Regular Exercise Within Last 3 Months						
Yes	75	63.6	40	60.6	35	67.3
No	37	31.4	20	30.3	17	32.7
Missing	6	5.1	6	9.1	--	--
Self-reported PA Level						
No activity	6	5.1	2	3.0	4	7.7
Low activity	17	14.4	9	13.6	8	15.4
Somewhat low activity	36	30.5	21	31.8	15	28.8
Somewhat high activity	43	36.4	23	34.8	20	38.5
High activity	12	10.2	7	10.6	5	9.6
Missing	4	3.4	4	6.1	--	--
Self-reported Time in Moderate PA						
<150 minutes	45	38.1	19	28.8	26	50.0
≥150 minutes	33	28.0	16	24.2	17	32.7
Not sure	34	28.8	25	37.9	9	17.3
Missing	6	5.1	6	9.1	--	--
Self-reported Time in Vigorous PA						
<75 minutes	50	42.4	19	28.8	31	59.6
≥75minutes	25	21.2	15	22.7	10	19.2
Not sure	36	30.5	25	37.9	11	21.2
Missing	7	5.9	7	10.6	--	--

Table 4.3. Continued

Self-Report PA Levels and Preferences	OVERALL (n=118)		DC (n=66)		IOWA (n=52)	
	Number (N)	Percent (%)	Number (N)	Percent (%)	Number (N)	Percent (%)
Preference of PA Routine						
I am not physically active	15	12.7	9	13.6	6	11.5
I prefer a routine I repeat weekly	38	32.2	20	30.3	18	34.6
I prefer variability	35	29.7	18	27.3	17	32.7
No preference	27	22.9	16	24.2	11	21.2
Missing	3	2.5	3	4.5	--	--
Exercise Location						
At home	50	37.6	21	35.0	29	39.7
Community/rec center	21	15.8	14	23.3	7	9.6
Fitness Center	9	6.8	3	5.0	6	8.2
Outdoors	19	14.3	4	6.7	15	20.5
Senior Center	31	23.3	15	25.0	16	21.9
Sports Club	2	1.5	2	3.3	--	--
Yoga/Pilates/barre studio	1	0.8	1	1.7	--	--
Socialization during Exercise						
I do not exercise	12	10.2	9	13.6	3	5.8
Exercise alone	28	23.7	13	19.7	15	28.8
Exercise in groups	37	39.8	28	42.4	19	36.5
No preference	30	25.4	15	22.7	15	28.8
Missing	1	0.8	1	1.5	--	--

There were many similarities between states related to their physical activity needs and preferences, with most categories reflecting three to four common overall themes. The area where there were limited similarities detected between states was preferred activities, which only had one overall common theme.

Table 4.4. Major Themes Addressed by Focus Groups

Category	Overall	Iowa	DC
Individual Perceptions		<ul style="list-style-type: none"> • Happy • Fearful/skeptical • Makes them feel better 	None stated
Preferred Activities	<ul style="list-style-type: none"> • Housework/cleaning 	<ul style="list-style-type: none"> • Walking • Cycling • Aquatic activities (e.g. swimming, water aerobics) 	<ul style="list-style-type: none"> • Dancing • Stretching • Group fitness • Exercises in bed • Brain exercises
Barriers	<ul style="list-style-type: none"> • Pain/fear of pain • Finances • Physical limitations • Low motivation 	<ul style="list-style-type: none"> • Limited time/scheduling challenges 	<ul style="list-style-type: none"> • Lack of transportation • Weather conditions • Mood/emotional stress
Motivators	<ul style="list-style-type: none"> • Socialization • Anticipated health benefits (e.g., weight maintenance, weight loss) 	<ul style="list-style-type: none"> • Improved energy • Pain relief 	<ul style="list-style-type: none"> • Cognitive benefits • Longevity • Benefits experienced by others
Perceived Benefits	<ul style="list-style-type: none"> • Improved physical function (e.g. ability to completed ADLs, less stiffness) • Improved cognitive function • General health benefits (e.g., lower cholesterol, blood glucose control, pain relief) • Increased life expectancy 	<ul style="list-style-type: none"> • Improved mood/mental health 	<ul style="list-style-type: none"> • Balance/fall prevention • Improved sex drive

Table 4.4. Continued

Category	Overall	Iowa	DC
Community Supports	<ul style="list-style-type: none"> • Senior center • Community center facilities designated for PA (i.e. paths, trails) • Access to facilities for physical activity (i.e. transportation, affordable cost) 	<ul style="list-style-type: none"> • Centrally located facility • Multi-purpose use (i.e. swimming pool, track, trainers) • Age appropriate exercise classes • Maintain residential sidewalks 	<ul style="list-style-type: none"> • Increase the number of facilities offering older adult specific physical activity options
Ideal Program Attributes	<ul style="list-style-type: none"> • Personal trainers/geriatric specialized health professionals • Multipurpose function • Affordable 	<ul style="list-style-type: none"> • Water-based activities 	<ul style="list-style-type: none"> • Bilingual instructors • Incentives for activity (i.e. insurance, fruit and vegetable vouchers, etc.)

Individual Perceptions and Experiences Related to Physical Activity

Iowa participants reported three major themes when asked about the thoughts or feelings that arose when thinking about physical activity or exercise: happy, fearful/skeptical, and makes me feel better. Many noted that being physically active or exercising made them feel happy. Most noted post-activity happiness more than happiness while participating in the activity. One stated, “[exercise] makes me feel good, and I feel bad that I didn’t do it for 20 years....” Some Iowans stated exercise made them feel better, “I exercise more when I hurt...it seems like I get better faster....” Others added they felt fearful and/or were skeptical of physical activity or exercise, mainly due to the fear that activity would exacerbate any previous and/or current injuries/conditions. This is best conveyed by the statement, “...I’m skeptical if I’m going to be worse off when I get through it [exercise].” Others worried they would be injured while

performing the activity. The most commonly reported forms of physical activity amongst Iowans were walking, cycling, aquatic exercises and home chores (e.g., cleaning, yard work, etc.).

The DC groups did not offer much in terms of physical activity perspectives. They talked more about specific types of exercises which came to mind when asked about perceptions and experiences related to physical activity. Across the racially diverse groups in DC (i.e. African Americans, Hispanics, and Asians), all three stated dancing was a common form of exercise, as was stretching, housework/cleaning, group fitness classes (i.e. aerobic classes, yoga, spin, dancing, etc.) and grocery shopping. Harrison and others (2020) reported “...*Some like to dance while cooking. Happy music from their countries changes their mood to joy.*” The African American and Hispanic groups both noted exercises in bed (e.g. arm lifts, leg lifts, etc.) were common forms of physical activity/exercise. A member of the Hispanic group in DC reported that they “...*exercise their arms and on the bed, some do stretches with the rubber band.*” (Harrison, et al., 2020). The Asian group specified that forms of “brain exercises”, such as Mahjong tiles and chess, were important perceived forms of physical activity and exercise for the purpose of reducing risk of cognitive decline (i.e. Alzheimer’s disease).

Barriers to Physical Activity and Exercise

Five major themes were noted amongst both states regarding physical activity and exercise barriers. These were pain/fear of pain, finances, physical limitations and low motivation. Many participants from both states reported having one or more physical issues with their body (e.g., joints, shoulders, arthritis, etc.), so it is not surprising that many were fearful of pain, thus limiting and/or preventing physical activity. In addition, many reported cost and finances to be a major barrier. One stated “...*the places that I like to go exercise are kind of expensive....*” Another replied, “*I have a friend who no longer goes to the health club or pool because her*

insurance did not renew the contract with the place they went...financial is a problem for a lot of people.”

Further, physical limitations related to age-related changes, injuries, or mobility issues also adversely influenced physical activity levels of Iowa and DC participants. One Iowan stated: *“I’ve been active most of my life. I can’t do most of the things I enjoy doing. I really grieved what I can’t do because of physical limitations.”* The DC groups cited medical problems and back problems prevented them from moving or being mobile (Harrison, et al., 2020). An Iowa participant commented that the perception of physical limitations can be a large barrier for many. *“I think we sell ourselves pretty short sometimes, and we need to get that back in ourselves that we can do things. If I’m still able, I should be doing it. Don’t let anybody tell you who you are and how old you are, you know? People have a tendency, once you hit 50 to start saying, ‘You shouldn’t do that,’ well yeah I should! I can!”* Low motivation towards being active and exercising regularly was another barrier across states. *“I think one of the barriers is just getting started.”*

Limited time and/or scheduling challenges were noted as a major barrier for Iowa participants. One participant voiced that she acted as her mother’s primary caregiver, posing a challenge to time available to be physically active. *“...I was [the] single caregiver for my mom...your time is so consumed over being with your loved one that you don’t have time to do some of the things that you should have time to do [like exercise].”* Scheduling challenges were also noted, such as when a facility is open, when equipment is available, as well as many facilities had limited age appropriate activities available, further causing limitations in activity due to scheduling.

Physical activity barriers themes which were unique for those in DC were lack of transportation and weather conditions (Harrison, et al., 2020). The topic of weather conditions and transportation was mentioned in the Iowa focus groups but did not emerge as a barrier theme. In addition, DC participants reported their mood and/or emotional stress limited their interest in being physically active, or taking part in regular exercise (Harrison, et al., 2020); this was not identified as a major theme in the Iowa groups.

Motivators toward Physical Activity and Exercise

Two major physical activity and exercise motivators for both states were socialization and anticipated health benefits. Taking part in group classes or having another person participating in exercise with them were noted as strong motivators for being active as conveyed by one participant, “[Socialization] is our primary reason for coming, otherwise we are sitting at home alone.” DC participants noted that they would specifically enjoy dancing classes, which offered opportunities for socialization. The anticipated health benefits associated with exercise were highly motivating factors for both states. In Iowa those benefits were weight maintenance, energy, and pain relief. Weight maintenance was one of the noted anticipated benefits, “I want to keep my weight where I am...so that’s what motivates me to try and get as much exercise as I can.” Improved energy level was another perceived benefit. “Exercising creates energy, so if you don’t exercise then you don’t have the energy to exercise.” Pain relief was another specified anticipated health benefit noted among Iowa participants. “...one of the biggest motivators for me is, I got a bad neck...and if I don’t do it [exercise], I got a problem...as long as I exercise every day, I don’t have a problem.” Another said, “I exercise more when I hurt. I have to move just so I can feel better.

Amongst the DC groups the benefits included perceived health benefits experienced by other participants, cognitive benefits, and the long-term benefit of longevity. DC participants were inspired to be active from hearing accounts of others' health achievements due to being physically active, such as living longer (Harrison, et al., 2020). Asian participants in DC reported they were motivated to be active if there was a specific change in health status associated with the activity (e.g. lower cholesterol, improved blood pressure, weight loss). Similarly, Hispanic DC participants reported they were motivated because exercise kept them active and healthy, allowing them to continue with normal activities, such as going to work and being able to support their families (Harrison et al., 2020). Those from DC who were African American mentioned longevity and extended life were major motivators for them (Harrison et al., 2020).

Perceived Benefits

Collectively, participants perceived exercise and physical activity positively. Perceived benefits of physical activity and exercise for all participants included: improved physical function, cognitive function, increased life expectancy, and general health. Improved physical function encompassed improved and/or maintained leg strength, weight maintenance, extended life, maintenance of independence, being able to recover from injuries, surgery, or other health issues more quickly, and continue caring for family and grandchildren. All participants felt that being active on a regular basis increased their life expectancy and longevity.

Benefits related to cognition were also noted for participants across both states. *“I think it [physical activity/exercise] keeps your mind sharper....”* Both states noted numerous additional health benefits, such as improved mood and mental health, lower cholesterol, maintenance and/or improvement of blood glucose and blood pressure, as well as pain relief. *“I enjoy biking...and I know one of the benefits is lower blood pressure, lower bad cholesterol,*

higher good cholesterol, lower blood sugar, just overall healthier.” DC noted additional benefits, such as ability to complete activities of daily living (i.e. grocery shopping), balance and fall prevention, improved sexual drive, and less stiffness.

Community Support for Older Adult Physical Activity and Exercise

The most commonly mentioned community supports for older adult physical activity and exercise by both states were the local senior center, community center, or facilities specifically designated for physical activity (e.g., fitness centers, parks, trails, etc.). Across both states, the main recommendations for community support included access to facilities designated to support physical activity, such as transportation and affordable cost. Iowans agreed that a centrally located facility that served a multi-use purpose (e.g. swimming pool, track, trainers, etc.), as well as provided age-appropriate exercises classes increasing socialization would be ideal. For Iowans, access to such a facility included transportation to and from, affordable/cost-reduced memberships, age appropriate activities, and flexible schedules.

Additionally, the Iowa focus groups revealed many communities appear to be making more walkable parks but were neglecting residential sidewalks. *“At the park they built a new sidewalk all the way around...that makes it easier for someone to walk especially if it’s on uneven ground.”* Another Iowan stated, *“Sidewalks in the residential and downtown are terrible...it’s not safe to walk on. You have to walk on the street, and some of those aren’t very safe.”* DC participants agreed that an increase in access to facilities would be supportive. Additionally, increasing the number of community facilities offering a variety of age appropriate fitness classes would be supportive. Furthermore, DC participants agreed that an affordable or cost-reduced access rate would further support their ability to engage in physical activity and exercise (Harrison, et al., 2020).

Ideal Programming Attributes

Both states described an ideal physical activity and/or exercise program/facility that provided personal trainers, a pool, served a multipurpose function, and would be affordable. When expanding on the term personal trainer, participants described someone who is knowledgeable of appropriate exercises/methods, was helpful at instructing these exercises, and was trained in working with the geriatric population regarding physical activity. Such trainers would be able to help them adjust exercises based on their physical limitations, health conditions, physical activity level, etc. *“I think leaders [trainers] that are willing to show you options of things you can do...if they are doing things that are physically impossible for you.”*

Iowans reported they enjoyed water activities, such as water aerobics and water walking, and viewed these exercises as appropriate for their physical limitations. One Iowan’s comment captured the identified themes: *“There would be a centrally located facility with both a lap pool so people could swim laps and a warm pool for people to do warm water exercises...and a track around that would have the right surface, and the ability to have ongoing classes of various kinds for exercises, and hobbies, and socializing...free transportation for those what cannot get there themselves.”* Those in DC noted that they would also benefit from having bilingual instructors at community/senior centers, a physician on site for consults, and offer incentives (i.e. insurance incentives, vouchers for fruits and vegetables, etc.).

Limitations

Generalizability of results from this study are limited due to small sample size. However, given the diversity of the present study’s population, these results provide valuable information regarding physical activity programming needs and preferences. As with any self-report research in which participants report their own health-related data, there is the possibility for bias as

participants may feel inclined to report information that makes them seem healthier to the research team. Another limitation to note is the possibility that the focus group setting is capable of bringing about a “group-think” bias, as members of a group may choose to agree with other’s opinions, and may possibly report information they wish the moderator to hear versus what is actually true.

Discussion

These findings reveal that the physical activity needs and preferences of community residing older adults in both rural and urban areas are fairly similar despite sociodemographic differences. For both states, the senior/community centers were seen and utilized as one of the primary ways in which communities supported physical activity and exercise for older adults. The National Council on Aging notes that senior centers are “a gateway to the national’s aging network,” by providing older adults with an inclusive environment that offers a multitude of services, such as community resources, meals and nutrition assistance resources, health and wellness programs, fitness options, volunteer and civic engagement opportunities, social and educational opportunities, and much more (National Council on Aging, 2015b). Additionally, Schneider, et al. (2014) reported race and language, living alone, environment of residence (i.e. senior apartments, public housing), mobility status, activity of daily living impairments, and being over the age of 75 tend to be significant predictors in senior center use. This statement reflects the composition of the population in the present study, relating to why the senior center was viewed positively by the participants. The senior center likely fosters a feeling of inclusivity and social interaction for community residing older adults, as well as provides a multitude of services to attendees, instilling greater feelings of “self-perceived benefits” from attendance. Thus to reach a larger number of community residing older adults, utilizing the local senior and

community centers for dissemination of physical activity programs, as well as emphasizing these locations as areas of support for physical activity would be beneficial for increasing levels of activity among this population.

Our study revealed perceived physical activity health benefits such as weight maintenance, fall prevention, and mental health were mentioned. This may be attributable to the utilization of senior and/or community centers. Health programming offered through the senior center or community center models are effective in helping older adults make lifestyle changes, such as, weight loss interventions (Smith-West, et al., 2011), fall prevention programs (Li, et al., 2016), improving physical, emotional and social health (CDC, 2018), and dietary intakes (Francis, et al., 2014; Lillehoj, et al., 2018). Since community and senior centers reach a variety of community-residing older adults, it would be advantageous for community-based physical activity programs, which serve both rural and urban areas, to explore ways to promote age-appropriate physical activity and exercise programs through the local senior centers and/or congregate meal sites.

The barriers noted for both states (i.e. pain/fear of pain, finances, physical limitations, and low motivation) are supportive to those reported previously. Costello and others (2011) reported major barriers to physical activity for older adults residing in a retirement community were potential for injury, motivation, and self-discipline. Similarly, Bethancourt and others (2014) reported the physical activity barriers for community residing older adults with lower incomes to be fear of previous injury and being cognizant of possible age-related disabilities which could potentially hinder one's ability to be physically active. Additionally, disinterest and lack of motivation, pain and exacerbation of existing injuries, and harboring the mindset of being "too old" to begin an activity regimen are perceived barriers (Baert et al., 2015). Fear of pain and

injury are strong barriers to avoiding physical activity. This demonstrates a need for physical activity education opportunities that talk about how to safely be active in order to reassure older adults that physical activity is safe.

Moreover, differences regarding barriers to physical activity were noted between states. Iowa participants specifically stated that time and scheduling challenges were a barrier to being physically active. Costello et al. (2011) agreed that scheduling and limited time were barriers noted amongst their participants. DC participants voiced that lack of transportation, weather conditions, and their mood or emotional stress hindered their ability/interest in being physically active. The lack of transportation voiced by DC participants is of interest, as urban areas are often thought to have more reliable transportation options than their rural counterparts (Pucher & Renne, 2004). The comment regarding lack of transportation may be related to a variety of things, including lack of use of personally owned/operated vehicles (Rural Health Information, 2015), safety of public transportation modes (Bolella, 2011), and compliance with mass transit scheduling (Ramos, et al., 2019). Studies regarding perceptions of transportation among the rural and urban older adult population would be beneficial for public transit programmers to address barriers and make improvements as needed, allowing for larger use of such public transportation systems.

In addition, DC participants' response to stress being a barrier to activity. A review by Stults-Kolehmainen & Sinha (2014) reported multiple instances in which varying types of stress, such as psychological stress, objective stress (i.e. life events, and subjective stress (i.e. stress) were related to reduced levels of physical activity. However, physical activity is often promoted as a form of stress relief, including: yoga, tai chi, and aerobic exercise bouts of 20-30 minutes (Jackson, 2013; Anxiety and Depression Association of America, 2018). Thus, it would be

beneficial for future programmers to educate their audience regarding the stress alleviating properties of physical activity and exercise, as well as the mental stimulation aspects to increase the likelihood of being physically active.

Furthermore, health care providers have stated that while many patients recognize the importance of physical activity, most are unaware of what kind and appropriate amounts of physical activity are necessary to see positive effects (Baert et al., 2015). It would be beneficial for more health care providers to provide older adults with information about how to safely be physically active. This is important since the ACSM encourages older adults to consult with their primary healthcare provider prior to beginning a new exercise regimen to determine the appropriate type, intensity, and duration of activity appropriate for their current condition (Cress, et al., 2005). Older adults are also encouraged to consult with exercise professionals to determine a personalized strategy for risk management and injury prevention (Cress, et al., 2005). Thus, community-based physical activity programs should offer education on age-appropriate exercise and activity for disease states which are common to persons of the aging population, such as arthritis, osteoporosis, cardiovascular disease, and hypertension (National Council on Aging, 2018; United Health Foundation, 2019a). Such programs should also encourage collaboration between the organization providing the program and local healthcare and exercise professionals to create a supportive environment for older clients.

Socialization and anticipated health benefits were major motivators towards being physically active. Socialization, related health benefits, maintenance of physical strength, improved energy, and ability to perform activities of daily living and other activities they enjoy as physical activity motivators for their participants are commonly mentioned motivators for older adults (Costello, et al., 2011; Bethancourt, et al., 2014; Baert, et al., 2015). Socialization is

an important aspect in aging, and it aids in the prevention the onset of cognitive decline, and encourages maintenance of mobility within the community; both of which impact the overall perception of life satisfaction among community residing older adults (Hwang, et al., 2018; Lee & Choi, 2019). Physical activity programmers may consider creating programs which promote socialization via group exercises and/or group classes to further encourage older adults to be active while gathering with peers.

Both states mentioned weight control as a health benefit. However, most of the specific health benefits reported varied between states. Interestingly, perceived benefits among Iowans were more specific, noting energy level and pain relief, while DC participants considered a broader spectrum of benefits, such as cognitive health and longevity. This difference is of particular interest as it notes the differences in priorities for older adults of these two areas. Iowans may be more weight and body image focused while DC residents may be more interested in longevity and elongating their cognitive health. Although, there may be societal factors affecting this weight/body image focus it is likely not a major contributor (Allison, et al., 1993; Crandall & Martinez, 1996; Altabe, 1998; Cachelin, et al., 1998; Shaw, 2005). It is more likely that those in Iowa have received more education regarding weight maintenance/loss than older DC residents, since older Iowans have a higher percentage of obesity (34.3%) than those in DC (24.7%). This additional education may have led to a heightened sense of weight and body image motivating physical activity (United Health Foundation, 2019b). DC participants reported that they associated physical activity with being able to work longer and provide for their families (Harrison, et al., 2020), meaning that they may feel as though they require a sense of longevity and sustained cognitive function to continue providing for their families.

Based on these findings, those who develop older adult physical activity programs may benefit from tailoring educational and or promotional messages towards specific motivators. Additionally, educating the target audience on why/how regular activity is beneficial may be perceived more positively than only educating the audience on exercises and movements alone, thus increasing the knowledge of the audience and increasing the likelihood of activity. In order to increase the likelihood that a participant will sustain physical activity behaviors post educational program, addressing behavioral factors (i.e. self-efficacy), creation of health contracts, regular performance feedback, and safety concerns should be addressed and monitored regularly during the program (Cress, et al., 2005).

Our study revealed this sample of older adults preferred to exercise in groups, indicating that they may be more apt to exercise if offered the opportunity to do so in groups for socialization and encouragement purposes. Our findings agreed with those of Beauchamp, et al. (2007), who reported that older adults find exercising in group settings, with persons of like ages, more appealing than exercising alone. Beauchamp, et al. (2018) also noted that older adults are more likely to adhere to a regular exercise regimen if partaking in group-based exercise programs. A study by Komatsu, et al. (2017) revealed that a similar group of community residing older adults felt strongly that regular group exercise contributes to a sense of balanced health. This feeling of balanced health encompassed: social connectedness, active mind, enjoyment, and functional health. Since group fitness is visualized as a method of contributing to balanced health, it is possible that if community-based physical activity programs utilize group formats to provide both education and exercise opportunities, it is likely that older adults may be more apt to participate, thus increasing the likelihood of physical activity in both present and future.

This present study revealed that while many communities are building walking paths around parks, residential sidewalks are not always viewed as safe/walkable by older adults. The environment in which older adults live (e.g. immediate surroundings, interpersonal, and physical factors) may influence their physical activity abilities and/or intentions (Sallis, et al., 2015). Chen and others (2019) reported that neighborhood environmental attributes, specifically sidewalk availability, significantly impact step counts of community residing older adults. Additionally, the immediate built environment (e.g. sidewalks, parks, bike paths, public transportation) available to older adults is capable of impacting one's level of physical activity (Chudyk et al., 2017). Safety is also an important environmental consideration. Facilities in "safe" neighborhoods or the perception of safety can impact physical activity (Harrison et al., 2020; Tucker-Seely, et al., 2009).

Communities may better support older adult physical activity and community walkability by providing microscale improvements (i.e. maintenance footpaths, street lights, sidewalks/protected walkways, and rest stops/benches), and larger scale permanent infrastructure, such as municipal parks and recreational facilities (Klann, et al, 2019). In many communities, parks have been shown to increase walkability of the community and ultimately overall physical activity level (Siu, et al., 2012; Todd, et al., 2016; Salvo, et al., 2017). Thus, walkability studies and studies measuring perceived level of environmental safety are useful in exploring the physical activity level of community residing older adults, as the body of literature extrapolates on the impact of which the immediate environment is capable of impacting one's level of activity. Communities may also benefit from examining the built environment and perceptions which community residing older adults share in its ability to support an adequate amount of physical activity. This will better enable the community to address the concerns of

their older residents in an effort to increase their physical activity, health, and ability to remain independent.

The common ideal programming attributes revealed a preference for trained instructors, a pool, serve a multipurpose function, and accessibility and affordability. The barrier of fear of pain may have influenced the preference for aquatic facilities for our sample. Aquatic programs are reported to be beneficial to older adults in regards to pain reduction and mobility, yet provide appropriate amount of resistance and aerobic exercises which may be tolerated better by those with diagnoses which cause pain or discomfort, such as osteoporosis and arthritis (Taglietti, et al., 2018).

The ACSM best practices for older adult physical activity mirrors many of these “ideal” attributes. First, such physical activity programs should be well-rounded, including elements of endurance, strength, balance, and flexibility in their programming (Cress et al., 2005). Secondly, physical activity programs should be tailored to best meet the needs and abilities of the participant (*Physical Activity Guidelines for Americans*, 2018). Additionally, there should be regular communication between the older adult and provider is encouraged to address any changes that may need to be made (Cress, et al., 2005).

In regard to a centrally located, multi-purpose fitness facility, many communities have begun to either consider or construct such which are available to community members of all ages. Communities which provide recreational opportunities to its residents often have higher health scores and see higher levels of physical activity (Annear, et al., 2014, National Recreation and Park Association, 2020). Regarding affordability, some fitness centers may consider offering a sliding scale fee for use based on income, different membership levels offering different opportunities for use (i.e. general gym use, personal training, fitness classes, etc.), discounts for

older adults or veterans, and may consider participating in national programs such as Silver Sneakers. Specifically, Silver Sneakers is a Medicare based physical activity program, allowing eligible adults over the age of 65 access to a local, participating fitness location, providing access to personal trainers and group classes at little to no cost to the individual (Silver Sneakers, 2019). Silver Sneakers improves physical and mental health, reduces the number of reported unhealthy days (Kell & Rula, 2019), decreases the feeling of social isolation and loneliness (Brady, et al., 2018), and reduces average healthcare costs (Crossman, 2018). Thus, participation in such programs by fitness centers would greatly benefit the older adult population.

Furthermore, those in more diverse areas where multiple languages are spoken would benefit from having bilingual instructors and/or educational materials available in different languages at community/senior centers to provide further instruction and appropriate education while remaining culturally sensitive. This kind of multi-lingual instruction and education would further address barriers of fear of pain or being in pain due to exercise, as well as increase feelings of self-efficacy regarding specific movements and activity regimens.

Creativity regarding types of educational topics about physical activity will be critical, since many audiences are varied in many ways, whether that be sociodemographics, physical abilities, cultural interests, etc. The present study addresses such by noting that older adults who reside in more diverse areas prefer dancing type exercises in addition to walking or other common exercises. Attention towards activity preferences of diverse populations, both racially and environmentally, should be considered regarding inclusion in public health programming.

Conclusion

Our study sought to determine the physical needs and preferences of older adults and determine if these differed between rural and urban areas. These findings provide valuable

information to guide the creation of effective physical activity programs for older adults that focus on their needs and preferences. In doing so, it is likely these programs will lead to increased physical activity and exercise levels, maintain and/or improve physical function and overall health; thus, enabling older adults to age in place and remain independent.

Take Away Points

- Public health programs should explore older adult access to existing exercise facilities in their communities (i.e. transportation, cost, age-appropriate programming/equipment, and access to fitness instructors).
- Physical activity programs should promote the benefits or “rewards” to the participant since this is a key motivating factor in choosing to be active.
- Future research should examine older adults’ perceptions of their built environment to determine the level of influence the community has on physical activity levels.

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CHAPTER 5. PHYSICAL ACTIVITY BEHAVIORS OF OLDER IOWANS ATTENDING THE CONGREGATE MEAL PROGRAM

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Modified from a manuscript to be submitted to the to the *Journal of Nutrition Education and Behavior*

Introduction

Physical activity and nutrition greatly influence health and wellness amongst the aging population. Aging has the potential to bring about various health ailments, including chronic disease, physical disabilities, and cognitive decline, each of which can greatly reduce one's quality of life (Grimmer, et al., 2019; Harada, et al., 2013; Manini, 2011). Regular physical activity is a cornerstone to successful aging by lowering the risk of frailty, sarcopenia (age-related muscle loss), hip fractures, falls, and chronic disease (e.g., cardiovascular disease, diabetes), and improves physical functioning and mobility, as well as cognitive function (Musich, et al., 2017; Vasankari, et al., 2017; Belza, 2017; Verhoeven, et al., 2016; Vaz Fragoso, et al., 2014; Giné-Garriga, et al., 2014; Langlois, et al., 2012; Tucker-Seely, et al., 2009).

Successful aging is considered to be the optimization of longevity in life through the minimization of chronic disease onset and risk factors, and promotion of high levels of both physical and cognitive functioning (Bowling & Dieppe, 2005). Yet, despite the well-known benefits of physical activity, many older adults are not meeting the American College of Sports Medicine (ACSM) physical activity recommendations (*Physical Activity Guidelines for Americans*, 2018). Nationally, only 17.6% of older adults are meeting the physical activity and exercise recommendations for optimal health and well-being (Center for Disease Control and

Prevention [CDC], 2017). In order for older adults to remain independent and age successfully, they must be knowledgeable of behaviors and practices which enable them to do so. Thus, providing effective and applicable community-based physical activity programming and education to older adults is necessary to ensure optimal health status and maintenance of physical ability.

Health and physical ability are impacted by the “Social Determinants of Health” (SDOH). Each aspect of the SDOH influences physical activity level and overall health (Office of Disease Prevention and Health Promotion, 2019). The SDOH encompass factors such as neighborhood and environment, health and health quality, social and cultural aspects, education, and economic stability (Office of Disease Prevention and Health Promotion, 2019). Each SDOH component further reflects key issues, such as employment, food security, cultural practices, health literacy, access to health care, healthy foods, etc. (Office of Disease Prevention and Health Promotion, 2019). Creators of physical activity programs for older adults should consider the various SDOH in relation to their target audience. In doing so, the resulting physical activity program will be better able to address several aspects of the SDOH. Such programming is critical to creating effective physical activity programs for older adults and improving their physical activity levels.

The Congregate Meal Program (CMP) is a nationwide community-based resource that promotes health and well-being amongst the aging population. Given its nationwide presence the CMP is in a good position to reach older adults of varying backgrounds and abilities (Administration on Community Living, 2020). The CMP is funded through the Older Americans Act and provides older adults with access to nutrition services and other chronic disease prevention and health promotion services, such as physical activity programs (Administration on

Community Living, 2020). In order to best meet the physical activity needs of their participants, it is important for the CMP to understand the physical activity practices and perceptions of their audience.

The Social Marketing Theory (SMT) is an effective program planning tool when creating needs-and preference-based lifestyle programs (Francis, et al., 2004; Francis & Taylor, 2009; Tan, et al., 2010; Roy et al. 2016). The SMT uses commercial marketing and promotion strategies for health purposes (Andreason, 1994; Lefebvre & Rochlin, 1997; Storey, et al., 2008). The SMT is comprised of six cyclic steps to create and provide health educational programs (Lefebvre & Rochlin, 1997; Storey, et al., 2008). These steps are 1) planning and strategy, 2) select channels through which to communicate and provide education, 3) develop educational materials and pretest to ensure quality, 4) implementation of health educational program, 5) assess the effect of the program against intended health outcomes, 6) gather feedback from participants and revise program as needed to meet intended outcomes (Lefebvre & Rochlin, 1997; Storey, et al., 2008).

The purpose of this cross-sectional study was to apply the SMT planning model to assess the physical activity perceptions and practices of Iowa CMP participants. The ISU Human Subjects Review Board approved the study protocol and classified it as exempt.

Methodology

Participant Recruitment

Participants were recruited from various meal sites in three Iowa Area of Agencies on Aging Areas. The goal sample size was 280-640 older Iowans, however, due to the COVID-19 pandemic, Iowa congregate meal sites were closed, and it was considered unsafe for researchers to continue, thus the study was cancelled. At the time of cancellation, 12 congregate meals sites

had been surveyed resulting in the completion of 176 surveys. Surveys were collected in Iowa; urban counties (ERS= 2 [n=87] and 3[n=28]) (ERS, 2013) and rural counties (ERS = 5 [n=9], 6 [n=15], 7 [n=11], 8 [n= 11], 9 [n=15] (ERS, 2013) were both surveyed.

Data Collection

The nine-page survey was comprised of validated tools and questions designed to assess the sedentary behaviors, physical activity perceptions and practices, and sociodemographics of the respondents. Tools utilized included questions centered on theory of planned behavior constructs to measure perceptions towards physical activity (Ajzen, 1991; Ghahremani, et al., 2012), sedentary time (CDC, 2019) and physical activity practices (CDC, 2019). Surveys were distributed to participants by trained personnel. Respondents completed the surveys independently; this took approximately 20 to 30 minutes. The completed surveys were returned to Iowa State University (ISU) for data entry and analysis upon completion. All respondents received a small gift for their time.

Physical activity perceptions and practices

Participants answered a series of six questions regarding their opinion towards physical activity (Ghahremani, et al., 2012). These questions were based on the Theory of Planned Behavior and required participants to rate their physical activity perceptions (e.g., usefulness of activity, enjoyable, etc.) using a 7-point Likert scale (1= highest opinion, 7=lowest opinion) (Ajzen, 1991; Ghahremani, et al., 2012). In addition, participants completed a series of questions from the National Health Interview Survey (CDC, 2019) where they rated their likeliness to be physically active and their estimated physical activity practices (CDC, 2019). Participants rated their intention to be physically active for at least 30 minutes a day, three times weekly within the next two months with a 5-point Likert Scale (1=not likely at all, 5=very likely) (CDC, 2019).

Participants also reported the number of days per week they participated in various forms of physical activity, including walking bouts of at least 10 minutes, stretching exercises, and muscle strengthening exercises (3-questions; CDC, 2019). For these questions, participants were provided the option to report, “I am unable to do this type of activity.” Sedentary time was measured by inquiring after how participants spent most of their day (i.e., sitting, standing, or walking) (CDC, 2019). Furthermore, participants who reported having arthritis rated the severity of the arthritis using a 5-point Likert Scale (1=not at all severe, 3=somewhat severe, 5=very severe) as well as the location (e.g., back, feet, hands, etc.).

Data Analyses

Statistical analyses were completed using IBM SPSS version 26.0. General descriptive statistics were used to assess response frequencies for all survey responses (n=176 participants). A general linear effects model was used to determine to what extent gender, race, education, and rurality affected physical activity intentions. A general linear effects model block regression analysis was then conducted to determine the variables that predicted physical activity intentions. The variables reported to influence physical activity intention (education, gender, race, location, self-reported health, and living arrangement) were included in this model. All respondents were included in these analyses.

Results

Table 5.1 describes the sociodemographic characteristics of respondents. The average age of respondents was 77.8 ± 8.2 years. Most respondents were white (91.8%) and female (67.0%). Nearly all (89.2%) were educated, reporting a high school education or higher. The majority (40.9%) were widowed. Over half (59.1%) reported living alone and resided in an urban county (65.3%). Finally, one-third (35.2%) reported being in “very good” health.

Table 5.1. Sociodemographic Characteristics of Respondents (n=176)

Sociodemographic Variable	Number (N)	Percentage (%)
Age (years)		
≤60	1	0.6
61-74	63	35.8
75-84	63	35.8
≥85	38	21.6
Missing	11	6.3
Gender		
Female	118	67.0
Male	48	27.3
Missing	10	5.7
Race		
American Indian/Alaska Native	3	1.8
Asian	1	0.6
Black	7	4.1
Hispanic	2	1.2
White	157	91.8
Other	1	0.6
Missing	6	3.4
Education Level Attained		
Less than High School	9	5.1
High School/GED	49	27.8
Some College	45	25.6
Associate's degree	6	3.4
Technical school	13	7.4
Bachelor's degree	22	12.5
Graduate degree	22	12.5
Missing	10	5.7
Marital Status		
Divorced	28	15.9
Married	44	25.0
Separated	3	1.7
Single, Never Married	19	10.8
Widowed	72	40.9
Missing	10	5.7
Living Arrangement		
Live Alone	104	59.1
Live with Someone	61	34.7
Missing	11	6.3
Location^a		
Urban (ERS Code 1-3)	115	65.3
Rural (ERS Code 4-9)	61	34.7

Table 5.1 Continued

Self-reported health status			
	Very poor	1	0.6
	Somewhat poor	14	8.0
	Average	50	28.4
	Somewhat good	40	22.7
	Very good	62	35.2
	Missing	9	5.1
^a USDA ERS, 2019			

Respondents viewed being physically active positively (Table 5.2). The majority agreed that physical activity is: “useful/very useful” (63.1%), “healthy/very healthy” (68.8%), “good/very good” (71.1%), “enjoyable/very enjoyable” (58.6%), “interesting/very interesting” (53.4%), and “pleasant/very pleasant” (57.3%). The majority (45.5%) were not sedentary. In fact, about one-third (37.4%) noted they were “very likely” to be physically active at least three days weekly within the next two months (physical activity intention). Similarly, 36.4% stated they spent five to seven days walking for at least 10 minute bouts per week, within the last seven days (Table 5.2). Approximately one-quarter (28.4%) reported spending zero days doing strengthening exercises while one quarter (25.6%) reported performing stretching exercises zero days weekly (Table 5.2).

Table 5.2. Physical Activity Perceptions and Practices of Respondents (n=176)

Characteristic		Number (n)	Percentage (%)
General physical activity (PA) perception			
	Good (1-3)	139	74.5
	Neutral (4)	9	5.1
	Bad (5-7)	18	10.2
	Missing	10	5.7
Healthiness of PA			
	Healthy (1-3)	138	78.5
	Neutral (4)	12	6.8
	Unhealthy (5-7)	19	10.2
	Missing	8	4.5

Table 5.2 Continued

Usefulness of PA	Useful (1-3)	127	72.2
	Neutral (4)	16	9.1
	Useless (5-7)	24	13.6
	Missing	9	5.1
Enjoyableness of PA	Enjoyable (1-3)	131	74.5
	Neutral (4)	9	5.1
	Unenjoyable (5-7)	26	14.8
	Missing	10	5.7
Interestingness of PA	Interesting (1-3)	132	75.0
	Neutral (4)	11	6.3
	Not interesting (5-7)	21	11.9
	Missing	12	6.8
Pleasantness of PA	Pleasant (1-3)	129	73.2
	Neutral (4)	15	8.5
	Not pleasant (5-7)	21	11.9
	Missing	11	6.3
Type of daily activity	Sit during most of the day	67	38.1
	Stand during most of the day	7	4.0
	Walk around most of the day	80	45.5
	Don't know	13	7.4
	Missing	9	5.1
Intention to perform 30 minutes of PA \geq3 days/week	Not likely at all	31	17.6
	Somewhat unlikely	24	13.6
	Neutral	27	15.3
	Somewhat likely	19	10.8
	Very likely	64	36.4
	Missing	11	6.3
Days spent in \geq10 minute bouts of walking, in the past week	0 days	31	17.6
	1-2 days	31	17.7
	3-4 days	38	21.6
	5-7 days	64	36.4
	Unable to do this activity	9	5.1
	Missing	3	1.7

Table 5.2. Continued

Days per week doing muscle <u>strengthening</u> exercises		
0 days	50	28.4
1-2 days	27	15.4
3-4 days	41	23.3
5-7 days	34	19.3
Unable to do this activity	17	9.7
Missing	7	4.0
Days per week doing muscle <u>stretching</u> exercises		
0 days	45	25.6
1-2 days	34	19.4
3-4 days	40	22.7
5-7 days	39	22.2
Unable to do this activity	14	8.0
Missing	4	2.3

One-third (38.6%) reported having no health issues that hindered their ability to be physically active. The most common ailments that adversely affected respondents' ability to be physical active were: arthritis (43.6%), shortness of breath (19.8%), osteoporosis (17.4%), knee, hip, or ankle surgeries (10.5%), and fatigue (8.7%). For those who reported pain when being active, the most commonly reported areas were one's back (27.8%), knees (24.3%), shoulders (14.8%), and hands (13.9%).

Location ($p=0.004$), education ($p<0.0001$), and self-reported health ($p=0.001$) influenced one's intention to perform 30 minutes of regular activity amongst this sample. The initial six-model, linear block regression analysis revealed that gender, race, location, and living arrangement were not predictors of one's intention to be physically active. For this sample, self-reported health and education ($R^2 = 0.134$, $F(2,152) = 11.748$, $p=0.001$) were the predictors of physical activity intention. Self-reported health explained 7.4% of variability in one's intention to be physically active. When education was added, the model was strengthened and explained 13.4%.

Table 5.3. Influencers of Physical Activity Intention (n=176)

Factor	Model 1		Model 2	
	B±SE	β	B±SE	β
Self-Reported Health	0.409±0.117	0.271 ^a	0.402±0.114	0.267 ^a
Education Level			0.203±0.062	0.246 ^a
R^2	0.074		0.134	
Adjusted R^2	0.067		0.122	
F	(1,153) = 12.138		(2,152) = 11.748	
^a p<0.01				

Limitations

The generalizability of these results is limited due to the small sample size (n=176), limited diversity, and the use of self-report data. Our sample size was slightly lower than our initial goal of at least 280 respondents; however, our sample size is still sufficient to draw insights. Our sample was also non-diverse, however, it is reflective of Iowa's older adult population in that the majority are White (90.7%) (Administration on Community Living, 2012), and educated (90.5%) (State Data Center of Iowa, the Iowa Department on Aging, 2020). Finally, we collected self-reported data. Although we used validated survey tools, the responses may be subject to respondent bias, as many may be more apt to report information in a way that represents themselves more positively than truthfully (Subar et al., 2015). Even with these limitations, these findings provide useful information when developing physical activity programming and messaging for CMP participants.

Discussion

These findings revealed that this sample of older Iowans attending the CMP considered themselves to be in good health and regarded physical activity favorably. Despite these favorable findings, the majority were not meeting current physical activity guidelines. The results of this

study also noted that self-reported health and education were significant predictors of physical activity intention.

While respondents had a positive opinion towards physical activity, it did not result in higher physical activity participation rates or higher intention to be physically active. It has been reported previously that although older adults have good perceptions of physical activity and exercise, only a small percentage are meeting the ACSM physical activity recommendations. (CDC, 2013; Keadle, et al., 2016; Zenko, et al., 2019). This suggests a need for physical activity programs specific to community-residing older adults that provides education and promotes increased levels of physical activity. The CMP serves as a potential location to host these programs. Moore-Harrison, et al. (2009) successfully implemented a CMP-based physical activity program that improved the health and physical ability amongst participants. Similarly, an exergaming program offered at rural CMP resulted in improved physical activity for those who were physically inactive and improved self-perceived health (Strand, et al., 2014). These findings by Moore-Harrison, et al. (2009) and Strand, et al. (2014) demonstrate that CMP-based physical activity programs can be effective. The key is to ensure they are designed to meet the needs of the clientele, and that the CMP has the space necessary to host a physical activity program.

Physical activity participation among older adults is adversely impacted by many social determinants of health (SDOH), such as ethnicity, environment, poverty, disabilities, and physical function (e.g., arthritis, weakness, etc.), gender, and social interaction (Sandlund, et al., 2017; Watson, et al., 2016). This may explain the low levels of physical activity detected among our sample that was mostly urban-residing females.

Baernholdt and others (2012) states urban-residing older adults tend to report higher instances of physical activity. This may be due to the higher availability of physical activity

resources, such as parks/designated walking areas and recreational facilities (Xiao, et al., 2018). Despite the tendency to have higher physical activity levels, urban-residing older adults report significant barriers regarding access to available physical activity resources, such as transportation and affordability (Harrison, et al., 2020; Morgan, et al., 2019). While communities may be able to provide physical activity resources, such as walking paths or fitness facilities, older adults may not be able to access them. Urban areas are often thought to have reliable and consistent public transportation (Pucher & Renne, 2004). However, older adults face many challenges related to public transportation including scheduling conflicts and reliability with mass transit (Ramos, et al., 2019), affordability of transit (Ramos, et al., 2019), and overall safety of the transit options (Bolella, 2011).

In addition, urban areas are noted to generally have a higher poverty rate (Bishaw & Posey, 2016). This may result in lower physical activity rates since affordability is an often linked to physical activity participation (Harrison, et al., 2020; Sims-Gould, et al., 2019). For communities and families with lower incomes, spending on items other than necessities is limited; this includes money spent on repairs of sidewalks, upkeep of parks, or dues to recreational/fitness facilities. Gallagher et al. (2010) reported that the quality of sidewalks (e.g. broken sidewalks, overgrown with weeds, or icy) is a strong deterrent of physical activity among urban-residing older adults because their safety appears compromised (i.e. tripping and falling or having to walk in the street).

Fitness and recreational centers often require membership dues or monthly charges for use, making access to such facilities difficult for those with limited incomes. Some communities may provide low-cost or free recreational options, but perceptions of neighborhood discourteousness, such as graffiti, litter, and low perception of safety may limit patron use of

such options (Miles, 2008). Barriers which limit the ability to be physically active need to be recognized when planning and disseminating physical activity programming for older adults. Communities are unique, thus their physical activity offerings may need to encompass creative approaches to overcoming these barriers. Working collaboratively with the CMP may be one strategy communities could explore when looking to increase the physical activity levels among community residing older adults.

Another potential reason for the low physical activity rates detected in our sample is that most were female. Older women tend to report lower physical activity levels than older men (Lee, 2005; Ransdell, et al., 2004). There may be a misconception between genders of this age group regarding what is considered physical activity and exercise. In general, older men may report their activity levels to be higher or consider themselves to be more active since they are typically more interested in activities that are more strenuous and skilled thus recognized as “exercise” (Van Uffelen, et al, 2017). On the other hand, women may report being less physically active because they are partaking in more leisurely/moderate level activities and do not consider those activities to be forms of exercise, thus decreasing their self-reported activity level (Van Uffelen, et al., 2017). Yet it may also be true that older women are choosing to do less physical activity and exercise for health and interpersonal reasons, such as fear of pain (Larsson, et al., 2016), fear of exacerbation of current health conditions (Huebschmann,et al., 2011), or fear of falling (Larsson, et al., 2016), as these are each noted to be major contributors to lower activity levels among older adults. Communities and individuals are unique and experience different barriers to physical activity. To best provide effective physical activity programming to older adults, the various aspects which may limit and support older adult activity need to be taken into account.

Our study also revealed education influences the physical activity intention of our sample. Education level is a well-documented factor that influences physical activity (Droomers, et al., 2001; Shaw & Spokane, 2008; Lee, et al., 2019). Education level is associated with socioeconomic status; those with less education often have lower incomes (American Psychological Association [APA], 2017). Those who have lower income levels are more likely to have lower physical activity levels (CDC, 2013; Moore & Littlecourt, 2015; Rawal, et al., 2020). This may be due to a myriad of factors, such as those with less education having: less knowledge of appropriate amounts of physical activity (Gray, et al., 2016), lower access (e.g., availability, cost) to fitness facilities (Kamphuis, et al., 2007; Gray, 2016), concerns related to neighborhood safety which impedes the ability to be active outdoors (Bennett, et al., 2007; Gray, 2016), work hours (Gray, 2016; Greaney, et al., 2012) and family constraints (Gray, 2016). However, many of these barriers could be addressed if physical activity programs are offered through the CMP. Communities would benefit if the CMP partnered with local agencies and organizations (e.g., Extension, physical therapy clinics, gyms, etc.) to develop physical activity materials and programs at the lower grade levels to help provide older adults with the best possible chance at comprehending the physical activity messaging, which will increase the likelihood that they are able to meet the ACSM physical activity guidelines.

For this sample, health status was generally perceived as above average, yet the physical activity levels reported did not align with ACSM guidelines. Conversely, self-reported health is positively associated with physical activity level with reports of “very good” health being linked to a higher overall physical activity (Lohne-Seiler, et al., 2014). In another study, current physical activity habits of older adults were linked to better perceptions of physical health, weight and body image, and mental health (Condello, et al., 2016). Condello and others (2016)

concluded this link suggests that the benefit of a physically active lifestyle may produce higher feelings of self-perceived health. The connection between self-perceived health and physical activity level is logical, such that if a person feels ill, weak, or perceives themselves to be unable to partake in a specific activity, they are less likely to be active. However, given the fact our sample reported above average health and low physical activity levels, it is possible they are exhibiting self-report bias by intentionally reporting their health as higher than it is or overestimating their own health perceptions.

The CMP is designed to promote health and well-being amongst community-residing older adults, and has been successful at aiding participants in eating healthier, feeling better, and providing mental stimulation via socialization, which contribute to feelings of better health (Administration on Community Living, 2013). It is possible that the high perceptions of self-related health reported here are attributable to attending the CMP. Additionally, this study only collected data from one time point. It is possible that if respondents “felt good” or “healthy” when they completed the survey, they would report their health as better than it usually is. When developing physical activity programs for older adults, it is important to consider their general health status. In addition, the effects of physical activity on health status and physical functioning should be emphasized in such programming to increase the perception of health, thus increasing the likelihood of physical activity among this population.

These findings suggest that future CMP-based physical activity programs should clearly explain the ACSM physical activity guidelines to older adults, provide age-appropriate exercises to aid participants in meeting these guidelines, as well as discuss the importance and associated benefits of a well-rounded exercise regimen (i.e. aerobic exercises, stretching, muscle strengthening exercises).

Conclusions

Many CMP participants are low income, have disabilities, and likely have little to no access to facilities meant to increase physical activity levels (Mabli & Shenk, 2018). Offering effective physical activity programs at congregate meal sites offers participants an opportunity to receive regular education and partake in physical activity and exercise. This opportunity may greatly increase one's perception of health and improve physical ability, thus increasing the ability to remain independent. The findings of the present study provide valuable information that can be used to continue making older adult physical activity education client-centered and applicable, thus increasing the likelihood of improving the health and well-being of participants. Such programming will aid in ensuring participants achieve the goal of successful aging.

Our study sought to assess the physical activity perceptions and practices of older Iowans who attend the CMP. These findings note that a great majority of CMP participants view physical activity positively and healthfully but are not meeting ACSM physical activity guidelines. The CMP has the ability to reach a great variety of older adults many who may not otherwise have access to or the opportunity to be physically active (Mabli & Shenk, 2018). The results of this study provide insight to guide the development and dissemination of physical activity programs for CMP participants in order to increase physical activity and exercise levels, maintain and/or improve physical function and overall health, and enable older adults to remain healthy and independent.

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CHAPTER 6. GENERAL CONCLUSION

Physical activity is an important aspect of successful aging. It has the potential to prolong muscle function and ability, reduce the risk and complications related to chronic disease, maintain cognitive function, and ultimately increase an older adult's opportunity to remain independent (Musich, et al., 2017; Vasankari, et al., 2017; Verhoeven, et al., 2016; Vaz Fragoso, et al., 2014; Giné-Garriga, et al., 2014; Langlois, et al., 2012). However, low physical activity participation rates among older adults suggests a need for community-based physical activity programming specifically designed for the aging population (CDC, 2013; Keadle, 2016; Zenko, 2019). Thus, this mixed methods assessment was completed to examine the needs, preferences, practices, and significant predictors of physical activity among community residing older adults in order to create effective community-based physical activity programming.

For organizations to develop applicable and effective physical activity programs for community-residing older adults, it is imperative these organizations first understand the needs, preferences, and opinions of their target audience. Study One, a physical activity needs assessment for both rural and urban, community-residing, older adults, revealed that many older adults were not meeting ACSM physical activity recommendations. The results also revealed multiple similarities between Iowa and DC regarding major needs and preference categories, such as motivators, barriers, and perceived benefits of physical activity. The information obtained through Study One provides valuable information to assist in the development of effective and applicable physical activity programs for community residing older adults.

Study Two noted that CMP participants viewed physical activity favorably but reported low levels of stretching and strengthening type exercises, and were also not meeting the ACSM physical activity guidelines. Education and self-reported health were identified as significant

predictors towards physical activity intention amongst this population. These results suggest that CMP-based physical activity programs and materials need to be tailored for appropriate literacy levels and emphasize the role of regular physical activity on general health and perception of health status.

These two studies emphasize the factors that need to be considered in order to promote physical activity amongst community-residing older adults. Future research should further assess physical activity programming educational messages which encourage active lifestyles and assess health outcomes of participants who receive these messages, thus improving the likelihood of remaining independent and achieving successful aging.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL FORMS

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 06/19/2018
To: Sarah L Francis
From: Office for Responsible Research
Title: **Fresh Conversations: Physical Activity Assessment and Satisfaction Evaluation**
IRB ID: 18-262
Submission Type: Initial Submission **Exemption Date:** 06/19/2018

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

2: Research involving use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior, unless (i) Information obtained is recorded in such a manner that human subjects can be identified, and (ii) Any disclosure of the human subjects' responses outside the research could reasonably place the subject at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any *modifications to the research procedures* (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the *inclusion of participants from vulnerable populations*, and/or any *change that may increase the risk or discomfort to participants*. The purpose of review is to determine if the project still meets the federal criteria for exemption.

In addition, *changes to key personnel* must receive prior approval.

Detailed information about requirements for submission of modifications can be found on our [website](#). For modifications that require prior approval, an amendment to the most recent IRB application must be submitted in IRBManager. A determination of exemption or approval from the IRB must be granted before implementing the proposed changes.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

IRB 03/2018

Please note that you must submit all research involving human participants for review. **Only the IRB or its designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed**. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.**

Please be advised that your research study may be subject to [post-approval monitoring](#) by Iowa State University's Office for Responsible Research. In some cases, it may also be subject to formal audit or inspection by federal agencies and study sponsors.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

Institutional Review Board

DATE: May 1, 2019

TO: Elgloria Harrison, DM

FROM: Lara A. Thompson, Ph.D., IRB Chair

STUDY TITLE: [1380607-3] Physical Activity Needs and Preference Assessment Focus Groups of Older Adults in Washington, DC

SUBMISSION TYPE: New

ACTION: APPROVED

APPROVAL DATE: 5/1/2019

EXPIRATION DATE: 4/30/2020

REVIEW TYPE: Administrative Review

Thank you for your submission of materials for this study which has been approved through review by the University of the District of Columbia Institutional Review Board (IRB). This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized.

All research must be conducted in accordance with the approved submission. You may proceed with your project, while protecting the safety, privacy and confidentiality of the participants.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Kindly note:

- Your approval is for a maximum of one year. The UDC IRB conducts continuing review of ongoing, approved research. Continuing IRB reviews are preceded by receipt of appropriate progress reports from the investigator, including available, study-wide findings.
- Any changes in your protocol must be approved by re-submittal to the IRB for review, although for minor changes you can request an expedited review process.
- Any revision to previously approved materials must be approved by this office prior to initiation.
- Please report all non-compliance issues or complaints regarding this study to this office.
- All research records must be retained for a minimum of three years following the closure of the study.
- You are expected to promptly report any serious or unexpected adverse effects or unanticipated risks encountered to the UDC IRB within 72 hours.

If you have any questions, please contact Lara Thompson at lara.thompson@udc.edu. Please include your study title and reference number in all correspondence.

APPENDIX B. PHYSICAL ACTIVITY FOCUS GROUP QUESTIONNAIRE

FRESH CONVERSATIONS Physical Activity Focus Group Questionnaire

The below questions are intended to help us better understand who is attending today's focus group session. The completion of this is voluntary. No names will be associated with these questionnaires.

1. How old are you? _____ (years)

2. Are you male or female?

- Male
- Female

3. Which one or more of the following would you say is your race?

- American Indian or Alaska Native
- Asian
- Black
- Hispanic
- Native Hawaiian or other Pacific islander
- White
- Other, please describe:

4. What is the highest degree of school you completed?

- Less than High School
- High School/GED
- Some College
- Associates degree
- Technical School degree
- Bachelor's degree
- Graduate degree

5. Are you currently or have you previously participated in *Fresh Conversations*?

- Yes
- No

Questionnaire Continues

6. Are you...?

- Divorced
- Married
- Separated
- Single, never married
- Widowed

7. In general, how would you describe your physical activity level?

- No Activity
- Low Activity
- Somewhat Low Activity
- Somewhat High Activity
- High Activity

8. Which statement best describes your time participating in MODERATE physical activity (e.g. can talk but not sing during)?

- In a typical week, I participate in **less than** 150 minutes of moderate-intensity activity (e.g. 50 minute sessions, 3 times per week or 30 minute sessions, 5 times per week).
- In a typical week, I participate in **greater than or equal to** 150 minutes of moderate-intensity activity.
- Not sure

9. Which statement best describes your time participating in VIGOROUS physical activity (e.g. not able to say more than a few words without pausing for a breath)?

- In a typical week, I participate in **less than** 75 minutes of vigorous-intensity activity (e.g. 25 minute sessions, 3 times per week or 15 minute sessions, 5 times per week).
- In a typical week, I participate in **greater than or equal to** 75 minutes of vigorous-intensity activity.
- Not sure

10. In the past 3 months, have you participated in regular exercise (defined as: planned, structured, repetitive activity with an objective to improve or maintain physical fitness)?

- Yes
- No

Questionnaire Continues

If yes, in what settings? Mark all that apply.

- At home
- Community/recreation center
- Fitness center (e.g. gym with membership)
- Outdoors
- Senior center
- Sport club
- Yoga/pilates/barre studio
- Other:

11. Which do you prefer, exercising on your own or with a group (e.g. walking with a friend, participating in a group fitness class)?

- I do not exercise.
- I prefer to exercise alone.
- I prefer to exercise in groups.
- No preference.

12. Which do you prefer, having a physical activity routine (*defined as: habitual activity bouts you repeat each week*) or having variability? Examples of physical activity routines include participating in a group fitness class at the same each week, going on a walk at the same time each day, going to the local recreation center at the same time each week, etc.

- I am not physically active.
- I prefer having a physical activity routine I repeat each week.
- I prefer having variability in my physical activity.
- No preference.

13. In general, how would you describe your health?

- Very poor
- Somewhat poor
- Average
- Somewhat good
- Very good

Questionnaire Continues

14. Mark all the health conditions that you have been told you have.

- | | |
|--|---|
| <input type="checkbox"/> Arthritis | <input type="checkbox"/> Knee issues |
| <input type="checkbox"/> Back Issues | <input type="checkbox"/> Lung disease (e.g. asthma, COPD, chronic bronchitis) |
| <input type="checkbox"/> Cancer | <input type="checkbox"/> Macular degeneration |
| <input type="checkbox"/> Diabetes | <input type="checkbox"/> Multiple sclerosis |
| <input type="checkbox"/> Fibromyalgia | <input type="checkbox"/> Osteoporosis |
| <input type="checkbox"/> Hearing impairment | <input type="checkbox"/> Parkinson's |
| <input type="checkbox"/> Heart attack | <input type="checkbox"/> Shoulder Issues |
| <input type="checkbox"/> High blood pressure | <input type="checkbox"/> Stroke |
| <input type="checkbox"/> High cholesterol | <input type="checkbox"/> Visual impairments/eye health issues |
| <input type="checkbox"/> Hip issues | <input type="checkbox"/> Other: <input type="text"/> |
| <input type="checkbox"/> Kidney Disease | |

For the below statements, please indicate if the statement was often true, sometimes true or never true for you/your household in the last 12 months.

15. I/We worried whether my/our food would run out before I/we got money to buy more.

- a) Often true
- b) Sometimes true
- c) Never true
- d) Don't know

16. The food that I/we bought just didn't last and I/we didn't have money to get more.

- a) Often true
- b) Sometimes true
- c) Never true
- d) Don't know

***This is the end of the questionnaire.
Thank you for taking the time to fill it out!***

APPENDIX C. PHYSICAL ACTIVITY NEEDS FOCUS GROUP QUESTIONS

FRESH CONVERSATIONS Physical Activity Needs Focus Group Questions

Introduction (to be read by moderator)

Today we are here on the behalf of the Iowa Department of Public Health to learn more about how the Department can support and encourage physical activity among older Iowans. *Provide a few Fresh Conversations newsletters as examples.*

Before we begin, I would like for each of us to state our first names only. These will not be recorded.

The general purpose of this focus group is to capture your thoughts, experiences, and emotions centering around physical activity. This discussion is expected to take about 90 minutes to two hours. Before we begin, there are a few guidelines and ground rules. These will help us hear everyone's thoughts while allowing us to complete the discussion on time.

- a. Everyone's participation is valuable and we want you to feel free to say whatever you think.
- b. Please speak one at a time and not in side conversations. It is okay to agree, but it is also okay to disagree.
- c. There are no right or wrong answers. Your best responses are those that are true for you.
- d. Keep in mind that we are just as interested in negative experiences and perspectives as positive ones.
- e. We must all agree to a very strict level of confidentiality to the information presented during this discussion. Some quotes from this discussion may be shared in presentations and publications, but the quotes will not be linked to any specific person.

To make sure we get everyone's comments, the discussion will be audio -taped and then transcribed at a later time by an independent party who will not know who participated in today's session. _____ will also be taking notes. You can refuse to answer or respond to any question, and you can choose to stop participating in the focus group discussion at any time. I will be reading the questions from my notes because we want to ask the same questions to our focus groups. However, where we go with responses to questions is pretty much up to all of you. If some of the questions we ask today don't seem to apply to you, think about a friend or family member who the question may apply to and answer from that perspective.

What questions do you have?

For today's discussion i want to define the terms exercise and physical activity.

Exercise is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body.

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure. These can include activities of daily living like walking around the store, cleaning your house, gardening.

Individual perceptions and experiences physical activity

1. There is a lot of experience and wisdom around this table and I hope you're willing to share some of it with me today. Don't worry, I won't ask anything too personal. One of the best ways for me to learn is to hear stories about your experiences. On the table, we have laid out a variety of pictures depicting feelings that you may or may not associate with exercise or physical activity. We would like you to think for a few minutes and select up to two images that best capture your feelings about exercise or physical activity either now or in the past.

Examples may include memories, emotions, or thoughts that come to mind from that image. Be ready to share what it is about these pictures that made you select them. Remember, we are just as interested in hearing negative experiences as positive ones. As well, feel free to share if your experiences do not match any of these images and why. *Go around the room and have each person share their images and why they selected them. Follow up question: Is there anything else these pictures are not capturing that anyone would like to share?*

Barriers

2. I'd like to hear more about things that get in the way—or prevent you, your friends, or family members from being as active as you'd like to be. Remember that you are here not only to share your thoughts, ideas, and experiences but you're also here to be the voice for people who can't speak for themselves today.

What feelings might you, your family members, or friends be experiencing as a result of these obstacles?

What could help you or them feel more encouraged?

Motivations

3. The people who write the *Fresh Conversations newsletters* want to better understand what motivates you and your peers to be active—or not.

Perceived benefits

4. What type of physical activity do you enjoy most? Describe the benefits you experience from this this activity (Prompts: physical, emotional, health, et.) How do you feel being physically active will impact your future?

Ideal Programming Attributes

5. Some people like to have a leader or trainer when doing physical activity. What kind of leadership, if any, do you like to have for physical activity?
6. In what ways do you feel supported by your community (i.e. your local county, city, and neighborhood) to be active every day? How could your community be more supportive?
7. If you were given the money and the power to create something that would help you and your friends be active, what would it be? What would it look like? Who would come and why?

APPENDIX D. DIETARY INTAKE AND PHYSICAL ACTIVITY QUESTIONNAIRE

To be completed by ISU:

Participant ID _____

**THIS PAGE WILL BE REMOVED WHEN RETURNED TO CAMPUS AND AN ID NUMBER IS
GIVEN.**

PLEASE PRINT YOUR ANSWER

FIRST NAME: _____

LAST NAME: _____

MEALSITE: _____

COUNTY: _____

AREA AGENCY ON AGING (AAA)

<input type="checkbox"/> Aging Resources of Central Iowa AAA	<input type="checkbox"/> Elderbridge	<input type="checkbox"/> Heritage AAA
<input type="checkbox"/> Northeast Iowa AAA	<input type="checkbox"/> Milestones AAA	

To be completed by ISU:

Participant ID _____

For each of the following items, mark the number that best describes your current beliefs. How certain (or confident) are you that you could overcome the following barriers?				
	Very Certain/ Confident	Rather Certain/ Confident	Rather Uncertain/ Confident	Very Uncertain/ Confident
I can manage to stick to healthful foods even if I need a long time to develop the necessary skills (e.g. label reading, cooking, etc).	4	3	2	1
I can manage to stick to healthful foods even if I have to try several times until it works (e.g. until it becomes a new habit).	4	3	2	1
I can manage to stick to healthful foods if I have to rethink my entire way of eating (e.g. eating more produce, buying lean meats, etc).	4	3	2	1
I can manage to stick to healthful foods even if I do not receive a great deal of support from others when making my first attempt (e.g. family/friends make fun of my new food choices, or I am offered high sugar or high fat foods).	4	3	2	1
I can manage to stick to healthful foods even if I have to make a detailed plan (e.g. shopping list, menu, meal plan, etc).	4	3	2	1

To be completed by ISU:

Participant ID _____

Please answer the following questions about your dietary intake.	
1. How often do you usually eat fruit as a snack?	<input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
2. How often do you usually eat whole grain <u>bread</u>s?	<input type="checkbox"/> Never or less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
3. How often do you usually eat whole grain <u>cereals (e.g. oatmeal, bran flakes, etc)</u>?	<input type="checkbox"/> Never or less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
4. How often do you usually eat candy OR chocolate?	<input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
5. How often do you eat crackers, pretzels, chips, OR popcorn?	<input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
6. How often do you eat cakes OR pies?	<input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
7. How often do you eat cookies?	<input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week
8. How often do you eat ice cream?	<input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> 1 or 2 times a week <input type="checkbox"/> 3 or more times a week

To be completed by ISU:

Participant ID _____

<p>9. How often do you eat cold cuts, hot dogs, lunchmeats OR deli meats?</p> <p><input type="checkbox"/> Never or less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 or more times a week</p>
<p>10. How often do you eat bacon OR sausage?</p> <p><input type="checkbox"/> Never or less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 or more times a week</p>
<p>11. How often do you eat carrots, sweet potatoes, broccoli, OR spinach?</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 or more times a week</p>
<p>12. How often do you eat fruit (not including juice)? Please include fresh, canned or frozen fruit.</p> <p><input type="checkbox"/> Never or Less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 to 5 times a week</p> <p><input type="checkbox"/> Every day or almost every day</p>
<p>13. How often do you eat hot or cold breakfast cereal?</p> <p><input type="checkbox"/> Never</p> <p><input type="checkbox"/> Less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 to 5 times a week</p> <p><input type="checkbox"/> Every day or almost every day</p>
<p>14. How often do you drink some kind of juice at breakfast?</p> <p><input type="checkbox"/> Never or Less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 to 5 times a week</p> <p><input type="checkbox"/> Every day or almost every day</p>
<p>15. How often do you eat chicken OR turkey?</p> <p><input type="checkbox"/> Never or less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 or more times a week</p>
<p>16. How often do you drink a glass of milk?</p> <p><input type="checkbox"/> Never or Less than once a week</p> <p><input type="checkbox"/> 1 or 2 times a week</p> <p><input type="checkbox"/> 3 to 5 times a week</p>

To be completed by ISU:

Participant ID _____

<input type="checkbox"/> Every day or almost every day <input type="checkbox"/> More than once every day
17. Do you usually add butter or margarine to foods like bread, rolls, OR biscuits? <input type="checkbox"/> Yes <input type="checkbox"/> No
18. Do you usually add fat (butter, margarine or oil) to potatoes and other vegetables? <input type="checkbox"/> Yes <input type="checkbox"/> No
19. Do you use gravy (when available) at meals? <input type="checkbox"/> Yes <input type="checkbox"/> No
20. Do you usually add sugar or honey to sweeten your coffee or tea? <input type="checkbox"/> Yes <input type="checkbox"/> No
21. Do you usually drink wine, beer or other alcoholic beverages? <input type="checkbox"/> Yes <input type="checkbox"/> No
22. How often do you eat fish or seafood that <u>IS NOT</u> fried? <input type="checkbox"/> Never <input type="checkbox"/> Less than once a week <input type="checkbox"/> Once a week <input type="checkbox"/> More than once a week
23. How many servings of milk, cheese, OR yogurt do you usually have each DAY? <input type="checkbox"/> None <input type="checkbox"/> One <input type="checkbox"/> Two or more
24. How many different vegetable servings do you usually have at your main meal of the day? <input type="checkbox"/> None <input type="checkbox"/> One <input type="checkbox"/> Two <input type="checkbox"/> Three or more
25. Which of the following best describes your nutritional supplement use? <input type="checkbox"/> I don't use supplements <input type="checkbox"/> I use supplements other than vitamins and mineral (e.g. Ensure) <input type="checkbox"/> I use a multivitamin/mineral preparation (e.g. Centrum)

THE NEXT SET OF QUESTIONS ARE ABOUT PHYSICAL ACTIVITY.

To be completed by ISU:

Participant ID _____

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure. These can include activities of daily living like walking around the store, cleaning your house, or gardening.

Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.

26. For me, participating in regular physical activity would be:								
Useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Useless
	1	2	3	4	5	6	7	
27. For me, participating in regular physical activity would be:								
Healthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unhealthy
	1	2	3	4	5	6	7	
28. For me, participating in regular physical activity would be:								
Good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bad
	1	2	3	4	5	6	7	
29. For me, participating in regular physical activity would be:								
Enjoyable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unenjoyable
	1	2	3	4	5	6	7	
30. For me, participating in regular physical activity would be:								
Interesting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Boring
	1	2	3	4	5	6	7	
31. For me, participating in regular physical activity would be:								
Pleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unpleasant
	1	2	3	4	5	6	7	

32. I intend to perform physical activity for 30 minutes/day for at least 3 days/week in the next 2 months (future).” Mark your response with an “X.”

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5
Not Likely at all			Very Likely	

33. Sometimes you may walk for fun, relaxation, exercise, or to walk the dog. During the PAST SEVEN DAYS, DID YOU WALK FOR AT LEAST 10 MINUTES AT A TIME for any of these reasons? Mark your response with an “X.”

- I am unable to do this type of activity
- Yes
- No

34. During the past seven days, on how many days did you walk for at least 10 minutes at a time for fun, relaxation, exercise or to walk the dog? Mark your response with an “X.”

To be completed by ISU:

Participant ID _____

0 days 1 day 2 days 3 days 4 days 5 days 6 days 7 days

I am unable to do this type of activity

35. How many times per week do you do physical activities specifically designed to STRENGTHEN your muscles such as lifting weights or doing calisthenics? Mark your response with an "X."

0 days 1 day 2 days 3 days 4 days 5 days 6 days 7 days

I am unable to do this type of activity

36. How many times per week do you do physical activities designed to STRETCH your muscles such as yoga, or exercises like bending side-to-side, toe touches, and leg stretches? Mark your response with an "X."

0 days 1 day 2 days 3 days 4 days 5 days 6 days 7 days

I am unable to do this type of activity

37. Which one of the following BEST describes your usual daily activities related to moving around? Do NOT include exercises, sports, or physically active hobbies done in your leisure time. Daily activities may include work, housework (if you're a homemaker), and what you normally do throughout a typical day. Pick the one you do MOST often. Mark your response with an "X."

- Sit during MOST of the day
- STAND during MOST of the day
- Walk around MOST of the day
- Don't Know

38. Do you have any of the following (Mark all that apply with an "X"):

- Shortness of breath at rest or with mild exertion (like walking two blocks).
- Unusual fatigue with usual activities.
- Arthritis
- Osteoporosis
- Any knee, hip, or ankle surgeries in the last year

40. If you have arthritis, please rate the severity of the arthritis?

1 2 3 4 5

Not at all severe Somewhat severe Very Severe

Where is the majority of the pain? (Mark all that apply with an "X"):

- Back
- Feet
- Hands

To be completed by ISU:

Participant ID _____

- Knees
 Shoulders
 Other (please list): _____

The below questions are intended to help us better understand who is completing these questionnaires. The completion of this is voluntary. No names will be associated with these questionnaires.

41. How old are you? _____ (years)

42. Length of time attending *Fresh Conversations*

- Less than one year
 1 to 2 years
 2 to 3 years
 4 years or longer

43. Are you male or female?

- Female
 Male

44. Which one or more of the following would you say is your race?

- American Indian or Alaska Native
 Asian
 Black
 Hispanic
 Native Hawaiian or other Pacific islander
 White
 Other, please describe:

45. What is the highest degree of school you completed?

- Less than High School
 High School/GED
 Some College
 Associates
 Technical School
 Bachelor's
 Graduate

46. Are you...?

- Divorced
 Married
 Separated
 Single, never married
 Widowed

47. What best describes your current living arrangement?

- I live alone
 I live with someone

If you live with someone, who do you live with? (Select all that apply)

- Adult Child

To be completed by ISU:

Participant ID _____

- Grandchild/children
- Roommate
- Spouse or Partner
- Other _____

48. Which statement best describes your status for purchasing meals/grocery items?

- I can take care of all my meal purchasing needs independently.
- I can shop independently for small purchases.
- I need to be accompanied while purchasing meal items.
- I need someone else to do all my purchasing.

49. Which statement best describes your status for preparation of meals on most days?

- I can plan, prepare, and serve nutritious meals independently.
- I can prepare adequate meals if supplied with ingredients.
- I can heat and serve my meals.
- I can plan, prepare, and serve my meals but I do not maintain a nutritious diet.
- I can plan and prepare my meals, but choose not to. I prefer to frozen meals or eating out.
- I need to have my meals planned, prepared and served.

50. In general, how would you describe your health?

- Very poor
- Somewhat poor
- Average
- Somewhat good
- Very good

For the below statements, please indicate if the statement was often true, sometimes true or never true for you/your household in the last 12 months.

51. I/We worried whether my/our food would run out before I/we got money to buy more.

- Often true
- Sometimes true
- Never true
- Don't know

52. The food that I/we bought just didn't last and I/we didn't have money to get more.

- Often true
- Sometimes true
- Never true
- Don't know

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.