SOCIAL INTERACTION AND PHYSICAL ACTIVITY AMONG RURAL OLDER ADULTS

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By

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Abstract

Physical activity and social interaction are critical components in supporting health and well-being among older adults; therefore, there is significant merit in further exploration of the relationship between these concepts, particularly in rural settings where rates of physical activity are low. Social interaction is also associated with numerous health benefits to older adults; however, little research exists on the association between social interaction and physical activity among rural dwelling older adults. The current COVID-19 pandemic has also placed additional barriers on physical activity participation and social interaction, particularly among older adults who are considered a high-risk population where, in an effort to minimize transmission of the virus, self-isolation and physical distancing were recommended.

The purpose of this dissertation was to explore what is known about social interaction and physical activity among older adults in rural communities through a scoping review of the literature, followed by a phenomenological study to better understand of the experience of social interaction and physical activity among the older adult population in a rural context during the COVID-19 pandemic.

The scoping review produced 990 results, where 26 articles met the inclusion criteria. Although there were differences in the defining role and meaning of physical activity among the studies, findings indicated that physical activity and social interaction were important for many older adults in maintaining health; however, not all older adults preferred the social aspect of exercising with others. A rural environment often presented limited opportunities for participating in physical and social activities related to geographical location and other socio-economic factors.
Using a social ecological model as a guide, data for the phenomenological study were collected from ten participants through individual telephone-based interviews. Findings revealed the inter-related aspects of individual and social factors that influence health promoting behaviours. For many, physical activity was socially motivated. The environment also had an impact on older adults’ physical and social interaction, both positively and negatively. Participants in rural communities expressed a sense of community belonging, safety, and trust which fostered engagement; however, inhibiting factors included icy roads, lack of public transportation and limited services. COVID-19 restrictions also impacted the opportunities for many rural older adults to participate in physical activities and social events, leaving many participants feeling lonely and isolated. COVID-19 restrictions on social interaction provided some with a welcomed break from their usual daily responsibilities.

Exploring social interaction and physical activity among rural dwelling older adults adds substantial value to rural-based research, targeting specific interventions that reflect the unique perceptions and experiences of rural older adults to support health and well-being throughout aging. The results of this research are useful in identifying modifiable factors to support and promote active engagement in physical and social activities; however, awareness of negative associations is needed when considering low physical activity rates and social interaction among rural older adults. As a scarcity of rural-specific studies was found in the scoping review, further research is needed to better understand the concepts in a rural environment as often physical and social interaction are experienced differently than in an urban setting.
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“All our dreams can come true if we have the courage to pursue them” Walt Disney
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Chapter 1 - Introduction

1.1 Introduction

Statistics Canada (2019a) estimates the number of older adults will increase from 15% to over 22% by 2031. In Saskatchewan, older adults are more likely to live in rural areas (Rural Dementia Action Research, n.d). According to Jeffery et al. (2014), people living in rural communities face unique challenges compared to their urban counterparts. Some inequities experienced in rural communities include lack of access to public transportation, reduced availability of health care services, lower incomes, and less education (Averill, 2012; Jeffery et al., 2014). These inequities make it more difficult for older adults to meet their needs in maintaining health and well-being (Hill & Hymus, 2019). Compared to their urban counterparts, rural residents experience poorer health in terms of increased mortality, lower life expectancy and functional health, increased risk of diseases, illness and injury (Kulig & Williams, 2011). With an increasing number of people aging, it is important to support health and well-being throughout the lifespan of the individual (Russell, 2017; Witcher, 2017).

Aging inevitably results in changes to the structural and functional ability regardless of health status; however, regular physical activity has been shown to improve strength, balance and flexibility as well as reduce the risk of chronic illness and frailty (Burton et al., 2019).

Physical activity is a broad concept that can be defined in many different ways. The World Health Organization [WHO] (2018) defines physical activity as “any bodily movement produced by skeletal muscles that requires energy expenditure” (p. 14), which includes activities such as work or chores, and activities that are done for enjoyment and
leisure or for transportation purposes. Exercise, which is a form of physical activity, includes planned, structured, repetitive activity done with the intention to improve or maintain fitness (WHO, 2018). As people age, many become less physically active despite numerous health benefits. Statistics show that only 14% of older adults are achieving the recommended weekly amount of physical activity compared to 18% in the adult population and 40% in children and youth, age 5 to 17 years (Statistics Canada, 2019a). Older adults in rural areas are at even greater risk of inactivity than those in urban areas (Hill & Hymus, 2019). Particularly within rural communities, risk of injury is often amplified by uneven or absent sidewalks, inadequate street lighting, snow build-up and icy conditions that perpetuate the fear of falling, and perception of crime and unrestrained animals often result in reduced desire among older adults to engage in outdoor activity (Schmidt et al., 2016). This limits the opportunity for social interaction with others in the community as outdoor activity provides an opportunity to interact with others in the neighborhood (Keating et al., 2011; Schmidt et al., 2016). While engaging in physical activity, older adults have an opportunity for social interaction with others. Social interaction is associated with numerous health benefits, especially among older adults (Dionigi & Son, 2017; Liechty et al., 2017). Broadly defined as a social exchange between two or more people, research on social interaction involves exploring who is involved in an interaction and the closeness of that connection, how an interaction is taking place, barriers and facilitators of the interaction, and why an interaction is occurring (Bacsu et al., 2014; McIntosh, 2018). Social interaction also includes measurable factors such as the number of people involved in an interaction, frequency of
interaction, number of social activities, and the types of social activities individuals are participating in (Jeffery et al., 2014).

Social interaction is associated with positive health outcomes among older adults such as lower morbidity rates and longer survival rates (Vogelsang, 2016). It provides opportunities for meaningful life activities and developing significant relationships and roles, including helping others (Levasseur et al., 2010). Social interaction also has an influence on decreasing depression rates, generalized anxiety disorder, and decreased risk of cognitive decline (Nemoto et al., 2021). Social interaction shares a reciprocal relationship with health as an important influencing factor in promoting healthy behaviors such as physical activity and physical activity facilitates social interaction (Hill & Hymus, 2019; Nemoto et al., 2021); however, the ability for some people to engage in health promoting behaviours is influenced by multiple social and economic factors. The social ecological model proposed by Stokols (1996), emphasizes the interconnection between individual, social, and environmental aspects of health. Considering the multiple levels of influence is essential in exploring physical activity among rural older adults according to Witcher (2017), as many factors influence healthy behaviours. Of particular importance is the rural environment in terms of facilitators and barriers for physical activity and social interaction faced by many older adults. There are a number of core principles of the social ecological model that relate to the environment and healthy behaviour (Stokols, 1996). These include the recognition that environmental settings have many dimensions that can influence individual behaviour within social, physical, and cultural dimensions as well as individual knowledge and attitudes (Stokols, 1996). The model also emphasizes the interconnection between the environment and health, and
more importantly, identifies that social and environmental factors and individual health behavior interact in a dynamic relationship (Sallis et al., 2008). This is particularly relevant to research conducted in rural settings where the history and culture of the community are important aspects to understand when working with the older adult population (Witcher, 2017). In examining the influence of the environment on physical activity, Sallis (2009) found that physical activity is place dependent, meaning some places support physical activity more than others. Sallis explains that physical elements in a community such as sidewalks and trails support physical activity. The environment is an important consideration of physical activity promotion (Kowalski et al., 2012). According to Spence and Lee (2003), people adapt and respond to their environment; therefore, attention needs to be placed on the physical and social environment when researching physical activity.

Other determinants also influence an individual’s ability to participate in health promoting behaviours. For example, income, social status and supports, culture, gender, education, social and physical environments all impact health (Government of Canada, 2021). Rates of physical activity are typically lower among those with low income, less education, poorer perceived health status, ethnicity, which is lower among non-whites and gender, particularly among females (Government of Canada, 2021; Public Health Agency of Canada, 2017). The context or environment where people reside also influences the health of an individual (Witcher, 2017). According to Holtz et al. (2014), where people live will impact their health and access to health and social services, rural residents face a combination of factors that influence health that include lack of public
transportation, inadequate access to specialized health care services, limited housing and home-care, and lower income compared to urban older adults (Averill, 2012).

Although there is no clear and concise definition, rural is often defined by population criteria of rural and small towns (RST) that includes people living outside larger urban centres with populations of 10,000 or more (Statistics Canada, 2015). In Saskatchewan, rural is often defined by criteria set forth by the Saskatchewan Association of Rural Municipalities [SARM] (2021) as 5,000 people or less. Within the province of Saskatchewan, rural communities are often characterized as calm, peaceful, stress-free settings where people have solid connections to each other (Schmidt et al., 2016); however, with changing economic pressure and political influence, rural communities are experiencing more hospital closures, increased financial barriers where lower incomes make travel for services more difficult, and an out-migration of younger rural residents to the city for more job opportunities (Schmidt et al., 2016). Therefore, it is equally important to consider other aspects of rurality such as density of population, distance away from dense population, and the diversity of rural Canada (Lauzon et al., 2015).

Furthermore, aging in a rural environment is often experienced differently than aging in an urban setting (Witcher, 2017). The risk of injury is often amplified by uneven or absent sidewalks, inadequate street lighting, snow build-up and icy conditions that perpetuate the fear of falling, particularly among older adults, resulting in reduced desire to engage in outdoor activities (Schmidt et al., 2016). Perception of crime and unrestrained animals also influences older adults’ participation in outdoor activities.
Other barriers include distance from health care services and programs, financial constraints, access to affordable housing, and geographical isolation from others (Quinlan et al., 2020). Many of these barriers influence the opportunity and ability for older adults to socially connect with others in the community as often, the outdoors are used for activities such as walking, which provides an opportunity to visit with people in their neighborhood (Keating et al., 2011; Schmidt et al., 2016).

The COVID-19 pandemic has been a particularly challenging time for the older adult population. At the onset of the global pandemic, public health experts warned that older adults were at a higher risk of experiencing severe and potentially fatal effects of the virus. Tam (2020) reported that people with underlying health conditions such as diabetes, cardiovascular disease, cancer, immunosuppression, obesity, respiratory disease, or chronic kidney disease, increase the risk of severe COVID-19 outcomes. Additionally, age is also a risk factor, where adults over age 60 experience the highest hospitalizations, intensive care admissions, and deaths (Tam, 2020).

To protect this vulnerable population, public health measures were put in place that recommended frequent handwashing, maintaining two metres of physical distance apart, and wearing a mask when around other people (Tam, 2020). Other measures, such as temporarily closing schools, non-essential businesses and social meeting places, were also implemented. These measures were particularly impactful to older adults who were asked to stay at home and limit contact with others as much as possible to protect them from severe illness (Ng et al., 2020).

As a result, many programs and services were cancelled, particularly those deemed non-essential such as senior centres, libraries, recreation facilities and coffee
shops (Tam, 2020). Many of these programs and services were a venue for older adults to remain active and connected to their communities and each other. The physical distancing measures that were implemented meant that family and friends also kept away physically from older adults in an effort to protect them; however, this also came with unintended consequences (Ng et al., 2020).

Even prior to the pandemic, many older adults were experiencing social isolation and loneliness (Herron et al., 2021). Since the pandemic, this has only increased. According to Ory and Smith (2020), the social isolation and inactivity experienced by older adults during the pandemic has a detrimental effect on physical and mental health. For example, social isolation is a risk factor for premature mortality, chronic diseases and psychiatric disorders. Lack of social interaction can reduce cognitive function and increase risk of depression, anxiety and suicidal thoughts (Ory & Smith, 2020).

Being at home also makes it more challenging for older adults to engage in healthy behaviours such as physical activity. Less physical activity is related to declining health in terms of weakened muscles, cardiovascular decline and increased risk of falling (Ory & Smith, 2020). In an effort to reduce the impact of social distancing measures, some organizations shifted their programs and operations to a virtual method of engagement. However, for many older adults, the accessibility and knowledge of current technology is limited. Hebblethwaite et al. (2021), reported that older adults have benefitted from technology to remain in social contact with others, but other concerns were raised such as having adequate support to use the technology and maintain the safety and security of being online. Genoe et al., (2018) added that technology is a good
alternative to in-person communication however, older adults need support in using and maintaining their devices.

Gaining a better understanding of the unique challenges experienced within rural communities is critical (Keating et al., 2011). Further exploration within the rural context will produce knowledge valuable in supporting social interaction and physical activity among rural-dwelling older adults. Physical activity and social interaction among rural dwelling older adults are understudied, particularly in the province of Saskatchewan where rates of physical activity are low, and the number of older adults residing in rural communities is increasing (Bacsu et al., 2014). According to O’Rourke et al. (2018), social interaction is a critical component in supporting health and well-being among older adults; therefore, there is significant importance in further exploration of social interaction among older adults to support healthy aging.

Additionally, as much of the current research involving older adults, particularly in the area of physical activity, has been conducted in an urban context (Witcher, 2017), this study seeks to gain a deeper understanding of these concepts and how they intersect among rural older adults. The overall goal of this dissertation is to enhance the understanding of social interaction and physical activity among rural older adults, particularly during the global COVID-19 pandemic.

1.2 Research Purpose and Significance

There are few studies that focus specifically on rural-based research within Saskatchewan that pertain to physical activity and social interaction combined. As the COVID-19 pandemic has placed additional restrictions on social interaction, this research emphasize the impact of social interaction within this population. The knowledge gained
through this dissertation guides interventions targeting physical activity and social interaction among rural older adults and further inform the field of practice. With known health benefits of both physical activity and social interaction, exploring these concepts during the COVID-19 pandemic adds substantial value to the growing body of evidence. The dissertation design emphasizes data collection from multiple sources through a comprehensive scoping review of the literature and subjective data collection through qualitative methods. The dissertation reflects the unique perceptions and experiences of older adults in rural communities in Saskatchewan, producing valuable findings relevant in supporting health and wellness as this population continues to age.

Numerous health benefits are associated with physical activity and social interaction (Chang et al., 2014); yet, rates of physical activity among rural older adults remain low (Nykiforuk et al., 2019); therefore, the purpose of this research is to explore multi-level interactions within individual, social, and environmental contexts to inform practice, build on existing knowledge, and help fill gaps in the existing literature. Results of this research enhance the understanding of these reciprocal concepts from a rural perspective to improve quality of life and well-being among older adults.

1.3 Research Questions

With limited research on the relationship between social interaction and physical activity among older adults in rural communities, the dissertation focused on exploring the following research questions:

Study 1: What is reported within the current literature on the association between social interaction and physical activity among rural dwelling older adults?
Study 2: How do rural older adults experience physical activity and social interaction during the COVID-19 global pandemic? More specifically:

a. What is the experience of physical activity among older adults living in a rural setting during the COVID-19 pandemic?

b. What is the experience of social interaction among older adults living in a rural setting during the COVID-19 pandemic?

c. How has the COVID-19 pandemic impacted the opportunity for older adults to engage in physical activity and social interaction in the rural setting?

1.4 Literature Review

1.4.1 Aging and Health

The population in Canada is aging. Statistics Canada (2019a) estimates the number of older adults will increase from 15% to over 22% of the population by 2031. The Government of Canada (2020) reports that 73% of older adults have at least one chronic condition including cardiovascular disease, cancer, diabetes, respiratory disease, and according to the Canadian Institutes of Health Research [CIHR] (2019), approximately 57% of older adults age 80 and older live with at least three chronic diseases. Tam (2020) indicates over 60% of deaths per year are caused by cancer, diabetes, cardiovascular, and chronic respiratory diseases, some of which may be mitigated through adopting health-promoting behaviours such as physical activity, healthy eating and not smoking.

Additionally, even though rates of dementia and depression are higher among middle-aged adults, older adults are also at risk for dementia and depression (Alzheimer
Society of Canada, 2017). Loss of independence as the result of illness, loneliness, or lack of social support can also lead to depression (Canadian Coalition for Seniors Mental Health, 2021). Dementia is a disorder affecting the brain that includes symptoms of memory loss, difficulty thinking and problem solving that reduces a person’s ability to perform everyday activity (Alzheimer Society of Canada, 2017). There are over 500,000 Canadians currently living with dementia. By 2030, that number is expected to increase 54% to 912,000 (Alzheimer Society Canada, 2017). With current costs to manage dementia at approximately $10.4 billion dollars per year, the Alzheimer Society of Canada estimates that the formal and informal cost to manage dementia will reach over 10.4 billion dollars. With an increasing number of people aging, it is important to support health and well-being throughout the lifespan of the individual. Health is influenced by determinants of health such as engaging in health promoting behaviors as well as broader social determinants of health including income, education, and access and availability of health services (Lindsay Smith et al., 2017). Engaging in health promoting behaviours such as regular physical activity reduces risks associated with chronic disease and functional decline, enabling people to live longer and healthier lives (Nemoto et al., 2021).

1.4.2 Physical Activity

There is an abundance of evidence on the health effects of maintaining a healthy lifestyle as long as possible (WHO, 2018). Older adults who engage in physical activity gain numerous physical, mental, and social benefits (Colley et al., 2011). According to WHO, regular physical activity is particularly beneficial for older adults in maintaining strength, flexibility, balance, and coordination. Engaging in regular physical activity
helps older adults gain muscle strength, decrease body fat, and improve cardiovascular endurance, which in turn increases self-efficacy and quality of life (Canadian Society for Exercise Physiology [CSEP], 2021). Regular physical activity also reduces the risk of developing certain chronic disease such as cardiovascular disease, stroke, hypertension, type 2 diabetes, osteoporosis and certain types of cancers (Warburton & Bredin, 2019). Even though many older adults often spend much of their day in low-intensity activities, non-exercise activities such as housework or using stairs have also been shown to improve mortality risk (Warburton & Bredin, 2019).

In addition to having a positive impact on physical illness, regular physical activity has an important role in treating and mitigating psychological illness and cognitive disorders such as depression, anxiety, and dementia (Callow et al., 2020). In studying the role of physical activity and Alzheimer’s disease among older adults, Beckett et al. (2015) found that physical activity engagement was associated with reduced risk of Alzheimer’s disease among those who were active compared to those engaged in physical activity compared to those who were more sedentary. Similarly, Patel et al. (2013) reported a positive association between increased physical activity and decreased depressive symptoms and perceived mental health among older adults. Liechty et al. (2017) found physical activity among adults transitioning to retirement yields important health benefits in physical, psychological, and cognitive functioning. Liechty et al. stated that physical activity is associated with reduced pain and illness, and improved social and mental health, adding that physical activity can be more meaningful if older adults enjoy the activity, particularly if social relationships with others are developed while engaging in the activity.
According to the Canadian physical activity guidelines for older adults (65 years and older), 150 minutes of moderate to vigorous physical activity [MVPA] per week is required to achieve physical health benefits and improve function (Canadian Society for Exercise and Physiology [CSEP], 2021); yet, only 40% of older adults are achieving the recommendation (Statistics Canada, 2019b). Moderate intensity activities include brisk walking or biking, whereas vigorous intensity activities include activities such as swimming or cross-country skiing (CSEP, 2021). Activities such as household cleaning, cooking and walking are considered light physical activity, whereas sedentary activity includes time spent sitting, lying down, watching television, office work, or travelling (CSEP, 2021). According to CSEP, following the recommended physical activity guidelines help reduce the risk of morbidity, mortality, and loss of independence, particularly among older adults.

Physical activity rates vary across the Canadian provinces. Rates of moderate activity in Canada are 52.2%, whereas, in Saskatchewan, moderate activity is reported at 50.4%. Usual daily activities such as heavy work, carrying heavy loads, lifting or carrying light loads, climbing stairs or hills, standing or walking is reported in 74.8% of Canadians, whereas in Saskatchewan, 79.9% report daily activity participation (Gilmour, 2014). In terms of active transportation (walking or biking for transport, at least six hours per week), the Canadian average is 24.1% compared to Saskatchewan at 35.6%. Using self-reported data from 2017, 35.8% of adults 65 years and over in Saskatchewan are achieving 150 minutes of moderate to vigorous physical activity per week, which is down 4.5% (40.3) compared to self-reported physical activity in 2016 (Statistics Canada, 2019b).
1.4.3 Social Interaction

There are numerous terms used synonymously in the body of research to define social interaction as well as many different ways to measure it. According to Zhang et al. (2018), commonly used social terminology include social engagement, which refers to the social interaction of a person within their environment; social participation, referring to the involvement in activities with a social element; or social support, referring to the level of social assistance available. Other commonly used terms include social connectedness or social networks. In a scoping review conducted by O’Rourke and Sidani (2017), social connectedness was defined as the subjective evaluation of meaningful, close, and constructive relationships of caring about others, feeling cared about by others, and belonging to a group or community. Social engagement or social connectedness are commonly measured by the frequency and number of productive or social (leisure) activities that older adults are involved in (Vozikaki et al., 2017). The term social interaction as defined by Manusov (2011) includes the communication between people within real-life contexts. It involves the constructs and patterns involved when people interact with each other as well as how and why people interact the way they do within their context (Manusov, 2011). Social interaction takes place within social networks, including social supports, and is a product of objective and subjective social connection, including perceived and actual social integration, social engagement, and social cohesion. Social interaction is often carried out through social participation and involvement in various social activities. As the term social interaction is inclusive, it was chosen as the term to describe the social construct of the dissertation.
In addition to individual health benefits, research demonstrates that physical activity is positively correlated with social functioning (Shvedko et al., 2018). Particularly among older adults, social interaction is an important factor in predicting positive physical health and well-being (Radacovska, 2012). There are numerous health benefits of social interaction, including increased self-esteem, increased sense of belonging, and reduced stress (Flórez et al., 2018). Additionally, social interaction is associated with reduced functional decline and increased levels of engagement in health promoting behaviours such as physical activity (National Seniors Council, 2014).

Within Saskatchewan, social interaction has been explored through personal interviews and focus groups in rural communities where many older adults face a greater risk of social isolation than urban adults (Jeffery et al., 2014). Research among rural dwelling older adults has been advanced through the work of the Saskatchewan Population Health Evaluation and Research Unit [SPHERU], who are leaders in population health research in Saskatchewan since 1999. Researchers from a broad range of disciplines stationed at the University of Regina and the University of Saskatchewan, including campuses in Prince Albert, are conducting research in collaboration with policy makers and communities throughout Saskatchewan concerning Northern and Aboriginal health, healthy children, rural health, and history of health inequities (SPHERU, n.d.). From 2014 to 2017, SPHERU has been engaged in community-based research on healthy aging in place among rural dwelling older adults. A pilot project titled, “The Role of Social Systems in the Health of Seniors Living in Rural Saskatchewan”, was completed in 2011 exploring the relationship between social systems and health among rural older adults. Using a social care model, qualitative data were collected through focus group
interviews with 42 older adults (age 67 to 98) in two rural Saskatchewan communities of Watrous and Preeceville. Social interaction as defined within this research encompasses a wide range of concepts exploring the perception of who is involved in the interaction and the closeness of that connection, how the interaction is taking place, and why the interaction is occurring, along with perceived barriers and facilitators of social interaction (Bacsu et al., 2014). Social interaction also includes measurable factors such as how many people are involved in the interaction, how often the interaction takes place, how many activities are participated in, and the types of social activities individuals are participating in (Jeffery et al., 2014). To align with Saskatchewan-based research, the term social interaction was chosen as the concept terminology for the dissertation.

Results from this rural-based research indicate that both formal and informal supports are important to healthy aging. Bacsu et al. (2014) found that formal supports such as healthcare providers are accessed less frequently than informal supports such as spouses, family, and friends. The informal supports often assist with transportation, household chores, and yard maintenance. Bacsu et al. also found that formal supports such as homecare, foot care and housekeeping services were accessed if informal supports were unavailable. There was a reluctance to ask for help among the rural participants, particularly among males for yard maintenance and among females for household and meal preparation tasks.

Social interaction decreases with age-related decline in mobility and physical functioning, leaving some older adults more vulnerable to negative health effects of loneliness (Franke et al., 2021). Loneliness is defined as the subjective feeling of being disconnected from others, whereas social isolation is defined as the level and frequency
of social interaction with others (Johnson et al., 2021). Low quantity and quality of contact with others can result in social isolation which is linked to long-term illness and increased risk for mortality (Kaye, 2017; Novik, 2016). Other factors contributing to social isolation can include hearing loss, poverty, and geographical isolation (Kaye, 2017).

Van Dyck et al. (2015) explored the relationship between physical activity and the social environment among older adults (55 to 65 years) and found that older adults who had social support from family or friends for physical activity were associated with improved mental health and quality of life. Ayotte et al. (2010) tested social support and social constructs with physical activity among Canadian adults (50-75 years) and found a positive association suggesting that social factors influence physical activity levels among older adults.

Kaplan et al. (2001) report that social factors are often important determinants of health associated with increased physical activity, particularly among women. Among men, Kaplan et al. found that the relationship between social interaction and physical activity was weaker than among women suggesting that social companionship may not increase physical activity for men. Findings confirm the importance of social interaction on health behavior and suggest that sedentary behavior in rural communities is related to the perception that fewer people are exercising (Kaplan et al., 2001). Having friends who are physically active is a strong predictor of physical activity, which suggests that people associate with those who have similar interests, whether active or inactive.

Chang et al. (2014) explored the mediating effects between social relationships and well-being on physical activity among American adults (age 50 to 96) using data
from the 2006 to 2010, U.S. Health and Retirement study. Chang et al. found that positive social relationships were associated with increased participation and involvement in physical activity, resulting in better health. Although valuable associations are made between physical activity, social relationships, and health among older adults, Chang et al. make no distinction between urban and rural dwelling older adults in the demographic variables.

Franke et al. (2021) explored rural older adult’s perceptions of participation in physical activity in terms of their needs, preferences and values. They found that participants stressed the importance of social connectedness and increased social contact with others as a contributing factor to their participation in physical activity. Further, all participants valued social contact and felt a sense of belonging as a result of their activities. Franke et al. also reported that the natural environment positively impacted physical and social activity participation.

1.5 Overview of the Dissertation

The aim of this dissertation was to explore the intersections between physical activity and social interaction among rural older adults to better understand how the two constructs interact. The dissertation is presented through two principal studies, each with specific research objectives related to physical activity and social interaction among rural older adults. Study one was completed prior to the COVID-19 pandemic, whereas study two was completed during the COVID-19 pandemic. The dissertation is divided into five chapters. Chapter one provides a general introduction including the statement of the problem, the purpose of research, the specific research question that was addressed, the significance of the research, as well as a brief overview of the research.
provides a description of the context which the dissertation occurred, including the rural setting and an overview of the COVID-19 pandemic. A detailed overview of the research methodologies used, including theories of aging, theoretical framework, philosophical foundations, and research design for each study is discussed. Chapter three contains the manuscript of the scoping review of the literature to gain an understanding of what is known about physical activity and social interaction among rural older adults. This involved exploring, identifying, and synthesizing relevant research from 2000 to 2020, to form the basis for further inquiry and identify gaps. Chapter four contains the manuscript of study two, a qualitative exploration of the subjective experience of physical activity and social interaction among rural older adults in Saskatchewan during the COVID-19 pandemic. Chapter five integrates the findings of each study and concludes the dissertation by providing a detailed description of the implications of the research findings, future research recommendations and an acknowledgement of the study’s limitations. The dissertation closes with appendices, and the list of tables and figures.
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Chapter 2 – Context

2.1 Introduction

This chapter provides an overview of the context in which this dissertation occurs including a discussion on the health implications of living in a rural community and the potential impact of the COVID-19 pandemic that began in Canada in 2020. As the dissertation began prior to the COVID-19 pandemic, the scoping review took place before public health orders were implemented in 2020. The qualitative study occurred during the first two waves of the pandemic therefore, an overview of the COVID-19 pandemic is provided, focusing on the pandemic’s potential effects of the pandemic on the older adult population. The chapter continues with an overview of various theories of aging, followed by the theoretical framework used to guide the dissertation. A discussion of the philosophical underpinnings is provided before moving into the methods chosen to conduct the research. The methods used in each individual study are discussed separately, beginning with the scoping review. The qualitative methods are discussed, beginning with the role of the researcher, followed by a detailed description of data collection, analysis procedures and rigor.

2.2 Rural Environment

The social and physical environment has an important role in the health of an individual (Stokols, 1996). Aging in a rural environment is often experienced differently than aging in an urban setting (Bacsu et al., 2014). Where people live influences their access to health and social services, as people living in rural communities are often more removed from social supports and services than urban residents (Kaye, 2017). Many rural residents, particularly older adults, face unique barriers compared to urban residents, such
as lower income, lack of adequate housing and public transportation, poor access to health care services including specialty services, higher functional disability and increased sedentary lifestyle, increased chronic illness and less use of preventative care (Bacsu et al., 2014). As a result of changing economic and political forces, rural communities are experiencing more hospital closures, increased financial barriers where lower income make travel for services more difficult, and an out-migration of younger rural residents to urban centres for better employment opportunities (Malone, 2011; Schmidt et al., 2016). Within the rural environment, the element of aesthetics, safety from crime or traffic and presence of recreation facilities, parks and trails all influence health of the residents (Frost et al., 2010). Other aspects, such as uneven or absent sidewalks and inadequate street lighting can present as fall hazards to older adults, limiting their physical activity and social interaction opportunities (Keating et al., 2011).

Additionally, compared to their urban counterparts, rural residents generally experience poorer health in terms of increased mortality, lower life expectancy and functional health, and increased risk of diseases, illness, and injury (Jeffery et al., 2014). According to Blackford et al. (2016), rural residents are more likely to experience higher rates of smoking, overweight and obesity, hypertension, and a lower fruit and vegetable consumption rate. Rural residents are also at a higher risk of dying prematurely from circulatory diseases. Rural men have the shortest life expectancy and also experience a smaller proportion of their life in good health compared to urban men. Mortality rates increase as people live in more remote places (DesMeules et al., 2012). In addition, rural older adults also face an increased risk of social isolation and lower social functioning,
which is hindered by the fear of falling and lack of opportunity to interact socially with others (Bacsu et al., 2014).

Despite the disadvantages, there are also health-related advantages to living in rural communities that are typically characterized by the opportunities to connect with the community through volunteering, local clubs and organizations such as church groups, community centres, and service clubs (Kaye, 2017). Rural adults often report a strong sense of trust and ownership to the community where mutual support is key to healthy aging (Bacsu et al., 2014; Witcher, 2017). Supporting social policies and advocating for age-appropriate opportunities for rural older adults to remain engaged in the community is very important to health and wellness (Novek et al., 2013).

Physical activity among rural older adults in Canada is understudied (Witcher, 2017), particularly in the province of Saskatchewan, where rates of physical activity are low and the number of older adults residing in rural communities continues to increase (Statistics Canada, 2015). In Saskatchewan, Temple et al. (2008) explored the influence of physical activity on physical, emotional, psychological, and social well-being among older adults and found that exercise had a positive influence on self-reported health and well-being. Additionally, Litwin (2003) examined the influence of social networks on health and found that they are important in recruiting people to engage in physical activity and maintaining their involvement in exercise programs yet, very few studies, if any, examine the association between social interaction and physical activity, particularly among rural older adults in Saskatchewan.

Although research measuring physical activity in rural communities in Saskatchewan among the older adult population is very limited, keeping active has been a
key theme emerging from rural research where older adults expressed the importance of having options for activity such as crafts, physical activity, and gardening (Bacsu et al., 2014). Graham and Connelly (2013) conducted a rural based study exploring older adult’s physical activity and found that participants who value independence, community, and being with others also valued physical activity. Anderson et al. (2016) further explored the association between sedentary behaviour and community belonging among older adults. Using data from the 2010 Canadian Community Health Survey, Anderson et al. found that those with a strong sense of community belonging were less sedentary, highlighting the importance of the social environment in health promoting behaviors such as physical activity.

In a qualitative study on the barriers and facilitators of physical activity in rural communities, Gilbert et al. (2019), identified that rural communities are distinct from one another in that size impacts the resources and infrastructure available to residents; therefore, a tailored approach to physical activity promotion in rural communities is needed (Boehm et al., 2013). As older adults in rural communities experience unique issues in terms of aging in place that are impacted by multi-level factors within individual, social, and environmental areas, it is important to understand the complete rural experience, from the perspective of the people who live there, particularly in rural Saskatchewan where research is limited.

2.3 COVID-19

In January of 2020, the Public Health Agency of Canada (PHAC) activated the Emergency Operations Centre in response to the COVID-19 pandemic in an effort to minimize serious illness and death and reduce the burden on the health care system
Part of the response included COVID-19 testing, outbreak investigations, and providing emergency supplies to provinces and territories. Additionally, public health measures were enacted, such as border closures, stay-at-home and quarantine orders, as well as closures and disruption of schools and non-essential businesses and organizations. According to the CPHA, these actions have affected the economic and social well-being of Canadians. COVID-19 restrictions have affected physical activity at multiple levels including individual, in terms of competence, confidence and motivation, where those who were less active prior to the pandemic were less motivated to be active during the pandemic; at a social level, where physical activity involvement has also been influenced by the lack of presence of emotional and social support; and the physical environment which can foster or inhibit opportunities for physical activity engagement. As older adults have been identified as at higher risk for COVID-19 complications, maintaining health is of utmost importance (Cunningham & O’Sullivan, 2020; Son et al., 2021).

With older adults already the least physically active population, the impact of COVID-19 on physical activity is significant as reduced physical activity in older adults contributes to reduced physical and mental health (Cunningham & O’Sullivan, 2020). Since the pandemic, there has been some targeted research on the impact of COVID-19 on physical activity among older adults. In a study assessing the impact of COVID-19 on the physical well-being of Canadians, Lesser and Nienhaus (2020) found that 22.4% of active adults reported achieving less physical activity during the pandemic. The fear and anxiety of contracting COVID-19 has also influenced daily activities among older adults (Cheval et al., 2020). The closure of community organizations, programs, events and
services has created a barrier for many older adults to engage in their usual physical and social activities (Nieman & Wentz, 2019).

In addition to physical activity opportunities impacted by the COVID-19 pandemic, social interaction, which is associated with health and well-being, was also affected. According to Cunningham and O’Sullivan (2020), COVID-19 disruptions have contributed to feelings of boredom, frustration and sense of isolation. Callow et al. (2020) surveyed older adults in Canada and the United States on the social impact of COVID-19 and found that restrictions in place have isolated those who were socially active people prior to the pandemic. Dahlberg (2021), reported an increased incidence of loneliness reported among older adults during the pandemic. From a social standpoint, Frank (2020) reports that older adults with chronic health conditions are even more vulnerable and may have a greater need for social support during the pandemic. As such, Hebblethwaite et al. (2021), in examining the impact of COVID-19 on older adults, states that COVID-19 has brought forward underlying social inequities that older Canadians have been experiencing such as financial instability, inadequate and affordable housing, lack of social inclusion and health inequities at a time when the importance of social interaction is being felt across the country. This highlights the detrimental influence of public health policies and the social environment on older adults' health behaviour, aligning with the social ecological model.

In rural communities, COVID-19 has changed the way people engage with each other in social relationships. Herron et al. (2021) report that older adults’ ability to adapt to the changes experienced during the pandemic are dependent on a multitude of factors including individual, social and environmental. Rural communities are often more
socially isolated in terms of geographical distance, population and lack of transportation options, and access to health care services (Henning-Smith, 2020; Herron et al., 2021). These inequities put rural residents at greater risk of social isolation (Henning-Smith, 2020). COVID-19 has influenced some socially engaged and integrated individuals to become less autonomous and more isolated as usual activities such as going to church, volunteering and going for coffee with friends has stopped due to the pandemic (Herron et al., 2021). It is therefore imperative to understand what is known about physical activity and social interaction among older adults prior to the pandemic and further, to gain a deeper understanding of the experiences of older adults in rural communities during the pandemic when circumstances related to physical activity engagement and social interaction in the community are impacted.

2.4 Theories of Aging

Theories are explanations or assumptions that provide understanding to guide research questions and designs (Bengtson & Settersten, 2016). Theories help researchers challenge knowledge, identify inconsistencies, guide interventions, and contemplate new research directions (Bengtson & Settersten, 2016). Many theories that have been developed and accepted to guide research on aging, including biological, psychological or cognitive, and social theories (Schroots, 1999). Biological theories of aging focus on the physiological aspects of aging at the cellular functional level whereas psychological theories focus on the developmental aspects of aging including memory, feelings and motivations (Schroots, 1999). Social theories emphasize the roles and relationships that people have throughout the aging process (Schroots, 1999). Historically, social theories brought forward in the 1960s focused mainly on the losses and adjustments to aging that
people experience (Yen et al., 2012). During this era, a prominent social theory during this era is disengagement theory, developed by Cumming and Henry (1961). This theory assumes that as people age, they become more centered on themselves rather than on society or the community and naturally withdraw, resulting in decreased interactions with others. The central focus is on the losses that occur with aging and how people adjust to those losses through disengagement (Cumming & Henry, 1961). They suggest that people’s abilities will decline over time and they realize death will occur; therefore, they will lose ties with society. This disengagement can lead to an increased risk of social isolation which influences health and well-being in older adulthood (Utz et al., 2002).

According to Schroots, disengagement theory is not well accepted and supported, particularly among older adults. Heinz et al., (2017) state that disengaging from society does not occur among all older adults and there is little evidence to support this theory.

Taking an opposing standpoint to disengagement theory, activity theory, developed by Robert Havighurst (1972), proposes that aging successfully and maintaining life-satisfaction involves staying active, either physically or mentally, and maintaining social interaction. Activity theory is built on three main assumptions. According to Havighurst, being active is better than being inactive, being happy is better than being unhappy, and older adults are the best judge of their own success in happiness and activity. Activities, especially if meaningful, help older adults replace lost roles due to age-related losses. Maintaining activity allows older adults to engage socially with others, resulting in improved happiness (Asiamah, 2017). Critics of this theory suggest that it does not account for those who face barriers to activity such as poor health or
lower income, and does not consider that some adults simply do not want to engage in an activity (Yen et al., 2012).

In 1971, Maddox and Atchley proposed the continuity theory. This theory disregards both disengagement and activity theory and states that people will maintain the same activities, behaviours, traits, values and relationships into late adulthood that they had throughout their earlier lives (Atchley, 1989; Yen et al., 2012). According to Yen et al., old age is not a separate part of a person’s life but rather a continuation. In terms of rural dwelling residents in eastern Canada, this has been the case in the work of Witcher (2017), who found that older adults place a high value on productive or work-related activity versus leisure activity as their historical and cultural identity lies in a hard work ethic as young adults. Although this theory has been expanded into the 1990s, critics of the theory state it does not adequately account for those with chronic illness, which limits choices and intentions of continuing to live the same lifestyle into aging (Yen et al., 2012).

In the 1980-1990s, the theoretical focus broadened to include the interrelationships between physical, political, environmental and social factors of aging (Yen et al., 2012). The person-environment fit theory proposed by Lawton (1982) looks at the physical environment and how an individual functions within that environment. According to Lawton, each person has specific competencies such as mental stamina, functional ability, biological health, and mental health that help shape who they are and how they deal with their environment throughout life. With age, these competencies decline, which change the way people interrelate with their environment (Lawton, 1982). Additionally, the environment can often become more threatening as people age. For
example, people may withdraw or retreat from society as functional ability, balance or stability decline and the environment may not be as favorable for older adults as the risk of falling increases (Yen et al., 2012). Researchers often use Lawton’s theory to study older adults living in various environments such as communities or within institutions to better understand the influence of various contexts on aging (Glanz et al., 2008).

In the early 1990’s, Carstensen (1994) proposed the Socioemotional Selectivity Theory. This theory focuses on the changes in social preferences and behavior throughout the lifespan, where people’s desire to associate with unfamiliar people decreases. Carstensen states that older people tend to lean more on their adult children for emotional comfort, similar to how children turn to their parents for emotional support when younger. As such, older people make choices based on emotional comfort from social interaction that is meaningful to them. This theory accounts for the social aspect of aging.

Unlike earlier theories that focused on the decline and loss experienced throughout aging, Baltes and Baltes (1990) proposed a framework pertaining to the study of aging called Selective Optimization with Compensation. This theory considers that older adults select and utilize their best abilities to compensate for the decline experienced through aging. This theory accounts for those who, despite experiencing physical decline, are able to adapt to the changes and maintain a high degree of subjective well-being (Carpentieri et al., 2017). Baltes and Baltes describe this as maximize gains and minimize losses approach, through the selection of goals according to their importance to the individual in achieving optimal gains, and avoiding or compensating for the losses experienced in aging. This theory of selection, optimization and compensation is considered a key approach in better understanding the aging process.
2.5 Theoretical Framework

Rural residents face a combination of factors that influence healthy aging in their community (Averill, 2012). It is important to consider the social, physical and built environment when exploring health among rural older adults. The framework that is particularly relevant to the study of multiple and complex concepts of social interaction and physical activity among older adults in rural settings is the social ecological model (Sallis et al. 2008). According to Zhang and Solmon (2013), the social ecological model is used to explore social and environmental factors on individual behavior. With the emergence of ecological models through the work researchers such as Bronfenbrenner (1999), McLeroy et al., (1988) Sallis et al., (2008) and Stokols (1996), a greater recognition of the complex interaction among a number of determinants within the individual, social, environmental and policy domain is appreciated. More recently, this model was used to develop a framework for recreation in Canada, which is an initiative of the Interprovincial Sport and Recreation Council and the Canadian Parks and Recreation Association (CPRA, 2015), used to create more supportive physical and social environments that encourage recreation and outdoor activity among Canadians. The social ecological model categorizes behaviours into five types (Zhang & Solmon, 2013). These include: (1) intrapersonal factors (personality traits, knowledge, beliefs and attitudes), (2) interpersonal factors (social groups, family, or friends), (3) institutional factors (health facilities), (4) community factors (organizations, institutions and social networks), and (5) public policy (laws and policies at the local, provincial and national level) (see Appendix A). Stokols advises the use of the social ecological model to encourage health promoting behaviors. There are a number of core principles of the
model that relate to the environment and healthy behaviour (Stokols, 1996). These include the recognition that environmental settings have many dimensions that can influence individual behavior within social, physical, and cultural dimensions as well as individual knowledge and attitudes (Stokols, 1996). The model also emphasizes the interconnection between the environment and health, and more importantly, identifies that social and environmental factors and individual health behavior interact in a dynamic relationship (Sallis et al., 2008). This is particularly relevant to research conducted in rural settings where the history and culture of the community are important aspects to understand when working with the older adult population (Witcher, 2017). In examining the influence of the environment on physical activity, Sallis (2009) found that physical activity is place dependent, meaning some places support physical activity more than others. Sallis explains that physical elements in a community such as sidewalks and trails support physical activity. Similar findings have been reported in the CPRA framework, particularly in rural and remote communities, where social, economic and environmental barriers are evident, including limited funding for infrastructure, lack of technological advances, and aging and reduced rural populations.

This dissertation examined social interaction and physical activity in the rural context, in a comprehensive approach to understand behavior at multiple levels. Drawing from individual, social, environmental and policy aspects offers a more comprehensive approach to understanding behavior at multiple levels (Sallis et al., 2008). This is essential in exploring concepts within a rural context as the environment strongly influences health and wellness, both physically and socially, among rural dwelling older adults (CPRA, 2015; Witcher, 2017).
2.5.1 Philosophical Foundation

According to Creswell (2014), all research needs a philosophical foundation. Each researcher conveys an underlying worldview or epistemology that captures beliefs about how knowledge is created including where it comes from and how it is known (Trochim & Donnelly, 2008). Some researchers focus on capturing objective data whereas others are more concerned with exploring subjective feelings and attitudes (Creswell, 2013). The development of different research paradigms are a result of differing views on what data need to be collected (Glesne, 2011). When planning to conduct research, the epistemology, along with the corresponding axiology (researcher values), ontology (nature of reality) and methodology (study approach) that the researcher holds, often become the foundation that the research approach and the study design are developed from (Creswell, 2014). There are four main epistemologies that influence research design including postpositivism, constructivism, transformative, and pragmatism (Creswell, 2014). Positivism, developed by Compte, holds the assumption that the world can be explained through observations and experiments (Glesne, 2011). This is considered the first and only approach to social science research in the 19th century where methods and concepts such as validity, reliability, objectivity and generalizability were initiated (Creswell, 2014). By the 1940s, a modification in the epistemology of positivism occurred, recognizing the world is not known with complete certainty, but rather with a level of prediction, known as postpositivism (Glesne, 2011). The main purpose and methodological approach of research for postpositivists was to predict outcomes and make generalizations about social phenomena (Glesne, 2011). Typically, postpositivists base their research design on objective measurements and experiments, originating from
theory (Creswell, 2014). A hypothesis is formed from theory and then tested and refined using formal instruments (Trochim & Donnelly, 2008). The methodological procedures, often referred to as quantitative research, involve the systematic collection of data from a large number of participants using formal instruments, and then statistically analyzed and reported in numerical form (Morgan, 2007). This quantitative, deductive approach is characterized by objective measurements of prevalence, likelihood, or significance of independent and dependent variables where bias is controlled through the design of the research (Pluye & Hong, 2014).

Within the field of physical activity research, quantitative methods, such as direct observation and objective measures are often used to gather data on the frequency and intensity of physical activity (Sallis, 2009). Objective research findings have established guidelines for recommended physical activity in terms of time spent active per week, spanning across multiple age groups from children to older adults (Kowalski et al., 2012). However, according to Murphy (2009), using measures of physical activity such as surveys present some unique challenges such as the aging effect on cognitive ability and memory to recall when answering questionnaires or surveys, which could result in over or under-estimation. Additionally, measures such as accelerometers or pedometers are considered more accurate in recording the amount, frequency, and the duration of activity, are limited to certain types of activity, and are less accurate in measuring activity at lower speeds and among those with variable gait (Murphy, 2009). Further, Kowalski et al. add that there are other unique issues in measuring physical activity among older adults as they often engage in different types and intensities of activity and tend to spend a higher percentage of their day performing low intensity activities. The differences in
activity preference and intensity may be due to decreased bone and muscle mass, flexibility, and ability to perform a cardiovascular activity at a higher intensity. As people age, metabolic rates change and cognition decline resulting in errors in energy expenditure rates and self-reporting data or compliance in wearing monitors (Murphy, 2009).

With a recognition of the limitations of the postpositivist paradigm, a shift in epistemology occurred where an alternate paradigm was presented through the work of Kant, asserting that reality is socially constructed, interwoven and difficult to measure. Through this shift in paradigm, constructivism was founded, based on the epistemological assumption that reality is considered a subjective experience that is unique to the individual (Creswell, 2014). Constructivist ontology asserts there are multiple realities structured through the lived experience and interaction among people (Creswell, 2013). Where postpositivists begin with a theory, constructivists approach research with the assumption that a theory may emerge from the results (Glesne, 2011). From an epistemological standpoint, Glesne (2011) states that the researcher is the instrument that is used to gather data, which is naturalistic and inductive, versus the researcher remaining separate as in postpositivist epistemology. Methodologically, the researcher inductively searches the data for patterns and themes and narratively describes findings to understand and interpret reality (Glesne, 2011). Constructivists interpret the world and make sense of it based on their historical and social perspectives, often through qualitative approaches (Creswell, 2014). With historical origins in the field of anthropology, sociology, and humanities, qualitative methods emerged with distinct structures and approaches to conducting research (Creswell, 2014).
Qualitative research approaches most commonly include narrative studies, phenomenological research, ethnography, grounded theory, and case studies where data can be generated through in-depth individual interviews, focus groups, observations, field notes, documents, records, and artifact collection (Creswell, 2013). An advantage to qualitative research is it provides the researcher with detailed and insightful information, requiring a much smaller sample size than quantitative research (Richards & Morse, 2013). By engaging with participants, the researcher asks specific questions and seeks clarification to gain a deeper understanding of how participants view their reality in their own context (Richards & Morse, 2013). Qualitative researchers approach and design studies incorporating their own preconceived ideas and perspectives that need to be acknowledged throughout the research process through reflexivity and journaling to add trustworthiness (Creswell, 2013). There are, however, some disadvantages to qualitative research including the high cost and time spent collecting and analyzing data, ethical issues including confidentiality, and the ability to generalize findings is limited (Bryman, 2007).

This dissertation employs a social ecological model to explore what is known about physical activity and social interaction among older adults in rural communities. Kowalski et al. (2012) state that qualitative research is needed to better understand older adults’ physical activity to help design new measures and improve on existing measures; therefore, to explore the experiences of older adults in their rural environment, study two is based on a constructivist epistemology, where phenomenology is the chosen research method. The specific methods of each study are provided individually.

2.6 Study 1: Scoping Review Methods
The scoping review was guided by the framework developed by Arksey and O’Malley (2005). A scoping review was chosen as the most appropriate method to report what is known about social interaction and physical activity among rural older adults as the concepts underpinning the research are broadly defined within the literature and gaps in evidence pertaining to the concepts in a rural context are evident. According to Peters et al. (2020), scoping reviews are conducted to clarify key concepts, report the types of evidence on the concepts, and identify any gaps in the evidence. The specific steps taken to conduct the scoping review included: identifying the research question; identifying relevant research studies; selecting studies; charting the data; and collating, summarizing, and reporting the results.

The theoretical model used to direct the scoping review was the social ecological model, which emphasizes multiple levels of influence on behavior, including individual, intrapersonal, organizational, community, and public policy. The model is founded on the principle that individual behaviour is influenced by the social environment. The social ecological model identifies multiple layers of interaction among personal, social, and environmental factors that influence behavior. According to Essiet et al. (2017), in considering physical activity, understanding the individual, social and physical environment context, including family and friends, neighbourhoods, organizations, and facilities, are important factors to consider when examining health-enhancing behaviors. Golden and Earp (2012) add that a social ecological model is recommended to guide public health practice as the model encompasses the individual and their physical and social environment. The social ecological model was used in the scoping review to guide the development of the search terms and to analyze data in the results related to
categories of individual, social and environment factors related to the terms. To establish what is known about the relationship between social interaction and physical activity among rural older adults and to identify gaps that exist in the knowledge base, the research question addressed: What is reported within the literature on the relationship between social interaction and physical activity among older adults in rural communities?

2.6.1 Data Collection

The scoping review focused on social interaction and physical activity among adults, defined as those age 65 and older, in alignment with the WHO (2018). The scoping review included the keywords social interaction, physical activity or exercise, and rural. Social interaction was defined according to Cutrona and Russell (1987) as the relationships people have with others in terms of guidance (advice or information), social integration (a sense of belonging to a group of friends), attachment (emotional closeness), reassurance of worth (recognition of one’s competence), and reliable alliance (assurance that others can be counted on in times of stress). Social interaction is often carried out through social participation and involvement in various social activities; therefore, the keywords for the scoping review included social interaction or social participation.

Physical activity encompassed any bodily movement, including activities such as work, play, transportation, and leisure, and includes planned, structured and repetitive exercise done to improve or maintain fitness as defined by the WHO (2018).

Although not limited to Canadian data, preference for context initially included only rural-based research (under 10,000 population) as defined by Statistics Canada (2001). However, urban studies were also added to the search strategy after an initial pilot search yielded no results for rural research in the topic area. In consultation with the
research librarian, the context (rural or urban) was not specified in the search filters; rather, the rural or urban-based context was identified within the full article review process.

There were no restrictions on study design. The scoping review considered both experimental and quasi-experimental study designs, including randomized controlled trials, non-randomized controlled trials, pre and post-tests, and interrupted time-series studies. In addition, analytical observational studies including prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies, were also considered for inclusion. Additionally, descriptive observational study designs including case series, individual case reports, and descriptive cross-sectional studies, were included. Qualitative studies, including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative description, action research, and feminist research were included in the search. In addition, systematic and scoping reviews meeting the inclusion criteria were included in the search strategy as were studies published in English.

The search strategy aimed to locate published, peer-reviewed studies at the global level. An initial limited search of Medline and CINAHL+ with full text (EBSCOhost) was undertaken to identify articles on social interaction and physical activity. The text words contained in the titles, abstracts and full text of relevant articles, and the index terms used to describe the articles were used to develop a comprehensive search strategy in consultation with a research data expert at the University’s Library. The search strategy, including all identified keywords and index terms, were adapted for each database source. Since the focus of the research was on social interaction and physical
activity among older adults, the following search terms were used: “Social Interaction” OR “Social Participation” AND “Physical Activity” OR “Exercise” AND “Older Adult” OR “Aging” OR “Elderly” OR ”65 Years or Older”. Excluded from the search were those residing in long-term care facilities or institutions, as well as older adults under age 65. Studies that did not include the concepts of social interaction and physical activity as defined and those not written in English were excluded. The scoping review protocol was developed using JBI SUMARI (Munn et al., 2019).

The following electronic databases were searched on August 1st, 2021, from 2000 to 2020: Medline (OVID), CINAHL+ with Full Text (EBSCOhost), Rehabilitation and Sports Medicine Source (EBSCOhost) and SPORTDiscus (EBSCOhost). Medline (OVID) is a large database that includes 4600 international journals within medicine, nursing, dentistry, allied health, and pre-clinical sciences. CINAHL+ with Full Text (EBSCOhost) is considered the largest and most in-depth nursing research database consisting of 768 journals and indexing for 5,000 journals from the nursing and allied health fields. Rehabilitation and Sports Medicine Source (EBSCOhost) is a database for rehabilitation clinicians that provides access to more than 370,000 records, including 150 full-text peer reviewed journals, over 220 full-text sports medicine and rehabilitation journals, and over 40 full-text books, trade publications, and magazines. SPORTDiscus includes more than 2.5 million records from leading sports medicine journals, books, and dissertations pertaining to sports and sports medicine research covering topics on nutrition, physical therapy, occupational health, exercise physiology, and kinesiology. To avoid duplication, PROSPERO, along with Cochrane Library, were searched to ensure no other reviews were currently being conducted on the same concepts. A manual search of
reference lists of articles meeting the inclusion criteria was also undertaken to identify any additional relevant articles.

2.6.2 Data Analysis

The scoping review search yielded a total of 987 articles and three additional articles added through the reference search for a total of 990 (see Figure 1). Medline was the source of 182 studies. The same search of CINAHL+ resulted in 284 studies. SPORTDiscus obtained 284 results, Rehabilitation and Sports Medicine produced 237 results with three additional studies generated from within a reference check of articles. Following this search, all identified citations were collated and uploaded into RefWorks, where 268 duplicates were removed. This left 722 studies to review. The screening process was conducted in three stages, including title screening, abstract screening and full text screening. For the first independent screening, two reviewers, LS and SJ, screened titles and keywords against the inclusion criteria. A total of 274 studies were excluded because they did not meet the inclusion criteria of age (65 or older), or they did not relate to either of the concepts. There was a discrepancy between the reviewers with one study, and it was agreed to leave it in for an abstract review. From there, a second independent review of abstracts was initiated with LS and SJ reviewing the remaining 448 articles. Results of this screening excluded an additional 201 studies for reasons of not meeting the age criteria of 65 years or older, not community-dwelling populations, and/or irrelevance to the concepts of social interaction and physical activity. The full-text review of the remaining 247 studies were assessed in detail against the inclusion criteria by the two reviewers independently. Full-text studies that did not meet the inclusion criteria of age requirements, non-community-dwelling, and/or not related to the concepts
of social interaction or physical activity were excluded. After the full-text review, the final inclusion of studies from the search was 26 (see Table 1). Disagreements arising between the reviewers at each stage of the study selection process were resolved through further discussion.

Data were extracted from the 26 studies included in the scoping review, using a data extraction tool developed and modified by the reviewers to include specific details about the study’s location or context, purpose, participants or sample, study design, methods, and key findings relevant to the review objective.

Content analysis methods were used to prepare, organize and report the data (Hsieh & Shannon, 2005). This method of data analysis is used for both quantitative and qualitative research, where inferences can be made, based on analysis meaning of words and concepts. A directed approach was used, based on the social ecological model outlined in the dissertation. This approach is more structured in using pre-existing categories. Using pre-determined categories of intrapersonal, interpersonal, environment and other, data were coded and sorted. Three steps were followed which included preparation, where all articles were read through and written notes were made to identify and define categories; step two was to organize the data, which involved re-reading articles and all text representing a category or sub-category and highlighting text. The third steps, reporting, involved final coding and categorizing, then combining and writing results in narrative summary.

2.7 Study 2: Phenomenology Methods

To gain a deeper understanding of rural older adults’ experience with physical activity and social interaction, qualitative methods were chosen to capture this data.
Specifically, interpretative (hermeneutical) phenomenology was chosen as the most appropriate qualitative method. Phenomenology is a qualitative research methodology aimed at describing and interpreting common experiences among a group of people (Giorgi, 2012). It is useful for understanding subjective experience and gaining insight on how people experience the world around them (VanScoy & Evanstad, 2015). Interpretative phenomenology involves three main criteria: phenomenology, interpretation and ideography. It is phenomenological in that the approach is used to describe and understand the participant’s experience. It is interpretative in that it accounts for the participant’s and researcher’s interpretation of the participant’s experience. It is ideographical in approaching the individual’s experience within their own context, which can be influenced by socio-cultural factors. In conducting this research, a description and interpretation of the personal experience are presented and then related to theory on the phenomenon (VanScoy & Evanstad, 2015). As such, researchers using interpretative phenomenology explore participants’ personal experiences and meaning by what is said and how it is said to gain an understanding of the phenomenon being investigated within the context the individual experiences it in (VanScoy & Evanstad, 2015). This research method is most appropriate to explore physical activity and social interaction among rural older adults. According to VanScoy and Evanstad, it is useful when seeking information particularly among under-served groups of people whose experience may differ from the general population and from others within their own group. Further, this research method focuses on the lived experiences and meanings situated within a social, cultural and historic setting (Mustafa et al., 2019). As the experience of older adults residing in rural communities may present with differences compared to the experience of older adults
residing in urban centres, this methodology was chosen as it was the best fit to address the research question. Therefore, the aim of this study was to explore the experiences of physical activity and social interaction among rural older adults in Saskatchewan by using an interpretative phenomenological approach.

2.7.1 Role of the Researcher

Creswell (2014) notes the importance for the researcher to discuss personal experiences with the research topic and prior knowledge that may affect the research process, including data collection and analysis. As a novice qualitative researcher, my interest in the field of rural aging and physical activity has stemmed from a few key experiences that have influenced my assumptions and beliefs as I entered into this research. At a personal level, I have a parent who, at age 81, is very physically active and agile, and another who, at age 75, is very socially active and engaged with others. Each parent exhibits health in unique ways. As a daughter of aging parents, I have had the privilege of engaging with, and directly observing the impact of both physical activity and social interaction on their health and well-being. With health promoting benefits of physical activity and social interaction with others, this raised further questions of what are the experiences among the rural older adult population related to physical activity and social interaction. In my educational journey, I have conducted research exploring physical activity among rural older adults. This research has provided a background from which I designed this dissertation. Second, I have an extensive career of over 20 years in the healthcare field where health promotion, policy directives, and a thorough knowledge of the social determinants of health have been the main focus of my work. Finally, I work in what is considered to be a rural area. As such, I have direct exposure to many of the
challenges and benefits that a rural environment entails. I have worked directly with older adults in rural communities and have been involved in projects that focused on physical activity promotion throughout my career. I am aware of the need for a greater understanding of the lived experiences of rural older adults in terms of physical activity and social interaction as health promoting factors. My educational background, career experience and personal connection to these concepts have placed me in a position that is well suited to conduct this dissertation research. I firmly believe that to best understand the experiences of others is to become immersed in the world of the participants as they experience it. This aligns well with qualitative methodologies. Although I believe that these past experiences have helped inform my work as a qualitative researcher in a positive way, I have also taken great care to position myself in a way that has been transparent and objective throughout the dissertation process through written reflection and on-going awareness of assumptions and biases, particularly in the data collection and analysis process.

2.7.2 Data Collection

Data are often collected in phenomenological studies through individual interviews (Creswell, 2013). This method of collecting data is key in gathering participant’s interpretations and provides an opportunity to tell their story, speak freely, and express concerns (Smith, 2017). The semi-structured interview format in this study addressed the main concepts and allowed for flexibility for other data to transpire.

In qualitative research, the sample size is typically determined when sufficient data describing the experience are collected. Francis et al. (2010) recommend that after the initial data analysis is completed, when three additional interviews yield no new
themes or additional material, data collection can be considered complete. This study consisted of 10 participants, recruited from the south east and south central area of the province as well as the south west, central east and west, and the far north east, who engaged in an individual semi-structured telephone interview conducted by the researcher. Each interview lasted between 45 to 60 minutes and was audio-recorded. Participants were invited to discuss their perception and experience of social interaction and physical activity throughout the COVID-19 pandemic in their rural community. A comparison table of community demographic information where each participant resides was created (see Table 3).

2.7.3 Ethical Consideration

Ethical consideration included an explanation of the study’s purpose and procedures. Participants were informed that their participation was voluntary, they could withdraw from the study at any time without penalty, and they could refuse to answer any questions they were not comfortable with. The study involved minimal to low risk to participants. Confidentiality, retention, and storage of information was explained prior to receiving consent to participate in the research study. This study was initially designed and approved for ethics in October of 2019 (REB 2019-112) before the global pandemic to consider the experience of physical activity and social interaction among older adults in a rural setting; however, the COVID-19 pandemic prompted a change in priority to explore the impact of the pandemic in addition to the original concepts. As such, an amendment to the ethics application was sought and approved in May 2020. Revisions were made to recruitment by means of email, phone and through community contacts, and the method of gathering data to remove in-person contact with participants. The
modification to ethics included gathering the data verbally over the telephone versus the original intent of meeting in-person to conduct the interviews (see Appendix B).

2.7.4 Recruitment

Purposive sampling was used to recruit older adults from rural and small-town communities throughout Saskatchewan. Unlike the scoping review, where rural was broadly defined as 10,000 people or less for the qualitative study, rural was defined to align with SARM’s (2021) definition as communities with populations of under 5,000 people. Recruitment occurred through various community contacts, including recreation organizations and provincial health promotion contacts, who shared the study information and poster within communities throughout the province (see Appendix C). Potential participants were screened for eligibility based on the following criteria: community-dwelling adults, age 65 or older, residing in rural Saskatchewan. Those not meeting the age and rural criteria were excluded. Recruitment began in July, 2020 and ended in December, 2020. Twelve potential participants expressed interest and consented to participate (see Appendix D); however, two were deemed ineligible as they did not meet the age criteria of 65 years or older.

2.7.5 Data Analysis

Data analysis for the qualitative study was performed using an interpretative phenomenological analysis (IPA) method. The IPA method was chosen for data analysis as it is a rigorous process, suitable for capturing the experience of a relatively small sample size (Biggerstaff & Thompson, 2008). The intention of this phenomenological study was to also consider the experience, interpretation and idiographic focus, which, according to Smith (2017), takes into account the individual within their lived context.
IPA is also useful for examining under-served populations (VanScoy & Evanstad, 2015), which is suitable for research with rural older adults.

IPA involves multiple stages of analysis that move from description to interpretation of data (VanScoy & Evanstad, 2015). After each interview was completed (see Appendix E), the researcher made reflexive notes consisting of initial impressions, possible connections, and questions arising. Data generated in the audio-recorded interviews were then transcribed by the researcher and reviewed numerous times, allowing the researcher to become immersed in the data. On each written transcription, comments were made along the margins each time the documents were reviewed. Key words and phrases were highlighted in each transcript. Through a process of manually reviewing each interview and creating notes in the side margins, theme areas were devised that considered patterns, connections and relationships, and were written in the left margin. These themes reflected what was important to the participant. This process was repeated for each interview transcript to capture the individual perspective of each participant before considering the entire data set. Data consisted of 429 codes which were reviewed, sorted, re-sorted, and clustered. The final stage of analysis involved a review of the entire set of themes to identify common patterns, make connections and identify differences. The resulting four themes, with sub-themes, were written out in narrative format with direct quotes from participants to enhance the understanding.

2.8 Rigor

Rigor was ensured throughout the research process in designing, conducting and reporting results. This began with the acknowledgement of the researcher’s role and moved into the development of the research question, and theoretical framework.
Johnson et al. (2020) outlined five steps to ensuring rigor in qualitative research. Step one is having a clear purpose. This includes identifying a research question and the supporting rationale. For this study, a thorough iterative review of recent literature was conducted and summarized, resulting in the development and refinement of a clear research question and study design to best answer that question. During this step, the researcher’s role and preconceived ideas were also acknowledged. In this case, the researcher had a personal interest and connection to the topic area with aging parents living in a rural setting. A conceptual framework was developed from the literature to guide the study design. In this study, the social ecological model was chosen as it addressed the main components of each concept: individual factors in health promoting behaviors (physical activity), social factors (social interaction), environmental factors (rural context) and policy influences (COVID-19 protocol). This model is highly regarded in public health research for addressing the physical and social conditions that influence health. It is distinct in that it brings forward the influence the environment has on health and health-promoting behavior (Golden & Earp, 2012).

Step two involved the careful selection and justification of the study design and research methods. A detailed explanation of the methods in the study were provided to allow for replicability of the study. A clear rationale for data collection and analysis process were also described. This included reasons for selecting the semi-structured interview to guide the collection of data. The study also employed a purposive sampling strategy to ensure participants would have the optimal experience to answer the research questions. Throughout the data collection and initial analysis, the researcher reviewed the data to ensure that there were sufficient quantity and quality of information to adequately
capture the experience through clarifying and verifying meaning in participants’ responses was conducted throughout the interviews. Decisions were made on when to end the recruitment based on whether new information was being uncovered from participants. Although true data saturation is difficult, especially during the evolving COVID-19 pandemic, once data were being repeated and new data were not surfacing, the data collection ended. Although some information is intended to be carried forward in hermeneutic phenomenology, it is important to recognize how the researcher’s position and perspectives influence the analysis; therefore, reflexive writing was conducted throughout the research to provide a record of researcher assumptions, questions, bias and decisions made throughout the research process.

Step three involved the data analysis process. Interviews were manually transcribed and reviewed by the researcher to become familiar with the participant’s experience. Reflexive notes were recorded after each transcription and throughout the analysis process. After the themes were sorted and re-sorted, the researcher provided an interpretative description of how the theme areas related back to the conceptual framework. Following this process, direct statements from the participant interview were added to verify the themes directly, and the information was sent to a member of the research team for peer review.

Step four involved a written discussion of the results and recommendations for practice. A detailed explanation of how the results related to each other, to the theoretical model, and to the research question were provided. The conclusion provided an overview of the contributions this research made to the field of study and suggestions for future research. Limitations of the study were also documented.
Step five involved reporting the results with clarity, completeness and accuracy to ensure quality and credibility. The researcher composed the results of the study as objective as possible, recognizing, documenting and acknowledging past experience and potential bias throughout the analysis process. To validate and confirm the interpretations made, the research results were written with rich, thick descriptions, remaining as close as possible to the actual words of the participants.

2.9 Summary

This chapter provided a detailed overview of the context in which the dissertation occurred, starting at a pre-pandemic time and concluding in mid-pandemic. Awareness of the context is important to acknowledge as the public health restrictions placed during the COVID-19 pandemic have potential implications on the findings presented in the dissertation. The social ecological model as a theoretical framework, enables multiple levels of interaction to be explored while studying the concepts of physical activity and social interaction among the older adult population in a rural setting. This chapter also provided an overview of the methods used to collect and analyze data in the scoping review and in the qualitative study. Each study is presented as a separate but inter-related studies in subsequent chapters.
2.10 References

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Chapter 3 – Social Interaction and Physical Activity among Rural Older Adults: A Scoping Review


3.1 Introduction

This paper is published in the Journal of Aging and Physical Activity. The scoping review of the literature explores the role of social interaction and physical activity among rural older adults. It was completed prior to the COVID-19 pandemic. Findings from this study highlight the important considerations of the negative association some older adults present in relation to physical activity engagement and social interaction with others. Attention is also placed on the rural environment in which the physical and social interaction occur. The following manuscript has been formatted to fit the dissertation style; however, the content remains the same. The publication is prepared as:


3.2 Abstract

Social interaction and physical activity are critical components in supporting health among older adults, yet rates of activity are low in rural communities. There is significant merit in exploring the relationship between these interrelated concepts. A scoping review was conducted to synthesize existing literature. Search results identified 26 studies meeting inclusion criteria. Findings indicated that social interaction and
physical activity were important for many older adults to maintain health; however, not all older adults preferred the social aspect of group-based exercise. Opportunities for physical activity and social interaction were limited based on geographical location and other socioeconomic factors. This was evident in rural communities where populations were lower and education and income levels varied. Differences on the defining role and meaning of physical activity also emerged. Increasing physical activity and social interaction must account for negative associations to address the lower rates of participation among rural older adults.

3.3 Introduction

The population in Canada is aging. Statistics Canada (2015b) estimates the number of adults, age 65 years and older will increase from 15% to over 25% of the population by 2063. With the number of people aging, it is essential to support health and well-being throughout the lifespan of the individual (Witcher, 2017). Aging inevitably results in changes to the structural and functional ability of an individual regardless of health status and, as people age, they naturally become less physically active (Chodzko-Zajko et al., 2009). There are numerous health benefits associated with social interaction, including improved psychological well-being, reduced stress, reduced heart attack risks, and enhanced immune system functioning (Chang et al., 2014; Douglas et al., 2017). Social interaction also decreases with age, particularly after age 75 years, leaving older adults more vulnerable to adverse health effects, increased health costs, and overall poorer health (Desrosiers et al., 2004).

Physical activity is one context where social interaction can occur. The environment in which people live may also influence health. Within the older adult
population in Canada, 18% reside in rural communities (Statistics Canada, 2018). Rural residents often experience poorer health outcomes in terms of increased mortality, lower life expectancy and functional health, increased risk of diseases, illness, and injury (Stackhouse, 2019). Furthermore, older adults living in rural communities are less physically active than their urban counterparts (Vogelsang, 2016).

Physical activity is defined as any bodily movement including activities such as work, play, transportation, and leisure, which includes planned, structured and repetitive exercise done to improve or maintain fitness (World Health Organization [WHO], 2018). Recommended guidelines for older adults (65 years and older), include 150 minutes of moderate to vigorous physical activity per week required to achieve physical health benefits and improve functional abilities (Canadian Society for Exercise Physiology [CSEP], 2021). Moderate-intensity activities include brisk walking or biking, whereas vigorous-intensity activities include activities such as swimming or cross-country skiing (CSEP). Activities such as household cleaning, cooking, and walking are considered light physical activity, whereas sedentary activity includes time spent sitting, lying down, watching television, office work, or travelling (CSEP). According to CSEP, following the recommended physical activity guidelines help reduce the risk of morbidity, mortality, and loss of independence, particularly among older adults. As a health promoting behavior, physical activity also helps reduce the risk of certain chronic diseases and illness, and improves the perception of quality of life (WHO, 2018). Yet, despite numerous health benefits, fewer than 15% of Canadian older adults are achieving the recommended weekly amount of physical activity as outlined in the physical activity guidelines for older adults (Statistics Canada, 2015a).
People who interact socially with others also have better health outcomes. Social interaction is broadly defined in terms of social support, social networks, and social participation. Adults with positive social supports and networks, who participate with others socially, often present with better health outcomes such as lower morbidity rates and longer survival rates as well as lower depression rates, decreased generalized anxiety disorder, and decreased risk of cognitive decline (Berkman et al., 2000; Glass et al., 1999; Golden et al., 2009). Approximately 17% of older adults are socially isolated (Social Development Canada, 2017). Low quantity and quality of contact with others can result in social isolation, which is linked, to long-term illness and increased risk for mortality (Kaye, 2017; Novik, 2016).

In addition to individual and social factors, the context or environment where people reside also has an influence on the health of an individual (Witcher, 2017). Rural communities, defined by Statistics Canada (2001) as people living outside larger urban centers with populations of 10,000 or more, are often characterized as calm, peaceful, stress-free settings where people have solid connections to each other; yet, rural residents often experience unique health inequities such as lack of transportation, inadequate access to specialized health care services, limited housing and home care, and economic barriers related to lower income (Averill, 2012; Schmidt et al., 2016). As a result, rural residents experience poorer health in terms of increased mortality; lower life expectancy and functional health; and increased risk of diseases, illness, and injury (Pampalon et al., 2006).

Despite the disadvantages, there are also health-related advantages to living in rural communities that are typically characterized by the opportunities to connect with the
community through volunteering, local clubs and organizations such as church groups, community centers, and service clubs (Kaye, 2017). Rural residents often report a strong sense of trust and ownership to the community where mutual support is key to healthy aging (Bacsu et al., 2014; Witcher, 2017). As such, gaining a better understanding of the unique challenges experienced within rural communities is critical (Keating et al., 2011).

There are a multitude of interrelated factors that influence health behaviors. According to Ball et al. (2015) people who are considered advantaged are more likely to be physically active compared to the disadvantaged population. Ball et al. (2015) state that inequities exist among various factors including gender, disability, ethnic background, and aboriginality. Furthermore, those with higher education, higher income, higher status occupations and living in affluent neighborhoods are more likely to be physically active (Ball et al., 2015). As social interaction and physical activity are critical components in supporting health and well-being among older adults, there is significant merit in further exploration of the role of social interaction and physical activity among rural older adults.

Using a socioecological model, this scoping review was conducted to gain a deeper understanding of social interaction and physical activity among older adults in the rural context, to explore the extent and nature of research, synthesize relevant research, and identify any gaps in the existing literature.

3.4 Methods

This scoping review was conducted using the scoping review framework developed by Arksey and O’Malley (2005). A scoping review was chosen as the most appropriate method to report what is known about social interaction and physical activity
among rural older adults as the concepts underpinning the research are broadly defined within the literature and gaps in evidence pertaining to the concepts in a rural context are evident. According to Peters et al. (2017), scoping reviews are conducted to clarify key concepts, report the types of evidence on the concepts, and identify any gaps in the evidence. Using the framework of Arksey and O’Malley, steps taken to conduct the scoping review included: identifying the research question; identifying relevant research studies; selecting studies; charting the data; and collating, summarizing, and reporting the results.

The theoretical model used to direct the scoping review was the social ecological model, which emphasizes multiple levels of influence on behavior, including individual, intrapersonal, organizational, community, and public policy. The model is founded on the principle that individual behavior is influenced by the social environment. The social ecological model identifies multiple layers of interaction among personal, social, and environmental factors that influence behavior. According to Essiet et al. (2017), in considering physical activity, understanding the individual, social and physical environment context, including family and friends, neighborhoods, organizations, and facilities, are important factors to consider when examining health-enhancing behaviors. Golden and Earp (2012) add that a social ecological model is recommended to guide public health practice as the model encompasses the individual and their physical and social environment. The social ecological model was used in the scoping review to guide the development of the search terms and to analyze data in the results related to categories of individual, social and environment factors related to the terms.
3.4.1 Data Collection

3.4.1.1 Step 1: Research Question

To establish what is known about the role of social interaction and physical activity among rural older adults and to identify gaps that exist in the knowledge base, the research question addressed: What is reported within the literature on the relationship between social interaction and physical activity among older adults in rural communities?

3.4.1.2 Step 2: Identifying Relevant Research

The scoping review focused on social interaction and physical activity among adults, defined as those age 65 years and older, in alignment with the World Health Organization’s definition (WHO, 2011). The scoping review included the keywords social interaction, physical activity or exercise, and rural. Social interaction was defined according to Cutrona and Russell (1987) as the relationships people have with others in terms of guidance (advice or information), social integration (a sense of belonging to a group of friends), attachment (emotional closeness), reassurance of worth (recognition of one’s competence), and reliable alliance (assurance that others can be counted on in times of stress). Social interaction is often carried out through social participation and involvement in various social activities; therefore, the keywords for the scoping review included social interaction or social participation.

Physical activity encompassed any bodily movement including activities such as work, play, transportation, and leisure, and includes planned, structured, and repetitive exercise done to improve or maintain fitness as defined by the World Health Organization (2018).
Although not limited to Canadian data, preference for context initially included only rural-based research (under 10,000 population) as defined by Statistics Canada (2001). However, urban studies were also added to the search strategy after an initial pilot search yielded no results for rural research in the topic area. In consultation with the research librarian, the context (rural or urban) was not specified in the search filters, but rather, the rural or urban-based context was identified within the full article review process.

There were no restrictions on study design. The scoping review considered both experimental and quasi-experimental study designs, including randomized controlled trials, nonrandomized controlled trials, before and after studies, and interrupted time series studies. In addition, analytical observational studies including prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies, were also considered for inclusion.

Additionally, descriptive observational study designs including case series, individual case reports, and descriptive cross-sectional studies, were included. Qualitative studies, including, but not limited to, designs such as phenomenology, grounded theory, ethnography, qualitative description, action research, and feminist research were included in the search. In addition, systematic and scoping reviews meeting the inclusion criteria as well as studies published in English, were included in the search strategy with no restriction on country of origin.

The search strategy aimed to locate published, peer-reviewed studies at the global level. An initial limited search of MEDLINE and CINAHL+ with Full Text (EBSCOHOST) was undertaken to identify articles on social interaction and physical
activity. The text words contained in the titles, abstracts and full text of relevant articles, and the index terms used to describe the articles were used to develop a comprehensive search strategy, in consultation with a research data expert at the University’s Library. The search strategy, including all identified keywords and index terms, were adapted for each database source.

Since the focus of the research was on social interaction and physical activity among older adults, the following search terms were used: “Social Interaction” OR “Social Participation” AND “Physical Activity” OR “Exercise” AND “Older Adult” OR “Aging” OR “Elderly” OR “65 Years or Older.” Excluded from the search were non-community dwelling populations such as those residing in long-term care facilities or institutions as well as older adults aged less than 65 years. Studies that did not include the concepts of social interaction and physical activity as defined and those not written in English were excluded. The scoping review protocol was developed using JBI SUMARI (System for the Unified Management, Assessment, and Review of Information. Joanna Briggs Institute, University of Adelaide, North Adelaide SA 5006, Australia. http://www.jbisumari.org (Munn et al., 2019).

The following electronic databases were searched on August 1st, 2021, from 2000 to 2020: MEDLINE (OVID), CINAHL+ with Full Text (EBSCOhost), Rehabilitation and Sports Medicine Source (EBSCOhost), and SPORTDiscus (EBSCOhost). MEDLINE (OVID) is a large database that includes 4,600 international journals within medicine, nursing, dentistry, allied health, and preclinical sciences. CINAHL+ with Full Text (EBSCOhost) is considered the largest and most in-depth nursing research database consisting of 768 journals and indexing for 5,000 journals from the nursing and allied
health fields. Rehabilitation and Sports Medicine Source (EBSCOhost) is a database for rehabilitation clinicians that provides access to more than 370,000 records, including 150 full text peer reviewed journals; over 220 full-text sports medicine and rehabilitation journals; and over 40 full-text books, trade publications, and magazines. SPORTDiscus includes more than 2.5 million records from leading sports medicine journals, books, and dissertations pertaining to sports and sports medicine research covering topics on nutrition, physical therapy, occupational health, exercise physiology, and kinesiology. To avoid duplication, PROSPERO, along with Cochrane Library, were searched to ensure no other reviews were currently being conducted on the same concepts. A manual search of reference lists of articles meeting the inclusion criteria was also undertaken to identify any additional relevant articles.

3.4.1.3 Step 3: Study Selection

The search yielded a total of 987 articles (see Figure 1). MEDLINE was the source of 182 studies. The same search of CINAHL+ resulted in 284 studies. SPORTDiscus obtained 284 results, Rehabilitation and Sports Medicine produced 237 results with three additional studies generated from within a reference check of articles. Following this search, all identified citations were collated and uploaded into RefWorks, where 268 duplicates were removed. This left 722 studies to review. The screening process was conducted in three stages, including title screening, abstract screening, and full-text screening. For the first independent screening, two reviewers, L.L. Schmidt and S. Johnson, screened titles and keywords against the inclusion criteria. A total of 274 studies were excluded because they did not meet the inclusion criteria of age (65 years or older), or they did not relate to either of the concepts. There was a discrepancy between
the reviewers with one study, and it was agreed to leave it in for an abstract review. From there, a second independent review of abstracts was initiated with L.L. Schmidt and S. Johnson reviewing the remaining 448 articles. Results of this screening excluded an additional 201 studies for reasons of not meeting the age criteria of 65 years or older, not community-welling populations, and/or irrelevance to the concepts of social interaction and physical activity. The full-text review of the remaining 247 studies was assessed in detail against the inclusion criteria by the two reviewers independently. Full-text studies that did not meet the inclusion criteria of age requirements, non-community-dwelling, and/or not related to the concepts of social interaction or physical activity were excluded. After the full-text review, the final inclusion of studies from the search was 26 (see Table 1). Disagreements arising between the reviewers at each stage of the study selection process were resolved through further discussion.

3.4.1.4 Step 4: Charting the Data

Data were extracted from the 26 studies included in the scoping review, using a data extraction tool developed and modified by the reviewers to include specific details about the study’s location or context, purpose, participants or sample, study design, methods, and key findings relevant to the review objective.

3.5 Results

The results of the 26 studies selected for the review were divided into subsections including study setting, study design, and summary of studies, including key theme areas that emerged from the data.
3.5.1 Study Setting

Studies included in the scoping review originated from several countries including: Japan (seven), Australia (four), Europe (10), which included one in Sweden, Belgium, Germany, Scotland, France, and United Kingdom, with two in the Netherlands, United States (three). Two studies did not identify a specific geographical location. In terms of population, eight studies focused on older adults residing in both rural and urban locations. Ten studies included older adults residing in urban centers only, with one study specifically focused on rural-dwelling older adults. Seven studies provided no indication of rural or urban geographical location of participants.

3.5.2 Study Design

The majority of the studies (15) were quantitative design with (four) randomized control studies, (six) cross-sectional, and (five) cohort surveys. Six studies were qualitative including (two) focus group, (two) phenomenology, (one) interpretative description, and (one) case study. Mixed methods were used in three studies with survey and focus group data and descriptive analysis. Study design was not applicable (article and literature review) in two articles.

Sample size varied depending on study design, from seven to 13,310 participants, ranging in age from 65 to 96 years. Of these, 20 studies included participants identified as male and female, with four focusing on participants identified as female only and none identified as male only. Two studies did not specify the identified gender of the participants.

In terms of ethnicity, five studies focused on Asian populations, one study centered on African Americans, and four studies indicated the participants were White.
Multiple ethnicities (Asian, African American, Alaskan, and White) were identified in one study. The remaining 15 studies did not specify ethnicity.

Income was identified among participants in 11 studies with two studies reporting income by categorical numbers and nine reporting income as a subjective analysis (low, mid, and high; concerns and no concerns; as well as poor and good). Education level was recorded in 15 studies with a categorical number of years (<13 years, >13 years, Grade 10 to post graduate; elementary to university) with one study reporting an actual number of years in formal education. In terms of marital status, 13 studies reported marital status in categories (married, widowed, alone, single/never married, and divorced). Marital status was not indicated in the remaining studies (13).

Among the selected studies, there were various terms used to describe social interaction, including (seven) social participation; (five) social support; (six) social interaction; and (two) social engagement, networks, factors, and connection. In terms of physical activity, the descriptive terms used among the studies were (nine) physical activity, (10) exercise, (three) healthy behaviors, with some specific activities mentioned such as (three) walking, resistance training, and leisure or recreational physical activity.

### 3.5.3 Summary of Studies: Themes

In response to the research question of what is reported within the literature on the relationship between social interaction and physical activity among older adults in rural communities, following the format of Arksey and O’Malley (2005), data were collated and summarized into three key themes. These include taking control of health; joy of social interaction and exercise, and a pleasant atmosphere.
3.5.3.1 Taking Control of Health. A common theme that emerged in the research was the desire for older adults to maintain and improve their health. This was made possible for many older adults through participating in physical activity. Taking control of health through exercise engagement emerged as a key theme from studies (five) where self-efficacy was the focus. Self-efficacy, the belief in the ability to perform physical activity, was a key focus of studies conducted by Dionigi (2007), Kanamori et al. (2014), Maula et al. (2019), Schutzer and Graves (2004), Warner et al. (2011), and Welmer et al. (2012). Dionigi (2007) explored the perceived benefits of an exercise program on self-efficacy and social interaction among 10 older adults (aged 65–72 years old). Participants engaged in a resistance training, group-based exercise program for 12 weeks. After three individual interviews were conducted with each participant, Dionigi reported three main themes: physical changes, such as improved strength, endurance, and balance; good feelings, such as pleasure, friendship, and pride; and social aspects, such as social and emotional support. These physical, mental, and social factors led to the belief among participants that they had improved strength, endurance, balance, and coordination, and gained an understanding that their bodies were capable of exercise. One participant claimed that it was her responsibility to maintain her health, “... I’ve been able to take control of my own health and change it” (p. 734), and in doing so, she gained a sense of satisfaction and motivation to continue. Maula et al. (2019), explored facilitating factors of group exercise maintenance among 30 adults, age 72–95 years in the United Kingdom. They found that participants maintained group exercise attendance for the physical health benefits they received, the positive experience of attending, the self-efficacy they gained, and for the social interaction they received with others. Seven
studies reported an association between physical activity and health by reducing frailty and increasing strength, flexibility, and balance (Fougner et al., 2019; Geboers et al., 2016; Kanamori et al., 2014; Kikuchi et al., 2017; Shinkai et al., 2016; Welmer et al., 2012; Wilcox & King, 2004). For example, in the rural-based study by Shinkai et al. (2016), preventing frailty was a theme among older adults. Shinkai et al. examined frailty and aging by focusing specifically on key risk factors, including physical activity, nutrition, and social functioning. Physical function was assessed by grip strength and walking speed, whereas social functioning was assessed using the social role subscale of the Tokyo Metropolitan Institute of Gerontology. Shinkai et al. found that physical, psychological, and social function was significantly worse in frail older women and increased with age. According to Shinkai et al., the intervention for prevention of frailty involving physical activity improved the functional health of older women. Fougner et al. (2019) explored group exercise and body image among 16 women, age 70–85 years. They found that engaging in physical activity contributed to a sense of well-being and positive body image among participants and that physical activity involvement impacted their physical ability and sense of social belonging.

Although most studies highlighted the positive aspects of physical activity among older adults, there were some negative associations that also emerged. Carrapatoso et al. (2018) found that older adults who received practical help from others, engaged in less physical activity, as receiving help with daily tasks may reduce the need for the individual to be independent. Robins et al. (2016) concluded that some older adults simply disliked group exercise and identified social aspects as a barrier to participating in group exercise programs. For some older adults, walking alone was simply preferred over
walking with others as it allowed them to go at their own pace, and some older adults perceived walking for pleasure as unnecessary. Welmer et al. (2012) found that older adults are reluctant to engage in strenuous activity as it was perceived as dangerous. Additionally, Welmer et al. reported that older adults in their study had no desire to get in shape. For Wilcox and King (2004), a lack of transportation created a barrier to participating in an exercise program. Schutzer and Graves (2004) also reported several barriers perceived among older adults for participating in physical activity. They found that some older adults reported the distance they lived away from an exercise facility was a barrier to participating. They also reported that some older adults simply felt they were getting enough physical activity through daily chores and did not need to participate in exercise. Warner et al. (2011) also found that how older adults defined physical activity influenced the rates of activity. Some older adults did not identify daily activities such as housework or running errands as physical activity. According to Schutzer and Graves, ethnicity also influenced physical activity participation where African American women recorded less physical activity than men.

3.5.3.2 Joy, Social Interaction, and Exercise. Interacting with other people was a motivating force in older adults engaging in physical activity and exercising in groups, as it provided an opportunity to socialize with others, while participating in a health-promoting behavior in 10 studies (Adamson & Parker, 2006; Bidonde et al., 2009; Carrapatoso et al., 2018; Dionigi, 2007; Lindsay-Smith et al., 2019; Maula et al., 2019; Pool et al., 2017; Schutzer & Graves, 2004; Shinkai et al., 2016; Welmer et al., 2012). Among the findings, there were positive effects associated with the social aspect of physical activity, where many noted a reciprocal relationship between the two factors.
For example, Dionigi (2007) reported that among 10 older adults (age 65–72 years) who participated in a 12-week exercise program, social interaction provided pleasure, friendship, intergenerational interaction, and pride. The exercise program was led by a university student whose role was to motivate, provide instruction on exercise form, and lead the warm-up and cool down stretching. From in-depth interviews with participants, it was reported that a social connection with the exercise program leader was a benefit among older adults as it provided motivation, support, and friendship to continue with the exercise program. According to Dionigi, “All participants said that they appreciated the time and effort that the students put into the program and often praised them during interviews” (p. 736), emphasizing the importance of encouragement and support the students provided to participants. Dionigi reported, “Not only did the students offer the participant encouragement, instruction, feedback and leadership, but, perhaps more importantly, friendship” (p. 737). The friendship, particularly the intergenerational interaction, was a described benefit of the exercise program (Dionigi). Welmer et al. (2012) studied the social aspects of walking group exercise among 20 community-dwelling older adults (age 80–91 years). Using focus group interviews, they explored the perceived meaning, importance, and experience of physical activity. They reported that older adults perceived physical activity as part of social interaction where the social aspect was even more important than the physical activity itself. They reported that having someone to walk with provided a further incentive to be active, and walking groups that incorporated a coffee time (social) component were perceived as beneficial to older adults. Physical activities such as dancing gave participants, “joy, social interaction, and exercise” (p. 323). For many older adults, social interaction was the main reason for
starting a group exercise program. Robins et al. (2016) explored the benefits and barriers to participation in exercise among 394 older adults (age 72–83 years). Data were collected through telephone surveys and were analyzed through qualitative description methods. Findings indicated that older adults started group-based exercise to improve health and for the social interaction with other people. According to Robins et al., “Older adults most commonly reported social interaction to be a benefit of participation in group-based falls prevention exercise, including those with no previous experience” (p. 358). Similar findings were reported by Carrapatoso et al. (2018) who examined the mediating effects of social support on vitality and psychological distress among 2,859 older adults. Social support was measured by frequency and quality of social contacts, group membership, social network size, and support from others. Vitality was defined as self-perceived energy and fatigue. Psychological distress was measured in terms of depression, anxiety, and other symptoms such as pain and fatigue.

Carrapatoso et al. concluded that all social support variables were positively associated with vitality and were negatively associated with psychological distress. Significant positive associations were reported between all social variables on walking; therefore, older adults with better social support who participate in group activities were likely to spend more time walking, resulting in better vitality. Carrapatoso’s findings indicated that older adults who participated in group activities were likely to walk more, resulting in better health-related vitality and lower psychological distress. Therefore, being part of a social group in older adulthood was deemed beneficial to health.

A similar study conducted by Bidonde et al. (2009) reported that group exercise was an important intervention among older adults (n = 9) with declining social support
and for prevention of social isolation among women as, for some older adults, the most valuable social contacts were in their fitness program. According to Bidonde et al., “Expressions of gratitude for the opportunity to get out and be among people with similar life experiences in a group fitness environment abounded” (p. s93). Emotional support from social contacts was a positive influence on health where those with higher social participation were associated with more physical activity and less passive sedentary time (Bidonde et al., 2009).

Pool et al. (2017) reviewed six interventions to improve social determinants of health, including social participation, social isolation, and loneliness. They found that participants of group-based exercise programs reported an increased perception of social support. As a result of the social aspect of group exercise, loneliness, and social isolation were reduced, which had a positive effect on health. Schutzer and Graves (2004) added that group cohesion, perception of similarity, and closeness also predicted short- and long-term adherence to physical activity where the frequency of exercise was influenced by the degree of social support received from a group. Social support was an important predictor of physical activity engagement where physical activity facilitated social connections among 309 older adults in an exercise program in a study by Warner et al. (2011). Social support and social engagement, particularly from neighbors and friends, had a more significant contribution to moderate to vigorous physical activity among older adults (n = 8,592) age 65–84 years (Seino et al., 2018).

Kikuchi et al. (2017) further added that data from 1,146 older adults (age 65–74 years) revealed that those with higher social participation spent 50% more time in moderate to vigorous physical activity than older adults with low social participation.
Motivation to exercise was further enhanced by the social interaction older adults received with others (Carrapatoso et al., 2018; Granbom et al., 2017; Kanamori et al., 2014; Tan et al., 2009).

Family and friends were also considered important in motivating older adults to participate in both exercise and social activities (Adamson & Parker, 2006; Bidonde et al., 2009; Dionigi, 2007; Kanamori et al., 2014; Kikuchi et al., 2017; Seino et al., 2018; Warner et al., 2011). Adamson and Parker (2006) assessed the range of activities reported by women, age 75–81 years (n = 509). Findings indicated that engaging in exercise was associated with higher levels of physical and mental health and the benefits of participating in class-based activities were friendship and relaxation. Social interaction was an important aspect among participants (Adamson and Parker). Similar results were found by Kanamori et al. (2014), who collected data from 13,310 older adults (65 years and older) revealed that social participation had positive effects on physical activity engagement by providing social reinforcement such as praise, acceptance, and attention from others. In a mixed methods study on community group impact on physical activity, Lindsay-Smith et al. (2019) found that among 35 older adults, combining social activity with physical activity increased motivation for older adults to participate. Also contributing to motivation among older adults was the use of technologies such as pedometers and smart phones. Maula et al. (2019) explored interventions, facilitators, and barriers to physical activity participation among 15 adults (age 70–88 years and found social interaction with others to be a facilitator of physical activity involvement.

Even though most studies reported numerous benefits of social interaction and physical activity, some studies uncovered a negative association. For example, Robins et
al. (2016) found that among 394 older adults surveyed, social interaction was a reason to start an exercise program, particularly among females living alone, yet some older adults simply disliked group exercise and identified social aspects as a barrier to participating in group exercise programs. According to Welmer et al. (2012) for some older adults, walking alone was preferred over walking with others as it allowed them to go at their own pace, and some older adults perceived walking for pleasure as unnecessary. Sugisawa et al. (2020) examined health habits among 739 older adults and uncovered that exercise obtained in younger years had an influence on engaging in healthy behaviors in later life among participants; therefore, if younger people are physically inactive, there may be more inclination for sedentary behavior as older adults, making it more challenging to engage older adults in physical activity.

Similarly, Colley et al. (2019), in exploring past experiences in recreation among older adults, found that interventions had the most impact at earlier stages of life; however, the most opportune time to engage older adults in recreational activity was at specific target points such as the onset of retirement, when people experience changes in lifestyle and social roles. Colley et al. further identified that people in early retirement began to form new routines of organized activities, so engaging them after this point became more difficult.

3.5.3.3 A Pleasant Atmosphere. The environment was another key theme among (nine) studies in the review (Bidonde et al., 2009; Dionigi, 2007; Howell, 2020; Kanamori et al., 2014; Kikuchi et al., 2017; Maki et al., 2012; Michèle et al., 2019; Seino et al., 2018; Tomioka et al., 2018; Welmer et al., 2012). For example, social interaction in a pleasant atmosphere assisted to increase exercise among older adults (age 65 years and
older) in a randomized control trial conducted by Maki et al. (2012). A 3-month community-based walking program was conducted to encourage participants to walk regularly. Maki et al. expected that the combined benefits of exercise and social interaction would be evident in the results and that participants would feel a sense of participation in the community. Maki et al. reported the intervention group had a significantly greater increase in the average number of steps taken than the control group. According to Maki et al., “Exercise could have a larger effect in combination with social interaction” (p. 509) and greater benefits may be expected when exercise is conducted in enriched environments where the focus is placed on a pleasant atmosphere, interactive communication, social role modeling, and motivation.

Similar to a pleasant atmosphere, Bidonde et al. (2009) found that older women (n = 9), felt engagement and ownership of an exercise program that was financially accessible, took place in a motivational setting, and provided physical activity opportunities in the winter months. Bidonde stated, “The use of a public facility was a perceived benefit to the participants” (p. s96) as the women were able to interact and socialize with others as well as have a place to visit after exercising. Other environmental factors that were reported included musical preferences dating back to older adult’s youth were important along with transportation (ca- pooling) and opportunities to add input on fees, schedules, and programs. Furthermore, an enjoyable atmosphere was also important for older adults who participated in exercise at the gym (Dionigi, 2007). If older adults felt welcomed, comfortable, and not patronized, they enjoyed physical activity more. Older adults also enjoyed opportunities for social interaction with other gym users, other participants, and program leaders, which, according to Dionigi, was central for
maintaining interest and enjoyment of resistance training exercise. Similar findings were reported by Kanamori et al., (2014) where social participation significantly lowered the risk of functional disability among older adults (age 65 years and older) and the reduction in risk was increased with participation in a number of organizations including local community groups, hobbies, and sports clubs. Over half of Kanamori et al.’s participants were engaged in a local community organization, which provided a protective effect against functional disability.

In terms of physical activity, participation in a sports organization had positive effects as social interaction provided social reinforcement and emotional support. Tomioka et al. (2018) reported similar findings using survey data to examine the effects of social participation on activities of daily living among 6,013 older adults (age 65 years and older). Social participation was defined as frequency (frequent, moderate, and nonparticipation) of participation in volunteer groups, sports groups, hobby clubs, senior citizens’ clubs, neighborhood community associations, and cultural clubs. Participants were also assessed on the frequency of exercise (exercisers or inactive). Findings indicated that older adults who participated in volunteer activity, hobbies, neighborhood, and cultural organizations, had benefits in preventing physical decline (Tomioka et al.).

Michèle et al. (2019) explored physical activity among 286 older adults. They reported that those who were physically and socially active over time continued to be engaged in activities at various levels throughout aging and expressed satisfaction with mental health and self-esteem. Social participation had a beneficial impact on well-being, particularly among those who were able to get out of their house and meet other people in the community. Research indicates that a pleasant atmosphere encouraged older adults to
participate and continue to engage in physical activity, particularly in group exercises with others. Community groups and organizations had an important role among older adults as a place to gather for socializing and activity. Organized physical activity programs brought people in contact with new social networks, which helped reduce the isolation that some older adults experience as they age and life circumstances change.

Among 20 older adults (age 80–91 years), Welmer et al. (2012) reported that being outdoors to go for a walk or work in the garden was considered an enjoyable part of physical activity. Welmer et al. stated, “The fresh air and the experience of the beauty of the countryside were just as, or more, important aspects” (p. 323). This, according to Welmer, emphasized the importance of getting outdoor to older adults.

Kikuchi et al. (2017) analyzed secondary data on physical activity and social participation among 1,146 older adults (age 65–74 years), where physical activity was defined by frequency and duration of vigorous, moderate and walking activity, and social participation was defined by the frequency of engagement in social activities. Kikuchi et al. found that social participation provided more opportunity to go outside by walking more to join activities, spending less time sitting at home, and improved access to social support, which increased physical activity.

In terms of neighborhood factors, Seino et al. (2018) analyzed data from 8,592 older adults (age 65–84 years) on neighborhood relationships and physical activity. Physical activity was measured using the International Physical Activity Questionnaire-Short form, in time and frequency spent in moderate to vigorous physical activity. Neighborhood relationships were categorized by the proportion of people with an active relationship with their neighbors. The results indicated that neighborhood relationships
were positively associated with participation in moderate to vigorous physical activity among older adults (Seino et al., 2018). Particularly among men, Seino et al. reported that having neighborhood relationships, including social support and social engagement, could help prevent physical inactivity.

Howell (2020) explored the sociocultural impact on healthy behavior and found that, among 82 older adults in Alaska (age 65–74 years), increased social opportunity resulted in increased participation in healthy behaviors such as exercising. Particularly among the younger aged participants in the study, social relationships had an impact on physical activity, where those with an increased level of social connection to others in the community and those who lived in the same community for longer periods of time, were more physically active.

Not all environmental factors were positive. Welmer et al. (2012) reported that a barrier for adherence among older adults to exercise included lack of suitable physical activities for older adults. They also found that some older adults rarely went for a walk without reason of having an errand to run. Wilcox and King (2004) found that among older adults who were recently widowed, attending a group exercise program was not preferred over individual activity. They also found that as life circumstances changed, a lack of transportation to exercise and social programs was a barrier. Kanamori et al. (2014) found a difference in the reported benefits of physical activity and social interaction between men and women attending programming at a senior’s centre. They found that men were more likely than women to benefit from attending a formal program or community organization. Similar findings were reported by Tomioka et al. (2018) who found in their study that Japanese men were more likely to benefit from involvement in a
senior’s centre than women as men have more opportunity to acquire social roles through their past employment, which is carried forward into retirement. Maki et al. (2012) highlighted the importance of participating in the community as a facilitator of physical and social activity. Yet, commitment to attending a structured program created a sense of obligation or added burden for some older adults.

3.6 Discussion

The scoping review captured both positive and negative associations of physical activity and social interaction among older adults interrelated among individual, social, and environmental levels of influence. In terms of physical activity, there is significant existing research on the health benefits of physical activity among older adults including improved physical and mental health and wellbeing (Boulton et al., 2018); however, even though many older adults were reported to have engaged in physical activity to improve and maintain health, the scoping review uncovered that for some older adults, physical activity was regarded as unsafe or dangerous, and exercise was unnecessary.

Similar results have been reported through research findings on physical activity barriers and facilitators among rural older adults in Australia. Boehm et al. (2013) found that many older adults did not exercise due to their perceived poor health status. As such, focusing only on physical health aspects to facilitate physical activity may not be beneficial to engage older adults in physical activity for non-health related reasons. Gilbert et al. (2019) also explored barriers and facilitators of physical activity among 62 rural older adults in the United States and found many motivators of physical activity among participants were not health related.
Of particular relevance for rural older adults is the desire among many to remain independent for as long as possible (Centers for Disease Control and Prevention, 2015). Promoting physical activity for the purpose of independence as well as maintaining health, may better target the desire for older adults to remain at home and in their own community for as long as possible throughout their lifespan, as those who lived in the same community the longest and were socially connected to others, were more physically active. With the increasing demand on health care with age, promoting physical activity in this way may help to reduce the rates of chronic disease and preventable health conditions.

Findings of the scoping review also highlighted that among some older adults, physical activity was conducted only when it served a productive purpose such as running errands. This aligns with research conducted by Witcher (2017), who explored perceptions of physical activity among 10 rural older adults in Atlantic Canada. Witcher reported that participants viewed physical activity as something done for productive purpose such as berry picking and doing chores rather than leisure activity. Similar findings were reported among 30 participants in a study by Leavy and Aberg (2010). They explored perceptions of physical activity among older adults and found that some participants viewed going to the gym and performing strengthening exercises as nonsense and un-purposeful. It is, therefore, imperative that motivation for physical activity be considered when promoting physical activity among this population. It is important to understand how older adults define physical activity to gain a broader understanding of actual physical activity rates in rural populations.
In addition to uncovering some negative associations of physical activity, the scoping review also produced results that identified the importance of social interaction among this population. Physical activity was one way older adults were able to socially interact with each other, which for some, resulted in reciprocal benefits to health. It is well-known through research that social interaction is associated with numerous benefits to older adults, where many older adults who are socially active report positive physical and mental well-being (Adams et al., 2011).

Significant relationships and roles including helping others are developed through social interaction opportunities (Levasseur et al., 2010); however, emerging from the scoping review findings was that not all older adults reported a positive association with the social aspect of physical activity. Some simply did not prefer to exercise with other people or in groups. This may be dependent on the stage of life older adults are currently in. For example, research by Naud et al., (2019) on social participation among Canadian older adults in rural communities, suggested as people get closer to the end of their life, their motivation to engage with others changes, resulting in a decreased involvement in social activities. Naud et al. concluded that participants shifted their focus toward more meaningful social relationships with family or close friends, rather than participating in a variety of community activities, including group-based physical activity. This is an important finding as many rural residents often report a close connection to people in their community (Schmidt et al., 2016). Trust and a sense of belonging are key findings from rural research on social interaction. It is therefore important to consider the relationships rural people have with each other to foster the bond that rural people often perceive with one another, which may further promote physical and social activity.
Connecting older adults with family members, either in person or through the use of technology, may further motivate them to be active together. With many organizations such as recreation, sport, education, health sectors, and municipalities, coming together to focus on increasing physical activity and social environments, particularly among children and youth (Canadian Parks and Recreation Association, 2015), promoting an intergenerational connection may serve a dual purpose in promoting and supporting healthy behaviors among older adults and the broader community; however, results of the scoping review also uncovered the importance of early exposure to physical activity which fosters activity in later adulthood. Another important consideration is the stage of life where physical activity interventions may be most effective such as the beginning of retirement, when roles and social responsibilities change for many older adults.

In addition to positive and negative physical activity and social interaction among older adults, results from the scoping review further highlight the environment which people live. Where people live had positive and negative influence on opportunities to join an exercise program, attend a senior centre or get involved in a community organization. Not all older adults have the same opportunity available to them. Within the scoping review, access to transportation, a lack of programs, and age-appropriate services were reported as negative associations among older adults in terms of accessing and attending a physical activity program. Environmental barriers are commonly reported in rural research. For example, Averill (2012) found that rural residents often face a combination of factors that inhibit healthy aging in their community including lack of transportation, inadequate access to specialized health care services, limited housing and home care and economic barriers related to lower income. Additionally, the rural
environment is not always conducive to safety, accessible exercise areas, particularly for older adults. This is supported by research conducted by Kulig and Williams (2011), who reported that some rural communities lack social, cultural and recreational facilities to support the health of the population. Additionally, according to Schmidt et al. (2016), risk of injury is often amplified in rural communities by uneven or absent sidewalks, inadequate street lighting, snow buildup and icy conditions that perpetuate the fear of falling, particularly among older adults, resulting in reduced desire to engage in outdoor activity. Lack of access to indoor facilities as well as extreme climate conditions were also found to be a barrier among older adults in rural United States (Aronson & Oman, 2004). Additionally, perception of crime and unrestrained animals also influences rural older adults’ participation in outdoor activities. These identified barriers limit social interaction opportunities with others in the community as people often use outdoor activities such as walking as an opportunity to visit with people in their neighborhood (Keating et al., 2011; Schmidt et al., 2016).

Although some barriers are similar in urban areas, addressing environmental barriers becomes more challenging in rural communities where resources are limited, infrastructure is often old and the population needed to support the existing facilities and programs are sparse compared to urban centers (Aronson & Oman, 2004). The scoping review highlighted the importance of maintaining physical activity throughout a person’s lifecycle; therefore, reaching out to community leaders and stakeholders for input on creating and maintaining accessible and walkable communities, may improve the barriers to physical activity many older adults commonly perceive and help connect the community to support a common goal.
3.7 Limitations and Strengths

This scoping review has limitations. With scant literature focusing specifically on rural communities, the results of the scoping review are drawn from a combination of rural–urban settings. As such, a rural lens was applied throughout the discussion, but results are not exclusive to rural communities. The scoping review provided a broad overview of the literature on social interaction and physical activity among older adults, with specific focus on the negative associations emerging from the results. Important research gaps among rural older adults have been identified.

3.8 Conclusion

It is evident from the research that there are numerous benefits of physical activity and social interaction among older adults; however, the scoping review also uncovered negative associations that are noteworthy, which are relevant to rural populations. The negative findings reported in the scoping review are critical to understanding motivations and barriers impacting physical activity and social interaction rates among rural older adults. With increased age, older adults tend to focus on fostering relationships with family and close friends. Typical to many rural communities, where people are often closely connected to each other, this is a key target area for promoting physical activity throughout the life course as close connections provide motivation and support for participating in physical activity. Rural communities often present with additional challenges of aging and declining populations, aging infrastructure, lower income and education, and a heavy reliance on volunteerism and community fundraising to maintain programs and services. Engaging older adults with others within their community to create and support physical and social opportunities provides a sense of ownership and
promotes intergenerational interaction. Community-driven leadership also ensures local needs are met such as creating safe and welcoming environments with age-appropriate activities to encourage people to be physically and socially active throughout their lives for as long as possible.
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Chapter 4 – Physical Activity and Social Interaction among Rural Older Adults in Saskatchewan

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4.1 Introduction

This paper addresses the dissertation’s final research objective by exploring the experiences of physical activity and social interaction among rural older adults in Saskatchewan during the COVID-19 pandemic. Key to this study is the context in which it has occurred, as the public health restrictions had been placed on Saskatchewan residents to maintain physical distance from each other. Many social programs and services were cancelled and postponed during this pandemic. Findings of the study revealed that, although rural older adults are resilient and adapt to their environment, there are some that experienced feelings of loneliness, even while living with a family member during the COVID-19 pandemic. Although this does not undermine the importance of family members, it places more emphasis on the role of the broader community on the health of rural individuals. Another noteworthy finding was that many older adults felt protected by the effects of the pandemic within their rural context; some even welcomed a break from the daily responsibilities they had been assuming in their community prior to the pandemic. Gaining an understanding of the experiences of rural
older adults during the COVID-19 pandemic is valuable in providing support and resources here it is needed to benefit health of the individual.

4.2 Abstract

Physical activity and social interaction among rural older adults are important concepts, particularly during the COVID-19 pandemic where restrictions on physical gatherings were placed. The purpose of this qualitative study was to gain a deeper understanding of rural older adults’ experience with physical activity and social interaction during the COVID-19 pandemic. An interpretative phenomenological approach was used to explore the experience of 10 older adults, age 67 to 82, from rural communities throughout Saskatchewan. Findings revealed that many rural older adults acknowledged the health benefits of physical and social activities and experienced loneliness when COVID-19 restrictions were placed, even when living with a partner. For some, the restrictions placed on physical and social activity provided a welcomed break from daily responsibilities. Rural communities, often at a disadvantage, were also perceived by participants as having a protective factor from COVID-19. The resilience demonstrated among rural participants to persevere and adapt to their changing environment during the pandemic was evident in the findings.

Keywords: older adults; phenomenology; physical activity; rural; social interaction; social ecological model
4.3 Introduction

Statistics Canada (2019) estimates the number of older adults will increase from 15% to over 22% of the population by 2031. With an increasing number of people aging, it is important to support health and well-being throughout the lifespan of the individual (Russell, 2017; Witcher, 2017). Regular physical activity has been shown to improve strength, balance and flexibility as well as reduce the risk of chronic illness and frailty (Burton et al., 2019). Physical activity is broadly defined as any bodily movement including activities such as work, play, transportation, and leisure and includes planned, structured and repetitive exercise done to improve or maintain fitness (World Health Organization [WHO], 2018). As people age, they naturally become less physically active, with only 14% of older adults achieving the recommended weekly amount of physical activity (Government of Canada, 2020). Less physical activity is related to declining health in terms of weakened muscles, cardiovascular decline and increased risk of falling (Ory & Smith, 2020).

Similar to physical activity, social interaction is also associated with numerous health benefits among older adults (Dionigi & Son, 2016; Liechty et al., 2017). Broadly defined as a social exchange between two or more people, research on social interaction involves exploring who is involved in an interaction and the closeness of that connection, how an interaction is taking place, barriers and facilitators of the interaction, and why an interaction is occurring (Bacsu et al., 2014; McIntosh, 2018). It also includes measurable factors such as the number of people involved in an interaction, frequency of interaction, number of social activities, and the types of social activities individuals are participating in (Jeffery et al., 2014). Social interaction is associated with positive health outcomes.
among older adults such as lower morbidity rates and longer survival rates (Vogelsang, 2016). It provides opportunities for meaningful life activities and developing significant relationships and roles, including helping others (Levasseur et al., 2010). Social interaction also has an influence on decreasing depression rates, generalized anxiety disorder, and decreased risk of cognitive decline (Nemoto et al., 2021). Additionally, social interaction is associated with reduced functional decline and increased levels of engagement in health promoting behaviours such as physical activity (National Seniors Council, 2014). According to Lee et al., (2008) social interaction is a critical component in supporting health and well-being among older adults; therefore, there is significant importance in further exploration of social interaction among older adults to support healthy aging.

In addition to health promoting physical and social behaviour, there are notable differences in healthy aging depending on the context in which people live. According to Jeffery et al. (2014), people living in rural communities face some unique opportunities and challenges compared to their urban counterparts. Although there is no clear and concise definition of rural, the Saskatchewan Association of Rural Municipalities [SARM] classification system defines rural as communities with populations of less than 5,000 people, including towns and villages (SARM, 2021). In Saskatchewan, approximately 40% of the population is considered rural (Olfert & Patrick, 2020). There are also health-related advantages to living in rural communities that are typically characterized by the opportunities to connect with the community through volunteering, local clubs and organizations such as church groups, community centres, and service clubs (Kaye, 2017). Rural dwelling adults often report a strong sense of trust and
ownership to the community where mutual support is key to healthy aging (Bacsu et al., 2014; Witcher, 2017). Supporting social policies and advocating for age-appropriate opportunities for rural older adults to remain engaged in the community is very important to health and wellness (Novek et al., 2013). Among older adults, the outdoors are often used for activities such as walking, which provides an opportunity to visit with people in their neighborhood (Keating et al., 2011; Schmidt et al., 2016); however, risk of injury is often amplified in rural communities by uneven or absent sidewalks, inadequate street lighting, snow build-up and icy conditions which perpetuate the fear of falling, particularly among older adults, resulting in reduced desire to engage in outdoor activity (Schmidt et al., 2016). These barriers in the physical environment influence the opportunity and ability for older adults to engage in physical and social activity. Other challenges common in rural communities include lack of transportation, inadequate access to specialized health care services, limited housing and home-care and economic barriers related to lower income.

Additionally, the COVID-19 pandemic has created a challenging situation for the older adult population. At the onset of the global pandemic, public health experts identified older adults as higher risk of experiencing severe illness with COVID-19 (Tam, 2020); therefore, in an effort to protect this vulnerable population, public health measures were put in place that included physical distancing from others and temporarily closing non-essential businesses and services such as senior centres, libraries, recreation facilities and coffee shops (Government of Canada, 2021). Many of these programs and services served as important avenues for older adults to engage in physical activity and interact socially with others in their community.
According to Ory and Smith (2020), physical inactivity and social isolation experienced by older adults during the pandemic is having a detrimental effect on physical and mental health. Even prior to the pandemic, many older adults were experiencing a certain level of social isolation and loneliness, but according to Dahlberg (2021), since the pandemic, this has increased. Although often studied interchangeably, loneliness typically refers to the subjective feelings of the individual, whereas social isolation involves the level and frequency of interaction with other people (Johnson et al., 2021; Marston et al., 2019). Franke et al. (2021) stated that an increased perception of loneliness often results in reduced physical activity participation. In an effort to help reduce some of the impact of social distancing measures, some organizations shifted their programs and services online to a virtual method of engaging with others; however, for many older adults, the accessibility and knowledge of current technology is limited or in some cases, not wanted (Marston et al., 2019).

The ability for some people to engage in health promoting behaviours are also influenced by multiple factors within individual, social, environmental, and socio-economic levels (Hill & Hymus, 2019; Nemoto et al., 2021). According to Witcher (2017), considering a multiple range of influencing factors is essential in exploring physical activity among rural older adults; therefore, a social ecological model was used to guide the study. It is distinct in that it brings forward the influence the environment has on health and health-promoting behaviour (Golden & Earp, 2012). This model is highly regarded in public health research for addressing the physical and social conditions including individual behaviours (physical activity), social factors (social interaction), as
well as environmental factors (rural context) and policy influences (COVID-19 protocol), making it most suitable to guide this study.

4.4 Research Purpose

To inform practice and make a valuable contribution to rural research, there is a clear need to gain a better understanding of rural older adults’ experiences with physical activity and social interaction during the global COVID-19 pandemic. This study sought to answer how rural older adults experience physical activity and social interaction during the COVID-19 global pandemic. More specifically, the research questions focus on:

a. What is the experience of physical activity among older adults living in a rural setting during the COVID-19 pandemic?

b. What is the experience of social interaction among older adults living in a rural setting during the COVID-19 pandemic?

c. How has the COVID-19 pandemic impacted the opportunity for older adults to engage in physical activity and social interaction in the rural setting?

4.5 Methodology

To explore rural older adults’ experience with physical activity and social interaction, an interpretative (hermeneutical) phenomenological approach was used. Phenomenology is a qualitative methodology aimed at understanding experiences that are common among a group of people and gaining insight on how people experience the world around them (Giorgi, 2012; VanScoy & Evanstad, 2015). Interpretative phenomenology approaches the individual’s experience within their own context (VanScoy & Evanstad, 2015). Researchers using interpretative phenomenology explore the personal experience and meaning of participant’s by what is said to gain an understanding of the phenomenon being investigated within the context the individual experiences it in (VanScoy & Evanstad, 2015). This research method was chosen as the
most appropriate to explore physical activity and social interaction among rural older adults as, according to VanScoy and Evanstad, it is useful when seeking information particularly among under-served groups of people whose experience may differ from the general population and from others within their own group. Further, this research method focuses on the lived experiences and meanings situated within a social, cultural and historic setting (Mustafa et al., 2019).

Ethics approval was obtained from the first author’s research ethics board before the study commenced. Potential participants were informed of the study’s purpose and procedures. The study involved minimal to low risk to participants. Confidentiality, retention, and storage of information was explained prior to receiving informed consent to participate in the study. To ensure confidentiality, pseudonyms were used in place of participant’s actual names.

4.6 Data Collection and Analysis

Purposive sampling was used to recruit older adults from rural communities throughout Saskatchewan. This province was selected as rates of physical activity among older adults are low. Physical activity rates are often lower among those with low income, less education, poorer perceived health status, ethnicity, and gender (Government of Canada; 2020; Public Health Agency of Canada, 2017), often experienced in rural communities. Rural was classified as communities with populations of under 5,000 people (Saskatchewan Association of Rural Municipalities [SARM], 2021). Recruitment occurred through various community contacts, including recreation organizations and provincial health promotion contacts, who shared the study information in rural communities throughout the province. Potential participants were screened for
eligibility based on the following criteria: community-dwelling adults, age 65 or older, residing in rural Saskatchewan. Recruitment began in July, 2020 and ended in December, 2020. Twelve potential participants expressed interest however, two were age ineligible and excluded (see Figure 2).

Figure 2
Map of Saskatchewan

Data are often collected in phenomenological studies through individual interviews which are key in gathering participant’s experiences and providing an opportunity to tell their story, speak freely, and express concerns (Creswell, 2013). This study consisted of data generated from 10 participants, recruited from the south east and south central area of the province, as well as the south west, central east and west, and the far north east, who engaged in an individual, semi-structured, telephone interview. Each interview lasted between 45 to 60 minutes and was audio-recorded.

Data analysis was performed using an interpretative phenomenological analysis (IPA) method which was chosen as it is a rigorous process, suitable for capturing the experience of a relatively small sample size (Biggerstaff & Thompson, 2008). IPA is also useful for examining under-served populations (VanScoy & Evanstad, 2015), such as rural older adults.

IPA involves multiple stages of analysis that move from description to interpretation of data (VanScoy & Evanstad, 2015). After each interview was completed, reflexive notes were made consisting of initial impressions, self-reflection, possible connections, and questions arising. Data generated in the audio-recorded interviews were then transcribed and reviewed numerous times for immersion in the content. On each written transcription, comments were made along the margins each time the documents were reviewed. Key words and phrases were highlighted in each transcript. Through a process of manually reviewing each interview and creating reflexive notes, theme areas were devised that considered potential patterns, connections, and relationships. This process was repeated for each interview transcript to capture the individual perspective of each participant before considering the entire data set (VanScoy & Evanstad, 2015).
Complete data analysis resulted in 429 codes which were reviewed, sorted, re-sorted, and clustered into common patterns, connections, and differences. The remaining themes were written out in narrative form, adding direct quotes from participants to enhance the understanding.

4.7 Rigor

Rigor was ensured throughout the research process. The study employed a purposive sampling strategy to ensure participants would have optimal experience to answer the research questions. The quantity and quality of information was consistently monitored throughout each of the interviews to adequately capture the experience by clarifying and verifying meaning of participants’ responses. Interviews were transcribed and manually reviewed with reflexive notes recorded after each transcription and throughout the analysis process. After the themes were sorted and re-sorted, data were shared with members of the research team for peer review. The results of the study were reported with clarity, completeness, and accuracy to ensure quality and credibility. To further validate and confirm the interpretations made, results were written with rich, thick description, using carefully selected quotes that related to the theme area.

4.8 Results

Of the 10 older adults interviewed, eight identified as female, and two as male. Participants ranged in age from 67 to 82. Seven were retired, two were semi-retired, and one was employed full time. Seven participants were married, two were widowed, and one was never married and living alone. Only one participant had less than grade 12 education. Two had at least a high school diploma and seven had completed post-secondary education (see Table 1).
Table 1

Participant Demographics

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Education</th>
<th>Marital Status</th>
<th>Occupation</th>
<th>Housing</th>
<th>Living Arrangements</th>
<th>Perceived Self-Reported Health Status</th>
<th>Rural Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary</td>
<td>81</td>
<td>Female</td>
<td>University/College</td>
<td>Widow</td>
<td>Retired</td>
<td>Semi-detached</td>
<td>Alone</td>
<td>Very good</td>
<td>1900</td>
</tr>
<tr>
<td>Barbara</td>
<td>77</td>
<td>Female</td>
<td>Up to Grade 12</td>
<td>Married</td>
<td>Retired</td>
<td>Apartment</td>
<td>Spouse</td>
<td>Not the best</td>
<td>2451</td>
</tr>
<tr>
<td>Vincent</td>
<td>67</td>
<td>Male</td>
<td>University/College</td>
<td>Married</td>
<td>Retired</td>
<td>Homeowner</td>
<td>Spouse</td>
<td>Very good</td>
<td>385</td>
</tr>
<tr>
<td>Clifford</td>
<td>68</td>
<td>Male</td>
<td>University/College</td>
<td>Married</td>
<td>Full-time employed</td>
<td>Homeowner</td>
<td>Spouse</td>
<td>Good</td>
<td>2688</td>
</tr>
<tr>
<td>Linda</td>
<td>74</td>
<td>Female</td>
<td>University/College</td>
<td>Married</td>
<td>Retired</td>
<td>Homeowner</td>
<td>Spouse</td>
<td>Very healthy</td>
<td>490</td>
</tr>
<tr>
<td>Patricia</td>
<td>79</td>
<td>Female</td>
<td>High school diploma</td>
<td>Married</td>
<td>Retired</td>
<td>Homeowner</td>
<td>Spouse</td>
<td>Good-Excellent</td>
<td>643</td>
</tr>
<tr>
<td>Carol</td>
<td>77</td>
<td>Female</td>
<td>University/College</td>
<td>Married</td>
<td>Retired</td>
<td>Homeowner</td>
<td>Spouse</td>
<td>Good</td>
<td>994</td>
</tr>
<tr>
<td>Nancy</td>
<td>82</td>
<td>Female</td>
<td>Up to Grade 12</td>
<td>Widow</td>
<td>Semi-retired</td>
<td>Homeowner</td>
<td>Alone</td>
<td>Not good</td>
<td>643</td>
</tr>
<tr>
<td>Betty</td>
<td>74</td>
<td>Female</td>
<td>University/College</td>
<td>Married</td>
<td>Retired</td>
<td>Homeowner</td>
<td>Spouse</td>
<td>Quite good</td>
<td>91</td>
</tr>
<tr>
<td>Judith</td>
<td>80</td>
<td>Female</td>
<td>University/College</td>
<td>Single</td>
<td>Part-time</td>
<td>Renter</td>
<td>Alone</td>
<td>Okay</td>
<td>994</td>
</tr>
</tbody>
</table>

In terms of geographical location, ten participants were recruited from eight different communities throughout the province of Saskatchewan. Two participants resided in towns with populations between 2400 to 2700 people. One participant resided in a town of just under 2000 people, whereas the remaining participants were located in towns with populations of under 1000 people. The smallest populated community was just under 100 people with the other participants coming from towns and villages between 300 to 650 people.

Using the IPA method of data analysis, levels of coding led to four superordinate themes: They took our activities away, I’ve kind of backed off everything; I’m tired of the pandemic; and Feeling like we are sort of forgot about. Each theme contained subordinate themes which provided deeper understanding of participants’ experience with the phenomena.
4.8.1 They took our activities away

Participants were asked to describe their experience with physical activity before and during the pandemic. Most spoke positively about the health benefits of physical activity and about the types of activities they were involved in as well as how that changed during the pandemic. Within this theme, three subordinate themes emerged: I try to do a variety of things; Might give me a few more years; and We’ve been pretty restricted. Participants recognized the role of physical activity in maintaining their health and mobility. This is especially important among rural adults who often place value on their independence which enables them to age in place in their rural community for as long as possible. Participants noted the various opportunities for physical activity that they engaged in prior to the pandemic; however, when asked about the impact of the pandemic on their physical activity, they reflected a deep sense of loss in terms of programs ending and facilities temporarily forced to close. Many described their experience during the pandemic as “restricted” and “curtailed”.

4.8.1.1 I try to do a variety of things. Prior to the pandemic, participants engaged in exercise programs and activities such as walking, dancing, golfing or playing pickle ball, most of which was done with other people. There were a range of activities and programs offered in most of the rural communities that participant’s resided in. Many spoke fondly of the physical and recreational activities they were involved in and enjoyed doing before the pandemic. For example, Linda (female, age 74) lived in a town of just under 500 people. She noted, “I walk quite a bit and do yoga”. Betty (female, age 74) who lived in the smallest community of 91 residents, stated, “I used to walk two miles and now I walk one mile, or when it’s windy, I don't do it”. With restrictions on social
gatherings and the closure of facilities, among those who were still engaging in physical activity, walking in the community was an activity that many participants had maintained.

Even though walking is a common physical activity reported among rural participants, some participants still felt there was not a lot of opportunity available to them in their rural community, even prior to the pandemic restrictions and closures. For example, Patricia (female, age 79), who lived in a town of approximately 650 people, stated, “We don't have a whole lot going on here, definitely for seniors”, even though the community had paved streets, recreation facilities, and numerous organizations, clubs and festivals. In further prompting Patricia on her experience with the lack of physical activity opportunities, she revealed that she had fallen on the ice in the recent past, which left her feeling fearful of engaging in outdoor activity, particularly in the winter. She said after falling, “you get scared then to go”.

Not all participants in the study related to the broader definition of physical activity. This is commonly reported among rural residents who often relate physical activity to work or productive activities versus leisure pursuits. This is demonstrated by Vincent, the youngest participant in the study (male, age 67), who shared that cutting grass and snow removal was considered work to him, rather than physical activity. He stated, “I don’t classify that as physical activity, even though it is physical”.

4.8.1.2 Might give me a few more years. Prior to COVID-19, older adults in this study had a variety of reasons for participating in physical activity. All participants spoke about personal health benefits they received through participating in various forms of physical activity such as to “strengthen”, to “feel better”, or to “have good balance”.
Engaging in physical activity meant that participants were able to maintain mobility, flexibility and improving mood and emotional well-being. The desire for maintaining mobility and independence is commonly reported among rural residents. Physical activity is a key factor in helping older adults perform daily activities such as housekeeping and chores, which help maintain independence. Patricia (female, age 79) shared:

When you're working out in your yard, you find if you get down on your hands and knees, it's a lot harder to get up. But if you're doing some sort of physical activity, and that's basically what most of us have found is, we're a lot more able to do that.

Betty (female, age 74), who was recently diagnosed with some health issues, stated that by exercising, “my muscles and my arthritis don’t get tightened up”, noting the important role that being active had for maintaining her health. Vincent (male, age 67), who had a heart condition, added, “My doctor says what I do, being physically active and strong and all that really helps. Might give me a few more years”.

In addition to physical health benefits, Carol (female, age 77) noted the mental health benefits of physical activity by stating, “I feel that walking outside is an emotional health benefit. It just brings a feeling of, I don't know, restful peace to be out in nature in the sky and do all that stuff”. A similar view was shared by Patricia (female, age 79) who added that, “Mentally, it just helps you to look at things a little bit differently”. Her town of just under 650 people was situated in a scenic community, located over 160 km away from an urban centre.

4.8.1.3 We’ve been pretty restricted. Among participants, COVID-19 restrictions had a negative impact on their experience of physical activity. Restrictions placed on physical activities meant that many things that were deemed important to them had to stop. Some described their experience in terms of “ceased” and “curtailed”. Mary
(female, age 81), who was once very involved in a local, peer-led fitness program stated, “Where we do our exercise, we can’t, we can’t go into the building”. She went on to say, “As far as activities are concerned, I mean we can’t, we don’t play cards anymore and we don’t exercise anymore”. Many participants were often engaged in various activities and organizations within their community, but COVID-19 interrupted the ability to be as involved as they once were. For Mary, restrictions placed on her physical activity meant that “life was different” now. Most participants recognized the restrictions were in place to keep them safe, as older adults were considered a vulnerable population at higher risk for serious COVID-related illness. A similar experience was shared by Betty (female, age 74), a participant from the smallest community in the study. She walked regularly with family members before COVID-19. Betty said, “I would prefer to do it with somebody but nobody’s around”, highlighting the awareness of feeling alone during the pandemic. These restrictions on activity added to the existing disadvantage of living in a rural context.

4.8.2 I’ve kind of backed off everything

This theme reflects participants’ experience with social interaction during the pandemic. When asked to describe their experience with social interaction before and during the pandemic, many participants spoke positively about the social aspects of their lives in their rural community prior to COVID-19 and the many benefits they received in being engaged with other people in their community. This is very common among rural residents who often place high value on connecting with others in the community. This is reflected in the first of two subordinate themes of chuckles, laughter, and mostly catching up. Participants recognized the support and companionship that social opportunities
provided prior to the pandemic. When asked to describe their experience during pandemic, many participants expressed a deep sense of loss, fear, and recluse in being separated from others. This was reflected in the second subordinate theme of: *I used to be quite social.* Here, participants expressed feelings of fear and sadness as they physically isolated themselves from other people to be safe from COVID-19. This experience brought forward feeling “afraid” and needing to be “careful”.

**4.8.2.1 Chuckles, laughter and mostly catching up.** Prior to the pandemic, participants spoke about the role and importance of social interaction in their lives. Interacting with others in rural communities is a way to connect with others and make activities more enjoyable. For Carol (female, age 77), the benefits of social interaction were bountiful. She said, “The benefit is just being able to meet with people, to change to share bits of our lives, to socialize and share coffee”. Nancy (female, age 82) added, “The togetherness…was certainly just as beneficial to us health-wise”. When prompted to explain further what value the social interaction had, Barbara (female, age 77) identified, “it’s just a sociability of meeting with other people, I guess. It gives you something to do. The ladies gather and we have coffee every afternoon”. This was something she looked forward to every day.

Many participants noted the inter-related aspects between social interaction and physical activity. For example, participants related social interaction as a facilitating factor for participating in physical activities. For example, Barbara (female, age 77) explained that she had numerous health and mobility issues. Even though physical activities were difficult for her, having the social interaction with others provided her with more motivation to engage in physical activity. She stated, “I think it’s better with
other people. You’re more motivated to do it”. A similar experience was expressed by
Clifford (male, age 68), who used physical activity as an opportunity to meet with other
people. He stated, “I like to do things to meet other new people. It’s a good way to keep
connected”. Being involved in physical activities with others gave him that opportunity.

4.8.2.2 I used to be quite social. Since COVID-19 restrictions were placed on
physical gathering, reducing the opportunity for social interaction, life became different
for many participants. This is particularly impactful in rural communities. Those who
were once very active and engaged with others, found themselves feeling alone and
disengaged. Feelings of loss were evident among many participants in the study. Linda
(female, age 74), who was once very engaged in community activities prior to the
pandemic, reminisced that she “used to be quite social”. Losses were also expressed by
Betty (female, age 74) who stated, “Every once in a while, you realize that you long to be
with your kids or to talk to somebody else in person”. Rural residents are noted for the
supportive environment they create within their communities. COVID-19 has challenged
rural resident’s ability to connect with others and to the community. Clifford (male, age
68) expanded the loss to the community, particularly in relation to supporting others
during funerals or wakes. He stated, “Communities feel like they can't provide as much
support as they usually do”. This was important for him as often in rural communities, he
stated that these were times when the community would gather together to support one
another. Betty described the feeling of loss as follows:

I don’t know, to me, I don't feel lonely because I mean, I have a husband here and
I can FaceTime my kids and stuff. But you still miss the human interaction. That's
by far the most significant thing for me. It's a fatigue, the weariness of not being
able to do what you love to do; and what I love is to be with other people all the
time. I sure do miss being with people...
4.8.3 *I'm tired of the pandemic*

This theme captured the changes and disruptions to participant’s daily lives which many described as “difficult” and “stressful”, citing feelings of “fatigue”, “longing”, and “weariness”, but also uncovered a resilience and ability to adjust and re-focus as they paused for the pandemic. This resilience was reflected in two subordinate themes: *I don’t need somebody to do it with* and *I’m good with things*.

As restrictions were implemented during the pandemic, most participant’s identified their struggle to adapt to the changes. Carol (female, age 77) shared that she felt living through the pandemic was “emotionally draining”. Betty (female, age 74) referred to feeling fatigue which she described as “weariness” stating, “I’m tired of it”. Nancy (female, age 82) spoke of a similar feeling of pandemic fatigue as she indicated, “COVID has certainly affected everything…I don’t go out, even in the community anymore because of COVID”.

4.8.3.1 *I don’t need somebody to do it with*. Although many participants initially struggled to adapt to the changes to their daily routine, when prompted to speak further about this experience, many demonstrated perseverance as they were accepting of the situation and made the best out of that, which was out of their control. This reflected the resilience that many rural people possess, in addition to the independent, resilient nature of many rural residents.

The independent nature of rural residents was evident even before the pandemic, where some quite simply preferred to do things on their own. Carol (female, age 77) spoke about her preference for walking on her own rather than with others. She stated, “I actually prefer going walking by myself”. She was very socially involved in the
community prior to the pandemic, describing herself as “too busy” to do organized exercise programs with others. She indicated, “Being alone by myself doesn't bother me that much”. Carol was also in a position to connect socially to others through technology such as using Zoom and Facebook, therefore, she was able to maintain some level of social interaction that she was accustomed to. A similar experience was conveyed by Mary (female, age 81) who stated, “I’m actually enjoying not having to go out to a lot of different things. I enjoy my space. I get more time to read my books and watch my programs on TV”. She further explained, “I don’t feel restricted”. She said, “It doesn’t matter so much because, I mean, I am quite happy with myself just doing things, yeah. I don’t need somebody to do it with”. Linda (female, age 74) explained:

I don't like walking with other people because, I don't know, it just ruins the peace and quiet that I like. And so often, if you want to walk with someone, it has to be at a certain time of the day or whatever. So yeah, I'm not good socially that way

For some participants, the physical distancing restrictions provided an advantage of having more time for solitary activities with less responsibility and commitment to other people. This was further reflected in the second subordinate theme: I’m good with things.

**4.8.3.2 I’m good with things.** Even though some participants spoke in detail of the hardships of living through the pandemic restrictions, many others were able to persevere and cope well within the given constraints. The resilient nature of participants, in the way they accepted things that were out of their control and made the best of their situation, was reflected in this subordinate theme. Judith (female, age 80) shared her attitude of acceptance of the situation by stating, “The key is to readjust”, “go on with
life”, and “work it out”. She stated, “You just adapt your living. So, how are you going to live and what are you going to do and you get on with it”.

Carol (female, age 77) added, “I don’t find it onerous. You know, it’s a bit of a nuisance but I mean, it's fine. I'm willing to follow the regulations. It doesn't bother us”. She added that she has learned some new things during the pandemic, such as Zoom and Facebook. She said, “What COVID did was, it forced me to do some of those things”. It appeared that some participants were able to shift their situation to focus on the positive aspects of the pandemic with relatively little impact, demonstrating a perseverance common among rural people.

4.8.4 Feeling like we are sort of forgot about

This theme reflected on questions pertaining to the participants’ experience living in a rural community before and during the pandemic. Although some participants felt forgotten about, for others, living in a rural community provided them with a sense of security and protection from the outbreaks of COVID-19 that were occurring in other areas of the province. This was reflected through two subordinate themes of: *Everything is for the cities and nothing for the country* and *We have deep roots here*.

4.8.4.1 Everything is for the cities and nothing for the country. Some participant’s spoke about living in a rural community prior to the pandemic in terms of already feeling “displaced” and “isolated”. This experience was compounded during the pandemic. An example was shared by Nancy (female, age 82), who was forced to drive into the city for a medical emergency during the pandemic. She stated, “They shut our hospital here so we don't have outpatient service or we don't have a doctor; that is the big problem here”. The small population base in rural Saskatchewan further compounds the
limited availability of services. Similar remarks came from Carol (female, age 77) who spoke of the loss of the public transportation service in her community that was recently discontinued. She indicated:

We used to have a bus that went to the city every two weeks, but now they don't go anymore and so, we're missing the bus service. And now we don't have that. They took that away from us. Everything is for the cities and nothing for the country.

Nancy (female, age 74) also spoke strongly about the government cutbacks that had forced the closure of many rural services. She stated, “They're always trying to save money from here and put it somewhere else”. In doing so, rural infrastructure was aging and there were limited financial incentives to update it. Aging infrastructure was a concern for some participants in rural communities who often preferred the outdoors for their physical activity. This concern was mentioned by Vincent (male, age 67), who often engaged in outdoor walking and biking. He stated, “This particular town has gravel streets. I find that a disadvantage; but on the other hand, I know that's never going to change because to redo the underground work and pave the streets was just way too expensive”. For many participants, maintaining the infrastructure and standard of living in their community was very important, yet, with the lack of funding from the government, some felt that they were forgotten about in their communities. Even with existing programs and services still in place prior to the pandemic, Clifford (male, age 68) noted, “The challenge sometimes is being able to make it sustainable”.

Further, in terms of the personnel needed to sustain existing programs and services, the volunteer sector was a very important aspect within rural communities. Vincent said, there are “way more opportunities than there are people that are willing to participate”. Linda (female, age 74) added to this viewpoint by stating:
I think as long as the people in rural communities will support the stores that we have in these places, we’ll be okay, but there certainly is, on I would say, on government's part, there's not a lot of push to, you know, keep rural Saskatchewan open compared to the city. I just get that feeling.

For others, the lack of recreational opportunities were more prevalent in their rural community. Patricia (female, age 79) said, “We live in a small community that there isn't a lot for people to do”. Nancy (female, age 82), who lived in the same community as Patricia, expressed a strong perception that she felt “sort of forgot about”; yet, for others like Barbara (female, age 77), the impact was less. She said, “I’ve always lived in rural, so I don’t know what to compare it to. I guess I’m happy with it. That’s what we chose”.

**4.8.4.2 We have deep roots here.** For many of the participants, the advantages of living in a rural community, even during the pandemic, far outweighed the aforementioned disadvantages. Living in a rural setting had a protective factor in that it distanced many of the participants from the high number of COVID cases reported in the urban centres and provided a safe, serene environment to live in. This was reflected among many participants who described their community as “safe” and “calm”. Feeling safe in the community was a common sentiment and held different meanings among participants. For some, being safe in their community meant they had a sense of personal security; whereas for others, they felt sheltered from some of the effects of the pandemic going on around them. Safety also meant participants like Clifford (male, age 68) were able to maintain some level of physical activity during the pandemic. He explained, “We're very free relative to others because we can go outside, go for a walk or swim…without being in contact with other people”, which is more difficult in an urban centre with a larger population living in closer proximity. Vincent (male, age 67) added,
“When I’d go for a daily walk and I’d see other people and we’d just stay 6 feet apart and that part I’d say, I think felt odd, but it wasn’t hard to do”.

Further, with an acknowledgement of the low number of active COVID-19 cases in their community, participants felt sheltered from some of the fear of contracting the COVID-19 virus. This was reflected by Linda (female, age 79) and Patricia (female, age 79) respectively who said, “To my knowledge, there are no cases here at all” and “We're very fortunate here. I don't think we have any cases”. Linda summed it up by stating, “As far as having COVID anxiety…I really was saved from that”. Carol (female, age 77) indicated, “I did not feel that we were limited in any way by it”. The protective factors of the rural environment had beneficial effects among many of the participants during the COVID-19 pandemic.

Participants also expressed a general sense of trust among others in their rural setting prior to the pandemic and throughout. Carol (female, age 77) stated, “We have a trust in our community”. When asked what that meant to her, Carol added that it made her feel more comfortable and protected during the pandemic in that she knew most people in the community. Patricia (female, age 79), indicated, “Anywhere you go, you're always stopping and talking to somebody in your community”. This connection to others was also important to Betty (female, age 74) who noted, “Neighbors that you know well have always been there”. When further prompted to explain the meaning of being known in the community, Betty stated, “Most of them would stand up for you, or you know, be there when you need them”. This sense of belonging or kinship in the community was also important to Judith (female, age 80) who conveyed her regard for what she referred to as, “the closeness of neighbors and the goodness of neighbors”, particularly as she
lived alone with no family close-by. The broader community was like family for her. Although living in a rural community had disadvantages of limited services and aging populations, there were numerous protective factors that had participants feeling more safe and content in their community compared to urban settings.

In conclusion, since COVID-19 restrictions were imposed, participants in this study described their experience of how their lives have been impacted. Even though health benefits of being physically active were acknowledged, some participants reduced or stopped engaging in physical activity altogether during the pandemic. Engaging in physical activity was viewed as a way that participants could interact at a social level with each other. COVID-19 restricted this interaction and further limited the opportunities for many participants, leaving many socially and physically distanced.

Despite feeling tired of the pandemic and the restrictions imposed on them, many participants expressed resilience and perseverance throughout the pandemic, helping them cope with a different way of life. Resilience, in the rural context, was described in terms of the ability to adapt and make the best of the situation around them. With high regard for independence, many participants were able to shift their focus away from the losses and restrictions experienced through the pandemic, toward taking advantage of new opportunities and experiences that enabled them to connect in new ways to the community and each other. For some participants, the pandemic provided a reason to engage more in solitary forms of physical activity such as walking or exercising alone with some preferring this over being active with other people. Within their rural communities, participants spoke about the impact of the closure of local businesses and
programs; yet, certain aspects of rural living were experienced as a protective force such as the supportive and safe atmosphere.

### 4.9 Discussion

The purpose of this study was to explore the experience of physical activity and social interaction among rural older adults in Saskatchewan during the COVID-19 pandemic. After data analysis, four themes (“They took our activities away”, “I’ve kind of backed off everything”, “I’m tired of the pandemic”, and “Feeling like we are sort of forgot about”) emerged.

Although many aspects of our study results aligned with current research, there were three distinct findings that emerged which provide an added contribution to the existing literature. First, at a personal level, COVID-19 impact on physical activity and social interaction led many participants to experience feelings of loneliness, especially among those who lived alone; however, what was particularly insightful was among participants who lived with a spouse, a similar experience of loneliness was also expressed. Feelings of loneliness among participants who lived alone, align with findings from Son et al. (2021), who examined physical activity and social well-being during COVID-19 among older adults. They found that older adults who lived alone were at greatest risk for loneliness and depression during the pandemic due to recreational opportunities being limited and stay at home orders in place. Lebrasseur et al. (2021) reported that decreased social interaction during the COVID-19 pandemic resulted in reduced quality of life, increased depression and reduced physical activity among older adults. Krendl and Perry (2021) found that older adults reported higher rates of depression and loneliness during the COVID-19 pandemic. According to Fingerman et al.
in-person contact with others had health benefits that were not available through telephone contact. According to Carver et al. (2018) successful aging is influenced by the opportunity for older adults’ to participate in social interactions with others. Social participation was positively associated with physical and mental health benefits among older adults which involved a reciprocal relationship of being with others and having an attachment to the community. A key finding from Carver et al. concluded that human infrastructure is what is required for successful aging. As such, enhancing social interaction opportunities is a valuable asset in maintaining health and wellness among older adults in rural communities (Douglas et al., 2017). Our results went further to uncovered that, even among those participants who lived with a partner, the loneliness experienced during the pandemic was also evident. This calls for further supports to make social interaction accessible and available outside the immediate household for all older adults, not to assume that living with a partner provides the necessary social interaction needed to avert feelings of loneliness.

Another distinct finding that emerged in our study was that some participants who were very physically and socially active prior to the pandemic, welcomed and appreciated a break from the responsibilities and activities that consumed much of their pre-pandemic days. Participants often noted the disadvantages they were experiencing in their rural community, but some were able to adjust and make the best of the situation, as demonstrated in the ability to adapt their activities and find new things to do, even if it meant solitary activity. Although the preference for some older adults to engage in solitary physical activity versus social or group-based activity was uncovered by Schmidt et al. (2021) in a pre-pandemic scoping review of physical activity and social interaction,
the welcomed preference for solitary activity contradicts findings by Lam and Garcia-Roman (2020) who analyzed solitary activities among older adults using data from the American Time Use Survey, 2012-2013. They found that those who engaged in more solitary activities also reported lower levels of life satisfaction, particularly among those who lived alone and were more isolated from others. Further, in a scoping review of the literature on physical activity in rural and remote communities, Pelletier et al. (2020) found that positive aspects of rural life, including social cohesion and willingness to share resources, are contributing factors to physical activity participation. This is further supported by Meisner et al. (2019) who stated that among rural older adults, physical activity programs should strive to promote physical and mental health, in addition to social participation and meaningful connection. Finding what older adults prefer in terms of individual versus group-based physical activity opportunities may help target specific interventions to support increased physical activity engagement.

Finally, having a deep rooted connection and feeling of belonging to the community resulted in a sense of safety and protection from some of the effects of the pandemic and restrictions among participants. In terms of the rural environment, despite the common barriers that many rural residents experience, a strong perception of protection from the effects of the COVID-19 pandemic was expressed. This may be a result of being geographically distanced from urban centres where many major COVID-19 outbreaks were occurring. Other protective factors in rural communities that emerged were the smaller population and close-knit communities where participants were well-known and felt cared for by others. This may contribute to the resilient nature of participants to adapt to the changing way of life during the pandemic. This aligns with
research by Zhang et al. (2021), who revealed that anxiety and depression among urban residents was more severe than among rural residents during the pandemic. Kirzinger et al. (2021) also found that rural residents perceived COVID-19 as less of a threat than urban residents. Wu et al. (2020) reported that rural older adults coped differently during the pandemic based on rurality and size of the rural community they lived in. Pérès et al. (2021) added that health status, loneliness and access to technology, as well as where people lived, also had an impact on health during the pandemic. Fearnbach et al. (2021) noted that social and demographic factors such as living alone and having low income were related to decreases in physical activity levels. Similar decline in physical activity was reported by Wang et al. (2021), particularly among rural females, where the number of minutes of physical activity per week reduced from 139 minutes to 120 minutes, seven months into the pandemic.

Placing more focus on the community resources needed for healthy aging may assist older adults in rural communities to continue engaging in physical and social activities which promote and support health throughout the lifespan, during the pandemic and into the future.

4.10 Summary and Implications

Results of the qualitative study demonstrate intersecting relationships among individual, social and environmental factors associated with physical activity and social interaction among older adults in rural Saskatchewan. Findings highlight some important considerations when promoting and supporting physical activity and social interaction opportunities among rural older adults. Although rural communities have some disadvantages in terms of socio-economic inequities, they also provide a protective and
supportive environment where older adults are able to safely engage in a variety of recreational activities and social opportunities, connecting them to the community and creating a sense of purpose and meaning. Rural residents are resilient. Many are able to adapt to the changing environment around them; however, it is necessary to create social interaction opportunities in the community when examining interventions to counter loneliness and isolation among older adults. The research findings uncovered that not all older adults preferred continued engagement in physical and socially activity, and for some, the COVID-19 restrictions provided a break in the demands of engaging in ongoing activities. Despite the barriers, many participants persevered in finding other ways of living through the pandemic. Emphasis is often placed on interventions to increase physical activities among older adults; therefore understanding the specific needs and desires of rural older adults is necessary to effectively support independence, health, and well-being throughout the lifespan.

4.11 Strengths and limitations

The purpose of this study was to gain a better understanding of rural older adult’s experiences throughout Saskatchewan within the context in which they were living. Each geographical area had an influence on the experiences and opportunities available. As such, experiences of those who lived in rural communities in close proximity to urban centres were captured, alongside those who lived in small or more remote locations further distanced from urban centres and amenities. Further, rural-based research focusing on the older adult population, impacted most by the pandemic, is of crucial importance as COVID-19 remains prominent across the province (Government of Canada, 2021); therefore, this study was timely and relevant to the current COVID-19
Pandemic situation in raising awareness and gaining a better understanding of the experiences of the impact of COVID-19 on rural older adults physical and social interaction.

This study was not without some limitations. There was a homogenous sample of participants recruited. Many had high levels of education, most were white, with above average income, and most were healthy and independent, with good social connections within their community. These determinants all influence the experience of physical activity and social interaction opportunities available to them. Themes may be different among minority populations and among those from various socio-economic backgrounds. The purposeful sampling strategy may better reflect those who are well connected socially and more physically active, excluding those who may be more isolated and sedentary.

In exploring the experiences of rural older adults during the COVID-19 pandemic, it is important to acknowledge that interviews occurred during the first and second wave of COVID-19 where, for many participants, rates of transmission were relatively low. Further, the COVID-19 pandemic continues to evolve, with new variants of concern impacting communities throughout the province. As a result, with greater transmission and infection rates, increased time spent living through the pandemic, and availability and uptake of vaccinations, experiences of older adults in rural communities may be portrayed differently.

4.12 Future Research

With COVID-19 restrictions placed on physical and social interaction, more research into alternate ways of connecting to others is needed. For many older adults in
our study, various forms of technology such as Facebook and Zoom were readily available and accessible to them, resulting in their ability to connect to others in a different way through the pandemic; however, this opportunity is not equally distributed among all geographical areas of the province, particularly in rural and remote communities. Many barriers exist for technology use among older adults that need to be considered such as, lack of knowledge among users and lack of technical supports, limited access to hardware and internet connection, as well as on-going cost of connecting. This highlights the need for individualized and localized approaches to supporting physical activity and social interaction needs of rural adults.

There is also a need for creative approaches to socially engage older adults, particularly during COVID-19. As such, consideration needs to be given to developing safe and accessible spaces where older adults can physically and socially engage with others in the community. Focusing on the rural outdoors where possible, may further support continued physical and social interaction in a safe manner during the pandemic to foster continued engagement in the community.
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Chapter 5 - Conclusion

5.1 Introduction

The purpose of this dissertation was to explore the relationship between physical activity and social interaction among rural older adults and to explore the experiences of physical activity and social interaction among rural older adults in Saskatchewan during the COVID-19 pandemic. Chapter one provided an overview of the dissertation where the research purpose and questions were established, followed by a summary of relevant literature. Chapter two detailed the methods chosen to address the research objectives and answer the research questions. An overview of the data collection and analysis procedures were also provided. Chapters three and four, written as two separate, but inter-related journal manuscripts, addressed the research purpose in the following manner: Chapter three consisted of a thorough examination of current literature on physical activity and social interaction among rural older adults in a scoping review format. The published manuscript was provided. Key findings indicated that many older adults recognized the importance of physical activity and social interaction on health and independence; however, some older adults expressed negative associations where, they preferred to be physically active alone rather than with others. The physical and social environment also had an influence on opportunities available to older adults in terms of physical activity engagement and social interaction with others, where mainly a lack of transportation and fear of falling, due in part to aging infrastructure and climate, were highlighted.

Building on the results of the scoping review, chapter four consisted of an exploration of the experiences of physical activity and social interaction among rural
older adults in Saskatchewan during the COVID-19 pandemic. The manuscript under revision for publication was provided. Findings of this study brought forward some challenges that rural older adults faced during the pandemic in accessing physical activity and social opportunities. Similar negative experiences were uncovered in terms of limited access to specialized programs and services as well as lack of transportation. However, for many participants in the study, living in a rural community had a protective and safety factor during the pandemic. Additionally, some older adults found the break in physical and social activities they were involved in prior to the pandemic to be a welcomed change to their daily pace. For others, loneliness was expressed even when living with another person, highlighting the importance of the community to many participants as a means of social interaction with other people. This chapter concluded with a reflection on the implications of the research findings and a discussion of recommendations for further research.

5.2 Implications and Future Research

This dissertation generated valuable insight in understanding physical activity and social interaction among older adults in a rural context. Findings support the use of the social ecological model in exploring what is known about these concepts and to understand the experiences of participants across individual, social and environmental factors, particularly during the COVID-19 pandemic, where it has been demonstrated that many aspects are inter-related.

Physical activity is known to be an effective health-promoting behaviour and immune system booster; yet, since the COVID-19 pandemic began, rates of activity among older adults, who are considered vulnerable to adverse outcomes associated with
COVID-19, have declined (Jiménez-Pavón et al., 2020; Tison et al., 2020). Since the beginning of the pandemic, approximately 30% of older adults living in rural areas have experienced a decrease in physical activity (Schmidt & Pawlowski, 2021). As the physical and social environment have an impact on the health behaviours of the individual, including physical activity, it is important to consider each level individually and collectively to explore the influence they have on the individual.

At an individual level, it was evident in the findings of the dissertation that older adults who engaged in physical activity were aware of and acknowledged positive health benefits of being active; however, some older adults expressed differing views on the purpose and meaning of physical activity in their lives, stating that engaging in physical activity without purpose was unnecessary. It may be useful for organizations and healthcare agencies to adjust the message they share to associate physical activity with purposeful behaviour, such as doing chores, running errands, or maintaining flexibility and balance, to retain independent living in the community for as long as possible. A critical component of effective messaging is to understand what purposeful physical activity means to rural older adults. This could be accomplished through consultations between older adults, community organizations, and leaders where further research exploring initiatives and messaging that encourage the engagement in continuous physical activity for health.

Although older adults in the study recognized the value of engaging in physical activity, many acknowledged that the social interaction while participating in a physical activity program was equally beneficial. As such, programs and interventions combining a physical and social component may foster further participation and perhaps engage
those less active to participate more. Understanding the specific facilitators and barriers of physical activity participation among rural older adults may be beneficial to increase rates of activity and engage those less active. This could be explored further in community-led research and focus groups where communities come together to explore their experiences and share ideas with policy-makers and community organizations to support physical activity opportunities and help to resolve existing barriers in the community.

The COVID-19 pandemic has created a context where group-based activities are not permitted, resulting in abrupt changes to the daily activities of many older adults. As such, participation rates in physical activities have declined. Fearnbach et al. (2021) noted that social and demographic factors such as living alone and having low income were related to decreases in physical activity levels. A similar decline in physical activity was reported by Wang et al. (2021), particularly among rural females. The number of minutes of physical activity per week reduced from 139 minutes to 120 minutes, seven months into the pandemic. Even though the pandemic has created a situational barrier for many to continue to engage in activities, it could also be considered an opportunity to explore further what older adults need to remain physically active.

It is also noteworthy to mention that in both studies, it was found that not all older adults preferred to be physically active in groups or with other people. Jiménez-Pavón et al. (2020) promotes the importance of home-based exercise programs designed specifically for older adults. Of relevance to those who prefer solitary over group-based activity, a home-based physical activity program, along with access to individual supports intended to promote solitary forms of activity such as gardening or yard
maintenance, may encourage this population to experience benefits of engaging in physical activity to support healthy aging.

At a social level, healthy aging is influenced by the opportunity for older adults to participate in social interactions with others (Carver et al., 2018). Social interactions are associated with physical and mental health benefits among older adults. As such, enhancing social interaction opportunities is a valuable asset in maintaining health and wellness, particularly among older adults in rural communities (Douglas et al., 2017).

Findings from both studies suggested that physical activity and social interaction generally shared a reciprocal relationship in supporting positive health outcomes among older adults. This finding aligns with the inter-related levels of the social ecological model. For example, according to Massie et al. (2021), physical activity programs that encouraged social connections within the community and the sense of community belonging may be more effective in increasing physical activity levels among older adults. Shores et al. (2009) noted that social support was key in physical activity engagement among rural older adults. Having a supportive partner was also an important factor in achieving moderate-to-vigorous physical activity, according to Soto et al. (2019). Hoogland et al. (2019) concluded that older adults benefit from engaging in physical activity and health-promoting behaviour with younger relatives as a means of social connectedness and mutual health benefits. Therefore, engaging the community in physical and social activities may be beneficial to improve health outcomes.

Intergenerational initiatives such as school and senior visiting programs and activities such as active gaming may further support physical and social health. Research collaborations involving healthcare leaders, community and educational administrators,
in consultation with older adults and youth in the community, would be beneficial in developing targeted initiatives to combat physical inactivity and social isolation or loneliness. For example, Hebblethwaite (2014) studied the experiences of family leisure among intergenerational rural families and found that family-based leisure activities played an important role in developing close social bonds.

The second study uncovered that the COVID-19 pandemic had placed barriers on many traditional social interaction forms through public health restrictions on social gatherings. The impact of reduced social interaction has harmed rural populations related to overall life satisfaction and mental health, according to Mueller et al. (2021). Lebrasseur et al. (2021) reported that decreased social interaction during the COVID-19 pandemic resulted in reduced quality of life, increased depression and reduced physical activity among older adults. Krendl and Perry (2021) found that older adults reported higher rates of depression and loneliness during the COVID-19 pandemic.

Creative solutions are needed to promote and support continued social interaction among older adults during the pandemic, particularly in rural communities. Berg-Weger and Morley (2020) reported that the pandemic had placed increased attention on the importance of social interaction for all ages. To mitigate the reduced social contact during the pandemic, Berg-Weger and Morley suggested that daily telephone calls and virtual visits effectively replace traditional strategies for socially engaging older adults. Walker et al. (2021) suggested that among rural older adults, particularly those age 85 and older where infrastructure is limited, a telephone call appeared to be the most effective means of communication during COVID-19. Fingerman et al. (2021), contrasted that in-person contact with others had health benefits that were not available through telephone contact.
Noone et al. (2020) studied the effectiveness of video calls to reduce loneliness among older adults during the pandemic. They reported the effectiveness of using video calls to reduce loneliness among older adults was uncertain.

Research findings have supported the use of technology to mitigate the pandemic restrictions of social distancing in an effort to keep older adults socially connected (Hajek & König, 2020; Xie et al., 2020). Many participants in study two were able to access and use various forms of technology to remain connected; however, this may not be applicable in all rural communities. According to Padala et al. (2020), older adults in rural areas report less capability and willingness to participate in video telehealth visits. This, along with limited access to technology including hardware and internet connection issues in rural communities, add an additional barrier. This is further supported by Henning-Smith et al. (2020), who reported that older adults use technology at lower rates than younger people and often lack access to quality internet and computer-based devices. O’Connell et al. (2021) added that older adults express fear of using technology which influences their opportunity for social engagement. With many organizations and services shifting to online forms of delivery, this may pose a serious barrier for rural older adults to socially connect to others during the pandemic.

Some solutions have been suggested to help foster social interaction among older adults during the pandemic. Kim et al. (2021) developed and evaluated a social prescribing project which included telephone counselling and online distance learning for health education. Results showed a significant reduction in loneliness and depression and an increase in participants’ self-esteem. Kim et al. concluded that social prescribing could be useful among older adults in rural areas to maintain social connection. Further
research is needed to evaluate the effectiveness of social interventions among rural older adults. Additionally, an environmental scan of opportunities and challenges that rural communities face in terms of internet, technology and, access to equipment needs further investigating.

Gaining a better understanding of healthy aging in rural communities requires further exploration into interventions that support aging and create supportive physical and social environments, particularly in rural areas (WHO, 2011). In order to do so, it is essential to build collaborative partnerships between older adults and community decision-makers, healthcare professionals, policy-makers and municipal leaders to address barriers that influence healthy behaviors among community members. Physical activity and recreation provide opportunities for people of all ages to engage in healthy behaviour and connect socially with each other (CPRA, 2015). As such, recreational opportunities in rural communities need to be further evaluated for equity and accessibility. To do so, it is necessary to include community members in planning and evaluating resources. Gaining an understanding of the specific barriers and facilitators of physical activity and social opportunities that are experienced by older adults living in the community will help target policies and programs to support healthy behaviour.

Relevant to the physical and social environment, Shores et al. (2009) found that a safe environment that included access to parks and walking areas, facilitated physical activity. Elshahat et al. (2020) reported that access to recreation facilities resulted in increased physical activity and a perception of being safe from crime increased walking levels. This is further supported by Barnett et al. (2017) in that safe, walkable neighbourhoods increased older adult’s physical activity participation. Levasseur et al.
(2020) reported that living in close proximity to services and recreational facilities were important factors in performing daily physical activities and initiating social interactions with members of the community. Similar to findings from study one, in a recent scoping review of the literature on physical activity in rural and remote communities, Pelletier et al. (2020) found positive aspects of rural life, including social cohesion and willingness to share resources, are contributing factors to physical activity participation. This is further supported by Meisner et al. (2019), who stated that among rural older adults, physical activity programs should strive to promote physical and mental health, in addition to social participation and meaningful connection. Cramm and Nieboer (2013) noted that social cohesion and having a sense of belonging in the community were associated with a range of health outcomes among older adults. Deng and Paul (2018) reported on the patterns of intrapersonal, behavioral, and environmental correlates among older adults, indicating that the context in which physical activity occurs needs to be considered when promoting physical and mental health. Levasseur et al. (2020) added that personal and environmental factors need to be considered to promote social interaction among older adults.

Despite many barriers, during the COVID-19 pandemic, older adults in study two perceived fewer negative outcomes of the pandemic restrictions. This may be partly due to the rural environment that provided a level of protection due to the distance away from larger urban centres. Similar findings have been recently reported on the rural experience during the pandemic. For example, Wu et al. (2020) reported that rural older adults coped differently during the pandemic based on the rural community’s rurality and size. Compared to urban counterparts, rural older adults noted that access to nature and greater
social support contributed to positive perceptions during the pandemic. According to Pérès et al. (2021), factors such as individual health, perception of loneliness, and access to technology impacted health during the pandemic. Kirzinger et al. (2021) found that rural residents perceived COVID-19 as less of a threat than urban residents. Zhang et al. (2021) added that anxiety and depression among urban residents was more severe than among rural residents. These findings also align with Baltes and Baltes (1990) Selective Optimization with Compensation theory, in which older adults re-focused their attention to things they could do and minimized the restrictions and barriers that were placed on them during the pandemic. Further research is needed to explore the experiences of rural older adults in terms of proximity to urban centres to identify similarities and differences in perception of safety and connectedness to services and supports.

Although many rural communities are often at a disadvantage in terms of decreasing and aging population, limited funding for infrastructure, and challenges in accessible technology and transportation, rural living has notable advantages. Many of these advantages were brought forward in study two. These include opportunities to connect with the natural environment and having a strong sense of community belonging. Ensuring that communities are walkable and accessible for older adults may encourage more to engage in active transportation to conduct errands such as getting the mail and paying bills, adding meaningful activity into daily living. Further research is needed on initiatives such as creating safe, outdoor walking programs or peer-led exercise classes using the natural environment to engage older adults in physical activity. This would require working collaboratively across various sectors that would include municipal
leadership, health and social organizations, and community organizations that represent the residents.

This dissertation has demonstrated the complexity of inter-related factors that influence physical activity and social interaction among rural older adults, from an individual, social, and environmental level. To effectively address the health and well-being of older adults living in rural communities, all levels must be considered. The COVID-19 pandemic has changed the way people communicate and interact with each other and has opened opportunities for further examination of the rural older adult population’s physical and social health needs. It is an opportune time to work together in collaboration to identify and problem solve challenges experienced by older adults in rural communities in terms of physical activity and social interaction opportunities and enhance existing supports and services as the pandemic nears the end.

5.3 Limitations

Although this dissertation provides in-depth knowledge of rural older adults’ experiences with physical activity and social interaction, particularly during the COVID-19 pandemic, it has some limitations that need to be acknowledged. The scoping review conducted prior to the pandemic was limited in producing rural-specific results. Although this confirms a gap in rural research, the findings of the review may not fully reflect the rural experience. Further, as the COVID-19 pandemic entered Canada, many aspects of health have been impacted. This includes physical activity and social interaction. Rates of physical activity have further declined, and social interaction during the pandemic has changed, resulting in increased perception of loneliness and social isolation.
In exploring the experiences of rural older adults during the COVID-19 pandemic, it is important to acknowledge that interviews occurred during the first and second wave of COVID-19 where, for many participants, rates of transmission were relatively low. Further, the COVID-19 pandemic continues to evolve, with new variants of concern impacting communities throughout the province. With greater transmission and infection rates, increased time spent living through the pandemic, and availability and uptake of vaccinations, experiences that older adults in rural communities have may be portrayed differently as a result.

Additionally, although an effort was made to capture a variety of experiences among rural older adults living in communities throughout the entire province, the demographics of participants were quite similar. Most participants had a high level of education and most were already physically and socially active in their community. According to Johnson et al. (2021), the pandemic has not impacted everyone equally. It has been particularly impactful for vulnerable populations such as immigrant and refugee populations; through racism, discrimination, language barriers, separation from family and friends and weak social networks; therefore, it is important to ensure that a broad equity lens is used when exploring social interaction among all older adults to gain a full understanding of the impact of the pandemic on physical and social well-being.

5.4 Conclusion

Identifying what is known about physical activity and social interaction and understanding older adult’s experiences within their rural communities are critical to developing appropriate programs and targeted strategies to promote healthy aging in rural areas. The findings of this dissertation have demonstrated the awareness and importance
of physical activity and social interaction among rural older adults in maintaining and improving health as well as living independent in the community for as long as possible. Using a social-ecological model has produced valuable insight into the relationship between individual, social, and environment factors that influence health among rural older adults. There is much to be gained in focusing on the advantages of rural living, including the connection to the natural environment and the inter-relationship between physical activity and social interaction, and working collaboratively between rural community members and organizations to address the existing barriers in rural areas.
5.5 References


Appendix A

The Social Ecological Model

Appendix B

Research Ethics Certificate 2019-112

PRINCIPAL INVESTIGATOR
Laurie Schmidt

DEPARTMENT
Faculty of Kinesiology and Health Studies

REB# 2019-112

SUPERVISOR: Dr. Shanthi Johnson

TITLE
Social Interaction and Physical Activity among Rural Older Adults in Saskatchewan

APPROVED ON
October 31, 2019

RENEWAL DATE
October 31, 2020

APPROVAL OF
Application for Behavioural Research Ethics Review

Consent Form

Interview Guide

Full Board Meeting
Delegated Review

The University of Regina Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol, or related documents.

Any significant changes to your proposed method, procedures or related documents should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS
In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for the renewal and closure forms:
https://www.uregina.ca/research/for-faculty-staff/ethics-compliance/human/ethicsforms.html

Chris Street PhD
REB Chair
University of Regina

Please send all correspondence to:
Research Office
University of Regina
Research and Innovation Centre 109
Regina, SK S4S 0A2
Telephone: (306) 585-4475 Fax: (306) 585-4803
research.ethics@uregina.ca
PARTICIPANTS NEEDED FOR

RESEARCH IN SOCIAL INTERACTION AND PHYSICAL ACTIVITY IN RURAL SASKATCHEWAN

We are looking for volunteers to take part in a study of Social Interaction and Physical Activity among Older Adults in Rural Saskatchewan.

As a participant in this study, you would be asked to participate in an individual telephone interview.

Your participation would involve one phone session, approximately 60 minutes in duration.

For more information about this study, or to volunteer for this study, please contact:

Laurie Schmidt
Faculty of Kinesiology and Health Studies
at
306-861-0920 or
Email: schmid11@uregina.ca

Supervisor: Dr. Shanthi Johnson

This study has been reviewed and received approval through the Research Ethics Board (REB2019-112), University of Regina.
Appendix D
Participant Consent

Participant Consent Form

Project Title: Social Interaction and Physical Activity among Older Adults in Rural Saskatchewan

**Researcher:** LAURIE SCHMIDT, PhD (c),
Graduate Student,
Faculty of Graduate Studies and Research,
KINESIOLOGY & HEALTH STUDIES,
UNIVERSITY OF REGINA,
(306) 861-0920
Schmid1l@uregina.ca

**Supervisor:** DR. SHANTHI JOHNSON, PhD, RD, FDC, FACSM, FGSA
KINESIOLOGY & HEALTH STUDIES,
UNIVERSITY OF REGINA,
Professor and Dean,
School of Public Health,
University of Alberta,
(780) 492-9072
www.publichealth.ualberta.ca

**Purpose and Objective of the Research:**
- The purpose of the study is to explore social interaction and physical activity among rural older adults, 65 years and older.
- Using a pre-designed interview guide, rural older adults will be provided an opportunity to participate in a telephone interview to share their personal experience and viewpoint on the concepts of social interaction and physical activity within the pandemic context.
- The objective is to gain a better understanding of rural older adults’ perception and experience of social interaction and physical activity in their community.

**Procedures:**
- Data will be collected from participants through individual telephone interviews, transcribed and categorized into common themes.
• Exploring these concepts among rural dwelling older adults adds substantial value to rural-based research in Saskatchewan, targeting specific interventions that reflect the unique perceptions and experiences of rural older adults to support health and well-being throughout aging, particularly during the 2019-2020 pandemic.

• Findings will be used to complete a dissertation, written summary, manuscripts for publications and will be presented at conferences.

• Please feel free to ask any questions regarding the procedures and goals of the study or your role.

**Funded by:** This study has not received funding

**Potential Risks:**

• There are no known or anticipated risks by participating in this research.

• None of the interview questions should cause physical or emotional stress.

Information will be provided to participants on who to contact for mental health supports. Local mental health services intake number is (306) 842-8665 or call 811 for further information on mental health services in your area.

**Potential Benefits:**

• There are no direct benefits to participants in this study.

**Confidentiality:**

• Complete anonymity is not possible because my supervisor and I will know that you participated in this study. However, your name will not appear with any of your individual responses in any public reports, since they will be presented in aggregate form along with the information from other participants. Some of your statements might be very useful to illustrate a point, in which case your name will be replaced with a pseudonym.
• I can guarantee confidentiality of participant responses because only my supervisor and I, who will be analyzing the data together, will know whose data belongs to whom. The raw data from the audio-recorded interviews will be locked in a filing cabinet and the electronic copies will be password protected.

**Storage of Data:**
• All materials pertaining to these interviews (e.g., audio cassette tapes, paper copies of interview transcripts, and electronic transcript copies) will be stored in a locked filing cabinet at the researcher’s home office; all electronic copies will be password protected. All data collected through phone interviews will be destroyed no later than five years after the end of this project.

**Right to Withdraw:**
• Your participation is voluntary and you can answer only those questions that you are comfortable with. You may withdraw from the research project for any reason, at any time without explanation or penalty of any sort. Should you wish to withdraw, your data will be destroyed appropriately.

• Your right to withdraw data from the study will apply for 30 days after the completed interview. After this date, it is possible that some results have been analyzed, written up, or presented and it may not be possible to withdraw your data.

**Follow up:**
• To obtain results from the study, please contact the principal investigator, Laurie Schmidt at 306-861-0920 or email schmid1l@uregina.ca.

**Questions or Concerns:** Contact the researcher(s) using the information at the top of page 1;
This project has been approved on ethical grounds by the U of R Research Ethics Board on August 19, 2019. Any questions regarding your rights as a participant may be addressed to the committee at (306-585-4775 or research.ethics@uregina.ca). Participants may call collect.

**Consent**

Your verbal informed consent to participate indicates that you have heard and understand the description provided. You have had an opportunity to ask questions and have questions answered. You verbally consent to participate in this research project.

**VERBALLY RECEIVED**

<table>
<thead>
<tr>
<th>Name of Participant</th>
<th>Signature</th>
<th>Date</th>
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Researcher’s Signature ___________________________ Date ____________

I read and explained this Consent Form to the participant before receiving the participant’s consent, and the participant had knowledge of the contents and appeared to understand it.

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<tr>
<th>Name of Participant</th>
<th>Researcher’s Signature</th>
<th>Date</th>
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Appendix E
Interview Guide

ID Number: __________

Date / time of telephone interview: _______________________

What municipality (town) do you live in? ____________

What is your postal code? ___________________________

General Information
1. Year of Birth: ______

2. Gender: ___ Female ___ Male ___ Other

3. Occupation: ___Full retired ___Working full-time for pay ___working part-time for pay
___unemployed ___other ___

4. Education: ___up to Grade 12 ___ High school diploma ___University/college degree ___ Technical/trade ___ Other

5. Marital Status: ___ Single ___ Married ___ Divorced ___ Widow ___ Common-law

6. How do you typically get around in your community (transportation): ___ Car – I drive myself, ___Someone else drives me, ___ Volunteer services ___ Other: ______

7. What type of home do you live in? (single detached, duplex, townhouse/apartment, supportive housing)

8. How many other people live in your household?

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

10. Has a doctor ever diagnosed you with any health-related conditions? (examples: diabetes, high blood pressure, heart disease, chronic breathing conditions (asthma,
COPD), cancer, liver disease, kidney disease, immunocompromised, overweight or obese…)

11. Do you have any ability-related issues? (examples: vision loss, hearing loss, mobility issues (difficulty walking), flexibility issues (bending/picking up objects), dexterity issues (difficulty using hands or fingers), pain-related, learning (attention difficulties), developmental (autism), mental health (anxiety, depression), memory issues or frequent confusion)

**Questions related to the Pandemic.** *(Reminder: your answers will be kept confidential)*

1. Have you been tested for COVID-19?

2. Have you been in close contact with anyone who was diagnosed positive for COVID-19?

3. Have you traveled outside of the province since January 1, 2020?

4. What have you done to lower your risk of getting COVID-19? *(examples: nothing different, hand washing regularly, avoiding touching face, disinfectant use on hands and for cleaning objects in the home (such as door knobs, or sink taps), staying home when sick, only taking essential trips outside of the home (such as to grocery store, pharmacy, walk a pet, exercise), practicing physical distancing (staying at least 2 metres away from people) when outside of the home, avoiding gatherings, working from home, wearing a mask).*

5. If you have left your home during the pandemic, what were the reasons and approximately how often did you leave the home? *(examples: health reasons, care for others, bored, to get food, exercise, meet friends, work/volunteer).*
a) Describe your experience with following the recommendations of physical distancing.

6. Where do you get your information on the COVID-19 pandemic? (examples: newspapers, television, radio, government websites (Government of Saskatchewan, Saskatchewan Health Authority, Public Health Agency of Canada), social media (Facebook, Instagram, Twitter), friends or family, health care professional (such as family doctor or 8-1-1)

7. Compared to before the coronavirus pandemic, how have some of your typical behaviors changed (example: walking, running or bicycling for recreation/transportation, other exercise or physical activity for recreation, connecting with family and friends)

8. How would you describe your mental health compared to before the coronavirus pandemic? (example: tell me about a time where you felt depressed, or anxious or irritable due to COVID 19”)

9. How would you describe your stress level since the pandemic?

10. What concerns do you have about the Covid-19 pandemic and the measures taken to prevent the spread of the virus? (Examples: your own health, health of others (vulnerable family/friends), overloading the health system, impacts on local businesses/economy, family stress from confinement, loss of routine, disruption of day-to-day life, uncertainty about the future, accessing the essential goods needed (e.g., due to shortages, store closures, delayed shipping, long lines), or violence in the home)

11. What is your experience with accessing services you need from a health care provider or other community service provider during the pandemic?

12. What has changed for the better for you since the pandemic?

13. What has changed for the worse for you since the pandemic?
PHYSICAL ACTIVITY

Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.

1. What activities or behaviors would you describe as physical activity?
   a) What is your preferred type of physical activities that you enjoy doing?
   b) Do you prefer to do the activities alone or with others?

2. What motivates or encourages you to be physically active in your community?

3. What barriers do you experience in your community related to physically activity?

4. What role do other people have in your physical activity?

5. How often, if ever, do you walk for at least 10 minutes at a time?

6. How often, if ever, do you do moderate physical activities like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities for at least 10 minutes at a time (not including walking).

7. How often, if ever, do you do vigorous physical activities like heavy lifting, heavier garden or construction work, chopping woods, aerobics, jogging/running or fast bicycling for at least 10 minutes at a time?

8. How much time do you typically spend sitting during a day (hours/minutes) and what factors influence this behavior?
9. What role, if any, does interacting socially with others have in the type, frequency and duration of physical activity you choose to do?

SOCIAL INTERACTION

1. What does social interaction look like in your community? (How and why do people socialize with each other?)
   a) What does social interaction mean to you? (Define)

2. Prior to the pandemic, what activities (formal or informal) encouraged you to interact with others in your community?
   a) How often did you participate in group activities and meetings?
   b) In which organization are you most active?
   c) How long have you been involved with the organization?
   d) How has the pandemic situation changed this for you?
   e) What did you enjoy about these activities?

3. What types of services and social programs are available in your community?
   a) Of the available programs, what did you engage in?
   b) Where did you typically socialize with others?
   c) What benefits did social interaction provide for you?
   d) What motivated you to socialize with others?
   e) Where in your community is the central gathering place that people can go to for social, recreational or educational activities?
   f) How has the pandemic situation changed this for you?

4. What types of programs and services would you like to be available to you?
a) Prior to pandemic, what multigenerational activities were available in your community, and were you involved in any?

b) What do you think is needed in your community to improve current and create future places to promote social interaction?

5. What barriers prevented you from being socially active or engaged in your community prior to the pandemic?

6. What, if any, volunteer work are / were you involved in?
   a) On average, about how many hours per month did you volunteer?
   b) What role does volunteering in the community have on social interaction?
   c) What effect has the pandemic had on your volunteering and social interaction?

7. How many close friends do you have, (that is, people who are not your relatives, but who you feel at ease with, can talk to about what is on your mind, or call on for help)?
   a) Do your close friend(s) live in the same community as you?
   b) Prior to the pandemic, how often did you see or talk with any of your friends?
   c) How has the pandemic situation changed this for you?
   c) How satisfied were you with how often you communicate with your friends?

8. Do you have many relatives living in or near the same community as you?
   a) How often did you see any of your relatives or talk with any of your relatives by telephone, text, email, face time, skype
   b) How has the pandemic situation changed this for you?
   c) How satisfied are you with how often you communicate with your relatives?
   d) How many relatives do you have that you feel close to, (that is, who you feel at ease with, can talk to about what is on your mind, or call on for help)?
9. How much do you trust people in your family, neighborhood, and community?

10. How would you describe your sense of belonging to your local community?

11. How did you typically connect with family, friends, or other social groups outside of your household before the pandemic and how has it changed? *(examples: phone, texting, email, video conferencing, social media, conversations – 2m apart)*

12. How do you feel about connecting with other people remotely or from a distance, through a video call or phone call (as appropriate), if given clear instructions on how to connect.

   a) Do you have the necessary technology (electronics) and connections to use distance methods?

13. What has been your experience with physical distancing throughout the pandemic?

   a) What has been the biggest impact on your social/emotional health in terms of interacting with others?

   b) What has been the biggest impact on your physical health in terms of physical activity?

14. Do you feel that rural residents are at an advantage or disadvantage in terms of social interaction with others and physical activity opportunities compared to urban residents?

   Why or why not?

15. What is the best thing about living in a rural community?

16. What is the most challenging part of living in a rural community?
## Table 1

**Article Extraction Table**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Location/Context</th>
<th>Purpose</th>
<th>Participants/Sample</th>
<th>Study Design</th>
<th>Methods</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adamson, L., &amp; Parker, G. (2006)</td>
<td>Australia</td>
<td>Describe</td>
<td>Women, age 75 to 81 years</td>
<td>Cross-sectional survey</td>
<td>Phenomenological hermeneutic analysis</td>
<td>Engaging in exercise is associated with higher levels of physical and mental wellness.</td>
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<tr>
<td>Bidonde, J.M., Goodwin, D.L. &amp; Drinkwater, D.T. (2009)</td>
<td>n/a</td>
<td>Describe the meaning of a group fitness program to older women living alone</td>
<td>Nine women, aged 67 to 83</td>
<td>Phenomenological case study</td>
<td>Hermeneutic phenomenology, Semi-structured interviews, photos and field notes</td>
<td>Previous roles change and women need to seek out new social networks to be socially integrated (social connectedness).</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
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<td>Study Design</td>
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<td>Carrapatoso, S., Cardon, G., Dyck, D.V., Carvalho, J., &amp; Gheysen, F. (2018)</td>
<td>Belgium</td>
<td>Examine mediating effects of walking on social support with vitality and psychological distress</td>
<td>Older adults ≥65 years old (N=2,859)</td>
<td>Cross-sectional survey</td>
<td>Linear Regression</td>
<td>Participation in group activities as part of social support, is beneficial in improving vitality and reducing psychological distress with walking being a strong facilitator</td>
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<tr>
<td>Colley, K., Currie, M.J.B., &amp;</td>
<td>Scotland - urban, rural,</td>
<td>To explore older people’s participation in (walking groups) that incorporate a social</td>
<td>Twenty-seven individuals</td>
<td>Qualitative – case study</td>
<td>semi-structured interviews and a focus group</td>
<td>Physical activities</td>
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<td>Authors</td>
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<tr>
<td>Irvine, K.N.</td>
<td>and small town coastal</td>
<td>outdoor recreation throughout their lives to examine how past experiences shape engagement later in life.</td>
<td>participated in the study: 9 were urban, 7 were coastal, and 11 were rural.</td>
<td>Phenomenology</td>
<td>Individual interviews and observational field notes. Inductive thematic analysis</td>
<td>element, offer more incentive for outdoor recreation. Retirement is a key moment of change for recreation and leisure activity interventions</td>
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<tr>
<td>Dionigi, R.</td>
<td>Bathurst, New South Wales, Australia</td>
<td>Explore the exercise experiences of healthy older people</td>
<td>Ten participants (aged 65–72 years; 6 women, 4 men)</td>
<td>Phenomenology</td>
<td>Individual interviews and observational field notes. Inductive thematic analysis</td>
<td>Social interaction is key in maintaining interest and enjoyment in resistance training. Exercise programs for older people should</td>
</tr>
<tr>
<td>Authors (publication year)</td>
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<td>Fougner, M., Bergland, A., Lund, A., &amp; Debesay, J. (2019)</td>
<td>Norway</td>
<td>To explore how aging women, who participate regularly in group exercise classes, perceive their own bodies and the bodies of others</td>
<td>16 women between the age of 70 and 85</td>
<td>Qualitative study</td>
<td>Hermeneutic phenomenology</td>
<td>The most important positive impact of the group exercise was related to increased social belonging and well-being, physical abilities, and capabilities.</td>
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<td>Geboers, B., Reijneveld,</td>
<td>Netherlands</td>
<td>Examine the association of participants</td>
<td>A subset of participants</td>
<td>Logistic</td>
<td>Chi square and logistic analysis</td>
<td>Associations between health literacy and health</td>
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<tr>
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<tr>
<td>S.A., Jansen, C.J., &amp; Winter, A.F.D. (2016)</td>
<td></td>
<td>health literacy with health behaviors and social factors among older adults aged 65 and over (n = 3,241; 51.4% male)</td>
<td>behaviors are not primarily moderated by social factors</td>
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<tr>
<td>Granbom, M., Kristensson, J., &amp; Sandberg, M. (2017)</td>
<td>Sweden</td>
<td>Evaluate the effects of a case management intervention for frail older people on social participation and leisure activities</td>
<td>108 older adults living at home, 65 years or older, dependent on help in two or more ADL, Intervention (n = 80) or</td>
<td>Randomized control trial</td>
<td>Structured interviews using standardized Instruments conducted every third month for 1-year</td>
<td>Some effects of the case management intervention were reported and has potential to improve social participation among frail older people living in the community</td>
</tr>
<tr>
<td>Authors (publication year)</td>
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<tr>
<td>Howell, B. M. (2020)</td>
<td>Anchorage, Alaska</td>
<td>To examine the relationship between the sociocultural factors that shape diet, physical activity, and nutritional status outcomes</td>
<td>control group (n = 73)</td>
<td>Cross-sectional study</td>
<td>Anthropometric measurements and questionnaires</td>
<td>Social determinants of health (social and cultural influences) are important factors of physical activity among urban older adults</td>
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<tr>
<td>Kanamori, S., Kai, Y., Aida, J., Kondo, K.</td>
<td>Japan</td>
<td>Examine the relationship between incident functional disability and social participation in a variety of different types of organizations (local community, hobby, or sports group) may</td>
<td>13,310 adults (65 years or older)</td>
<td>Cohort Study</td>
<td>Analysis of 12,951 adults, excluding 359 people whose information on community, hobby, or sports group may</td>
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<td>Authors</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
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<td>Kawachi, I., et al. (2014)</td>
<td>Social participation in types of organizations and type of social participation</td>
<td>age or sex was missing.</td>
<td>decrease the risk of incident functional disability in older people in Japan.</td>
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<tr>
<td>Kikuchi, H., Inoue, S., Fukushima, N., Takamiya, T., Odagiri, Y., Ohya, Y., …</td>
<td>Japan</td>
<td>Examine associations of social participation with physical activity and sedentary time</td>
<td>Adults (65 to 74 years), randomly selected from 3 municipalities (N=1146)</td>
<td>Cross-sectional survey</td>
<td>Data collected on social participation, physical activity and sedentary behaviors through questionnaires.</td>
<td>Older adults with higher social participation are more likely to be physically active and have less passive sedentary time.</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
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<tr>
<td>Owen, N. (2017)</td>
<td></td>
<td>To explore the impact of participation in community activity groups for older adults on physical activity, health and wellbeing</td>
<td>35 people (mean age 67)</td>
<td>Mixed-methods</td>
<td>longitudinal</td>
<td>Community-dwelling older adults enjoyed socializing in their PA group and this motivated their continued attendance</td>
</tr>
<tr>
<td>Maki, Y., Ura, C., Yamaguchi, T., Murai, T., Isahai, T.</td>
<td>Japan</td>
<td>Effectiveness of a walking program on prevention of mental decline in 150 Adults (65 and older) without dementia</td>
<td>150 Adults</td>
<td>Randomized controlled trial</td>
<td>Intervention group: 30-minute exercise and 60-minute group work. Control exercise and 60-minute group interaction. Motivation is essential for developing</td>
<td>Exercise could have a greater impact when combined with social interaction. Motivation is essential for developing</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
<td>Study Design</td>
<td>Methods</td>
<td>Key Findings</td>
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<tr>
<td>Maula, A., LaFond, N., Orton, E., Iliffe, S., Audsley, S., Vedhara, K., &amp; Kendrick, D. (2019)</td>
<td>United Kingdom</td>
<td>To understand PA maintenance behaviors</td>
<td>FaME group – 10 females and 5 males, age range of 70–88 years. The OTAGO group- 12 females and 3 males aged 72–95 years</td>
<td>Qualitative study interview</td>
<td>Social interaction was a facilitating factor in maintaining PA. Other facilitators included, physical autonomy, enjoyment, positive evaluation of the activity and physical benefits, importance of social interaction, positive feedback, development of behavior considered</td>
<td></td>
</tr>
<tr>
<td>Authors</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
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<td>Michele, J., Martinent, G., Taliercio, A., Bailly, N., Ferrand, C., &amp; Gana, K. (2019)</td>
<td>France</td>
<td>To investigate activity profiles among older adults</td>
<td>286 older adults (mean age 75.3, range = 66–96)</td>
<td>Quantitative longitudinal study</td>
<td>Survey data from a longitudinal study on adjustment to retirement initiated in 2001</td>
<td>normal or habitual, motivation and self-efficacy</td>
</tr>
<tr>
<td>Pool, M. S., Agyemang, C. O., &amp; Smalbrugge, M. (2017)</td>
<td>Netherlands</td>
<td>Identify effective interventions to increase social participation and reduce social isolation in community dwelling, ethnic minorities (age 66 to 73)</td>
<td>Community dwelling, ethnic minority (age 66 to 73)</td>
<td>Systematic review</td>
<td>Community dwelling ethnic minority, interventions</td>
<td>The group aspect of physical activity has a positive influence on social participation, improving social participation,</td>
</tr>
<tr>
<td>Authors (publication year)</td>
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<td>Purpose</td>
<td>Participants/Sample</td>
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<tr>
<td>Robins, L. M., Hill, K., Day, L., Clemson, L., Finch, C., Haines, T. (2016) Victoria, Australia</td>
<td>Describe benefits and barriers to group and home based falls prevention programs and exercise</td>
<td>394 English speaking adults, aged 70+ years</td>
<td>Cross sectional survey</td>
<td>Telephone survey, Likert scale used for each quantitative item.</td>
<td>Open-ended questions</td>
<td>Social interaction is an important benefit of participating in group-based falls prevention exercise. Being healthier and more physically able influences older adults to...</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
<td>Study Design</td>
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<tr>
<td>Schutzer, K.A., &amp; Graves, B.S. (2004)</td>
<td>n/a</td>
<td>examine whether characteristics of older adults may be associated with frequently reported benefits or barriers</td>
<td>Literature review of Elderly adults (over age 65)</td>
<td>Literature review</td>
<td>followed responses to determine participation and perceived benefits or barriers</td>
<td>There is an indirect relationship between social support and exercise adherence. Frequency of exercise influenced by degree of social support form a group. Self-efficacy, group cohesion and...</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/ Sample</td>
<td>Study Design</td>
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<tr>
<td>Seino, S., Kitamura, A., Nishi, M., Tomine, Y., Tanaka, I., Taniguchi, Y., … Shinkai, S. (2018)</td>
<td>Ota City, Tokyo, Japan</td>
<td>Examine whether individual- and community-level neighborhood relationships are associated with physical activity.</td>
<td>8592 (4340 men and 4252 women) non-disabled residents (65–84 years)</td>
<td>Cross-sectional survey</td>
<td>Multilevel regression analyses of individual- and community-level neighborhood relationships (NR) with PA variables</td>
<td>People with inaccessible neighbors engage in less MVPA, while men living in communities with active NRs engage in more MVPA. Social support and social engagement may have a direct contribution to MVPA.</td>
</tr>
<tr>
<td>A., Nishi, M., Tomine, Y., Tanaka, I., … Shinkai, S.</td>
<td>Town of Kusatsu, Japan (pop: 7,000)</td>
<td>Examine a 10-year community intervention for frailty among community-dwelling older adults (65 and older) living frailty</td>
<td>Community-based Intervention for frailty prevention is promising for promoting healthy aging among frailty prevention</td>
<td>Community-based Intervention (collaborative research project)</td>
<td>Comprehensive geriatric assessment of a frailty intervention</td>
<td>Community intervention is for frailty prevention is promising for promoting healthy aging among frailty prevention</td>
</tr>
<tr>
<td>Authors (publication year)</td>
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<tr>
<td>Murayama, H., Nishi, M., Amano, H., … Fujiiwara, Y. (2016)</td>
<td>prevention among older adults in the town of Kusatsu (n = 1737 in 2001; n = 2287 in 2011)</td>
<td>program designed to promote physical activity, nutrition and social participation.</td>
<td>community-dwelling older adults</td>
<td></td>
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<tr>
<td>Sugisawa, H., Harada, K., Sugihara, Y., Yanagisawa, S., &amp; Shimmei, M. (2020)</td>
<td>Tokyo metropolitan Examined health habits (healthy diet, exercise, and nonsmoking) using 4 models: sensitive period, pathway, social mobility, and</td>
<td>A survey of people 65 years and older, living in Tokyo measured through retrospective recall questions.</td>
<td></td>
<td></td>
<td>More exposures to healthy diet and exercise in social networks over the life course were related to greater exercise involvement in late-life</td>
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<td>Authors (publication year)</td>
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<tr>
<td>Tan, E. J., Rebok, G. W., Yu, Q., Frangakis, C. E., Carlson, M. C., Wang, T., … Fried, L. P. (2009)</td>
<td>Baltimore, Maryland</td>
<td>Determine cumulative effects increases in physical activity with participation in Experience Corps (EC)</td>
<td>71 African American women (65 – 86) compared to 150 African American Women’s Health and Aging study participants (same age range) = EC</td>
<td>Community-based participatory research</td>
<td>Over three years, a cohort of older urban African American women enrolled in EC compared to a matched cohort not enrolled in EC.</td>
<td>Community based health promotion interventions could be useful for promoting increased physical activity and social engagement</td>
</tr>
<tr>
<td>Authors</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
<td>Study Design</td>
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<tr>
<td>Tomioka, K., Kurumatani, N., &amp; Saeki, K. (2018)</td>
<td>Nara, Japan</td>
<td>Investigate associations of types and frequency of social participation (SP) with instrumental activities of daily living (IADL)</td>
<td>6,013 community-dwelling older adults (65 and older)</td>
<td>Cohort study</td>
<td>IADL was assessed using a subjective evaluation of 5 items (public transport, shopping, meal preparation, bill payment, and money management). Exercise was assessed by frequency of exercise during the past year</td>
<td>Several types of SP have a favorable effect on IADL through moderate participation rather than frequent participation. A positive effect of SP on IADL ability varies depending on gender, the type and frequency of SP, and physical and mental functioning.</td>
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<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
<td>Study Design</td>
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<tr>
<td>Warner, L. M., Ziegelmann, J. P., Schüz, B., Wurm, S., &amp; Schwarzer, R. (2011)</td>
<td>Germany</td>
<td>Examine effects of social support on physical exercise in older adults (age 65–85)</td>
<td>309 German adults</td>
<td>Longitudinal study without intervention</td>
<td>Hierarchical-regression analyses</td>
<td>Social support predicted physical exercise better if combined with at least medium levels of self-efficacy. Low self-efficacy will benefit less from social support for exercise. Exercise self-efficacy and friend support for exercise are substantial predictors of exercise.</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
<td>Study Design</td>
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<td>Welmer, A.-K., Mörck, A., &amp; Dahlin-Ivanoff, S. (2012)</td>
<td>Europe</td>
<td>Describe experience of physical activity, perceived meaning, motives and barriers for participation in physical activity</td>
<td>20 community living adults (80–91 years) recruited among individuals enrolled in a health promoting and disease preventing randomized controlled trial.</td>
<td>Qualitative. Focus group of 12= intervention (instruction/home visit), 2= intervention (home visit), 6= control.</td>
<td>RCT. Five focus-group interviews after the interventions.</td>
<td>When arranging physical activities for older people, it is important to include time and opportunities for social interaction. Physical activity was not a separate activity but rather as a part of other activities.</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
<td>Participants/Sample</td>
<td>Study Design</td>
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<tr>
<td>Wilcox, S., &amp; King, A. C. (2004)</td>
<td>Sunnyvale, CA</td>
<td>Examine the association between life events and participation in exercise.</td>
<td>103 adults (67 women, 36 men)</td>
<td>RCT</td>
<td>Group: 1) moderate-intensity endurance and strength exercises (fit &amp; firm). 2) stretching and flexibility exercises (stretch &amp; flex). Self-report measures (demographic, psychosocial) and clinical evaluation (measures of functional)</td>
<td>There was no association between interpersonal loss and home-based exercise adherence. Women are able to maintain participation in properly structured home-based exercise even when experiencing an interpersonal loss.</td>
</tr>
<tr>
<td>Authors (publication year)</td>
<td>Location/Context</td>
<td>Purpose</td>
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<td>baseline and</td>
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<td></td>
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<td>12 months.</td>
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<tr>
<td>Name</td>
<td>Age</td>
<td>Sex</td>
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<td>Marital Status</td>
<td>Occupation</td>
<td>Housing Status</td>
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<td>Semi-detached</td>
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<td>Retired</td>
<td>Apartment</td>
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<td>Vincent</td>
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<td>Clifford</td>
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<td>Male</td>
<td>University/College</td>
<td>Married</td>
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<td>Homeowner</td>
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<td>Linda</td>
<td>74</td>
<td>Female</td>
<td>University/College</td>
<td>Married</td>
<td>Retired</td>
<td>Homeowner</td>
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<tr>
<td>Patricia</td>
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<td>Female</td>
<td>High school diploma</td>
<td>Married</td>
<td>Retired</td>
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<tr>
<td>Carol</td>
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<tr>
<td>Nancy</td>
<td>82</td>
<td>Female</td>
<td>Up to Grade 12</td>
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<td>Semi-retired</td>
<td>Homeowner</td>
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<td>Female</td>
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<td>Retired</td>
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<tr>
<td>Judith</td>
<td>80</td>
<td>Female</td>
<td>University/College</td>
<td>Single</td>
<td>Part-time</td>
<td>Renter</td>
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### Table 3

*Comparison Table – Rural Communities of Participants*

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<tr>
<th>Town</th>
<th>Pop.</th>
<th>Income</th>
<th>Minorities</th>
<th>Ethnicity</th>
<th>Education Level/ Field of Work</th>
<th>Median Age</th>
<th>Industry</th>
<th>Active Transportation (prefer walking)</th>
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<td>1</td>
<td>2688</td>
<td>80,677</td>
<td>135</td>
<td>Black, Filipino &amp; Chinese</td>
<td>No certificate - Education</td>
<td>29.6</td>
<td>Real estate, manufacturing</td>
<td>14.68%</td>
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<td>2</td>
<td>643</td>
<td>89,728</td>
<td>20</td>
<td>Black</td>
<td>High School - Engineering</td>
<td>43.4</td>
<td>Agriculture, Mining</td>
<td>21.4%</td>
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<td>3</td>
<td>1900</td>
<td>66,300</td>
<td>90</td>
<td>Filipino, South Asian, Arab</td>
<td>High School - Health</td>
<td>46.4</td>
<td>Agriculture, Mining &amp; Oil</td>
<td>11.36%</td>
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<tr>
<td>4</td>
<td>2451</td>
<td>72,448</td>
<td>235</td>
<td>Filipino, South Asian, Black</td>
<td>High school – Business Admin</td>
<td>47.2</td>
<td>Agriculture</td>
<td>10.21%</td>
</tr>
<tr>
<td>5</td>
<td>994</td>
<td>67,482</td>
<td>10</td>
<td>Black</td>
<td>University- Business Admin</td>
<td>27.6</td>
<td>Construction, Mining &amp; Oil</td>
<td>26.14%</td>
</tr>
<tr>
<td>6</td>
<td>91</td>
<td>67,072</td>
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<td>0</td>
<td>High School - Humanities</td>
<td>47.2</td>
<td>Agriculture</td>
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<tr>
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<td>385</td>
<td>76,032</td>
<td>n/a</td>
<td>n/a</td>
<td>High School - Engineering</td>
<td>42.2</td>
<td>Agriculture</td>
<td>10.42%</td>
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<td>8</td>
<td>490</td>
<td>53,760</td>
<td>10</td>
<td>Black</td>
<td>High School - Engineering</td>
<td>49</td>
<td>Agriculture, Management</td>
<td>23.81%</td>
</tr>
</tbody>
</table>
Figure 1

Flow Chart of the Article Selection Process

Records identified through database searching (n = 987)

Additional records identified through other sources (n = 3)

Records after duplicates removed (n = 722)

Records screened (n = 722)

Records excluded (n = 475)

Full-text articles assessed for eligibility (n = 247)

Full-text articles excluded, with reasons (n = 221)

Studies included in qualitative synthesis (n = 26)
Figure 2

Map of Saskatchewan