HEALTH-RELATED QUALITY OF LIFE AMONG NURSING HOME RESIDENTS IN WESTERN CANADA

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ABSTRACT

Bianca M. Shieu: Health-Related Quality of Life Among Nursing Home Residents in Western Canada
(Under the direction of Ruth A. Anderson)

Background: The percentage of young adults (age 18-64) residing in nursing homes (NHs) has been increasing over the past decade. Yet, little is known about who they are, why they reside in NHs, and how their quality of life/health-related quality of life are affected.

Methods: This is a three-paper dissertation. The first study is a scoping review seeking to understand younger NH residents’ lived experiences, needs, and quality of life. The second paper is a secondary analysis using the Canada Minimum Data Set to describe and compare the individual characteristics between younger and older NH residents. The third study is another secondary data analysis using the Translating Research in Elder Care (TREC) dataset. The ANCOVA analysis and case-control propensity score matching were used to conduct a retrospective cohort study comparing the Health-Related Quality of Life between younger and older NH residents. Covariates were also examined.

Results: The study’s key review findings cover five themes: (1) Confinement, (2) Lack of socialization, (3) Lack of privacy, (4) Lack of appropriate settings, and (5) Loss of identity as well as results of quality of life. In the secondary analyses, individual characteristics, facility characteristics and the mean score of HRQoL were examined for differences with age. Younger NH residents had a higher chance of being male, single, more obese, more depressed, had a higher prevalence of depression, cerebral vascular accidents, hemi- or quadriplegia, required more assistance in ADLs, and had better HRQoL than older residents. Moreover, younger NH
residents were reported to reside mainly in the large (> 120 beds) and voluntary sectors of Alberta and had higher mean HRQoL score than older NH residents.

Conclusions: This study contributed to a better comprehension of younger NH residents’ lived experiences, needs, and quality of life, as well as how their individual characteristics differed from older residents. These findings can offer useful information to policymakers, providers, and researchers to guide them in developing tailored policies, programs, and interventions. Finally, the findings provided a baseline estimate as researchers continue to track the growth of and changes in populations served in NHs.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADLs</td>
<td>Activities of Daily Living</td>
</tr>
<tr>
<td>ANOVA</td>
<td>Analysis of variance</td>
</tr>
<tr>
<td>ANCOVA</td>
<td>Analysis of covariance</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
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<tr>
<td>CDC</td>
<td>Center for Disease Prevention and Control</td>
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<tr>
<td>CIHI</td>
<td>Canadian Institute for Health Information</td>
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<tr>
<td>CMS</td>
<td>Centers for Medicare &amp; Medicaid Services</td>
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<tr>
<td>CVA</td>
<td>Cerebrovascular Accident</td>
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<tr>
<td>HRQoL</td>
<td>Health-related Quality of Life</td>
</tr>
<tr>
<td>LTC</td>
<td>Long-term Care</td>
</tr>
<tr>
<td>MDS</td>
<td>Minimum Data Set</td>
</tr>
<tr>
<td>NIA</td>
<td>National Institute on Aging</td>
</tr>
<tr>
<td>NHs</td>
<td>Nursing Homes</td>
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<td>OR</td>
<td>Older Nursing Home Residents</td>
</tr>
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<td>YR</td>
<td>Younger Nursing Home Residents</td>
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<tr>
<td>TBI</td>
<td>Traumatic Brain Injury</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
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<td>WHO</td>
<td>World Health Organization</td>
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CHAPTER 1: A COMPREHENSIVE STUDY OF NURSING HOME RESIDENTS IN CANADA

Introduction

Worldwide life expectancy has increased significantly since the 1960s (WHO, n.d.). For instance, the average life expectancy was reported to have grown by 5.5 years between 2000 and 2016 according to the World Health Organization (n.d.). Increasing life expectancy implies that more human beings may need long-term care (LTC) later in their lives. Therefore, having well-established LTC infrastructures as well as LTC services are especially crucial in countries such as Canada and the United States (U.S.) that are experiencing an increasing aging population (Government of Canada, 2019; U.S. Census Bureau, 2019). Nursing Homes (NHs) are an essential component of the LTC system because they provide a myriad of services including health and personal care for residents (National Institute on Aging [NIA], 2017). The average admission age in NHs is 83 years old and more than 60% of residents are above 75 years old (Caffrey et al., 2010; Harris-Kojetin et al., 2019). Thus, the care approaches in NHs are typically geared toward the older population, perhaps ignoring the needs of younger residents. Younger residents, for the purpose of this study, were defined as being between the ages of 18 and 64.

There are three types of NHs in Canada: public not-for-profit, private for-profit, and voluntary not-for-profit (Estabrook et al., 2014). The majority of the services (73%) were paid by public funds through various provincial and municipal plans and agencies (CIHI, 2012). These facilities employed the equivalent of more than 126,000 full-time employees, the total spending was 9.8 million, and 66% of the spending was on salaries (CIHI, 2012). In 2012, there were
143,000 residents living in NHs and in 2013, 95% of NH residents needed at least some assistance with activities of daily living (ADLs) such as bathing, dressing, or eating; more than 80% of these residents needed extensive assistances with these activities. In addition, 70% had heart or circulatory diseases and 60% lived with dementia (CIHI, 2012, 2013). To date, there are numerous reports about NH residents aged 65 and over in Canada and elsewhere; however, relatively little research has focused on younger residents between 18 and 64. Thus, this study will focus on understanding the whole spectrum of the NH population.

There were three aims in this study. First, creating a scoping review with regard to the lived experiences, needs, and quality of life among younger NH residents. Second, using MDS 2.0 to describe and compare individual characteristics (sex, marital status, disease diagnoses, cognitive functions, physical functions, and depressive symptoms) between younger (age 18-64) and older (age ≥ 65) NH residents in Western Canada. Third, comparing the Health-Related Quality of Life (HRQoL) between younger (age 18-64) and older (age ≥ 65) NH residents in Western Canadian NHs.

Chapter One outlined the problems associated with increasing life expectancy for the aging population in Canada, followed by the background, conceptual framework, purpose, study aims, and description of manuscripts. It concluded with the significance and anticipated contribution of new knowledge about younger NH residents in Canada for nursing science. Chapter Two was a scoping review that summarizes younger NH residents’ needs, lived experiences, and quality of life over the years. Chapter Three was a cross-sectional, correlational study describing and comparing the individual characteristics of younger and older NH residents in Western Canada. Chapter Four showed the resulting comparisons of the HRQoL among younger and older NH residents in Western Canada.
Background

NHs are a type of LTC facilities, which typically serve older adults who need assistance in at least three ADLs such as bathing, eating, and toileting (Nelson & Bowblis, 2017; Bigby et al., 2008). The average admission age in NHs is 83 years old and more than 60% of residents are above 75 years old (Caffrey et al., 2010; Harris-Kojetin et al., 2019). The services provided by NHs generally include nursing care, 24-hour supervision, three meals a day, and assistance with everyday activities (National Institute of Aging [NIA], 2017). In addition, some facilities offer rehabilitation services that include physical, occupational, and speech therapy (NIA, 2017). A large number of the residents in NHs are there for ongoing physical or mental conditions that require constant care and supervision (NIA, 2017).

In the United States (U.S.), it is common for NH residents to have both cognitive and functional impairments. According to the Centers for Medicare & Medicaid Services (CMS) (2008 & 2015), ADLs are defined as activities related to personal care, including bathing or showering, dressing, bed mobility, walking, toileting, and eating. In the CMS 2015 compendium, more than 80% of NH residents had at least one ADLs impairment and more than 60% had at least mild cognitive impairment. Cognitive impairment was defined as whether a person has trouble remembering, learning new things, concentrating, or making decisions that affect their everyday life, ranging from none to severe (Center for Disease Control and Prevention [CDC], 2011). It is often measured using Mini-Mental State Examination (MMSE), which is a 30-point questionnaire that is used extensively in clinical and research settings. The total score of MMSE ranges from 0 to 30 with scores 18 to 23 considered as mild cognitive impairment, and scores 0 to 17 considered as severe cognitive impairment (Heart and Stroke Foundation of Canada, n.d.). To date, approximately 15% of the NH population have both severe cognitive and five ADLs impairments (CMS, 2015). Similarly, in Canada, more than 96% of NH residents were reported
to require assistance with at least one ADLs and 81% of residents needed assistance with at least three or more ADLs, such as bathing, dressing, and eating. In addition, more than 70% of NH residents had heart or circulatory diseases and 62% lived with dementia (Canadian Institute for Health Information [CIHI], 2018).

It is speculated that there are substantial differences between younger (age 18-64) and older (age ≥ 65) NH residents, such as disease diagnoses and the length of stay (Fries et al., 2005; Colantonio et al., 2010; O’Reilly & Pryor, 2002). Prior studies have reported that YR with TBI admitted to NH were often in their early 20’s and were inclined to reside in NHs for a relatively longer period of time, compared with residents who are admitted later in life (Colantonio et al., 2010; O’Reilly & Pryor, 2002). Consequently, the total cost for society to take care of younger NH residents will possibly be higher than that of older NH residents. Likewise, a study conducted by Harris et al., (2018) revealed that younger NH residents require extra care and assistance because they are more likely to be morbidly obese. As a result, they may increase the burden on staff, facilities, and society for the long term (Harris et al., 2018). Weingarden and Graham (1992) suggested that NHs possibly lack resources to manage the unique needs of younger NH residents, which, combined with isolation, external society, and the extensive period of time they were living in a NHs, may conceivably affect their health, feelings of isolation and stagnation, eventually impacting their quality of life as well as HRQoL.

Additionally, YR are in a different developmental stage than OR (Armstrong, 2019). Corresponding to the twelve stages of the human life cycle as suggested by Armstrong (2019), younger NH residents in their early adulthood or midlife phases are supposed to “go out into the world and make their mark, creating life, and reflect upon them” (section 8-9), but if they reside in NHs for a long period of time, likely may not be able to do these developmentally appropriate
tasks. I propose that the absence of these full developmental activities will contribute to a poorer quality of life compared with older NH residents. On the other hand, OR in late adulthood are expected to have achieved a rich repository of experiences that they can manage to help guide others (Armstrong, 2019). Therefore, when older residents move into NHs, they are possibly becoming better prepared for what might happen during their stay and, with a better mindset, they are likely to achieve a better quality of life. To date, limited evidence-based studies have been published regarding the younger NH population in comparison with others, but we cannot deny that they are a growing populace and are equally as important as older residents in NHs. These differences in developmental stages and opportunities for meeting developmental milestones support the need for this proposed study.

Quality of life studies have primarily targeted NH residents with dementia because the majority of the residents were older and were admitted to NHs with this diagnosis (MDS, 2015). Two systematic review studies have identified factors influencing quality of life in dementia patients in LTC facilities (e.g., NHs and assisted living facilities) and communities (Beerens et al., 2013; Jing et al., 2016). Beerens et al. (2013) summarized 13 studies and reported seven factors (socio-demographic characteristics, depressive symptoms and anxiety, behavior, dependency in activities of daily living, cognition, severity of dementia, and medication use) that are likely related to quality of life in dementia patients residing in LTC facilities.

Meanwhile, the systematic review conducted by Jing et al. (2016) included 56 empirical studies and concluded seven factors (demographic characteristics, physical factors, psychological and emotional factors, social factors, religious, environmental and other factors of elderly people with dementia) that can affect the quality of life in people with dementia in various settings such as institutions and communities. The factors recapitulated by Beerens et al. (2013) pay more
attention to individual perspectives, whilst Jing et al. (2016) cover a variety of individual and environmental aspects. Nevertheless, both studies share the following similar conclusions: first, quality of life in patients with dementia was determined by multiple factors, such as functional independence and use of antipsychotics medication (Beerens et al., 2013; Jing et al., 2016). Second, more depressive symptoms, the presence of behavior disturbances, higher dependence on activities of daily living (ADLs), and cognitive impairment might be related to lower quality of life in people with dementia (Beerens et al., 2013; Jing et al., 2016). Lastly, different populations (e.g., proxies and residents) present different priorities when organizing the control factors on quality of life in residents with dementia (Beerens et al., 2013; Jing et al., 2016).

The measurement of quality of life in dementia residents has been approached in three different ways: self-report, proxy report, and direct report (Brod et al., 1999; Albert et al., 1999; Lawton et al., 1999). However, the scale to measure quality of life in NH residents with comorbidity has not been standardized (Torisson et al., 2016). One of the most common measurements being used for dementia patients is the Quality of Life in the Alzheimer's disease scale (QoL-AD) (Logsdon et al., 2002). The common measurements being used to measure HRQoL are the subscales of SF-36, CDC HRQOL–14 "Healthy Days Measure," and the MDS Health Status Index, which measures the NH residents (Almomani et al., 2014; Chouiter et al., 2015; Drageset et al., 2017). The studies using the aforementioned measurements have mainly targeted the smaller group of older cognitively impaired or residents with dementia (Drageset et al., 2017). Therefore, there is an urgent need for current research to measure the HRQoL more quantitatively among younger NH residents, such that we can obtain a more precise understanding of this population. Furthermore, evaluating HRQoL can serve as an important index because it can be utilized in many ways, including population surveys of perceived health.
problems or other aspects of health-services or intervention research (Center for Disease Prevention and Control, 2018; European Patients’ Academy, 2016).

To the best of my knowledge, this study will be the first to summarize the lived experiences, needs, and quality of life of younger NH residents in research findings during the past two decades. It will also describe and compare younger and older NH residents’ individual characteristics, as well as their HRQoL using a representative dataset-Minimum Data Set (MDS 2.0) from Canada. We hope that this study can provide areas for new research and suggest interventions for development as well as future use of improving quality of life among younger NH residents.

**Conceptual Framework**

Figure 1. HRQoL Conceptual Framework

The framework (Figure 1) in this study was developed based on Wilson and Clearly’s research (1995) to describe and compare the individual characteristics of younger and older NH residents in Western Canada, and to explore their HRQoL. The aims of this study were to first analyze the association between age (younger vs. older) and individual characteristics in NH residents from Western Canada. Next, it was meant to explore differences of the HRQoL between younger and older residents while controlling for individual and facility characteristics. The results from this study can provide an initial first step to understanding NH residents in Canada, especially the younger age group.
In Figure 1, the age group of nursing home residents was an independent variable, whereas HRQoL was a dependent variable. Under individual characteristics were seven subgroups: sex, marital status, disease diagnoses, body mass index, physical functions, cognitive functions, and depressive symptoms. Under facility characteristics there were three subgroups: province, ownership, and facility sizes.

The residents’ age group was divided using age 65 as a threshold for the following reasons: First, people aged 65 and over traditionally have been defined as older adults (Office of Disease Prevention and Health Promotion, 2019). Second, many government benefits such as pensions for the elderly are distributed to people that are aged 65 and above (Government of Canada, 2014; Benefit.gov, 2018). Third, the care and programs in NHs are usually tailored to the older population, because more than 93% of the NH population is over age 65 in Canada (CIHI, 2014), and more than 80% is over age 65 in the U.S. (CMS, 2015); the influx of younger residents is a new trend. Therefore, it is beneficial to use 65 as a cutoff age to gain a deeper understanding of the similarities and differences between younger and older NH residents in Canada.

**Disease diagnoses** were selected based on three studies included in the scoping review from Chapter Two that focuses on the younger NH residents in Canada (Barber et al., 2020; Hay et al., 2013; Watt et al., 2007). It is important to explore this variable because the results can serve as a reference for care providers, as they display an overview of diagnoses for the younger NH populace as well as for researchers that want to continue tracking the growth and changes in LTC facilities.

**Body Mass Index (BMI)** was a measure of body fat based on height and weight. The calculation formula was described as a person's weight in kilograms divided by the square of
height in meters (CDC, 2017). This has been used to define anthropometric height/weight characteristics in individuals and to categorize them into groups (i.e., underweight, normal, overweight, and obese). This study classified BMI in six categories: underweight (BMI is less than 18.5), normal weight (BMI in the range of 18.5 to <25), overweight (BMI in the range of 25 to <30), and obesity: Class I (BMI is 30 to <35), Class 2 (BMI is 35 to <40) and Class 3 (BMI is 40 or higher) (CDC, 2017). It is important to explore BMI in NH residents, as studies have found that obesity is associated with worse HRQoL, and individuals with lower BMIs had a better quality of life than others with higher BMIs (Pimenta et al., 2015; Busutil et al., 2017). In addition, a recent study in the U.S. using MDS dataset found that younger NH residents (median age 64) were the most obese (BMI 50 kg/ m²) among the rest of the age groups; as BMI increases, extra staff are needed to provide care and assistance with all types of ADLs except eating (Harris et al., 2018). Consequently, using the MDS 2.0 dataset from Canada to examine the NH residents’ BMI is crucial, because the results can help us to better understand whether Canadian NH residents are also prone to being obese and, if so, what kind of health, nutrition, and dietary education we could suggest to the NH population to help reduce their weight and optimize their HRQoL.

Physical Function and Cognitive Function: Physical function was conceptually defined as a resident’s potential for performing ADLs (Morris et al., 2012). It was measured using the Activities of Daily Living Hierarchy Scale (ADL-H), embedded in the MDS 2.0. Meanwhile, cognitive function was conceptually defined as “to determine the resident’s performance, including the ability to remember recent and long-past events, think coherently and organize daily self-care activities” (Morris et al., 2012). It was measured using the Cognitive Performance Scale (CPS), which was based on items embedded in the MDS 2.0.
It was crucial to explore these two variables because a large number of studies summarized by Jing et al. (2016) have indicated that a lower quality of life is likely to be related to poor physical function and less independence with performing ADLs (e.g., dressing, mobility, and personal toiletry) in dementia patients. Meanwhile, those with higher cognitive impairments have a lower quality of life regarding people with dementia (Beerens et al., 2013). However, little is known about how these factors might relate to the quality of life in younger NH residents. As a result, looking at these factors in the younger NH residents can help us to better understand this population and provide useful information to providers as they plan for the future needs for younger NH residents. For example, early recognition of cognitive function changes will allow healthcare providers to implement proper treatments as well as different healthcare planning (Morley et al., 2015). Moreover, it can provide valuable information to health care providers when allocating staffing assignments, since these vulnerable residents are in need of extra assistance, given that numerous NHs are facing inadequate levels of nurse staffing (Harrington et al., 2016). Thus, exploring factors related to quality of life and finding solutions can not only help improve the quality of care performed in the NHs, but optimize the residents’ quality of life and HRQoL.

**Depressive Symptoms:** Depression was referred to as a common and serious medical illness that negatively affects how you feel, the way you think, and how you act (American Psychiatric Association, 2020). In addition, it has a significant and negative impact on health and quality of life (Brenes, 2007). Depression symptoms were measured using the Depression Rating Scale, embedded in the MDS 2.0.

In fact, the quality of life among depressed adults is more impaired than that of adults with chronic illnesses such as hypertension and diabetes (Wells et al., 1999). A review has
indicated that depressive symptoms are related to lower quality of life in people with dementia in LTC facilities (Beerens et al., 2013). However, limited studies have addressed the possible link between depressive symptoms and residents without dementia in NHs, nor have they reported findings in younger NH residents. Therefore, there is a need to use a comprehensive assessment dataset: MDS 2.0 can analyze the percentage of NH residents with depression in Canada, as the results can provide strategies and better care approaches within NHs, as well as suggestions to manage and control symptoms.

**Health-Related Quality of Life (HRQoL)** was conceptually defined as a multi-dimensional concept that includes domains related to an individual’s vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain (Hirdes et al., 2018). The HRQoL score was calculated using the format provided in Hirdes et al. (2018)’s study and the variables were readily available in the MDS 2.0. It has become important to examine HRQoL, as most countries around the globe report an increased life expectancy for their citizens compared to decades ago (Salomon et al., 2012). However, it may be meaningless to have an extension of life expectancy without knowing the years of desired quality of life. As a result, measuring HRQoL can serve as an important index to perceive health problems and other aspects of health-services or intervention research.

The Resident Assessment Instrument-Minimum Data Set 2.0 (shorten as MDS 2.0 in this study) is a comprehensive assessment that has been mandated for use in selected Canadian provinces with NHs, which is submitted to CIHI quarterly (CIHI, 2019). It contains resident-level data that are some of the most comprehensive and representable data sets. The reliability and validity of MDS 2.0 have been established through numerous international studies (Poss et al., 2008; Hirdes et al., 2008; Burrow et al., 2000).
Overall, it is essential and significant to further explore the individual characteristics of Canadian NH residents’, as knowing the listed variables (sex, marital status, disease diagnoses, BMI, physical functions, cognitive functions, depressive symptoms, HRQoL) can help predict issues and burdens that the Canadian NHs might encounter when taking care of these residents over the next few years, as well as suggest proper interventions to improve their lived experiences and quality of life.

**Project and Purpose**

The principal aim of this dissertation was to describe the characteristics and explore differences in HRQoL between younger residents (age 18-64) and older residents (age 65 and above) in Western Canadian NHs.

**Study Aims**

**Chapter 2. Paper 1. Younger Nursing Home Residents: A Scoping Review of their lived experiences, needs, and quality of life.**

**Aim 1**: To synthesize research findings about the lived experiences, needs, and quality of life among younger nursing home residents.

**Chapter 3. Paper 2. A Cross-sectional, Correlational Study Comparing Younger and Older Nursing Home Residents in Western Canada using MDS 2.0.**

**Aim 2**: To describe and compare selected characteristics (sex, marital status, body mass index (BMI), disease diagnoses, physical functions, cognitive functions, and depressive symptoms) of Canadian younger and older NH residents from three provinces using Minimum Data Set 2.0.

I. To describe and compare individual characteristics between younger (age 18-64) and older (age ≥ 65) residents from NHs in Western Canada using MDS 2.0.
II. To describe and compare individual characteristics among five age groups (age <35 years old, 35-50 years old, 51-64 years old, 65-80 years old, and 81 years old and above) of residents from NHs in Western Canada using MDS 2.0.

**Chapter 4. Paper 3. Comparing HRQoL between Younger and Older Nursing Home Residents in Western Canada using Canadian MDS 2.0**

**Aim 3:** To describe and compare HRQoL between the younger and older populations residing in NHs in Western Canada. Measure HRQoL using the InterRAI HRQoL assessment index, controlling for individual characteristics (sex, marital status, disease diagnoses) and facility characteristics (province, ownership, and facility size).

**Description of Manuscripts**

The format of this dissertation was three pre-publishable manuscripts. Chapter One of this proposal provided a comprehensive review to understand NH residents in Canada. Chapter Two was a publishable scoping review that focused on the lived experiences, needs, and quality of life among younger NH residents. Chapters Three and Four were pre-publication dissertation versions of a secondary analysis using MDS 2.0 from Western Canada. Chapter Five was a discussion and conclusion of the results of the three manuscripts, along with implications and suggestion for future research.

This study first summarized research findings with regard to the quality of life in younger NH residents around the world over the past decade, identifying factors that are likely to impact their quality of life, while suggesting how to optimize this for younger residents living in NHs (Chapter Two). Next, this study used MDS 2.0 from Canada to conduct a preliminary large-scale study that covered the age spectrum of NH residents in Western Canada, describing and comparing individual characteristics of younger and older residents (Chapter Three). Furthermore, this study compared the HRQoL between younger and older NH residents in
Western Canadian NHs (Chapter Four). Finally, this study concluded the aims and findings from each chapter, discussed implications for clinical practices and future research directions (Chapter Five).

**Significance of Studying Younger (ages 18-64) NH residents**

It is crucial to have a better understanding of the younger NH population, because it is commonly believed that they have substantially different characteristics from other NH residents (Fries et al., 2005). National reports indicated that the percentage of younger people residing in NHs had been growing gradually from 12 percent to 16 percent between 2003 and 2014 in the U.S., although the total amount of NH residents had decreased from approximately 3.2 million to roughly 1.4 million (CMS 2008, 2015). Similarly, the percentage of young adults from NHs in Canada have reported a progressive increase from 6.2 percent (N=8,919) to 6.7 percent (N=12,852) between 2012 and 2019 (CIHI, 2012, 2019). These results implied that the individual characteristics of younger and older NH residents were different and, therefore, deserved better understanding. The younger residents in NHs represent a growing but less recognized population. Thus, there is a need for a comprehensive understating of individual characteristics, their HRQoL, and their differences compared with older NH residents.

Existing studies mainly focused on older NH residents with dementia and their quality of life. The findings aimed to contribute to a better comprehension of the characteristics and HRQoL of the younger NH population and how they differ from other residents. In addition, the study provided useful information to policymakers, providers, and consumers as they plan for the future LTC needs of their loved ones. Finally, the findings will serve as a baseline estimate as researchers continue to track the growth of and changes in the populations served by the LTC industry.
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doi:10.1097/PHM.0b013e3181f703ef

CHAPTER 2: YOUNGER NURSING HOME RESIDENTS: A SCOPING REVIEW OF THEIR LIVED EXPERIENCES, NEEDS, AND QUALITY OF LIFE

Introduction

The percentage of younger residents (YR), aged 18 to 64 years, residing in a NH in some countries, including the US and Canada has been increasing (Canadian Institute for Health Information, 2012, 2019; Center for Medicare and Medicaid Services, 2008, 2015). Between 2007 and 2014, the number of NH residents has declined from nearly 3.2 million to roughly 1.4 million. However, the percentage of YR in the US increased from approximately 13 % to 16 % (Center for Medicare and Medicaid Services, 2008, 2015). Likewise, the percentage of YR in NHs in Canada has increased from 6.2 % (N=8,919) to 6.7 % (N=12,852) over the past seven years (2012 to 2019) (Canadian Institute for Health Information, 2012, 2019). The observation raises questions about how younger and older NH residents differ in terms of their lived experiences, needs, and quality of life.

NHs typically serve older adults towards the end of their lives,(Bigby et al., 2008) and may be referred to as skilled nursing facilities, aged-care facilities, long-term care facilities, or residential care depending on the country (Cameron, Pirozzo, & Tooth, 2001; Watt & Konnert, 2007; Winkler et al., 2010). More than two-thirds of NH residents are at least aged 75 and the average admission age is 83 years (Bigby et al., 2008; Harris-Kojetin L, 2019; Nelson & Bowblis, 2017). Thus, care and programming in NHs are designed to meet the physical and psychological needs of older residents (OR) and may not be prepared to meet the needs of YR (Marshall & Baffour, 2011; Muenchberger et al., 2011). Consequently, it is essential to
understand YR’ lived experiences, needs, and quality of life to guide interventions for this age group.

Quality of life is a broad concept that includes domains of health, social relationships, and culture (Center for Disease Control and Prevention, 2018). According to World Health Organization (2012), it is defined as “an individual's perception of their positions in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns”. Existing studies of quality of life in NHs often have focused on OR (age ≥ 65 years) and indicated that residents who are more independent, less depressed, and have better cognitive abilities are likely to achieve better quality of life (Beerens et al., 2013; Jing et al., 2016).

YR are considerably different from OR with a unique set of clinical and nonclinical characteristics (Fries et al., 2005). However, prior studies have not systematically characterized YR in NHs owing to their relatively small percentage in the past. Thus far, studies related to YR’ lived experiences, needs, quality of life were conducted in several countries (e.g., Australia, Canada, Ireland, Jordan, the US) via different methodological approaches (e.g., qualitative, quantitative, and mixed methods) and the time span of publications varies broadly (i.e., 2001 to 2020). We conducted a scoping review to synthesize evidence from studies with widely varying designs and measures. (Tricco et al., 2018) With data obtained from this review, we aim to offer suggestions to develop interventions to optimize YR’ quality of life while residing in NHs.

Methods

We use the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-ScR) to guide the search, abstraction, and synthesis (Moher, 2009). The author (BS) consulted a research librarian to search relevant studies published in PubMed, CINAHL, PsycINFO, and Web of Science databases prior to January 8, 2021 (see Figure 2). PubMed was

**Data Screening and Abstraction**

Three reviewers (BS, CD, and JA) examined the titles and abstracts, and chose articles for full-text review if they met the following criteria. The studies must focus on the younger population (the definition of “YR” varied across studies). Furthermore, articles were included that mentioned the following information: (1) YR with a chronic medical diagnosis residing in a NH, skilled nursing facility, extended-care facility, or intermediate-care facility for 30 days or more; (2) Described their lived experiences, and/or needs, and/or quality of life in the younger population; and/or (3) Compared QoL between YR and OR. We excluded non-NH settings such as hospitals, home care, and palliative care hospitals as well as non-English published articles because we did not have a translator. We used no limitation of publishing date since we anticipated a low number of publications. The reviewers met about all articles for which they disagreed concerning inclusion and discussed them until an agreement was reached. The reviewers discussed with RAA to resolve any continuing disagreements.

We used the Mixed Methods Appraisal Tools (MMAT) originally developed by Pluye et al., (Pluye, 2009) and revised by Hong et al., (2018) to examine the quality of the selected studies (see Table 4). Three reviewers (BS, CD, and JA) then abstracted the following data from the
articles: purpose of the study, geographic area, long-term care setting, population/sample size, inclusion/ exclusion criteria, study design, and data collection techniques.

Data Synthesis

Three research team members (BS, CD, and JA) collectively analyzed extracted data, using matrices, and vote counting (Cooper, 2015) to categorize the data. We sorted the abstracted data based on purpose, geographic location, setting, population/sample size, inclusion/exclusion criteria, study design, and data collection techniques. We divided qualitative and quantitative findings into separate tables. Table 2 includes themes, subthemes, as well as direct and indirect quotes from residents, whereas statistical results are provided in Table 3. When the three reviewers did not agree about the data they abstracted, we met and discussed disagreements until agreement was reached. If an agreement was not reached, we then discussed with the senior author (RAA) until an agreement was made.

Quality Appraisal

MMAT focuses on the assessment stage of complex systematic literature reviews and addresses the quality of mixed-methods, qualitative, and quantitative methods (Hong et al., 2018). Three researchers (BS, CD, and JA) examined the study quality, indicating “Yes” if the study met the criteria, “No” if the study did not meet the criteria, and “Can’t tell” if we were unable to determine if it did or did not meet the criteria due to insufficient detail (see Table 4). When an agreement was not reached by the three reviewers, the article was discussed with the senior author (RAA) until an agreement was reached.

Results

Study Characteristics

The electronic search yielded 1,666 unique studies and 13 studies met the criteria for inclusion. Across studies, seven were qualitative, four were quantitative, and two were mix-
methods. Studies were published from 2001 to 2020. In terms of geographic location, four
studies were conducted in Australia, three were conducted in the US and Canada, and one study
was conducted from Ireland, Turkey, and Jordan (see Table 1).

Design of the Studies

Among the qualitative studies (n=7), four used a phenomenological approach (Barber et
al., 2020; D’Or et al., 2020; Dwyer et al., 2017; Hay & Chaudhury, 2015), one used an
ethnography approach (L. L. Jervis, 2002), one used a biographical approach (Smith, 2004), and
the other used ground theory (Marshall & Baffour, 2011). The quantitative studies (n=4) used
cross-sectional, correlational, and descriptive designs. All the mix-method studies (n=2) used
cross-sectional as well as descriptive designs and one of them also used a correlational design.

Setting

Across studies, all settings were based in NHs. However, the terminology for NHs varied
across countries. For example, some NHs in Canada were described as aged-care facilities and
some NHs in Australia were referred to as residential aged care.

Sample Characteristics

Across studies, YR participants were primarily white non-Hispanic and male. Their
education level was typically between primary school and high school (Khader, 2011; Presson &
Ostwald, 2009; Subasi & Hayran, 2005) with an average length of stay in NHs amounting to
three years (Khader, 2011; Marshall & Baffour, 2011; Winkler et al., 2006). Studies used
different criteria to define “YR”. For instance, eight studies defined age 65 years as the
threshold, three studies used age 60 as the threshold, and one study had a higher criterion (age
70). The sample sizes ranged from 6 to 59 participants in the qualitative studies and from 136 to
478 participants in the quantitative studies. Within four quantitative studies and two mixed-
methods studies, three had response rates ranging from 72% to 78%. (Cameron et al., 2001;
Presson & Ostwald, 2009; Winkler et al., 2006) one had a 92% response rate, (Subasi & Hayran, 2005) and the remainder did not specify their response rate.

**Diagnoses**

No studies reported the full range of co-morbid conditions that participants may have experienced. We included those studies that reported the disease diagnoses and determined that residents with brain injuries (e.g., acquired or traumatic) appeared the most, followed by multiple sclerosis, physical disabilities (e.g., paralysis, amputation), intellectual and developmental disabilities, cerebral palsy, Huntington’s disease, blindness/vision impairment, psychiatric diagnoses (e.g., psychiatric disorder, cognitive disorder, depressive or bipolar disorder), morbid obesity, and HIV (Barber et al., 2020; Cameron et al., 2001; D’Or et al., 2020; Dwyer et al., 2019; Jervis, 2002; Marshall & Baffour, 2011; Watt & Konnert, 2007).

**Findings**

The summary of findings is divided into two sections. First, we present the findings across nine studies using qualitative or mixed designs. Second, we report on findings from four studies using quantitative designs.

**Findings from Studies with Qualitative and Mixed Methods Designs**

The findings across seven qualitative and two mixed methods studies cover five themes describing limitations in the quality of care and quality of life of YR. The themes are: (1) confinement; (2) lack of socialization; (3) lack of privacy; (4) lack of appropriate settings, and (5) loss of identity. Further details of each theme, subtheme, and selected quotation can be found in Table 2. Information about each theme is provided in the next section.

**Theme 1: Confinement**

In six of seven studies, younger NH residents described limited opportunities to explore life out of the NH which results in an emerging sense of confinement (Cameron et al., 2001;
D’Or et al., 2020; Dwyer et al., 2019; Hay & Chaudhury, 2015; Lori L. Jervis, 2002; Presson & Ostwald, 2009). YR felt trapped and depressed, with some participants using the metaphor of prison to represent the stagnation and restriction in their current living experiences (Dwyer et al., 2017; Jervis, 2002; Presson & Ostwald, 2009). They also expressed feeling frustrated when encountering ill or dying residents (Cameron et al., 2001; Hay & Chaudhury, 2015; Presson & Ostwald, 2009). For example, some participants expressed concern that they are going to experience what they were observing in dying residents at the end of their own lives. These thoughts triggered anxiety, especially in YR with poor subjective health, poor functional ability, poor social support, and extended stays in the facility (Hay & Chaudhury, 2015). Furthermore, YR described disappointment in not being included in decision-making concerning their stay in NHs (Barber et al., 2020; D’Or et al., 2020; Dwyer et al., 2017; Smith, 2004). YR indicated that they had little say in their lifestyle, which was regimented and mundane: “breakfast, morning activities, lunch, afternoon activities, dinner, and television before going to bed”(Presson & Ostwald, 2009). They reported feeling powerless and a loss of self-determination in many aspects of their lives including but not limited to food choice, mealtimes, and social activities were mostly unfulfilled (Dwyer et al., 2017; Hay & Chaudhury, 2015).

**Theme 2: Lack of Socialization**

In all nine studies, younger NH residents described a desire to socialize with people in their same age group (peer support) and/or with the external community as well as their immediate family, friends, and significant others. Eight studies reported a lack of age-appropriate activities (Barber et al., 2020; D’Or et al., 2020; Dwyer et al., 2017; Hay & Chaudhury, 2015; Lori L. Jervis, 2002; Marshall & Baffour, 2011; Presson & Ostwald, 2009; Smith, 2004). For instance, the majority of YR criticized their activities because NHs provided one set of activities that were not always age-appropriate (Marshall & Baffour, 2011). Also, YR desired to have a
greater variety of leisure activities such as playing table tennis, cards, quilting, and video games (Marshall & Baffour, 2011; Presson & Ostwald, 2009; Smith, 2004). In fact, YR felt that they were excluded from the external community and expressed feelings of boredom and loneliness (Dwyer et al., 2017; Marshall & Baffour, 2011; D. Winkler et al., 2006). The YR expressed that the most valued means to overcome emptiness was developing meaningful connections through family visits and spending time or socializing with other YR in the NHs (Cameron et al., 2001; Dwyer et al., 2017).

Theme 3: Lack of Privacy

In six of the studies, YR described having a lack of privacy including privacy in personal hygiene, routines and intimacy (Barber et al., 2020; Cameron et al., 2001; D’Or et al., 2020; Hay & Chaudhury, 2015; Jervis, 2002; Presson & Ostwald, 2009). For example, some YR expressed feeling “ashamed” of having an intimate relationship with others due to having little privacy in the NHs and this problem likely attributed to their desire to leave the NH (Cameron et al., 2001; Jervis, 2002). Other YR mentioned that having one’s own bathroom and being able to close the door was an important aspect of having privacy and a vital factor of quality of life (Cameron et al., 2001; Hay & Chaudhury, 2015).

Theme 4: Lack of Appropriate Settings

In six studies, YR described the NHs as old folk’s home, not a true home but a refuge. Namely, YR said NH was a place for OR who are dying soon (Dwyer et al., 2017). Similarly, YR mentioned they had difficulties living in proximity with residents who were terminally ill, at the end stage of their lives or had dementia because they may experience significant loss through death of roommates (Cameron et al., 2001; Presson & Ostwald, 2009). However, some YR stated that they long for a “real” home but that NHs were better than living in a group home or the
Lastly, other YR reported their basic needs were not met (Cameron et al., 2001; Marshall & Baffour, 2011).

**Theme 5: Loss of Identity**

In seven studies, YR described lacking a sense of belonging, personhood, and sense of empowerment. To illustrate, YR saw themselves not belonging to or fitting in both physically and socially in NHs or they could no longer be by the side of their children/ significant others since they had become “the patient” (Smith, 2004). Similarly, one-third of the residents reported they were restricted in contacting their children due to custody issues. They felt disempowerment and the relationship with their children became extremely damaged (Marshall & Baffour, 2011).

**Findings from Studies with Quantitative and Mixed Methods Designs**

The statistical results for quality of life from quantitative studies (n=4) and mixed methods studies (n=2) are presented in Table 3.

**Quality of Life**

All three quantitative designs described the relationship between YR and quality of life in NHs. Across studies, quality of life was measured using WHO Quality of Life-BREF (WHO-QOL-BREF), Life Satisfaction Index-A (LSI-A), and the Quality-of-Life Profile: Version for Persons with Physical and Sensory Disabilities (QOLP-PD). The findings were mixed as illustrated below (Khader, 2011; Subasi & Hayran, 2005; Watt & Konnert, 2007).

The QOLP-PD domain consisted of nine dimensions including physical, spiritual, growth, psychological, social, leisure, practical, physical, and community belonging. It was reported that physical belonging was rated highest among YR (mean=1.83, SD= 2.91), indicating that YR felt connected to their environments in terms of safety, privacy, comfort, adequacy of space, and physical accessibility (Watt & Konnert, 2007). In contrast, the sub-components of social belonging and community belonging were rated lower, suggesting that YR felt somewhat
disconnected from friends, relatives, other residents, and social events (Watt & Konnert, 2007). Overall, better quality of life was related to better perceived physical health, lower pain, greater frequency of visitors, and the presence of a confidant. Likewise, other studies included in this review mentioned that better emotional and social support, as well as social factors can lead to better quality of life (Hay & Chaudhury, 2015; Presson & Ostwald, 2009; Winkler et al., 2006). Moreover, Subasi et al. (2005) utilized the LSI-A to measure residents’ quality of life from a NH in Turkey and the study found that quality of life was positively related to participation in leisure activities such as, handcrafts, reading, and walking (p=0.03), marital status (t=2.25, p=0.02), level of education (F=2.97, p=0.03), and place of residence (F=13.97, p=0.001).

The findings regarding whether quality of life differed between YR and OR were mixed. For example, Watt et al (2007) did not find significant differences of quality of life between YR and OR in Canada even though YR residing in NHs were viewed as having a non-normative experience and felt secluded from their age peers. Similarly, Subasi et al. (2005) found no significant differences between LSI-A scores and age in a study conducted in Turkey (Subasi & Hayran, 2005). However, Khader (2011) conducted the study in Jordan and, despite an overlap in age groups by one year at ages 59 and 69 in published results, noted a statistically significant difference (p<.05) between younger and older NH residents scores in quality of life domains, specifically with better physical health, psychological health, and environment among YR (< 69 years old). Additionally, Khader found a statistically significant difference (p<.05) in the psychological domain between the residents of age group 59-68 years compared to OR.

**Discussion**

The purpose of this study was to summarize YR’s lived experiences, needs, and quality of life. To the best of our knowledge, this is the first study using the scoping review approach to include any literature published to date.
The Importance of Studying YR

According to the PRISMA flowchart (see Figure 1), there were less than 2,000 articles from six different resources about YR globally whereas for OR, there were approximately 20,000 articles from PubMed alone. However, YR are considerably different from OR with a unique set of clinical and nonclinical characteristics. Therefore, this scoping review makes an important contribution to understanding what is known from the literature and what questions remain open to be addressed with future research.

The Individual Characteristics of YR

The YR from this study were primarily White male, single, had a low education level (illiterate to primary school), NH residents for 3 years, and had limited family support. While we cannot determine comprehensively the number and type of diagnoses, the included studies were focused on debilitating conditions such as, mental illness (e.g., depression, schizophrenia), traumatic injury (e.g., cerebrovascular accident, spinal cords injury), and hemi–quadriplegia. Meanwhile, two of the included studies reported OR who were mainly White female, widowed, and had a diagnosis of dementia or memory problems. The findings summarized above were consistent with studies conducted by Fries et al. (2005), Muenchberger et al., (2012), Mehr et al., (1993) and Nelson and Bowl, (2017) suggesting that YR share similar individual characteristics worldwide.

We found that YR had low literacy levels, (Khader, 2011; Marshall & Baffour, 2011; Presson & Ostwald, 2009; Subasi & Hayran, 2005) which are barriers to completing higher education. Additionally, lower literacy has been linked to problems such as limited or delayed diagnoses (Bennett et al., 1998), weaker self-management skills (Williams et al., 1998), increased mortality risks, (Baker et al., 2007) and higher health care costs (Howard et al., 2005). For YR with traumatic brain injury and hemi- or quadriplegia, they were likely admitted to NHs due to
motor vehicle accidents or violence such as gun shots, combat injuries, sport injuries, and falls as these are some common causes of death in males and younger age groups (Centers for Disease Control and Prevention, 2020; Cunningham et al., 2018). As a result, increasing the use of seat belts, keeping teens safe on the road, and reducing drinking and driving can be beneficial to decrease the risk of long-term confinement from accident injuries (Centers for Disease Control and Prevention, 2009). Finally, poor mental health in YR may affect mood, thinking, and behavior; more importantly, people with mental illness may tend to have depression, suicidal ideation, schizophrenia, and eating disorders (Office of Disease Prevention and Promotion, 2020). Consequently, closely monitoring YR for mental health concerns during their stay is crucial.

**Lived Experiences, Needs and Quality of Life**

We categorized the findings into five themes and found that YR viewed privacy, autonomy, identity, socialization, and appropriateness of accommodation as the most important criteria for determining their quality of life. This finding was similar to a systematic review examining quality of life in older NH residents (Lee et al., 2009). To illustrate, older people consider their ability to maintain independence, autonomy, individuality, environmental readiness, and socialization as the major criteria influencing their quality of life (Lee et al., 2009). The overarching themes between YR and OR were similar but given that the individual characteristics such as marital status, disease diagnoses, cognitive functions (Fries et al., 2005) were considerably distinct between these two populations, the needs that can put into as a theme were quite different. For instance, both YR and OR prefer to have choice and social activities while residing in NHs. However, YR prefer to meet with similar age peers and play video games or listen to music that caters to their genre. Older NH residents enjoy self-care and leisure activities (Duncan-Myers et al., 2000). Appelholf et al. (2017) focus on the quality of life in NH
residents with young-onset dementia (YOD) and reported that their quality of life was negatively associated with advanced dementia and the factors such as agitation/aggression, depression, and apathy. Additionally, their findings suggested that both late-onset dementia and YOD NH residents share the same determinants of quality of life. Other studies (Duncan-Myers et al., 2000; Lee et al., 2009) focusing on quality of life in NH residents had proposed the importance of environmental modification to improve their quality of life. Therefore, if NHs want to accommodate these two populations, it is likely that they need to design different wings or buildings since they are substantially different populations.

There were mixed findings related to age and quality of life. Two studies (Subasi & Hayran, 2005; Watt & Konnert, 2007) reported that there were no significant results between age and quality of life and these findings were somewhat surprising compared with the qualitative outcomes presented in Table 2. NH environments were often criticized for the lack of privacy and the limited space associated with shared accommodation. However, Khader (2011) indicated that quality of life is different between younger and older NH residents. Khader (2011) reported domains of quality of life rather than the total scores of quality of life which may contribute to mixed findings. Studies also differed in other methodologies and sample composition.

**Conclusions and Implications**

YR residing in NHs is a rising phenomenon in many countries yet little has been studied. The summary of findings from this review can serve as a reference to guide decision making to provide an appropriate care environment for the younger population in long-term care settings. Additionally, this study suggested strategies for improving quality of life including increasing autonomy and socialization within the same age group, providing age-appropriate activities, and training existing staff to take care of the YR. In fact, some studies mentioned positive outcomes that YR expressed as while residing in NHs such as positive aspect of volunteering or helping
others. However, these types of responses were too scarce to comprise a theme. Future research can explore positive outcomes in these residents and determine appropriate interventions (e.g., activities, outings, community resources) for improving quality of life in YR. In sum, the identified themes of this scoping review provided some essential suggestions to help better understand the lived experiences, needs, and quality of life of the YR so that long-term care policy makers, researchers, care staff as well as program planners can work collaboratively to help optimize their quality of life.
Records identified through database searching
(PubMed=147)
(CINAHL=91)
(PsychINFO=69)
(Web of Science=145)
(Scopus = 1,208)

Additional records identified through other sources (n=6)

Records after duplicates removed
(n = 1334)

Records excluded
(n = 1307)

Title and Abstract
Records screened
(n =1,334)

Full-text articles excluded, with reasons
(n=14).
Unable to retrieve full text (n=6)
Ineligible outcomes
(n=5)

Full-text articles assessed for eligibility
(n =27)

Studies included in synthesis (n = 13)
<table>
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<tr>
<th>Qualitative Study (N=7)</th>
<th>Purpose</th>
<th>Geographic</th>
<th>LTC Setting</th>
<th>Population/Sample Size</th>
<th>Inclusion/Exclusion Criteria</th>
<th>Study Design</th>
<th>Data Collection Techniques</th>
</tr>
</thead>
</table>
| Dwyer et al., 2019     | To explore the lived experiences of YR with ABI. | Ireland | 1NH | • Mean age= 45 years  
  • Total=6  
  • Male=5  
  • Female=1  
  • Race: NR  
  • Marital status: NR  
  • Academic level: NR  
  • LOS: 1-9 years (average 4.3 years) | Inclusion: (1) Age <60 with ABI (2) Ability to communicate verbally (3) Living in NHs ≥ six months (4) White (5) Middle class background | Phenomenological approach | Interview |
| Hay et al., 2013       | To explore the QoL of YR. | Canada | 1NH | • Age range: 40-68 years  
  • Total=19  
  • Male=14  
  • Female=5  
  • Race: all White  
  • Marital status: NR  
  • Academic level: NR  
  • LOS: 5 months-10 years (average 3.4 years) | Inclusion: (1) Age <70 living in NHs three months or more (2) Ability to communicate verbally (3) Cognitively intact | Exploratory phenomenological approach | Interview, focus group, and discussion |
| Jervis, 2002           | To explore the experiences of YR with psychiatric disorders. | USA | 1NH | • Age range: NR (10 of whom were under age 65 were conducted)  
  • Total=10  
  • Race:  
  White 13(72%)  
  Black 2(11%)  
  American Indian 2(11%)  
  Hispanic 1(6%)  
  • Marital status: NR  
  • Academic level: NR  
  • LOS: NR | Inclusion:(1) Age < 65 with at least one psychiatric and medical diagnosis [Psychiatric disorder (schizophrenia), dementia, cognitive disorder, depressive or bipolar disorder] | Ethnography | Observation, interview, and medical record review |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Purpose</th>
<th>Country</th>
<th>Setting</th>
<th>Age Range</th>
<th>Total</th>
<th>Gender</th>
<th>Race</th>
<th>Marital Status</th>
<th>Academic Level</th>
<th>LOS</th>
<th>Inclusion</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith, 2004</td>
<td>To explore the experiences of YR.</td>
<td>Australia</td>
<td>NH</td>
<td>40-57 years</td>
<td>8</td>
<td>4:4</td>
<td>All White</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>Participation was restricted to those people with physical incapacity who were medically stable and able to communicate</td>
<td>Biographical approach</td>
</tr>
<tr>
<td>Marshall Jr. et al., 2011</td>
<td>To explore the perceptions of YR concerning their experiences.</td>
<td>USA</td>
<td>NH</td>
<td>18 to 45</td>
<td>15</td>
<td>9:6</td>
<td>Black=12 Hispanic=1 White=2</td>
<td>Single=14 Married=1</td>
<td>Post-secondary education/training (42.6%)</td>
<td>2.78 years</td>
<td>(1) Age 18-45. (2) Reside in facilities 30 days or more. (3) Cognitive intact and alert</td>
<td>Ground Theory</td>
</tr>
<tr>
<td>Barber et al., 2020</td>
<td>To explore the lived experiences of YR regarding their long-term health and aging-in-place needs.</td>
<td>Canada</td>
<td>NH</td>
<td>36-60</td>
<td>11</td>
<td>3:8</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>(1) Age &lt;65; (2) Ability of participants to communicate with or without a support person (3) Participants were able to provide their own consent to participate in the study (4) Self-identify experiencing a disability including but not limited to</td>
<td>Purposive phased recruitment strategy; Guided by the social-ecological model</td>
</tr>
<tr>
<td>Study</td>
<td>Objective</td>
<td>Setting</td>
<td>Sample Characteristics</td>
<td>Methodology</td>
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<tr>
<td>D'Or et al., 2020</td>
<td>To gain insights into the psychosocial impact of placement in a residential ACF and identity strategies the YR with a disability utilizes to adjust to their living environment.</td>
<td>Australia</td>
<td>Age range 45 to 61 &lt;br&gt; Total=4 &lt;br&gt; Male=1 &lt;br&gt; Female=3 &lt;br&gt; Race: NR &lt;br&gt; Marital status: NR &lt;br&gt; Academic level: NR &lt;br&gt; LOS: 10 months – 15 years</td>
<td>Interpretative phenomenology, Interview, semi-structured questions</td>
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<tr>
<td>Quantitative Study (N=4)</td>
<td>Purpose</td>
<td>Geographic Setting</td>
<td>Population/Sample Size</td>
<td>Inclusion/Exclusion Criteria</td>
<td>Study Design</td>
<td>Data Collection Techniques</td>
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</tbody>
</table>
| Khader, 2011            | To examine QoL among residents and factors that may influence QoL, and the relationship between QoL and certain demographics. | Jordan | 3NHs | • Age: 50–59 = 39 (27.9%) 59–69 = 28 (20.0%) 69-79 = 43 (30.7%) 79 and above = 30 (21.4%)  
  • Total = 140  
  Male = 70 (50%)  
  Female = 70 (50%)  
  • Race: NR  
  • Marital Status:  
    Single=41 (29.3%)  
    Married=9 (6.4%)  
    Divorced=40 (28.6%)  
    Widow=29 (20.7%)  
    Separated=21 (15%)  
  • Academic level:  
    Illiterate=35 (25%)  
    Basic cycle=45 (32.1%)  
    Secondary=32 (22.9%)  
    Diploma/university=28 (20.0%)  
  • LOS:  
    Less than 3 years=35 (25%)  
    3-7 years=45 (32.1%)  
    7-11 years=32 (22.9%)  
    11 or more=28 (20%)  
  Inclusion: all residents residing in three government supported NHs. | Cross-sectional, descriptive, correlational study | Structured interview using the WHO-QOL-BREF (minor cultural modifications) tool |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subasi et al., 2005</strong></td>
<td>To examine the relationship between life satisfaction and the sociodemographic characteristics of the elderly.</td>
</tr>
<tr>
<td><strong>Turkey</strong></td>
<td>3NHs</td>
</tr>
<tr>
<td>Age:</td>
<td>60–69 = 61 70–79 = 76 80 and above = 46</td>
</tr>
<tr>
<td>Total:</td>
<td>183 Male = 106 Female = 77</td>
</tr>
<tr>
<td>Race:</td>
<td>NR</td>
</tr>
<tr>
<td>Marital Status:</td>
<td>Single = 161 Married = 22</td>
</tr>
<tr>
<td>Academic level:</td>
<td>No education = 38 (20.8%) Primary school = 109 (59.6%) Secondary school = 24 (13.1%) University = 12 (6.5%)</td>
</tr>
<tr>
<td>LOS:</td>
<td>NR</td>
</tr>
<tr>
<td><strong>Inclusion:</strong></td>
<td>(1) Age &gt; 60 being in stable medical condition (2) Being independent and can carry out daily living activities (3) Intact mental and cognitive functions. (4) Not bedridden or in a wheelchair.</td>
</tr>
<tr>
<td><strong>Exclusion:</strong></td>
<td>(1) Residents with cardiovascular, pulmonary, metabolic, and/or musculoskeletal disease.</td>
</tr>
<tr>
<td><strong>Winkler et al., 2006</strong></td>
<td>To describe the characteristics and examine the occupational participation by measuring social contact, participation in recreation, and community access.</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td>RAC NH = 626 (78% response rate with one response no willing to participate in this study)</td>
</tr>
<tr>
<td>Age (n = 327)</td>
<td>&lt;30 = 13 (4%) 30–39 = 22 (7%) 40–49 = 75 (23%) 50–59 = 217 (66%) Mean (SD) = 50.48 (+/- 8.69)</td>
</tr>
<tr>
<td>Approximately</td>
<td>participants N = 478 and (73% of 451) required high clinical nursing home level of care. The results presented refer to these residents. Sex (n = 328) Male = 160 (49%) Female = 168 (51%)</td>
</tr>
<tr>
<td><strong>Inclusion:</strong></td>
<td>(1) Age &lt; 60 (2) All facilities in Victoria, Australia.</td>
</tr>
<tr>
<td><strong>Exclusion:</strong></td>
<td>Cross-sectional, descriptive study</td>
</tr>
<tr>
<td><strong>Survey of Directors of Nursing</strong></td>
<td>Interview and survey with LSI-A questionnaire</td>
</tr>
</tbody>
</table>
| Watt et al., 2007 | To examine QoL of YR and to assess differences in QoL between YR and OR. | Canada | 1NH | **Race:** NR  
**Marital status:** NR  
**Academic level:** NR  
**LOS (days) (n=320) Min=3 Max=8535(23 years) Mean (SD)=1427.9(+/-1431.7) (3.9 years)** |
|------------------|---------------------------------------------------------------------|--------|-----|-------------------------------------------------------------------|

- **Age**  
<65 =43 [Mean age =53.7, SD=7.46, age range: 25-64]  
65 and above=38 [Mean=79.92, SD=8.08, range=66-97]  
- **Total=81**  
Younger Male= 51.2%  
Older Female= 65.8%  
- **Race:** NR  
**Marital status**  
Younger: Single=30.2% Married=32.6% Divorced= 25.6%  
Older: Widowed=57.9% Married=21.1%  
- **Academic level:** NR  
**LOS:** NR  

**Exclusion:**  
(1) MMSE < 20 (2) Too physically ill to participate in the study. (3) Lived in NHs less than six months. (4) Unable to communicate.  
**Cross-sectional, correlational, descriptive study**  
**Interview, survey with LSI-A questionnaire, [QOLP-PD, QOLP-SV, MDS-ADL for functional health, NRS-11 for pain, MMSE for mental status] and BBB model**
<table>
<thead>
<tr>
<th>Mixed-Methods Study (N=2)</th>
<th>Purpose</th>
<th>Geographic</th>
<th>LTC Setting</th>
<th>Population/Sample Size</th>
<th>Inclusion/Exclusion Criteria</th>
<th>Methods (E.G., Analysis)</th>
<th>Data Collection Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cameron et al., 2001</strong></td>
<td>To identify the number of YR with ABI and to evaluate the readiness of ACF.</td>
<td>Australia</td>
<td>ACF=493 (75% response rate) so n=369 were included in this study but only 97 facilities were serving ABI residents</td>
<td>• Age ≤30= 12(5.7%) 31-45=43(20.6%) 46-55=64(30.6%) 56-65=90(43.1%)  Total= 209  • Participants’ gender: NR  • Race: NR  • Marital status: NR  • Academic level: NR  • LOS: NR</td>
<td>Inclusion: ABI. Exclusion: congenital disorders, degenerative neurological conditions, or acquired foetal damage</td>
<td>Cross sectional, descriptive study</td>
<td>Survey of director of nursing or manager of all ACF about their residents?</td>
</tr>
<tr>
<td><strong>Persson et al., 2009</strong></td>
<td>To describe the demographic and functional characteristics of the YR and to examine the needs and issues described by staff and identify strategies that can help improve YR's QoL.</td>
<td>USA</td>
<td>8NHs</td>
<td>• Mean age=51.3 years, SD=8.86, age range: 23.6-64.8  Total=136 (participate rate=74%)  Male=90(66%)  Female=46(34%)  • Race (n=135)  White=49(36%)  Black=71(53%)  Hispanic=13(10%)  Asian=2(1%)  • Marital Status: (n=135)  Never married=68  Married=38  Widowed= 12  • Academic level (n=123) Grade 11 or less =29 (24%)</td>
<td>Inclusion: Age &lt;65.</td>
<td>Descriptive, correlational study</td>
<td>Interview and focus groups</td>
</tr>
<tr>
<td>Education Level</td>
<td>Number</td>
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<tr>
<td>High school graduate</td>
<td>62 (50%)</td>
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<tr>
<td>Some college/technical school</td>
<td>24 (20%)</td>
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<tr>
<td>Bachelor or graduate degree</td>
<td>8 (7%)</td>
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</tbody>
</table>

- LOS: NR

Abbreviation: ABI: Acquired brain injury; ACF: Aged care facilities; BBB model: Being, Belonging, and Becoming model; CP: Cerebral palsy; Length of Stay: LOS; LSI-A: Life satisfaction index-A; MDS: Minimum data set; MDS-ADL: Minimum Data Set- Activity of Daily Living; MMSE: Mini-Mental State Examination; Multiple sclerosis: MS; NHs: Nursing homes; NR: not reported; OR: older residents; QOLP-SV: Quality of Life Profile: Seniors Version; QoL: Quality of life; WHO BREFF: WHO Quality of Life-BREF; QOLP-PD: Quality of Life Profile: Version for Persons with Physical and Sensory Disabilities; RAC: Residential aged care; YR: Younger residents.
### Table 2. Main Findings

<table>
<thead>
<tr>
<th>Main theme</th>
<th>Confinement</th>
<th>Lack of socialization</th>
<th>Lack of privacy</th>
<th>Lack of appropriate settings to accommodate YR</th>
<th>Loss of identity</th>
<th>Selected Illustrative Quotations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub themes</strong></td>
<td>1. Confined in NH facilities 2. Not being included in most decision process and not involved in the placement assignment 3. No other options but to stay in NHs</td>
<td>1. With YR (peers) 2. With wider community 3. With family, friends, and significant others 4. Age-appropriate activities</td>
<td>1. Personal hygiene routines 2. Intimacy</td>
<td>1. NHs viewed as old folks' home 2. Not a true home but as a refuge 3. Does not meet the need</td>
<td></td>
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</tr>
<tr>
<td><strong>Dwyer et al., 2019</strong></td>
<td>S</td>
<td>S(1,2,4)</td>
<td>N/S</td>
<td>S (1)</td>
<td>S (3)</td>
<td>Confinement:  “It is terrible, it is terrible, it is not for me, not for a young person.”  “… So many people have died there, I am in their company and helping people here and there and next thing you know they are after dying.”  “You are not encouraged to do anything for yourself in a nursing home… but I wanted my independence back.”  “I couldn’t have the dinner at any other time…. I had to eat it at the time because they couldn’t rehear it like, you know.”  Lack of socialization  “If nobody comes to see my I am on my own basically at the four walls…”  “all participants articulated an empty landscape of time, largely devoid of meaning and characterized by boredom, loneliness and depression.”</td>
</tr>
</tbody>
</table>
“The remaining participants expressed tremendous loneliness and a depressive state concurrent with their social needs going unfulfilled” “His lack of control over when others visit him, coupled with his inability to watch TV due to ABI-related vision difficulties, contribute to a lonely, limited self.”

**Lack of appropriate settings to accommodate YR**

“They described this setting as a place for older adults who are dying and often suffering from dementia.”

<table>
<thead>
<tr>
<th>Hay et al., 2013</th>
<th>S(1,3)</th>
<th>S [They included both positive and negative socializations]</th>
<th>S(2)</th>
<th>N/S</th>
<th>N/S</th>
</tr>
</thead>
</table>

“Overall QoL:

“The QoL is terrible, it is terrible…”

**Lack of socialization**

“real contact is not that much.”

“Sometimes, for the younger ones like myself, there is nothing that really could interest someone my own age.”

<table>
<thead>
<tr>
<th>Jervis, 2002</th>
<th>S</th>
<th>S(1,2,4)</th>
<th>S(2)</th>
<th>S (2) [The author viewed it as a negative result but the YR viewed it in a more positive way]</th>
<th>S (1)</th>
</tr>
</thead>
</table>

**Confinement:**

“Just because residents have a mental problem or there are emotionally unbalanced does not mean that they should put ‘em here with these old folks who are on their way out.”

(no direct quote) Manchester residents used their psychiatric difficulties and the lack of suitable alternatives to explain and justify their placement in a locale in which they were culturally “out of place.”

**Lack of appropriate setting:**

“The longest I’ve ever been at any place in all my life. I’m used to jumping around and all this stuff, and group homes and streets and everything; you name it, I was in. I didn’t have a stable living situation ‘til I came to Manchester. Not even a home. So, it says a lot for Manchester when I’ll stay around.”
Smith, 2004

<table>
<thead>
<tr>
<th>S (2,3)</th>
<th>S</th>
<th>N/S</th>
<th>S</th>
<th>S (1,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confinement</td>
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<tr>
<td>“Can’t go dancing anywhere, too far from here.”</td>
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<tr>
<td>Lack of socialization</td>
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<tr>
<td>“There are not any other people in my age group. I feel like I am talking with my mother all the time…”</td>
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<td>“I would like to play hockey, tennis, cricket, swimming, dancing... Singing and dancing I like.”</td>
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<tr>
<td>Loss of identity:</td>
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<td>It’s just not normal. I don’t fit.</td>
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<tr>
<td>Mary felt sorrow for the child she saw infrequently and Rosemary for the children she would never have.</td>
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</table>

Marshall et al., 2011

<table>
<thead>
<tr>
<th>N/S</th>
<th>S (2,3,4)</th>
<th>N/S</th>
<th>S (3)</th>
<th>S (2,3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of social support</td>
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<tr>
<td>“My aunt comes from North Carolina to put my mother in an assisted living over in College Park ...and me here. They split us up ...and I miss my mother terribly.”</td>
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<tr>
<td>“My father tried to come around and ... I don’t know what happened ...he became uncomfortable around me.”</td>
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<tr>
<td>“That’s another thing that really depresses me ... not to have my mother to lean on sometimes. My mother and I were a team and we are still a team.”</td>
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<tr>
<td>Lack of empowerment</td>
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<tr>
<td>“They [children] don’t come more than what I expect. They come when the baby[’s] mother wants them to come or wants something [from me].”</td>
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<tr>
<td>Lack of personhood</td>
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<tr>
<td>I haven’t seen him [his son] since I been here. He live in Baltimore with his mother.</td>
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</tbody>
</table>
She doesn’t really understand. That is a whole another piece of cake. I would love to see him. I call him and talk to him on the phone.”

Lack of socialization

“Everything is timed: when you eat, when you do this, when you do that and whatever... I got to get out of here and just do my own thing.”

“I would make it more social. We [younger residents] would get together in the dining room and just socialize. They would play music.... I wish there were a computer lab because I miss being on my computer.”

Confinement:

“...decision-making regarding day to day living within the residential aged care environment was also identified as a challenge for the participants of this study.”

“They were not included in the majority of decision-making regarding their placement into a residential aged care facility.”

Lack of socialization

“I’d rather be with younger people. I mean when you stop and think about the reality of it. ‘Oh, my best friend is ninety-eight years old. They could die tomorrow you know.’ Like, it is not a good idea to make too close of an attachment with these people.”

“Participants of this study disconnected from family and friends.”

D’or et al., 2020

Barber et al., 2020
supposed to be coming to see me this week. I don’t know whether he will or not."
"The current findings are similar as younger residents in this study experienced limited social networks and opportunities for community participation, which resulted in an increased reliance on interpersonal relationships within the LTC home."

<table>
<thead>
<tr>
<th>Mixed- Methods Study (N=2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main theme</strong></td>
</tr>
<tr>
<td>Cameron et al., 2001</td>
</tr>
</tbody>
</table>
Persson et al., 2009

<table>
<thead>
<tr>
<th>Abbreviation: S: specify; N/S: not specify; YR: younger residents.</th>
<th>Confinement:</th>
</tr>
</thead>
<tbody>
<tr>
<td>“This place here… makes you feel like you are a captive.”</td>
<td></td>
</tr>
<tr>
<td>“It is hell [to live here]”</td>
<td></td>
</tr>
<tr>
<td>“I get up and brush my hair and put on makeup and wait for breakfast… Then I just walk around and sit outside… And then next thing is lunch, same story. Then dinner.”</td>
<td></td>
</tr>
<tr>
<td>Lack of socialization</td>
<td></td>
</tr>
<tr>
<td>“I wish they had a football team, and I could be a player.”</td>
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</tr>
<tr>
<td>“I mostly stay in my room, I don’t like to float around too much.”</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3. Main Findings (Cont.)

<table>
<thead>
<tr>
<th>Findings</th>
<th>Quality of life (QoL)</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Khader, 2011</strong></td>
<td>(1) QoL was statistically significant related to age (p&lt;.05). (2) YR reported better QoL in psychological domain.</td>
<td></td>
</tr>
<tr>
<td><strong>Subasi et al., 2005</strong></td>
<td>(1) QoL was not statistically significant related to age. (2) QoL was statistically significant related to marital status (t=2.25, p = 0.02), leisure time activity (p = 0.03), education level (F=2.97, p = 0.03) and place of residence (F=13.94, p = 0.001).</td>
<td></td>
</tr>
<tr>
<td><strong>Winker et al., 2006</strong></td>
<td>N/S</td>
<td>(1) Many of the participants were socially isolated. (2) Family members tended to be the only ones who maintained contact with them. (3) Many of them were effectively excluded from the community.</td>
</tr>
<tr>
<td><strong>Watt et al., 2007</strong></td>
<td>(1) QoL measures were not statistically significant related to age. (2) YR reported better QoL in physical belonging domain. (3) YR reported worse QoL in community belonging domain. (4) Study suggested that it was YR perceived health and pain that were related to QoL.</td>
<td>(1) For YR (n=43) 40% had visitors 1 to 2 times per week, 14% once a month and 7% less than once a month. 21% less than once a month involve in activities.</td>
</tr>
</tbody>
</table>
### Mixed- Methods Study (N=2)

<table>
<thead>
<tr>
<th>Findings</th>
<th>Quality of life (QoL)</th>
<th>Others</th>
</tr>
</thead>
</table>
| Cameron et al., 2001 | N/S | (1) YR experienced numerous kinds of challenges while residing in NHs.  
(2) The current use of housing for YR with ABI is inappropriate and does not meet their needs. |
| Persson et al., 2009 | N/S | (1) YR responses to the questions/prompts varied and indicated this is not a homogeneous population.  
(2) Four themes emerged: Regimentation of Life; Activities Give You Freedom; Being a Captive; and Our Life Slices Are Very Different  
(3) There were no significant differences in these characteristics [between age and functional characteristics, desire to return to the community, family support for discharge, and predicted duration of stay in the nursing home facility] by age group |

Abbreviation:  N/S: not specify; YR: younger residents; QoL: quality of life
Table 4. Quality Assessment of the Included Studies using the MMAT (n=13)

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<tr>
<td>S1. Are there clear research questions?</td>
<td>Y</td>
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<td>S2. Do the collected data allow to address the research questions?</td>
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<td>1. QUALITATIVE STUDIES</td>
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<td>1.1. Is the qualitative approach appropriate to answer the research question?</td>
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<td>Y</td>
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<td>1.2. Are the qualitative data collection methods adequate to address the research question?</td>
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<td>1.3. Are the findings adequately derived from the data?</td>
<td>Y</td>
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<td>1.4. Is the interpretation of results sufficiently substantiated by data?</td>
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<td>1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?</td>
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<td><strong>4. QUANTITATIVE DESCRIPTIVE STUDIES</strong></td>
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<td>4.1. Is the sampling strategy relevant to address the research question?</td>
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<td>4.2. Is the sample representative</td>
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<td>4.3.</td>
<td>Are the measurements appropriate?</td>
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<td>4.4.</td>
<td>Is the risk of nonresponse bias low?</td>
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<td>Y</td>
<td>Y</td>
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<td>4.5.</td>
<td>Is the statistical analysis appropriate to answer the research question?</td>
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<td>Y</td>
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<td>5.1.</td>
<td>Is there an adequate rationale for using a mixed methods design to address the research question?</td>
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<td>Can't tell</td>
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<td>5.2.</td>
<td>Are the different components of the study</td>
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<td>5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?</td>
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<td>5.5. Do the different components of the study adhere to the quality criteria</td>
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<td>Traditions of each method involved?</td>
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Abbreviation: Y: Yes.
REFERENCES


CHAPTER 3: A CROSS-SECTIONAL, CORRELATIONAL STUDY COMPARING INDIVIDUAL CHARACTERISTICS OF YOUNGER AND OLDER NURSING HOME RESIDENTS USING WESTERN CANADIAN RAI-MDS 2.0

Introduction

The average life expectancy has increased from 68 to 80 years old in North America between 1950 and 2015 (Roser et al., 2019). As a result, the demands on the LTC system and services have grown, especially for countries such as Canada and the US that are experiencing an “ageing population” (Government of Canada, 2021; United States Census Bureau, 2019). NHs are an essential component of the LTC system, which provide a variety of services including medical and personal care to people who are unable to manage independently in the community (Center for Disease and Control and Prevention, 2020). Thus, the care approaches in NHs are typically geared toward the older population.

However, not only older people live in NHs, as there is also an increasing number of younger NH residents (YR), a population that has received little attention in research and policy. YR, for the purpose of this study, are defined as being between 18 and 64 years of age. Increasing numbers of YR are occurring in US NHs, where there has been an increase of 13 % to 16 % between 2008 and 2015, although the total number of residents has declined from nearly 3.2 million to roughly 1.4 million (Center for Medicare and Medicaid 2008, 2015). Concurrently, the percentage of YR from Canadian NHs has steadily increased from 6.2 % (N=8,919) to 6.7 % (N=12,852) between 2012 and 2019 (Canadian Institute for Health Information [CIHI], 2012, 2019). Most speculate that there are substantial differences between YR and older NH residents (OR). In fact, Fries et al. (2005) used the MDS to examine the disease diagnoses of NH residents
in the US, and found that YR were less prone to Alzheimer’s and Parkinson’s compare with OR. Previous studies mainly used a qualitative approach and had small sample sizes, or were published decades ago to solely examine the lived experiences and needs of YR (Watt et al., 2007; Cameron et al., 2001; Smith, 2004). Moreover, there is limited data on YR in Canadian NHs and the increasing percentage of them suggests the need to understand the individual characteristics of YR and how they differ from the OR. Therefore, larger scale cohort studies of YR compared with OR are needed. This study used secondary data from the Canadian Resident Assessment Instrument Minimum Data Set (MDS 2.0), which are collected quarterly and passed onto CIHI quarterly for public reporting. The rationale to conduct this study was the idea that knowing the characteristics of YR in NHs will help to better understand the differences between YR and OR in Canada, as well as provide the groundwork to intervene to better meet their unique needs. Furthermore, the results could be used to generalize countries that are using the MDS to assess residents in LTC settings.

The purpose of this study was to describe and compare individual characteristics between YR and OR from NHs in Western Canada. The rationale for the study was to identify differences in YR in NHs as well as potential domains for tailoring care to address their needs.

**Conceptual Framework**

The conceptual framework of this study (Figure 1) depicts the two study groups and individual characteristics that potentially differ within these groups. The rationale for including this set of individual characteristics was twofold. First, this set of resident characteristics includes clinical and nonclinical characteristics that will provide data on the overall physical and emotional health of residents. Second, this set of resident characteristics is readily available in the MDS 2.0, which increases the feasibility of the study and may facilitate a generalization of findings for other North American NHs. The results will provide the insight needed to grasp
Canadian NH populations, especially the YR, which is not readily available in Canada or elsewhere.

Figure 3. Conceptual Framework for Aim 2

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Individual Characteristics</th>
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<tbody>
<tr>
<td>&lt;65 years old</td>
<td>Sex</td>
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<tr>
<td>35-50 y/o</td>
<td>Marital Status</td>
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<tr>
<td>51-64 y/o</td>
<td>Disease Diagnoses</td>
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<tr>
<td>≥ 65 years old</td>
<td>Body Mass Index</td>
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<tr>
<td>65-80 y/o</td>
<td>Physical Functions</td>
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<td>81 y/o and above</td>
<td>Cognitive Functions</td>
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<td>Depressive Symptoms</td>
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**Rationales for Choosing Selected Variables**

This study will examine the relationship between the ages of NH residents as well as seven clinical and nonclinical characteristics. The definitions and rationale for including these seven characteristics in the study are described below.

**Age Groups:** This study used age 65 as a threshold to dichotomize residents as younger vs. older for the following reasons: First, people age 65 and over traditionally have been defined as older adults (Office of Disease Prevention and Health Promotion, 2019). Next, many government benefits such as pensions for the elderly are distributed to people that are age 65 and above (Government of Canada, 2021; Benefit.gov, 2018). Finally, the care and programs in NHs are usually tailored to the older population, because more than 90% of the NH population is age 65 or older in Canada (CIHI, 2015) and more than 80% in the U.S. (CMS, 2015), but the increasing number of YR is a new trend. Therefore, using age 65 as the cutoff provides an indication of group membership that may be valid and provide a preliminary, provisional estimate of group differences.
**Sex:** It is of interest to analyze the relationship between age and sex, as the care needs will likely differ by gender, and women are more likely than men to require LTC for longer durations (Feder & Komisar, 2012). Thus, we were curious about whether this trend is the same in NHs, as the results can help us to better understand the demographics of NH residents in Western Canada.

**Marital Status:** It is of interest to understand the marital status of YR vs OR in NHs, as this evidence may suggest how their family structure and support systems may differ, and the kinds of resources they may need to optimize their quality of life.

**Disease Diagnoses:** Disease: This study included selected disease diagnoses variables based on evidence from three studies included in the scoping review from Chapter Two (Barber et al., 2020; Hay et al., 2013; Watt et al., 2007). The diagnoses in the study included seizures, hemi- or quadriplegia, CVA, TBI, multiple sclerosis, Alzheimer’s disease, Parkinson’s disease, Dementia, Cancer, ASHD, CHF, Diabetes, Depression, Manic depressive, and Schizophrenia. These diseases were selected because they are associated with current ADLs status, cognitive status, mood and behavior status, medical or nursing care, or risk of death (CIHI, 2010). It is important to explore this variable because the findings may serve as an indicator of the clinical needs of NH residents for the next few years in Canada.

**Body Mass Index (BMI):** BMI was defined in this study as a measure of body fat based on height and weight, calculated as a person's weight in kilograms divided by the square of height in meters (CDC, 2021). It has been used for defining anthropometric height/weight characteristics in individuals to categorize them into groups (i.e., underweight, normal, overweight, and obese). In this study, BMI was classified in six categories: underweight (BMI is less than 18.5), normal weight (BMI in the range of 18.5 to <25), overweight (BMI in the range
of 25 to <30), and obesity: Class I (BMI is 30 to <35), Class 2 (BMI is 35 to <40) and Class 3 (BMI is 40 or higher) (CDC, 2021). Previous studies have revealed that obesity is associated with poor HRQoL (Pimenta et al., 2015; Busutil et al., 2017). For example, a finding in a U.S. study indicated that YR (median age 64) compared to those older than 64 were the most obese (BMI 50 kg/m^2); moreover, residents with higher BMI require extra staff time to provide care and assistance with ADLs (Harris et al., 2018). Using the MDS 2.0 data from Canada to examine the residents’ BMI is crucial, because the results may indicate the degree to which Canadian NHs residents are obese, how this varies with age, and how to focus interventions to help weight control.

**Physical Function and Cognitive Function:** Physical function was conceptually defined as a resident’s potential for performing ADLs (Morris et al., 2012). It was measured using the Activities of Daily Living Hierarchy Scale (ADL-H) embedded in the RAI-MDS 2.0. Cognitive function was conceptually defined as “to determine the resident’s performance, including the ability to remember recent and long-past events, think coherently and organize daily self-care activities” (Morris et al., 2012). This was measured using the Cognitive Performance Scale (CPS), which was based on items embedded in the MDS 2.0. A systematic review study conducted by Jing et al. (2016) indicated that low levels of physical function and independence with performing activities of daily living (e.g., dressing, mobility and personal toiletry) in dementia patients were associated with low quality of life. In addition, high levels of cognitive impairment are associated with low quality of life in dementia patients (Beerens et al., 2013). However, little is known about how these variables might relate to quality of life in YR. As a result, looking at these variables in YR can help us to better understand this knowledge gap and guide the planning of future research and resident care. For example, the early recognition of
changes in cognitive functions will allow healthcare providers to implement adequate treatments and better healthcare planning (Morley et al., 2015).

**Depressive Symptoms:** Depression was defined as a common and serious medical illness that negatively affects how a person feels, thinks and acts (American Psychiatric Association, 2020). In addition, it has a significant and negative impact on health and quality of life (Brenes, 2007). Depressive symptoms were measured using the *Depression Rating Scale*, embedded in the RAI-MDS 2.0. Beerens et al. (2013) found that depressive symptoms were related to lower quality of life in people with dementia in LTC facilities (including NHs). However, the review did not address the possible link between depressive symptoms and residents without dementia in NHs, nor did they report findings in YR (Beerens et al., 2013). It is estimated that in Canada, almost half (44%) of those age 65 and older living in LTC have depression (Canadian Institute for Health Information, 2010). Hoben et al. (2019) indicated that depressive symptoms are common in LTC residents in Western Canada. However, they did not emphasize the findings in the YR. Therefore, it is crucial to assess depressive symptoms in YR, as the results can offer insights into how many people are being diagnosed with depression in NHs, what kinds of health services and care planning NHs can offer to avoid the situation if it gets worse, and what kind of policy can be proposed to prevent younger adults from getting depression early on.

**Methods**

**Study Design**

This was a retrospective cohort study designed to describe (1) individual characteristics between YR and OR from NHs in Western Canada; and (2) differences in individual characteristics between YR and OR. The data used were from a large-scale, federally mandated data set, the MDS 2.0 from Western Canada.


**Study Setting and Study Sample**

The study setting was NHs from three provinces (Alberta, British Columbia, and Manitoba) in Western Canada and there were a total of 513 facilities and 90,555 unique residents being collected in MDS 2.0 between January 2016 and December 2017. In addition, we included the last available assessment from each resident (full and abbreviated) that performed quarterly.

**Data Source**

This study obtained MDS 2.0 from the TREC database, housed at the Faculty of Nursing, at the University of Alberta, Canada. MDS 2.0 is an assessment that has been mandated for use in NHs in selected Canadian provinces, which is submitted to CIHI quarterly (CIHI, 2019). It contains resident-level data and the reliability and validity of MDS 2.0 have been established through numerous international studies (Poss et al., 2008; Hirdes et al., 2008; Burrow et al., 2000).

**Variable Definitions and Measures**

The following are the variables and definitions included in this study that were based on my conceptual framework, the literature review, and the availability of the data set I will use. The rationale of selecting each variable was described above (Conceptual Framework).

**Sex:** Defined as male, female based on the MDS 2.0 dataset.

**Marital Status:** The variable categorizes residents as never married, married, widowed, separated, and divorced.

**Disease Diagnoses:** Disease diagnosis was selected based on previous evidence provided in three studies included in the scoping review from Chapter Two that focused on YR in Canada (Barber et al., 2020; Hay et al., 2013; Watt et al., 2007). Diagnosis was a categorical variable indicating whether or not one of the medical conditions was present: seizure disorder, hemi-or
quadriplegia, CVA, TBI, manic depressive, schizophrenia, multiple sclerosis, Alzheimer’s disease, Parkinson’s disease, Dementia, Cancer, ASHD, CHF, Diabetes Mellitus, and depression.

**Body Mass Index (BMI):** BMI was a measure of body fat based on height and weight and is calculated as a person's weight in kilograms divided by the square of height in meters (CDC, 2017). It has been used to define anthropometric height/weight characteristics in individuals, to categorize them into groups (i.e. underweight, normal, overweight, and obesity). This study classified BMI in six categories by combing the CDC guidelines and BMI table obtained from the BMI Calculator Canada: underweight (BMI in the range of 9 to <18.5), normal weight (BMI in the range of 18.5 to <25), overweight (BMI in the range of 25 to <30), and obese: Class I (BMI is 30 to <35), Class 2 (BMI is 35 to <40) and Class 3 (BMI is 40 to < 66) (CDC, 2017; BMI calculator Canada, 2020).

**Physical Functions (PF):** PF was conceptually defined as a resident’s potential for performing ADLs (Morris et al., 2012). It was measured using the *Activities of Daily Living Hierarchy Scale (ADL-H)*, embedded in the RAI-MDS 2.0. The ADL-H scale includes 4 items (i.e., personal hygiene, toilet use, locomotion, and eating) and scores ranging from 0 to 6, with a higher score indicating a greater decline in ADL performance (Morris et al., 1994, 1999). The specific items on ADL-H have been validated against the previously reported ADL scales in other LTC settings (Morris et al., 1999). In addition, this was found to have excellent reliability (Kappa >0.75) when testing inter-assessor reliability (Morris et al., 1999).

**Cognitive Functions (CF):** CF was conceptually defined as “the ability to remember recent and long-past events, think coherently and organize daily self-care activities” (Morris et al., 2012). It was measured using the *Cognitive Performance Scale (CPS)*, which is based on items embedded in the MDS 2.0. The CPS measures include memory impairment, level of
consciousness, and executive function, with a 7-point scale ranging from 0=intact, 1=borderline intact, 2=mild impairment, 3=moderate impairment, 4=moderate severe impairment, 5=severe impairment, and 6=very severe impairment (Hartmaier et al., 1995). The CPS has been validated against the Mini-Mental State Examination and the Test for Severe Impairment (Morris et al., 1994).

**Depressive Symptoms (DS):** DS were conceptually defined as feelings of psychic distress (depressed, anxious, or sad) expressed directly by the resident (Morris et al., 2012). DS were measured using the *Depression Rating Scale (DRS)* embedded in the MDS 2.0. The DRS scale included seven items scoring the level of depressive symptoms on a 15-point scale, ranging from 0 to 14 with 0 indicating no symptoms exhibited in the last 30 days, 1 indicating symptoms exhibited up to five days a week, 2 indicating symptoms showing daily or almost daily. If the score was less than 3 there was no depression, and if the score equaled above three, it indicated minor to major depression (Burrow et al., 2000). The DRS scale has been used in multiple studies (Onder et al., 2005; Chamberlain et al., 2020) and the specific depressive symptoms have been validated against the Hamilton and Cornell Scales as well as psychiatrists’ rating (Burrows et al., 2000). In addition, it was found that the DRS scale demonstrated adequate internal consistent reliability (Koehler et al., 2005).

**Age Groups (AGs):** The AGs variable was conceptually defined as residents 18 years old or above in this study, and the operational definition was based on the conventional definition of younger and older, to dichotomize residents into 65 years old and below as the younger group and 65 years old and above as the older group. Subgroups of age were generated based on the developmental stages suggested by Armstrong (2019) (i.e. <35 years, 35-50 years,
51-64 years, 65-80 years, and 81 years and above). The subgroups of age will be used for the purpose of exploratory analysis.

**Ethical Considerations**

Information provided by the MDS 2.0 was completely de-identified to protect the privacy of patients and LTC facilities. In addition, I accessed these data in compliance with the Health Insurance Probability and Accountability Act of 1996. This quantitative research was reviewed and approved by the institutional review boards (IRBs) of the University of North Carolina at Chapel Hill and the University of Alberta, Canada.

**Analysis Plan Rationale**

This study used SPSS version 26 to complete the following data analyses.

**Descriptive Analysis**

The first statistical analysis phase was a descriptive analysis, as this study aimed to describe the individual characteristics of YR and OR in Western Canada from 2017 to 2019, and summarize the results of all proposed variables reporting sample sizes \((N)\) and percentages.

**Bivariate Analysis**

T-tests and chi-square tests were used to conduct the analyses for comparing whether each variable (sex, marital status, BMI, disease diagnoses, physical functions, cognitive functions, and depressive symptoms) differed between age groups (YR and OR).

The t-tests analysis was appropriate to use when one variable was of a continuous nature and the other was dichotomous. In addition, it was used to compare the means of two groups on a given continuous variable (Pagano & Gauvreau, 2018). In this study, age was dichotomized into two groups, while BMI was viewed as a continuous variable. We used the t-tests to explore whether age had a relationship with BMI. That is to say, the significance and strength of association can be assessed by using two-sample independent group t-tests to compare the means.
of each continuous variable of interest (BMI) between age groups, and tables were used to illustrate the results.

In general, the assumptions of two-sample t-test were: (1) The study variables follow the normal probability distribution; (2) The two samples are independent (Holcomb and Cox, 2018).

We assessed normality using the Shapiro-Wilk Normality test, as it has been found to be the most powerful test in most situations (Holcomb and Cox, 2018). If the data distributions did not follow a normal distribution, I used nonparametric tests such as the Wilcoxon Rank Sum Tests.

The Chi-square tests were used to analyze categorical variables (Pagano & Gauvreau, 2000). In this study, sex, marital status and disease diagnoses, activities of the daily living hierarchy scale (ADL-H), CPS, and DRS were defined as categorical variables. We used a chi-square test to explore whether age is related to sex, marital status, disease diagnoses, ADL-H, CPS, and DRS. The assumptions of the chi-square test include that the study groups must be independent; adequate sample sizes for the chi-squared distribution applies; no cell in the table should have an expected count of less than one, and no more than 20% of the cells should have an expected count that is less than five (Pagano & Gauvreau, 2018). In this study, our total sample size was approximately 90,000 and the study population were two independent groups: younger and older NH residents in Canada, and cell counts in any of the tables (age, sex, marital status, disease diagnoses) should be more than adequate.

There may be potential problems related to multiple testing and falsely significant p values (type 1 error) in the bivariate analysis of age and disease diagnoses due to conducting approximately 15 bivariate tests. Thus, in this study, I applied Bonferroni’s correction to get the Bonferroni critical value to adjust for the inflation of a type 1 error (Pagano & Gauvreau, 2018).
In addition, if the expected counts were low (Pagano & Gauvreau, 2018), (i.e., cells with expected n<5) in the disease diagnoses results, then I used Fisher’s exact test throughout. Furthermore, missing values were coded as “missing” so that they were excluded from the analyses. The absence of data reduces statistical power, which refers to the probability that the test will reject the null hypothesis when it is false. In addition, the lost data can cause bias in the estimation of parameters (Kang, 2013).

Finally, I was interested in looking for a relationship between BMI and ADL-H. Thus, if I find any relationships, we will do crosstabulation.

**Exploratory Analysis**

We used Armstrong’s (2019) rationale to classify age into five groups, because this classification was developed based on the human’s developmental stages, which may be more precise than dichotomized NH residents based on the conventional definition of younger (age < 65) and older (age≥ 65). To better understand where these differences lie, we conducted an exploratory analysis by dichotomizing ages based on the developmental phase suggested by Armstrong (2019).

The variables included in this exploratory analysis were individual characteristics, and we compared the 5 age groups with individual characteristics, respectively. This exploratory analysis aimed to describe and compare whether the individual characteristic (stated below) differed by new proposed age groups (stated below). The following section contains two parts: descriptive and bivariate analyses.

**Descriptive Analysis**

This exploratory analysis used a descriptive analysis to describe individual characteristics with alternative age groups (18-34, 35-50, 51-64, 65-80, 80 and above) of NH residents in Western Canada, as there was a new way to differentiate them from the previous analysis. The
results of the proposed variables (sex, marital status, BMI, disease diagnoses, ADH-L, CPS, and DRS) were presented by reporting sample sizes (N) and percentages (%).

**Bivariate Analysis**

We compared whether the individual characteristics differentiated by age in Canadian NH residents, respectively. We used ANOVA and chi-square tests to conduct the above statements. It was appropriate to use one-way ANOVA when the analysis involved one variable that had three or more population means, while the other variable was continuous (Pagano & Gauvreau, 2018). In this analysis, age was categorized into five subgroups and we compared the means of each continuous variable of interest (BMI) between age groups.

The assumptions of ANOVA include: (1) The experimental errors of the data are normally distributed; (2) Equal variances between treatments (can be tested by a F statistics); (3) Independence of samples (Holcomb and Cox, 2018).

In the course of the analysis procedure, the results indicated that there was a significant difference in the ANOVA analysis; thus, it was not necessary to examine what variables differed. In addition, post-hoc tests were implemented to examine mean differences between the groups, but there was a chance to get a Type I error due to the large cell counts. Thus, to control the Type I error rate, it would have been necessary to do a correction test such as Tukey's honestly significant difference (HSD) post hoc test, if the data met the assumption of homogeneity of variances. However, the data met the homogeneity of variance assumptions; thus, we did not run the Games Howell post hoc test (Holcomb and Cox, 2018). Meanwhile, the chi-square tests were used to compare proportions of each categorical variable of interest (sex, marital status, disease diagnoses, ADL-H, CPS, DRS) among different age groups, while the assumptions of the chi-square test are the same as previously noted on page 81. Additionally, we used Kendall’s tau-c to
measure the ordinal association between age and sex, and if there appeared to be a trend in the proportion of female sex across the age groups, then we would use the Cochran-Armitage test (Puka, 2014; Young, 1987).

**Results**

There were 89,240 unique residents residing in 512 Western Canadian NHs across three provinces (Alberta, Manitoba, and British Columbia). The results were reported based on two aims and the findings outlined below.

**Study Aim 1**

Aim 1 was to describe individual characteristics (sex, marital status, BMI, disease diagnoses, physical functions, cognitive functions, and depressive symptoms) of NH residents in Western Canada using the MDS 2.0. Findings are described in Table 5 and below.

**Individual Characteristics among NH Residents from Two Age Groups**

Of the 89,240 unique residents residing in western Canadian NHs, 6,361 (7%) were in the younger age group and 82,870 (93%) were in the older age group (Table 5).

**Sex**

Among YR group, more than half (54%) were male, whereas among OR group, approximately one third (34%) were male. This difference was statistically significant (p<.001), meaning age was related to sex, with those age 65 and under having a higher possibility of being male (Table 5).

**Marital Status**

The top three categories in YR were: never married (40%), married (22%), and divorced (20%). Meanwhile, the top three categories in OR were: widowed (52%), married (25%), and divorced (10%). The chi-square and post-hoc results showed that there was a significant difference (p<.001) between age group and marital status with the percentage of female residents
over age 65 being higher. That is to say, age was related to marital status, with those under 65 years old having a higher proportion of being single (Table 5).

*Body Mass Index (BMI)*

The top three BMI categories in YR were: BMI 18.5 to < 25 (35%), followed by BMI 25 to < 30 (28%) and BMI 30 to < 35 (15%). Meanwhile, the top three categories in OR were: BMI 18.5 to < 25 (46%), followed by BMI 25 to < 30 (26%) and BMI 9 to < 18.5 (12%). In fact, more than 29% of YR had a BMI indicating obesity (BMI of 30 or above), as opposed to OR (16%), of which 7% of YR were extremely obese (BMI of 40 or higher), whereas only 2% of OR were extremely obese (CDC, 2017). On average, when considering BMI, the YR fell into the overweight category ($M=27.501$, $SD=7.855$), which was statistically significantly different than OR whose average BMIs fell into the normal range ($M=24.710$, $SD=5.896$). The t-test results showed that there was a statistically significant difference between age and BMI [$t (6920.974) =27.744$, $p <.001$]. Additionally, when considering BMI in a category, both the chi-square and the post-hoc results indicated that the difference between the YR and OR was statistically significant ($p <.001$), and indicated age was related to BMI status with those under 65 years old being more obese (Table 5). Furthermore, we conducted a crosstabulation analysis between BMI and ADL-H, and the results in an excel chart illustrated that among all the NH residents, as BMI increased, partially assisted ADL (i.e., ADL-H scored 2 to 4) also increased from 45.1% to 67.3%, and residents required more assistance; however, the situation reversed from 48.4% to 25.1% for totally dependent residents (i.e., ADL-H scored 5 to 6) (Figure 4).

*Disease Diagnoses*

We analyzed 15 disease diagnoses respectively between YR and OR, and the findings vary. To illustrate, among YR, the most prominent disease diagnoses were as follows: more than
35% were being diagnosed with depression, followed by 22% with diabetes mellitus (DM), 21% with dementia (non-Alzheimer’s type), 17% with cerebrovascular accident (CVA), 16% with seizures (16%), hemi-or quadriplegia (15%), 14% with multiple sclerosis (14%), and roughly 10% with traumatic brain injury (TBI). On the other hand, among OR, approximately 56% were diagnosed with dementia (non-Alzheimer’s), followed by 28% diagnosed with depression, 20% with CVA, 14% with Alzheimer’s disease, and 14% with congestive heart failure (CHF). The chi-square test indicated that there was no significant difference (p=.496) between age and DM (Table 1). However, there were statistically significant differences (all p<.001) between age and all other diagnoses, including seizures, CVA, TBI, multiple sclerosis, dementia, CHF, and Alzheimer’s disease. Moreover, YR were also more likely to experience hemi- or quadriplegia, TBI, and multiple sclerosis. In contrast, residents over age 65 were experiencing more prevalent dementia, CHF, and Alzheimer’s disease (Table 5).

Activities of Daily Living (ADLs)

YR were found to have a better ADLs function than OR via the Activities of Daily Living Hierarchy Scale (ADL-H). The trichotomous version of ADL reported that within younger age groups, more than 35% of residents were reported as being totally dependent (ADLs scored 5 to 6), followed by roughly 49% being partially dependent (ADLs scored 2 to 4), and less than 17% were able to do self-performances (ADLs scored 0 to 1). Meanwhile, less than 33% of OR were reported as being totally dependent (ADLs scored 5 to 6), followed by 57% needing partial assistance (ADLs score 2-4), while about 10% were able to self-perform. Both the chi-square and post-hoc tests showed that the difference in ADL-H performance was statistically significantly (p<.001) between YR and OR, with approximately 90% of residents over age 65 requiring
assistance in daily living, while residents under age 65 were only at 84%. In sum, age was related to ADL-H with those age over 65 requiring more assistances in daily activities (Table 5).

Cognitive Performance

OR were found to have poorer cognitive functions than YR using the Cognitive Performance Scale (CPS). The trichotomous version of CP reported that approximately 42% of YR were cognitively impaired (CPS scored 2 to 4), followed by 40% who were cognitively intact (CPS scored 0 to 1), while more than 19% had a sever impairment (CPS scored 5 to 6). On the other hand, 59% of OR were cognitively impaired (CPS scored 2 to 4), followed by 23% having a severe impairment (CPS scored 5 to 6), and 19% being cognitively intact (CPS scored 0 to 1). Both the chi-square and post-hoc tests were statistically significantly (p<.001) between age and CPS, with the severity of cognitive impairments being higher among those age over 65 (Table 5).

Depression Rating Scale (DRS)

YR showed a higher prevalence of depressive symptoms than OR when using the DRS measure. Within YR, more than 82% reported no depression, whereas approximately 18% of YR had minor or major depression (DRS scored 3 or above). Meanwhile, within OR, roughly 85% of OR showed no depression, while 15% had minor or major depression (DRS scored 3 or above). The chi-square test result showed that there was a significant difference (p<.001) between age groups and depressive symptoms with fewer depressive symptoms among OR (Table 5).

Study Aim 2

Aim 2 of this study was to compare the differences in selected individual characteristics of NH residents among different age groups. In this exploratory analysis, residents were divided into five age groups, because this classification was disseminated based on human developmental stages, which may be more precise than dichotomized NH residents based on the
conventional definition of younger (age < 65) and older (age≥ 65). Findings are described in Table 6 and below.

**Individual Characteristics among NH Residents from Five Age Groups**

Of the 89,240 unique residents residing in western Canadian NHs, 6,361 were in the younger age group with 223 (0.2%) between 18 to 23 years old; 1,069 (1.2%) between 35-50 years old; and 5,069 (5.7%) between 51 to 64 years old. 82,870 were in the older age group with 23,840 (26.7%) between 65 to 80, and 59,030 (66.2%) between 81 years and above (Table 6).

**Sex**

The older age groups (age 65-80, and 81 and above) consisted of more female residents than younger ones, and the percentage of females among the five age groups increased with age, 35%, 47%, 46%, 54%, 71%, respectively. The ANOVA test for differences between age groups and sex was statistically significant (p<0.001) and the overall correlation using Kendall’s tau-c was -.128 (p<.001), with the percentage of females increasing after age 65. Since there appeared to be a trend in the proportion of female sex across the age groups, the Cochran-Armitage test was used and the trend was confirmed (p<.001) (Table 6).

**Marital Status**

Younger age groups (i.e., age 18-34, age 35-50, and age 50-64) were never married more often and to a greater extent than older age groups. To illustrate, in the 18-34 group, the top three categories were: never married (89%), married (6%), and widowed (5%). Similarly, in those 35-50 years old, the top three categories were: never married (56%), married (16%), and separated (12%). Finally, in the 51-64 group, the top three categories were: never married (36%), married (23%), and divorced (22%). On the other hand, in the 65-80 group, the top three categories were: married (34%) followed by widowed (26%) and then divorced (18%), and in the age 81 and above group, the top three categories were: widowed (56%), married (22%), and divorced (7%).
The chi-square test results indicated that there was a significant association (p<.001) between marital status and these age groups. The post-hoc test reported that the distribution of marital status was statistically significant (all p<.001), with each age group differing from the others; the percentage of never married decreased as residents’ ages increased. Furthermore, the percentage of being widowed increased with age. Meanwhile, the percentage of divorces increased up until 65 when the trend reversed, while the percentage of being married increased until 80 when the trend reversed. Finally, the percentage of separated individuals increased until age 50 before the trend reversed (Table 6).

*BMI*  

BMI increased with age across the younger ages, but the trend reversed beginning with the over 65 group and decreased across groups. In addition, the 18-34 group has the narrowest interquartile range (IQR), indicating that their BMIs were more homogenous within their age group than in other age groups (Figure 1). The majority of residents in all five groups fell into the normal BMI category (all of these were < 50%). However, obesity (BMI 30 and above) and BMI mean was the greatest in the 51-64 age group NH (30%, M= 27.62), followed by the 35-50 group (28%, M=27.47), the 65-80 group (23%, M=26.28), the 18-34 group (16%, M=25.03), and finally, the 81 and above group (13%, M=24.08). These mean differences were significantly different across the five age groups [F (4, 89226) = 904.970, p < .001] using ANOVA. The post-hoc test (Table 4B) showed that the following groups (age 18-34 vs. age 35-50; age 18-34 vs. age 51-64; age 35-50 vs. age 65-80; age 35-50 vs. age 81+; age 51-64 vs. age 65-80; age 51-64 vs. age 81+; age 65-80 vs. age 81+) differ in statistically significantly ways (p<.0001), with the mean BMI increasing until age 65 when the trend reversed (Table 6).
Disease Diagnoses

No single disease diagnosis dominated the youngest age groups. Instead, it was observed that multiple disease diagnoses such as TBI (29%) and hemi-or quadriplegia (24%) were more prominent in the 18-34 group compared with the rest; CVA (39%), depression (35%), multiple sclerosis (21%), seizures (20%), and hemi-or quadriplegia (20%) had higher percentages in the 34-50 group than the rest of the age groups; depression (36%), dementia (25%), diabetes (24%), CVA (19%), seizure (16%), hemi- or quadriplegia (13%), and multiple sclerosis (13%) characterized the 51-64 group. Meanwhile, dementia (48%), depression (33%), diabetes (29%), CVA (23%), and arteriosclerosis heart disease (ASHD) (23%) had a higher percentage in the 65-80 group than the rest of age groups. Those age 81 and above had a higher percentage of residents being diagnosed with dementia (59%), ASHD (31%), depression (26%), diabetes (19%), CVA (19%), and Alzheimer’s (14%) compared with the rest of the age groups. The chi-square test results showed that there were significant differences (all p < .001) between age groups and disease diagnoses, with the percentage of hemi- or quadriplegia and TBI decreasing as residents age; the percentage of seizure and multiple sclerosis increasing until age 50 until the trend reversed; the percentage of Alzheimer’s, dementia, cancer, and cardiac conditions increased with age groups; the percentage of depression increased until age 65 until the trend reversed; and finally, the percentage of DM and Parkinson disease increased until age 80 until the trend reversed (Table 6).

Activities of Daily Living (ADLs)

ADLs was measured using ADL-H. The youngest (age 18-34) had the highest percentage (65%) of residents requiring complete assistance in ADLs, followed by age 35-50 (43%), then age 51-64 (32%), and age 65-80 (32%). Meanwhile, the oldest (age 81 and above) had the
highest percentage (58%) of residents needing partial assistance, followed by those age 65-80 (54%). Finally, the group that had the highest percentage of self-independent residents (17%) was in the 51-64 group followed by the 65-80 group. The results showed a significant association (p<.001) between age groups and ADL-H for the five age groups, and the post-hoc results reported that the distribution of ADL performance results were statistically different (all p<.001) for each age group. This is comparable to the rest with percentages of self-performance in activities of daily living increasing until 65 until the trend reversed; the need for assistance increased with increasing ages, while assistance and total dependence decreased until age 80 until the trend reversed (Table 6).

Cognitive Performance (CP)

CP was measured using CPS. The youngest (age 18-34) had the highest percentage (48%) of residents showing severe impairments, followed by the 65-80 group (23%). On the other hand, the oldest (age 81 and above) had the highest percentage of residents having mild to moderate cognitive impairments, followed by the 65-80 group (52%). Finally, the 35 to 50 group had the highest portion of residents (43%) as being cognitive intact. The results showed a significant association (p<.001) between age groups and CPS for the five age groups, and the post-hoc results indicated that cognitive performance differed statistically (all p<.001) between each age groups. This is comparable to the rest with the percentage of residents that were cognitively intact increasing until 65 until the trend reversed. The percentage of residents with partial impaired cognition increased as residents aged. Finally, the percentage of residents with severe impairments decreased until age 65 until the trend reversed (Table 6).
Depression Rating Scale (DRS)

Depressive symptoms were measured using DRS. The younger age groups (age 35-50 and age 51-64) had the highest percentage (17%, 18%, respectively) of residents showing severe depression, whereas the youngest (age 18-34) had the highest percentage (86%) reporting no depression, followed by the oldest (age 81 and above) and those age 65-80 (both 85%). The results showed a significant association (p<.001) between age groups and DRS for the five age groups, with the depression score increasing until 65 until the trend reversed. The post-hoc test results reported that these two groups (age 51-64, age ≥81) were statistically significant (p<.001) and associated with the depression status (no depression, minor, major depression), respectively (Table 6).

Discussion

It is a peculiar phenomenon that the percentage of YR in many countries including the US and Canada has been increasing (Center for Medicaid and Medicare 2008, 2015; Canadian Institute for Health Information, 2012, 2019). Yet, few studies have explored whether and in what ways they differ from other NH residents. Therefore, this article sets forth a new profile to describe and compare the individual characteristics between YR and OR in three provinces (Manitoba, Alberta, and British Columbia) of NHs in Western Canada.

In summary, when divided into two groups of residents using age 65 as a threshold, YR were mostly male, never married, had a greater chance being morbidly obese than OR, were mainly diagnosed with depression, CVA, seizures, hemi- or quadriplegia, chronic mental health (manic depressive, schizophrenia), multiple sclerosis, and TBI. Furthermore, they required more assistance in daily activities and were reported as being more depressed, but were more cognitively intact than older NH residents. Meanwhile, OR were mainly female, widowed and with average BMI (18 to <25), prone to diagnosis with dementia (non-Alzheimer’s) and cardiac
conditions, and more cognitively impaired. However, when dividing residents into five age groups, some results were slightly different than previous ones. For instance, the youngest (age 18-34) were more prone to being severely cognitively impaired as well as being totally dependent, whereas the oldest (age 81 and above) required partial assistance and reported mild to moderate cognitive impairments.

**Sex**

Our findings reported that YR had a higher percentage of being male and never married when compared with OR. This finding can be linked to a previous study that reported the life expectancy of females is relatively longer than males (United Nations, 2019). The same rules apply to our study, as the results revealed that OR consisted primarily of females while YR were mainly males.

**Marital Status**

The majority of the YR reported being single, which might imply that they have more limited support systems compared with older NH residents, including those once married but now widowed. Existing studies have shown that healthy marriages play an influential role in engaging in positive behaviors such as physical activity, wearing seat belts, and not smoking (Schone and Weinick, 1998; Margelisch et al., 2017). Furthermore, married people continue to have better health and longevity than unmarried people (particularly in comparison to the previously married), and this pattern is more evident for men than for women (Rendall et al., 2011). As a result, findings suggest that YR may need help securing good support systems within the facility, gathering periodically for social events, and using apps to meet new friends outside of facilities.
**Body Mass Index (BMI)**

YR were reported to have higher BMIs than older NH residents, and there was a significant difference between age and BMI (p<.001). More specifically, those between 35 and 50 had the highest percentage of people (8%) being obese (BMI 35 to 40), followed by 7% being morbidly obese (BMI 40 and above) between ages 51 to 64. The results were relatively different than Harris et al. (2018), who reported that the median age of obesity was 74 among those with a BMI of 35 to 39.9, while those age 71 were among the morbidly obese (BMI 40 to 49.5), and those age 64 had a BMI of 50; this trend reflects the more probable causal direction that aging might cause BMI to decrease. One of the possible explanations for why YR had a higher morbid obesity rate than OR may be due to physical restrictions (Capodaglio et al., 2010). Another explanation is that many older adults have dementia and other diseases that may reduce their ability to eat as well as their appetite. It is hard to keep people with advanced dementia well-nourished. Often, residents wander, have swallowing problems, maybe had a stroke, and polypharmacy may reduce appetite, etc. (Desai & Grossberg, 2001). Our study found that younger adults have a higher chance of having a diagnosis of hemiplegia, quadriplegia, or seizures as well as a higher prevalence of being totally dependent. Thus, from an individual perspective, this may indicate that many of them were likely be bedridden; in the organizational aspect, facility settings may have limited staffing and resources to take care of them. Furthermore, the results may imply the need for appropriate weight control programs and diet options to help these residents stay fit and healthy, as there are many deleterious risk factors related to morbid obesity (Pi-Sunyer, 2009).

It is interesting to note that we did a crosstabulation analysis between BMI and ADL-H (Figure 2) and found that as BMI increased, the need for total assistance in ADL decreased, but the need for partial assistance in ADL increased. One of the possible explanations for the
underweight population (BMI 9 to < 18.5) in this sample requiring the most assistance in ADLs may be because they were already bedridden when admitted to the NH. Meanwhile, others may have developed more comorbidity owing to obesity-related diseases, but were not bedridden and can still perform some ADLs. In addition, this might be due to the referral process or NH structure that hinders the admission of individuals with high levels of obesity. Therefore, future research should examine how these residents were being referred to the NH and whether NH residents differ from the population.

**Disease Diagnoses**

Diagnoses varied by age category. In particular, YR were more likely to have seizures, hemi-or quadriplegia, TBI, multiple sclerosis, manic depression, schizophrenia, and depression. In fact, the potential causes of seizures can be due to acute stroke, cerebrovascular disease, Alzheimer’s disease etc. (Liu et al., 2016). Previous studies indicated that younger male drivers age 19 to 39 were significantly more likely to engage in aggressive behaviors, be more reckless and cause more elevated crash risks such as car and motorcycle accidents (AAA Foundation for Traffic Safety, 2017; Bolandparvaz et al., 2017). This can lead to severe injuries such as TBI or hemi- or quadriplegia than females in the same period of time. Additionally, seizures may occur as a neurological consequence of TBI (Liu et al., 2016). Overall, it is likely that YR were more prone to comorbidities than OR, as the diagnoses mentioned above may be somewhat connected to one another.

Mental illness, particularly depression, has been found and reported to be one of the most prominent diagnoses among younger age groups in NHs (Jervis, 2002; Barber et al., 2020). With serious depressive symptoms, this can lead to various health issues such as chronic pain, heart disease, and inflammation (Goodwin, 2006). A possible explanation for YR being more prone to depression may be the severity of their illness and the awareness of substantial losses due to
major health events such as trauma, early and severe stroke, and other severely debilitating medical conditions. Depression severity may also be due to feeling isolated from peers, not enough social events or age-appropriate activities that can cater to their age group, feeling lonely, or lacking the autonomy to make decisions (Dwyer et al., 2017; Hay et al., 2013; Persson et al., 2009). Meanwhile, prior literature suggested that depression in older adults—especially those with dementia—is severely underdiagnosed. Thus, the true rate may be substantially higher for that population (Fiske et al., 2009; Allan et al., 2014). However, the focus of this study is the YR; thus, future studies should look at what kinds of programs can help improve their mental health conditions as well as how to manage and prevent other health issues derived from depression while residing in the NH.

Limitations

Our study had some limitations that should be considered when interpreting the results. First, this is a secondary analysis that included only three provinces in Canada. However, we used population data from these three provinces, so our findings provided an estimate to understand the younger and older NH residents in Western Canada as a basis for additional research. Next, race and ethnicity were not available to us in this data set (Morris et al., 2012); therefore, we were not able to report differences that might be explained by these characteristics. Additionally, we had marital status variables but none about parents, siblings or other relatives. Finally, depression is poorly coded in the MDS and validity issues have been raised for the DRS scale and its items.

Conclusions and Implications

To our knowledge, this is the first study to describe and compare individual characteristics between younger and older NH residents in Western Canada. We included all assessments (full and abbreviated) performed quarterly from MDS 2.0. Findings indicated that
YR and OR in NHs were considerably different in their clinical and nonclinical characteristics. More specifically, YR were predominately male, single, more obese, more depressed, had a higher prevalence of depression, cerebral vascular accidents, and hemi- or quadriplegia, while also requiring more assistance for daily activities than OR. Thus, care approaches should be different when taking care of YR vs OR. Our study aimed to contribute to a better comprehension of the characteristics of YR and how they differ from OR. In addition, to maximize the benefits and manage the risks associated with YR residing in NHs, governments should support continuing education and update information for health care providers including frontline caregivers who are taking care of them. Furthermore, this could establish a safety net for YR and offer age-appropriate activities for socialization that can be sustained over the long-term to prevent social isolation, reducing inequality and promoting social inclusion among YR. Finally, our findings can provide useful information to policymakers, providers, and consumers as they plan for the future LTC needs of their loved ones, and researchers can continue to track the growth of and changes in the populations served by the LTC industry. Although this is only a first step, future research can use our results as a basis guideline for health conditions, outcomes, and resource used for YR in NHs.
Table 5. N (%) and M (SD) of Residents Characteristics by Age Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age groups</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>18-64</td>
<td>65+</td>
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<td></td>
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<tr>
<td>Sample population (N)</td>
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<td>82,870</td>
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<td>Column Percent of Sample</td>
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<td>92.9</td>
<td></td>
<td></td>
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<tr>
<td>Sex (n (%))</td>
<td>**&lt;.001</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
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<td>54,683 (66.0)</td>
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<td></td>
</tr>
<tr>
<td>Marital Status (n (%))</td>
<td>**&lt;.001</td>
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<tr>
<td>Never Married</td>
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<td>Married</td>
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<td>13,645 (25.4)</td>
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<tr>
<td>Widowed</td>
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<td>27,793 (51.7)</td>
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<td></td>
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<tr>
<td>Separated</td>
<td>350 (10.7)</td>
<td>2,877 (5.4)</td>
<td></td>
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</tr>
<tr>
<td>Divorced</td>
<td>654 (19.7)</td>
<td>5,337 (9.9)</td>
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</tr>
<tr>
<td>Province (n (%))</td>
<td>**&lt;.001</td>
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<tr>
<td>Alberta</td>
<td>803 (64.8)</td>
<td>10,880 (50.7)</td>
<td></td>
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<tr>
<td>Manitoba</td>
<td>111 (9.0)</td>
<td>3,698 (17.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>British Columbia</td>
<td>325 (26.2)</td>
<td>6,901 (32.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Mass Index (kg/m²) (n (%))</td>
<td>**&lt;.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI 9 to &lt;18.5</td>
<td>492 (7.7)</td>
<td>9,934 (12.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI 18.5 to &lt;25</td>
<td>2,235 (35.1)</td>
<td>38,121 (46.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI 25 to &lt;30</td>
<td>1,764 (27.7)</td>
<td>21,635 (26.1)</td>
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<td></td>
</tr>
<tr>
<td>BMI 30 to &lt;35</td>
<td>963 (15.1)</td>
<td>8,707 (10.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI 35 to &lt;40</td>
<td>451 (7.1)</td>
<td>2,964 (3.6)</td>
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<td></td>
</tr>
<tr>
<td>BMI 40 to &lt;66</td>
<td>456 (7.2)</td>
<td>1,509 (1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Mass Index (kg/m²) (mean (sd))</td>
<td>M=27.501</td>
<td>M=24.710</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD=7.855</td>
<td>SD=5.896</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease Diagnoses (n (%))</td>
<td>**&lt;.0001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seizures</td>
<td>1,030 (16.2)</td>
<td>2,933 (3.5)</td>
<td>**&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Hemi- or quadriplegia</td>
<td>926 (14.6)</td>
<td>3393 (4.1)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>n (%)</td>
<td>Reference n (%)</td>
<td>p-value</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular accidents (CVA)</td>
<td>1,086 (17.1)</td>
<td>16,526 (20.0)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Traumatic brain injury (TBI)</td>
<td>659 (10.4)</td>
<td>999 (1.2)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Multiple Sclerosis</td>
<td>872 (13.7)</td>
<td>916 (1.1)</td>
<td>**&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Alzheimer’s disease</td>
<td>276 (4.3)</td>
<td>11,147 (13.5)</td>
<td>**&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>198 (3.1)</td>
<td>4,927 (6.0)</td>
<td>**&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Dementia (non-Alzheimer’s)</td>
<td>1,359 (21.4)</td>
<td>46,208 (55.8)</td>
<td>**&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>240 (3.8)</td>
<td>6,903 (8.4)</td>
<td>**&lt;.0001</td>
<td></td>
</tr>
<tr>
<td>Arteriosclerotic Heart Disease (ASHD)</td>
<td>139 (2.2)</td>
<td>5,510 (6.7)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Congestive Heart Failure (CHF)</td>
<td>255 (4.0)</td>
<td>10,709 (13)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Diabetes Mellitus (DM)</td>
<td>1,405 (22.1)</td>
<td>18,305 (22.1)</td>
<td>**.496</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>2,244 (35.3)</td>
<td>23,372 (28.2)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Manic Depressive</td>
<td>265 (4.2)</td>
<td>1,510 (1.8)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>529 (8.3)</td>
<td>2,028 (2.4)</td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>ADL-H (n (%))</td>
<td></td>
<td></td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Self-perform</td>
<td>1,030 (16.2)</td>
<td>8,485 (10.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(index=0-1)</td>
<td>3,088 (48.5)</td>
<td>47,247 (57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assisted (2-4)</td>
<td>2,243 (35.3)</td>
<td>27,138 (32.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent (5-6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive performance (n (%))</td>
<td></td>
<td></td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Intact (index= 0-1)</td>
<td>2,497 (39.3)</td>
<td>15,333 (18.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impaired (2-4)</td>
<td>2,641 (41.5)</td>
<td>48,451 (58.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe impairment (5-6)</td>
<td>1,223 (19.2)</td>
<td>19,086 (23.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression rating (n (%)</td>
<td></td>
<td></td>
<td>**&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Score &lt;3 = no depression</td>
<td>5,218 (82.4)</td>
<td>70,496 (85.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score ≥3 = minor or major depression</td>
<td>1,111 (17.6)</td>
<td>12,312 (14.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * for independent groups t-test, ** for chi-square test.
All post-hoc comparison were significant at the 0.05 level.
The total N of ppl in marital status was different than the rest of variables.
Table 6. N (%) and M (SD) of Resident Characteristics by Five Age Groups (exploratory analysis)

<table>
<thead>
<tr>
<th>Sample population (N)</th>
<th>18-34</th>
<th>35-50</th>
<th>51-64</th>
<th>65-80</th>
<th>81 +</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column Percent of Sample</td>
<td>223</td>
<td>1,069</td>
<td>5,069</td>
<td>23,840</td>
<td>59,030</td>
<td></td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.2</td>
<td>1.2</td>
<td>5.7</td>
<td>26.7</td>
<td>66.2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sex (n (%))</th>
<th>Marital Status (n (%))</th>
<th>Body Mass Index (kg/m²) (n (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Never-married</td>
<td>BMI 9 to &lt; 18.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Married</td>
<td>23(10.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Widowed</td>
<td>82(7.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Separated</td>
<td>387(7.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Divorced</td>
<td>2,077(8.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7,857(13.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>107(48.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>389(36.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,739(34.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9,421(39.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>28,700(48.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>56(25.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>294(27.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,414(27.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6,748(28.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14,887(25.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>22(9.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>145(13.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>796(15.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,262(13.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5,445(9.2)</td>
</tr>
<tr>
<td>BMI 35 to &lt;40</td>
<td>9(4.0)</td>
<td>72(6.7)</td>
<td>370(7.3)</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>BMI 40 to &lt;66</td>
<td>6(2.7)</td>
<td>87(8.1)</td>
<td>363(7.2)</td>
</tr>
<tr>
<td><strong>Body Mass Index (kg/m^2)</strong></td>
<td>M=25.03</td>
<td>M=27.467</td>
<td>M=27.617</td>
</tr>
<tr>
<td><em>(mean (SD))</em></td>
<td>SD=7.980</td>
<td>SD=7.868</td>
<td>SD=6.713</td>
</tr>
<tr>
<td><strong>Disease Diagnosis (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Seizures</strong></td>
<td>39(17.5)</td>
<td>209(19.6)</td>
<td>782(15.5)</td>
</tr>
<tr>
<td><strong>Hemi- or quadriplegia</strong></td>
<td>52(23.8)</td>
<td>214(20.0)</td>
<td>659(13.0)</td>
</tr>
<tr>
<td><strong>CVA</strong></td>
<td>15(6.7)</td>
<td>98(39.2)</td>
<td>973(19.2)</td>
</tr>
<tr>
<td><strong>TBI</strong></td>
<td>64 (28.7)</td>
<td>155(14.5)</td>
<td>440 (8.7)</td>
</tr>
<tr>
<td><strong>Multiple Sclerosis</strong></td>
<td>12(5.4)</td>
<td>225(21.0)</td>
<td>635(12.5)</td>
</tr>
<tr>
<td><strong>Alzheimer’s disease</strong></td>
<td>2(0.9)</td>
<td>16(1.5)</td>
<td>258(5.1)</td>
</tr>
<tr>
<td><strong>Parkinson’s disease</strong></td>
<td>2(0.9)</td>
<td>19(1.8)</td>
<td>177(3.5)</td>
</tr>
<tr>
<td><strong>Dementia (non-Alzheimer’s)</strong></td>
<td>6(2.7)</td>
<td>70(6.5)</td>
<td>1,283(25.3)</td>
</tr>
<tr>
<td><strong>Cancer</strong></td>
<td>4(1.8)</td>
<td>29(2.7)</td>
<td>207(4.1)</td>
</tr>
<tr>
<td><strong>Arteriosclerotic Heart Disease (ASHD)</strong></td>
<td>10(4.4)</td>
<td>63(5.9)</td>
<td>626(12.4)</td>
</tr>
<tr>
<td><strong>Congestive Heart Failure (CHF)</strong></td>
<td>5 (2.2)</td>
<td>21 (2.0)</td>
<td>229 (4.5)</td>
</tr>
<tr>
<td><strong>DM</strong></td>
<td>16(7.2)</td>
<td>184(17.2)</td>
<td>1,205(23.8)</td>
</tr>
<tr>
<td><strong>Depression</strong></td>
<td>54(24.2)</td>
<td>377(35.3)</td>
<td>1,813(35.8)</td>
</tr>
<tr>
<td><strong>Manic Depressive Schizophrenia</strong></td>
<td>6 (2.7)</td>
<td>44 (4.1)</td>
<td>215 (4.2)</td>
</tr>
<tr>
<td><strong>ADL-H (n (%))</strong></td>
<td>5 (2.2)</td>
<td>63 (5.9)</td>
<td>461 (9.1)</td>
</tr>
<tr>
<td><strong>Self-perform (index=0-1)</strong></td>
<td>24(10.8)</td>
<td>130(12.2)</td>
<td>876(17.3)</td>
</tr>
<tr>
<td>Cognitive performance (n (%)</td>
<td><strong>&lt;.001</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assisted (2-4)</td>
<td>54(24.2) 478(44.7) 2,556(50.4) 12,934(54.3) 34,313(58.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent (5-6)</td>
<td>145(65.0) 461(43.1) 1,637(32.3) 7,608(31.9) 19,530(33.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intact</strong> (index= 0-1)</td>
<td>78(35.0) 458(42.8) 1,961(38.7) 6,002(25.2) 9,331(15.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impaired (2-4)</td>
<td>37(16.6) 403(37.7) 2,201(43.4) 12,417(52.1) 36,034(61.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe impairment (5-6)</td>
<td>108(48.4) 208(19.5) 907(17.9) 5,421(22.7) 13,665(23.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression rating (n (%))</td>
<td><strong>&lt;.001</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score &lt;3 = no depression</td>
<td>177(86.3) 878(82.7) 4,163(82.2) 20,212(84.8) 50,284(85.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Score ≥3 = minor or major depression</td>
<td>28(13.7) 184(17.3) 899(17.8) 3,616(15.2) 8,696(14.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * for ANOVA, ** for chi-square test.

All post-hoc comparisons were significant at the 0.05 level except (1) among age and province crosstabulation, age 65 to 80 will be the only age group among province that was not statistically significant from the other (p=.601). (2) among depression scale crosstabulation, age 18-34; age 35-50; age 65-80 were not significant from the others (p=.574, p=.038, p=.526), respectively. (3) Posthoc comparisons using Tukey’s HSD. Mean difference so not significant between age 18-34 vs. age 65-80 (p=0.013); age 18-34 vs. age 81+ (p=.216), and age 35-50 vs. age 51-64 (p=.957). The total N of ppl in marital status was different than the rest.
Figure 4. Illustration of Crosstabulation Analysis Between BMI and ADL-H
REFERENCES


CHAPTER 4: COMPARING HEALTH-RELATED QUALITY OF LIFE (HRQOL) AMONG WESTERN CANADIAN NH RESIDENTS USING CANADIAN RAI-MDS 2.0

Introduction

Increasing life expectancy for citizens is a trend that almost all countries around the globe are making efforts toward (Salomon et al., 2012). Higher life expectancy is associated with a higher GDP per capita and lower infant mortality levels (Miladinov, 2020). However, it may be meaningless to have extended life expectancy without the desired quality of life. As a result, measuring HRQoL has served as an important index to assess a population’s perceived quality of health and life (Center for Disease Control and Prevention, 2018).

NHs typically serve older adults near the end of their lives (Bigby et al., 2008). In general, more than two-thirds of residents are at least 75 years old or above, and the average age of a resident upon admittance to a NH is 83 years old with the majority being female (Bigby et al., 2008; Harris-Kojetin, 2019; Nelson & Bowblis, 2017). However, the number of younger residents in NHs (YR) (18 to 64 years of age) has been increasing over the past decade. In the United States, the YR increased from 13 percent to 16 percent between 2008 and 2015 while the population of all NH residents declined from approximately 3.2 to 1.4 million (Center for Medicare and Medicaid Services, 2008, 2015). Similar trends have been observed in Canada, where the percentage of YR steadily increased from 6.2 % (N=8,919) to 6.7 % (N=12,852) between 2012 to 2019 in Canada (Canadian Institute for Health Information, 2012, 2019).

Studies have reported that the YR were mainly admitted with more severe impairments such as hemi- or quadriplegia, traumatic brain injury, and/ or required more assistance in ADLs
Additionally, findings from existing studies indicated that NHs are geared toward taking care of older residents (OR) (Cameron et al., 2001; Dwyer et al., 2017). Therefore, these differences suggest that the way life in NHs is experienced can vary, meaning that YR and OR perceptions of HRQoL may differ as well.

The term Quality of Life and HRQoL has been used interchangeably to refer to similar concepts, but there are differences between the two that may be essential for characterizing age-related differences (Lin et al., 2013). QOL is an umbrella concept that HRQoL is a part of: “Quality of life is a broad concept incorporating all aspects of an individual’s existence. HRQoL is a more narrowly defined subset that relates only to the health aspects of an individual” (Torrance, 1987). Thus, evaluating HRQoL is important because it measures how severely a person’s life/well-being is impacted by certain health issues rather than by other circumstances. To date, HRQoL has been measured using subscales as part of larger health-related measures, such as the 36-Item Short Form Survey (SF-36), the 14-Item set of Healthy Days Measure (CDC HRQOL–14) "Healthy Days Measure," and the MDS Health Status Index (Almomani et al., 2014; Chouiter et al., 2015; Drageset et al., 2017). A significant gap in the literature is that studies of HRQoL among NH residents have mainly focused on OR with dementia and cognitively intact residents, without comparisons to the younger population (Drageset et al., 2017). This lack of evidence limits our further understanding of the YR.

This study is significant because it gives us the opportunity to examine HRQoL in the population of interest by using a comprehensive dataset, interRAI, to compare YR and OR inside the MDS 2.0. The InterRAI can be used to calculate the HRQoL score, which has a unique advantage. These data are gathered as part of normal clinical practices in care settings where
InterRAI instruments are mandatory and include measures related to HRQoL such as vision, hearing, functional and cognitive impairment, health status, depressive symptoms and pain (Carpenter & Hirdes, 2013; Guthrie et al., 2016). In particular, those with severe cognitive and functional impairments who tend to be under-represented in survey data can be evaluated using the interRAI tools (Hirdes et al., 2018).

The aim of this study was to examine the HRQoL in NH residents from three provinces (Alberta, Manitoba, British Columbia) of Western Canada, using the InterRAI HRQoL assessment index to calculate the score (Hirdes et al., 2018), controlling for relevant individual characteristics (sex, marital status, disease diagnoses) and facility characteristics (ownership, province, and facility size). The findings will characterize the unique attributes of YR vs. OR and may also suggest opportunities for intervention (activities, programs, socialization opportunities) to promote the HRQoL and health of YR.

**Conceptual Framework**

The conceptual framework of this study (see Figure 5) was developed based on the research of Wilson and Clearly (1995) and the findings from Chapter Three, which indicated that non-clinical and clinical individual characteristics of YR and OR were considerably different. In the present study, it was hypothesized that the HRQoL is lower in YR than in OR. This hypothesis is supported with evidence that suggests that a high prevalence of severe impairments, disabilities (e.g., hemi-quadriplegia, traumatic brain injury, and assistance in activities of daily living) and needs were found in YR, and the appropriateness of the LTC environment is questionable (Cameron et al., 2001; Colantonio et al., 2020). Therefore, residing in a NH may create substantial burdens and distress in the YR that may ultimately affect their HRQoL. The findings of this study will provide insights to understand the HRQoL of both YR and OR, and how they differ.
Rationale for Choosing Selected Variables

Age groups were dichotomized into two categories: age 18-64 years old, and age≥ 65 as per the common and widely recognized definition (Office of Disease Prevention and Health Promotion, 2019a). In addition, official benefits such as pensions for the elderly are distributed to people aged 65 and above (Benefit.gov, 2018; Government of Canada, 2021). Furthermore, the care and programs in NHs are usually tailored to the OR and more than 93% of NH residents are over age 65 in Canada (Canadian Institute for Health Information, 2019).

Health-Related Quality of life (HRQoL): HRQoL was conceptually defined as a multi-dimensional concept that includes domains related to an individual’s vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain (Hirdes et al., 2018). The rationale for measuring HRQoL was to characterize the experiences of the YR and to learn if they are different from OR, as well as to examine if any factors contribute to variations in HRQoL. Overall, measuring HRQoL can serve as an important index for evaluating perceived health problems or other aspects of health-services or intervention research in Canada.
Individual Characteristics: We included sex, marital status, and disease diagnoses as control variables for the following reasons: First, a study looking at gender differences in HRQoL among patients with colorectal cancer found that women have a lower HRQoL, because they appear to be more affected than men by impaired physical and social functioning after the development of cancer (Laghousi et al., 2019). Next, a study focusing on gender difference in HRQoL among patients undergoing intracranial radiation (RT) also found that HRQoL differed with gender, with females demonstrating significantly worse HRQoL than males prior to RT (Burkeen et al., 2018). Another study investigating marital status and quality of life in residents from community health settings found significant relationship between marital status and QOL. This relationship appeared to differ by gender and age, with single men having worse QoL than married men, whereas the QoL measured was better in single women than in married women, and separated or divorced women (Han et al., 2014). Finally, a study examining the factors related to quality of life in residents with chronic illness in Iran found that disease types were among the significant variables predicting the quality of life (Samiei et al., 2019). Therefore, we controlled for these variables in the models.

Facility Characteristics: We included ownership, facility sizes, and provinces as control variables because existing literature has reported that facility size (Lucas et al., 2007), ownership types (Pekkarinen et al., 2004), and location (Shippee et al., 2015) affect residents’ experiences. To illustrate, residents in smaller and not-for-profit facilities report better overall quality of life (Lucas et al., 2007; Pekkarinen et al., 2004). Additionally, rural facilities demonstrate a better CMF (comfort score) of QoL domain (Shippee et al., 2015). Rather than comparing rural vs. urban NHs, it is of interest to explore how provinces affect residents’ HRQoL in this study, as the three provinces we included vary in terms of the number of NHs and
the ownership of these facilities (Canadian Institute for Health Information, 2020). Thus, we controlled for these variables in the models because we know that differences in facility characteristics can confound the relationship between age and HRQoL.

Methods

Study Design

This was a retrospective cohort study using administrative data that was designed to compare differences in HRQoL between YR and OR in three provinces of Western Canada, while controlling for relevant individual and facility characteristics. The outcome of interest was a measure of HRQoL between YR and OR, which was constructed using data from the InterRAI HRQoL assessment index (Hirdes et al., 2018).

Study Setting and Study Sample

The data used in this study was from 94 NHs from three provinces (Alberta, Manitoba, and British Columbia) in Western Canada. The MDS 2.0 was collected from 21,129 unique residents between January 2016 to January 2018. We included the last available assessments (admission, quarterly, and full) from each resident.

Data Source

This study obtained MDS 2.0 from TREC database, housed at the Faculty of Nursing at the University of Alberta, Canada. TREC collected longitudinal data from 94 NHs across Alberta, Manitoba, and British Columbia, with a representative sample of urban NHs, stratified by location (health region), facility size and ownership model. Health regions include the Edmonton Zone and Calgary Zone (Alberta), the Fraser Health Region and Interior Health Region (British Columbia), and the Winnipeg Regional Health Authority (Manitoba). Ownership models include public not-for-profit, private for-profit, and voluntary not-for-profit (Hoben et al., 2019).
The MDS 2.0 is an assessment that has been mandated for use in NHs in most Canadian provinces and territories. Data are submitted to the Canadian Institute for Health Information quarterly (Canadian Institute for Health Information, 2010). The reliability and validity of MDS 2.0 data were established through numerous international studies (Burrows et al., 2000; Koehler et al., 2005; Poss et al., 2008).

Variable Definitions and Measures

The following variables and definitions included in this study were based on my conceptual framework, the literature review, and the availability in the data set. The rationale for selecting the variables was provided in the conceptual framework section.

Dependent Variable

**Health-related Quality of Life (HRQoL):** HRQoL was conceptually defined as a multi-dimensional concept that includes domains related to an individual’s vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain. The operational definition of HRQoL was based on the score generated from the formulated listed below, to calculate individual HRQoL scores. The formula was retrieved from Hirdes et al. (2018). [Global HRQoL Score= 1.371 (u\text{vision} * u\text{hearing} * u\text{speech} * u\text{ambulation} * u\text{dexterity} * u\text{emotion} * u\text{cognition} * u\text{pain})-0.37]. Table 7 illustrates the RAI2.0 Scale Items that were included in the HRQoL score.

Hirdes et al., (2018) have demonstrated that it is feasible to obtain the HRQoL measure from the Inter RAI assessment instrument that they cross-walked to the Health Utilities Index (HUI 3) standard, a widely use analysis in government survey and clinical trials in Canada. By examining the correlation between InterRAI HRQoL and HUI3 scores, the mean global score for each age-sex group in three samples (well-elderly, home care, and NHs), the result demonstrated a strong validity ($R^2=0.91$) (Hirdes et al., 2018).
Independent Variable

**Age Groups (AGs):** Residents 18 years old or above were included. As described and justified above, the operational definition of the age group was based on the conventional definition of younger (age 18-64) and older (age≥ 65) individuals.

Control Variables

**Sex:** The RAI-MDS data categorized sex as men and women.

**Marital Status:** The RAI-MDS data categorized marital status as never married, married, widowed, separated, and divorced.

**Disease Diagnoses:** Disease diagnoses were selected based on the findings in Chapter Three, and each was categorized as 0 for no diagnosis and 1 if one of the following medical conditions were present: Seizure, hemi- or quadriplegia, cerebrovascular accidents, traumatic brain injury, multiple sclerosis, Alzheimer’s disease, Parkinson’s disease, dementia, cancer, congestive heart failure, diabetes, depression, manic depressive, and schizophrenia.

**Facility Size:** The conceptual definition was the number of available licensed beds that could accommodate residents during the given period. The variable was categorized as small (<80 beds), medium (80-120 beds), and large (>120 beds). This operational definition was based on a sampling frame in TREC.

**Ownership:** The definition of this variable was based on a sampling frame in TREC and it includes three categories: public not-for-profit, private for-profit, and voluntary not-for-profit.

Analysis Plan Rationale

Descriptive Analysis

All analyses used SPSS version 25. We used a descriptive analysis to better understand the characteristics of younger and older NH residents in Canada by summarizing individual and
facility characteristics (age, sex, marital status, diagnoses, ownership, facility sizes) and HRQoL assessment index scores using N (%) and mean (SD), as appropriate.

**Unadjusted T-Test Analysis**

T-test analyses were utilized when one variable was continuous and the other was dichotomous. We used t-test analyses to examine the difference in the mean values of HRQoL index score between age groups without adjusting for control variables. Additionally, we used an independent sample t-test to compare HRQoL variables between younger and older NH residents, providing the results using mean (SE), 95% CI and p-value (Pagano & Gauvreau, 2018).

**Chi-Square Test Analysis**

The Chi-square tests were used to analyze categorical variables (Pagano & Gauvreau, 2018). In this study, sex, marital status, disease diagnoses, provinces, ownership, and facility size were defined as categorical variables. We used a chi-square test to explore whether age is related to sex, marital status, disease diagnoses, provinces, ownership, and facility size. The assumptions of the chi-square test include that the study groups must be independent; adequate sample sizes for the chi-squared distribution apply; no cell in the table should have an expected count of less than one, and no more than 20% of the cells should have an expected count of less than five (Pagano & Gauvreau, 2018).

**Adjusted ANCOVA Analysis**

We used adjusted ANCOVA analysis, as this is the standard approach when dealing with confounders in observational studies. Observational studies can be prone to bias due to the process of confounding when prognostic factors are unequally distributed between study groups (Agoritsas et al., 2017). In this study, prognostic factors were individual and had facility characteristics. Using ANCOVA analysis allowed me to look for differences in the mean of
HRQoL scores between age groups when adjusting for control variables. In addition, the 95% Confidence Interval (CI) for the mean difference was reported.

**Adjusted Propensity Score Analysis**

**Propensity Score (PS) Analysis**

Additionally, we used a propensity scoring method because it is appropriate for observational data and can be used to reduce selection bias by balancing the distributions of covariates between two groups (Pan & Bai, 2015). In particular, we used PS matching because it was used to examine the difference in the mean HRQoL score between age groups controlling for the propensity score. This, in turn, considered a potentially large number of factors, such as individual and facility characteristics. We then used a covariate adjustment for this PS when comparing the difference in the mean HRQoL between younger and older NH residents, as this is conceptually similar to the ANCOVA approach. We also compared and contrasted the results between the PS and ANCOVA methods to determine whether our findings are robust across both methods.

**Ethical Considerations**

This study was reviewed and received approval by the institutional review boards (IRBs) of the University of North Carolina at Chapel Hill and University of Alberta in Canada. RAI-MDS 2.0 Dataset were de-identified to protect the privacy of participants and long-term care facilities. In addition, I fulfilled the requirement of the Health Insurance Portability and Accountability Act of 1996 when accessing the data.

**Results**

Of the 21,129 residents residing in 94 Canadian NHs across three provinces (Alberta, Manitoba, and British Columbia), 883 (4.2%) were under the age of 65. Of YR, 64% were from Alberta, 29% from British Columbia and 8% from Manitoba. Of OR, 48% were from Alberta,
followed by and 37% and 16%, respectively, from British Columbia and Manitoba. Other resident characteristics are described in the following.

Sex

Among those under 65, the percentage of male residents was slightly higher than that of the female population (51.6 % vs. 48.4%). In the older age group, female residents dominated (65%). These differences were statistically significant (p<.001) (Table 8).

Marital Status

The YR were more likely to be never married, compared with OR. The top three categories in the YR were: never married (37%), followed by married (25%), and divorced (22%). Meanwhile, the top three categories in the OR were: widowed (52%), followed by married (29%), and divorced (9%). The chi-square test and the post-hoc test both indicated that the marital status differed statistically and significantly between the age groups (Table 8).

Provinces

The NHs in Alberta accommodated the highest percentage of YR compared with the other two provinces. That is to say, 64% of YR and 48% of OR were from Alberta, followed by 29% and 37%, respectively, from British Columbia and 8% and 16%, respectively, from Manitoba. The chi-square test and post-hoc results both revealed that the difference between the YR and OR residing in selected provinces was statistically significant (p <.001) (Table 8).

Ownership

The rates of YR were 45% in voluntary not-for-profit settings, followed by 32% in private for-profit settings, and 22% in public not-for-profit settings. Meanwhile, the majority of OR were reported to reside in either voluntary (41%), private (40%), or public (19%) settings. Both the chi-square and the post-hoc tests suggested p-values of <.001 (Table 8).
Facility Size

Three facility size categories were compared: small (< 80 beds), medium (80-120 beds), and large (>120 beds). Among three types of facility sizes, large facilities accommodated more than 70% of YR, followed by medium facilities (19%) and small facilities (10%). Similarly, large facilities consisted of 60% OR, followed by medium (29%) and small facilities (11%). The chi-square test p-value was <.01. However, upon conducting the post-hoc test, the differences between the younger vs. older residents in facility sizes was only statistically significant (p <.001) in medium and large facilities, with YR dwelling at higher rates in the large sectors (Table 8).

Disease Diagnoses

The most commonly indicated diagnostic groups of YR were depression (36%) followed by dementia (non-Alzheimer’s) (21%), seizure (19%), CVA (17%), multiple sclerosis (13%), and hemi-or quadriplegia (11%). In contrast, the most commonly indicated diagnostic groups of OR were dementia (non-Alzheimer’s) (54%), which was noted to be a leading diagnosis in OR, followed by depression (29%), cerebrovascular accident (21%), congestive heart failure (14%), and Alzheimer’s disease (13%). Each of the disease diagnoses differed statistically between the two age groups (all p<.001), with the exception of diabetes mellitus (p=.154). Overall, the majority of the disease diagnoses were related to age with a higher percentage of seizures, hemi-or quadriplegia, multiple sclerosis, and depression for those under age 65 and a higher percentage of CVA, Alzheimer’s disease, and dementia for those aged 65 and over (Table 8).

Health-related Quality of Life (HRQoL) Index Score

The HRQoL index score ranged from -.351 to .996 with the mean at 0.693, the median at 0.004 and SD at 0.265 (Figure 2). The YR had a higher mean HRQoL score than OR in [0.159
(0.314) vs. 0.065 (0.262)], and there was a statistically significant difference (p<.001) between age groups with respect to the mean HRQoL score (Table 8).

**Comparison of HRQoL Index Score to Age**

To compare the HRQoL between YR and OR, we took into account the covariates by using ANCOVA and PSM. There were a total of 820 matched pairs of YR and OR after the PSM case-control matching. The differences between matched pairs and unmatched were matched pairs had higher percentages of married and widowed status, a higher percentage of residents residing in Manitoba, a higher percentage of residents residing in private or voluntary sectors, a higher percentage of residents residing in medium or large facilities, and a higher percentage of residents diagnosed with CVA, Alzheimer’s disease, dementia, and cancer. However, the matched pair mean score of HRQoL was greater by .002 (Table 9). The results of the unadjusted two sample T-test, adjusted ANCOVA, and PSM both indicated a significant difference (p<.001) in the mean HRQoL score between YR and OR (Table 3). In an unadjusted two sample t-test, the difference was 0.093 (p<.001) and the corresponding 95% CI was (0.072, 0.115), meaning YR had higher HRQoL scores than OR.

In the adjusted ANCOVA model, the difference was 0.046 (p<.001) and 95% CI (0.027, 0.064). In the PS model, the difference was 0.061 (p<.001) and 95% CI (0.031, 0.091). We did an independent sample T-test to analyze the separate variables in HRQoL (Table 10). The findings showed that vision, hearing, speech, ambulation, dexterity, and cognition were statistically significant (p<.05), indicating that these variables differed between YR and OR with the younger observed to have a higher mean score in hearing, speech, ambulation, and cognition than older NH residents (Table 11). Based on the outcome of HRQoL score, YR had better HRQoL than OR.
Discussion

Many western countries such as the US and Canada have reported a rising percentage of YR in NHs (Canadian Institute for Health Information, 2012, 2019; Center for Medicare and Medicaid Services, 2008, 2015). However, limited research has been done on this population. To the best of our knowledge, this is the first study using MDS 2.0 to examine the HRQoL between YR and OR in western Canada. The results from this study indicated that sex, marital status, disease diagnoses, and HRQoL differed between YR and OR in NHs.

Health-Related Quality of Life (HRQoL)

Our assumption was that YR will have poorer HRQoL than OR in NHs. However, our findings indicated that the mean score of HRQoL was higher in YR than OR when adjusting for covariates, contrary to my original assumption. In fact, a prior study conducted by Hirdes et al., (2018) found the HRQoL score among NH residents residing in Ontario, a province in eastern-central Canada, decreased as their ages increased. To illustrate, they used MDS and separated residents into four age groups: age 0-65; age 65 to 74; age 75 to 84; and age 85 and above. Groups with ages below 74 had higher mean global HRQoL scores of 0.17 followed by 0.14 in the 75 to 84 age group and 0.1 in the 85 years old and above group. Their findings were similar to our results, as YR in this study reported a higher HRQoL score (0.16) than OR (0.07). Interestingly, Hirdes et al. (2018)’s approach determined that younger age groups required further clarification, as NHs generally admit residents 18 and above; however, they did not provide rationale for residents aged 0 to 17, in terms of why they were being included in the data set and how they were managed for the analyses. Overall, these were the questions being raised while conducting this study, which will be confirmed with the corresponding author.

The main goal of this study was to compare the HRQoL between YR and OR in NHs using the interRAI assessment index. The assessments were performed by trained health
professionals who use all sources of information including but not limited to self-reporting (Hirdes et al., 2018). Self-reported measures are often viewed as the gold standard; however, if the sample is small, there might be generalization issues. For instance, a previous study compared the quality of life between YR and OR in a Canadian NH using a self-report survey, but it was administrated verbally to accommodate vision loss and motor problems, while residents indicated that there was no difference between YR and OR (Watt & Konnert, 2007). Additionally, the study was restricted to a single NH and excluded residents with an inability to communicate and those with low MMSE scores. Thus, only YR with higher levels of functioning were likely to participate. On the other hand, some qualitative studies (Dwyer et al., 2017; Jervis, 2002; Perrson & Ostwald, 2009; Smith, 2004) looking at experiences and needs of YR reported that those in younger age groups did not find themselves fitting into the NH settings and reported a poorer quality of life. However, they did not compare the results with OR in NHs. As a result, our study fills the gap by comparing both YR and OR using the interRAI HRQoL, as it belongs to the interRAI instrument, which is mandatory and used to assess all eligible persons in those sectors.

Both Hirdes et al. (2018) and our study used the HRQoL index consisting of variables such as vision, hearing, speech, and cognition, which are readily available in the MDS, a large-scale dataset in Canada. Thus, we could quantify the score of HRQoL using existing data and include residents who could not otherwise provide a score, because they might lack the capacity to respond to a self-report measure. Additionally, YR tended to have better vision, hearing, speech, ambulation, and cognitive performance than OR, which may explain the higher HRQoL scores than those of the OR. Based on our findings and the summary from previous literatures, it is possible that spiritual or psychosocial aspects that play more important roles when influencing
quality of life than health-related factors do. Therefore, future intervention design can be geared toward spiritual and/or psychosocial aspects.

**Sex and Marital Status**

The findings concerning sex and marital status were consistent with prior studies (Fries et al., 2005; Mehr et al., 1993), which indicated that sex and marital status differed with age in 94 NHs of Western Canada, respectively.

To a greater extent, the YR were male and never married and the OR were predominately female and widowed. This was a possibility since OR tend to be female, due to their life expectancy being typically longer than males (Medina et al., 2020). As for YR who were male, never married, and whose diagnoses included multiple sclerosis, seizures, or hemi-quadriplegia, it is likely that they were being sent to the NHs because they needed help with daily activities. They also may have lacked family caregivers or other care supports and, being younger, they may have not yet started a family (Barry et al., 2018; Watt & Konnert, 2007). Prior studies have shown that marriage continues to beneficially impact health and longevity, compared with unmarried people, and this pattern is more evident for men than for women (Rendall et al., 2011). In particular, there are a lot of single/unmarried young people and widowed older people in the NHs. Thus, this study suggests that helping the YR to develop better support systems and stronger safety nets might be beneficial.

**Disease Diagnoses**

No single diagnosis was dominant in the younger age group. Among all the disease diagnoses, depression, seizure, hemi or quadriplegia, multiple sclerosis, and diabetes had a higher prevalence in YR than in OR. Thus, further investigation into their needs is important, because serious health conditions or suicidal ideations are associated with serious chronic conditions (Kavalidou et al., 2017). We included disease diagnoses related to mental illness (e.g.,
depression, manic depressive, and schizophrenia) in this study, because mental illness has been reported as being more prevalent in YR and can lead to negative effects. For instance, Jervis (2002) reported that YR in NHs with mental illnesses often feel lonely and do not consider themselves to be among NH members, nor do they feel included in decision-making processes. Therefore, further exploration in this area can focus on how to help YR alleviate mental issues such as loneliness, and what kind of care approaches health care providers can offer, and how they can optimize their quality of life.

Seizures (19%) and multiple sclerosis (13%) were two prominent disease diagnoses among younger NH residents, which was found in prior qualitative studies that focused on YR in NHs (Barber et al., 2020; Marshall & Baffour, 2011). To date, the cause of MS is unknown; however, it is considered to be an autoimmune disease in which the body's immune system attacks its own tissues (Kamm et al., 2014). MS can occur at any age, but the onset of MS usually happens around 20 and 40 years of age (Confavreux & Vukusic, 2006). Additionally, many seizure types can occur when someone has MS (Moreo & Benbadis, 2019). These diseases require strong family support when the prognosis worsens, since the individuals lose independence and physical functioning. Additionally, besides taking medications as prescribed, closely monitoring the safety of individuals with MS is equally important. In fact, based on the previous literature focusing on younger NH residents, it was suggested that YR had limited support systems from either family or society (Presson & Ostwald, 2009; Smith, 2004). Thus, they had no choice but to be admitted to a NH where they could receive care for dependent needs. As a result, this study suggests that NH staff might help these YR to establish support systems from the internal NH community, or from online support groups they can belong to and participate in, so they can look after each other.
Diabetes was another prominent diagnosis in the YR. According to our findings, one in four younger NH residents were diagnosed with diabetes. Findings from Shieu et al. (2021) reported that younger NH residents were more prone to having severe obesity (BMI greater than 40) than residents aged 65 and over. Additionally, Al-Goblan et al. (2014) reported that BMI had a strong relationship to diabetes. Thus, it is crucial to be aware of the trend of obesity among younger NH residents, as this might require extra staff assistance. This study suggests that monitoring diet intake and weight management can be beneficial for the younger age group.

In summary, age differed with sex, marital status, selected disease diagnoses between medium or large facilities, and private sectors. More of the YR were male and never married, had the highest percentage of being diagnosed with depression compared to the other disease diagnoses in older age groups, resided mainly in the large (> 120 beds) and voluntary sectors in Alberta, and had a higher mean HRQoL score than OR in NHs. On the other hand, OR were predominately female, widowed, had the highest percentage of being diagnosed with dementia compared to the other disease diagnoses tested, mainly residing in large facilities (> 120 beds) that were either private or voluntary sectors in Alberta, and had lower mean HRQoL scores compared with the YR in NHs.

Characteristics of Nursing Home Facilities

Among the three provinces, more than half of the residents were from Alberta; this may be because of the data being obtained from TREC research groups, which is housed in the University of Alberta School of Nursing. In addition, this is possible because the population density is higher in Alberta compared with the other two provinces. Based on the findings, YR resided in larger facilities that had 120 beds or more. Meanwhile, OR tended to reside in medium sized facilities. This may be due to the coverage of certain health insurances or other financial reasons, since YR may encounter financial difficulties and could be receiving welfare from the
government. On the other hand, OR may have accrued greater financial stability over a lifetime and thus, they may prefer to choose better accommodations, as they are likely to die in the NH.

**Robustness Across Methods**

We used three different analysis methods: Unadjusted two sample T-test, adjusted ANCOVA and adjusted PSM to compare the mean of HRQoL between YR and OR. All of the results had a p-value of less than .001 and indicated that the mean score of HRQoL differed according to age group, with the mean score of HRQoL higher in younger than older NH residents.

**Limitations**

One of the limitations of this study was race, as this categorization was not made available to our team in the TREC MDS 2.0, because rules regarding use of the race variable are strict, requiring comprehensive collaborations with indigenous communities, which were not feasible for this study. Additionally, the analyses did not account for the clustering of residents nested within facilities, which violates the independency of observational assumptions. HRQoL was measured based on an aggregate score of various functional and disease-related outcomes. However, they are not a good proxy for HRQoL. The types of diagnoses, symptoms, and functional limitations someone has does not at all tell us how they feel about these issues. Furthermore, we were limited to 94 facilities, as we did not have access to the facility level variables for NHs that were not in the TREC dataset. However, the findings can serve as a reference for future researchers interested in comparing the differences between younger and older NH residents in other provinces or countries.

**Conclusions and Implications**

To the best of our knowledge, this was the first study to compare HRQoL between YR and OR in NHs among three provinces of Western Canada using MDS 2.0. Our findings showed
that the mean score of HRQoL differed between ages, with YR having a higher HRQoL mean score than OR. Additionally, it was found that YR were generally better when it came to vision, hearing, speech, ambulation, and cognition than OR. Therefore, future research can develop interventions that help optimize other aspects of quality of life, rather than just focusing on health-related aspects. For instance, such interventions could include organizing activities that can help boost self-esteem, or having regular meet ups/check-in opportunities either in-person or virtually, to allow patients to connect with similarly-aged peers, family, or significant others. Additionally, it would be useful to compare these results with other counties that are using MDS data to see what else might be learned about the differences in HRQoL scores between YR and OR in NHs.
Table 7. RAI-MDS 2.0 Scale Items (retrieved and adapted from Hirdes et al., 2018)

<table>
<thead>
<tr>
<th>Vision</th>
<th>RAI 2.0 items or scales</th>
<th>RAI 2.0 scale level</th>
<th>Assigned utility weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D1---Vision (with glasses if used)</td>
<td>Adequate vision without use of visual appliances</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>D3---Use of visual appliance</td>
<td>Adequate vision with use of visual appliances</td>
<td>0.974</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impaired vision</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderately impaired vision</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highly or severely impaired vision</td>
<td>0.61</td>
</tr>
<tr>
<td>Hearing</td>
<td>C1---Hearing (with appliance if used)</td>
<td>Adequate hearing, without the use of a hearing aid</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>C2a and C2b---Hearing aid use</td>
<td>Adequate hearing, with the use of a hearing aid</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimal difficulty in hearing, without the use of a hearing aid</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimal difficulty in hearing, with the use of a hearing aid</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hears in special situation only</td>
<td>0.789</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highly impaired hearing</td>
<td>0.61</td>
</tr>
<tr>
<td>Speech</td>
<td>C4---Making one’s self understood</td>
<td>Understood when expressing information</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Usually understood</td>
<td>0.909</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sometimes understood</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rarely or never understood</td>
<td>0.68</td>
</tr>
<tr>
<td>Ambulation</td>
<td>G1ea---Self-performance: locomotion on the nursing unit</td>
<td>Independence locomotion, without the use of walking aid</td>
<td>0.997</td>
</tr>
<tr>
<td></td>
<td>G5 through d---Modes of locomotion (mobility aid use)</td>
<td>Independence locomotion, with the use of walking aid</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supervision in locomotion, without use of walking aid</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supervision in locomotion, with use of walking aid</td>
<td>0.73</td>
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<tr>
<td></td>
<td></td>
<td>Limited assistance in locomotion</td>
<td>0.73</td>
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<tr>
<td></td>
<td></td>
<td>Extensive assistance in locomotion</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any wheelchair use</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total dependence, or locomotion does not occur</td>
<td>0.58</td>
</tr>
<tr>
<td>Dexterity</td>
<td>Cognitive performance Scale (CPS)</td>
<td>Independence eating</td>
<td>1</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------</td>
<td>---------------------</td>
<td>---</td>
</tr>
<tr>
<td>Requires supervision only for eating</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If individual has moderate or greater cognitive impairment (CPS &gt;=3)</td>
<td>0.919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited assistance in eating</td>
<td>0.919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensive assistance in eating</td>
<td>0.919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total dependence in eating</td>
<td>0.919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If individual has moderate or greater cognitive impairment (CPS &lt;3)</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited assistance in eating</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extensive assistance in eating</td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total dependence in eating</td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating did not occur</td>
<td>0.56</td>
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</table>

<table>
<thead>
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<th>Emotion</th>
<th>Depression Rating Scale (DRS)</th>
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</tr>
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<tbody>
<tr>
<td>DRS=1</td>
<td></td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>DRS=2</td>
<td></td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>DRS=3 or 4</td>
<td></td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>DRS=5 to 14</td>
<td></td>
<td>0.46</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognition</th>
<th>Short term memory</th>
<th>Cognitive skills for decision making</th>
<th>Independent decision making AND Intact short-term memory</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2a—</td>
<td></td>
<td></td>
<td>Modified independence in decision making AND Intact short-term memory</td>
<td>0.92</td>
</tr>
<tr>
<td>B4—</td>
<td></td>
<td></td>
<td>Independence decision making AND Short-term memory problems</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Modified independence in decision making AND Short-term memory problems</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Moderately impaired decision making</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Severely impaired decision making AND Intact short-term memory</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Severely impaired decision making AND Short-term memory problems</td>
<td>0.42</td>
</tr>
<tr>
<td>Pain scale</td>
<td>Pain</td>
<td>Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain scale =0</td>
<td>Pain</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain scale =1</td>
<td>Pain</td>
<td>0.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain scale =2</td>
<td>Pain</td>
<td>0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain scale =3</td>
<td>Pain</td>
<td>0.643</td>
<td></td>
<td></td>
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### Table 8. N (%) and Mean (SD) of Residents and Facility Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age groups</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-64</td>
<td>65+</td>
<td>p</td>
</tr>
<tr>
<td><strong>Sex (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>427 (48.4)</td>
<td>13,089 (64.6)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td><strong>Marital Status (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never Married</td>
<td>308 (37.3)</td>
<td>1,200 (6.2)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Married</td>
<td>209 (25.3)</td>
<td>5,493 (28.5)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>49 (5.9)</td>
<td>10,079 (52.4)</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>80 (9.7)</td>
<td>744 (3.9)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>180 (21.8)</td>
<td>1,727 (9.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Province (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alberta</td>
<td>562 (63.6)</td>
<td>9,707 (47.9)</td>
<td></td>
</tr>
<tr>
<td>Manitoba</td>
<td>69 (7.8)</td>
<td>3,135 (15.5)</td>
<td></td>
</tr>
<tr>
<td>British Columbia</td>
<td>252 (28.5)</td>
<td>7,404 (36.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Ownership (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>196 (22.2)</td>
<td>3,789 (18.8)</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>286 (32.4)</td>
<td>8,183 (40.4)</td>
<td></td>
</tr>
<tr>
<td>Voluntary</td>
<td>401 (45.4)</td>
<td>8,265 (40.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Facility Size (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt;80 beds)</td>
<td>92 (10.4)</td>
<td>2,145 (10.6)</td>
<td></td>
</tr>
<tr>
<td>Medium (80-120 beds)</td>
<td>170 (19.3)</td>
<td>5,893 (29.1)</td>
<td></td>
</tr>
<tr>
<td>Disease Diagnoses (n (%))</td>
<td>Large (&gt;120 beds)</td>
<td>Other (≤120 beds)</td>
<td>p-value</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------</td>
<td>-----------------</td>
<td>---------</td>
</tr>
<tr>
<td>Seizures</td>
<td>169 (19.1)</td>
<td>792 (3.9)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Hemi- or quadriplegia</td>
<td>93 (10.5)</td>
<td>853 (4.3)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Cerebrovascular accidents (CVA)</td>
<td>149 (16.9)</td>
<td>4,182 (20.7)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Traumatic brain injury (TBI)</td>
<td>61 (6.9)</td>
<td>203 (1.0)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Multiple Sclerosis</td>
<td>112 (12.7)</td>
<td>202 (1.0)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Alzheimer’s disease</td>
<td>54 (6.1)</td>
<td>2,635 (13.0)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>35 (4.0)</td>
<td>1,392 (6.9)</td>
<td>**.001</td>
</tr>
<tr>
<td>Dementia (non-Alzheimer’s)</td>
<td>183 (20.7)</td>
<td>10,978 (54.2)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Cancer</td>
<td>11 (1.2)</td>
<td>979 (4.8)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>35 (4)</td>
<td>2,819 (13.9)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Diabetes</td>
<td>216 (24.5)</td>
<td>4,583 (22.4)</td>
<td>**.154</td>
</tr>
<tr>
<td>Depression</td>
<td>317 (35.9)</td>
<td>5,920 (29.2)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Manic Depressive</td>
<td>39 (4.4)</td>
<td>353 (1.7)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>57 (6.5)</td>
<td>436 (2.2)</td>
<td>**&lt;.001</td>
</tr>
</tbody>
</table>

HRQoL score (mean (SD))

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large (&gt;120 beds)</td>
<td>0.15887 (0.314)</td>
</tr>
<tr>
<td>Other (≤120 beds)</td>
<td>0.06538 (0.262)</td>
</tr>
</tbody>
</table>

Note: Two independent sample t-test. * chi-square test. **
†Post-hoc comparison were all significant at the 0.05 level except small facility size (p=.868).
Table 9. N (%) and Mean (SD) of Resident and Facility Characteristics Between Matched and Unmatched Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Matched</th>
<th>Unmatched</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Matched</td>
<td>Unmatched</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Sex (n (%))</td>
<td>Female 742 (45.2)</td>
<td>12,104 (65.7)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td>Marital Status (n (%))</td>
<td>**&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never Married</td>
<td>338 (23.7)</td>
<td>1,116 (6.1)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>629 (38.4)</td>
<td>5,071 (27.5)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>258 (15.7)</td>
<td>9,870 (53.6)</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>102 (6.2)</td>
<td>722 (3.9)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>263 (16.0)</td>
<td>1,644 (8.9)</td>
<td></td>
</tr>
<tr>
<td>Province (n (%))</td>
<td>**&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alberta</td>
<td>944 (57.6)</td>
<td>8,513 (46.2)</td>
<td></td>
</tr>
<tr>
<td>Manitoba</td>
<td>258 (15.7)</td>
<td>2,917 (15.8)</td>
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<tr>
<td>British Columbia</td>
<td>438 (26.7)</td>
<td>6,993 (38.0)</td>
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<tr>
<td>Ownership (n (%))</td>
<td>**&lt;.001</td>
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<td></td>
</tr>
<tr>
<td>Public</td>
<td>275 (16.8)</td>
<td>3,588 (19.5)</td>
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<tr>
<td>Private</td>
<td>550 (33.5)</td>
<td>7,665 (41.6)</td>
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<tr>
<td>Voluntary</td>
<td>815 (49.7)</td>
<td>7,170 (38.9)</td>
<td></td>
</tr>
<tr>
<td>Facility Size (n (%))</td>
<td>**&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt;80 beds)</td>
<td>132 (8.0)</td>
<td>2,054 (11.1)</td>
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</tr>
<tr>
<td>Medium (80-120 beds)</td>
<td>348 (21.2)</td>
<td>5,541 (30.1)</td>
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<tr>
<td>Disease Diagnoses (n (%))</td>
<td>Large (&gt;120 beds)</td>
<td>1,160 (70.7)</td>
<td>10,828 (58.8)</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Seizures</td>
<td>263 (16.0)</td>
<td>608 (3.3)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Hemi- or quadriplegia</td>
<td>155 (9.5)</td>
<td>717 (3.9)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Cerebrovascular accidents (CVA)</td>
<td>348 (21.2)</td>
<td>3,760 (20.4)</td>
<td><strong>.436</strong></td>
</tr>
<tr>
<td>Traumatic brain injury (TBI)</td>
<td>61 (6.9)</td>
<td>203(1.0)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Multiple Sclerosis</td>
<td>180 (11.0)</td>
<td>109 (0.6)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Alzheimer’s disease</td>
<td>146 (8.9)</td>
<td>2,466 (13.3)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>72 (4.4)</td>
<td>1,284 (7.0)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Dementia (non-Alzheimer’s)</td>
<td>423 (25.8)</td>
<td>10,214 (55.4)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Cancer</td>
<td>29 (1.8)</td>
<td>852 (4.6)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>63 (3.8)</td>
<td>2,638 (14.3)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Depression</td>
<td>514 (31.3)</td>
<td>5,403 (29.3)</td>
<td><strong>.087</strong></td>
</tr>
<tr>
<td>Manic Depressive</td>
<td>66 (4.0)</td>
<td>305 (1.7)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>97 (5.9)</td>
<td>336 (2.0)</td>
<td><strong>&lt;.001</strong></td>
</tr>
<tr>
<td>HRQoL score (mean (SD))</td>
<td>0.13002(0.298)</td>
<td>0.06551(0.261)</td>
<td><em>&lt;.001</em></td>
</tr>
</tbody>
</table>

Note: Two independent sample t-test. * chi-square test. **
Table 10. HRQoL Between Younger and Older Age Groups

<table>
<thead>
<tr>
<th>HRQoL Index Score</th>
<th>18-64 Adjusted mean (SE)</th>
<th>65+ Adjusted mean (SE)</th>
<th>Mean Difference (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.159 (0.011)</td>
<td>0.065 (0.002)</td>
<td>0.093, (0.072, 0.115)</td>
<td>*&lt;.001</td>
</tr>
<tr>
<td></td>
<td>0.115 (0.009)</td>
<td>0.069 (0.002)</td>
<td>0.046, (0.027, 0.064)</td>
<td>**&lt;.001</td>
</tr>
<tr>
<td></td>
<td>0.153 (0.011)</td>
<td>0.092 (0.010)</td>
<td>0.061, (0.031, 0.091)</td>
<td>***&lt;.001</td>
</tr>
</tbody>
</table>

*Unadjusted two sample T-test; ** Adjusted ANCOVA Analysis; *** Adjusted Propensity Score Analysis (PSA); ¹N=20,036 unique residents; ²N=809 unique pairs in PSA
Table 11. HRQoL Variables Between Younger and Older Residents

<table>
<thead>
<tr>
<th></th>
<th>Age groups (in years)</th>
<th>Mean Difference (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-64 Mean (SE)</td>
<td>65+ Mean (SE)</td>
<td></td>
</tr>
<tr>
<td>Vision</td>
<td>.903 (.004)</td>
<td>.886 (.001)</td>
<td>.017 (.009, .025)</td>
</tr>
<tr>
<td>Hearing</td>
<td>.983 (.002)</td>
<td>.942 (.001)</td>
<td>.041 (.002, .037)</td>
</tr>
<tr>
<td>Speech</td>
<td>.914 (.004)</td>
<td>.905 (.001)</td>
<td>.008 (.004, .001)</td>
</tr>
<tr>
<td>Ambulation</td>
<td>.753 (.004)</td>
<td>.722 (.001)</td>
<td>.030 (.004, .022)</td>
</tr>
<tr>
<td>Dexterity</td>
<td>.928 (.004)</td>
<td>.955 (.001)</td>
<td>.027 (.004, .036)</td>
</tr>
<tr>
<td>Emotion</td>
<td>.872 (.006)</td>
<td>.872 (.001)</td>
<td>.001 (.006, .013)</td>
</tr>
<tr>
<td>Cognition</td>
<td>.736 (.007)</td>
<td>.659 (.001)</td>
<td>.077 (.008, .062)</td>
</tr>
<tr>
<td>Pain</td>
<td>.977 (.002)</td>
<td>.978 (.000)</td>
<td>.001 (.002, .005)</td>
</tr>
</tbody>
</table>

Note: The significance level is .05. Independent sample t-test.
REFERENCES


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CHAPTER 5: DISCUSSION

Introduction

This chapter includes six sections. First is the discussion of papers one, two, and three, which is followed by a synthesis of the implications for research and clinical practice, future research directions, and the conclusion.

Paper 1. Chapter 2

Aim one included a scoping review to summarize the lived experiences, needs, and quality of life among YR in NHs. To the best of our knowledge, this is the first study using the scoping review approach in the literature. The younger NH population has been understudied over the years. The findings discussed in earlier chapters aligned with Fries et al. (2005), Muenchberger et al. (2012), Mehr et al. (1993), and Nelson and Bowl (2017), suggesting that YR sharing similar individual characteristics worldwide provide a resource for health care providers when taking care of YR.

Findings in Scoping Review

We categorized the findings into numerous themes and found that YR viewed privacy, autonomy, identity, socialization, and appropriateness of accommodation as the most important criteria for determining their quality of life, and a systematic review of quality of life in older NH residents reported similar findings (Lee et al., 2009). For instance, OR consider their ability to maintain independence, autonomy, individuality, environmental readiness, and socialization as major criteria to influence their quality of life (Lee et al., 2009). The overarching themes between YR and OR were similar, but there were differences as well, given that the individual
characteristics were considerably distinct between these two populations. To illustrate, both YR and OR preferred to have choice and social activities while residing in NHs. However, YR preferred to meet with their age peers and play video games or listen to music that catered to their genre, whereas OR enjoyed the availability for them in self-care and leisure activities such as parlor games and excursions (Duncan-Myers & Huebner 2000; Jing et al., 2016). Another example is that the majority of NH residents were aged 75 and above, so NH were more prepared to accommodate the older population rather than younger people. However, both studies focused on quality of life in NH residents and proposed the importance of environmental modification to improve their QoL. Therefore, if the facilities want to accommodate these two populations, it is likely that they need to design different wings and facilities because the preferences of these two groups were substantially different.

There were mixed findings related to age and quality of life. Subasi et al. (2005) and Watt et al. (2007) reported no significant results linking age and quality of life. However, Khader (2011) indicated that quality of life differed between younger and older NH residents. Some possible explanations are that Khader reported domains of quality of life rather than the total scores of quality of life, cultural differences due to having three studies conducted in three different countries during different times, and small sample sizes that may have led to selection bias.

Overall, our scoping review provided a deeper understanding of the lived experiences, needs, and quality of life among younger NH residents. The results provided suggestions for future studies regarding what kind of interventions might be implemented in the NHs to optimize their quality of life. Details will be illustrated in the implication sections.
Paper Two: Findings of the Cross Sectional, Correlational Secondary Data Analysis

The percentage of younger NH residents in many countries including the United States and Canada has been increasing recently (Canadian Institute for Health Information [CIHI], 2012, 2019; Center for Medicaid and Medicare [CMS], 2008, 2015). Yet little is known about this population in terms of their individual characteristics and how they differ from older NH residents. Therefore, this study, the first to do so, described and compared the individual characteristics between younger (age under 65) and older (age above 65) NH residents in three provinces of Western Canada.

The results indicated that individual characteristics differed with age. More specifically, younger NH residents were mostly male, had never married, had more obesity (high BMI) and a greater chance being morbidly obese than older residents. They were mainly diagnosed with depression, CVA, seizures, hemi- or quadriplegia, chronic mental health (e.g., manic depressive, schizophrenia), multiple sclerosis, and TBI. Furthermore, they required more assistance in activities of daily living and were reported to be more depressed. Fortunately they were more cognitively intact than the older NH residents. Meanwhile, OR were mainly female and widowed, had an average BMI (18 to < 25), were prone to diagnosis with dementia (non-Alzheimer’s) and cardiac conditions, and were more cognitively impaired. Overall, the results suggested that younger people may be more prone to limited support systems than the older NH residents as well as having higher chances of being admitted with a myriad of diseases. Implications will be discussed in the implication sections.
Paper 3. Chapter 4

Paper Three: Findings of the Cross-Sectional, Correlational Secondary Data Analysis

We hypothesized that the HRQoL was worse in the YR than OR based on an existing study that indicated (1) YR are more likely require relatively heavy care and are most likely to classify into the RUG-III Special Care or Clinically Complex categories, which represents the presence of major medical problems that drive care; (2) they are likely to have more chronic disease illnesses and explicit terminal prognoses than OR (Fries et al., 2005). However, our result was contrary to our expectation that OR would have better HRQoL than YR. This is the first known study to compare the HRQoL between YR and OR among three provinces in Western Canada. The HRQoL index scale implemented in this study was mainly focused on variables such as vision, hearing, speech, and cognition. The results suggested that OR have higher needs that might be met with assistive devices and symptom management. Meanwhile, YR likely need different measures to examine HRQoL or perhaps more focus on the other domains of QoL. The implications of these finding will be illustrated in the implication sections.

Implications for Clinical Practice

This study, including a literature review of qualitative research, quantitative, and mixed method analyses, is the first to explore and summarize the lived experiences, needs, and quality of life among younger NH residents as well studies to compare the individual characteristics and HRQOL between younger (age 18–64) and older (age 65+) NH residents from three provinces of Western Canada. Our findings have implications for NH residents as well as health care practices and set the baseline estimates for researchers and health care providers in the LTC industry.
Implication in Younger NH Residents

The findings from our study suggested strategies for improving NH quality of life.

1. Increase the autonomy of the YR by such steps as allowing them to decide their meal choice and whether to participate in the group activities. Simply involve them in the decision-making process.

2. Increase socialization opportunities within the same age group (peers), provide appropriate activities (e.g., playing video games, listen to music cater to their genre, using online apps to meet friends) that can be tailored to their age. Offer resources to meet their needs (e.g., physiological needs, self-fulfillment needs; Marshall & Baffour, 2011; Presson & Ostwald, 2009; Smith, 2004). This can help optimize their quality of life.

3. Suggest assigning those same age residents into the same units so that they can be familiar with each other and establish friendships. Our findings indicated that YR were more prone to having limited family support systems; thus, building a solid support system with other residents inside the NH community is crucial. Studies have found support system to be a key factor influencing residents’ well-being and quality of life (Kelly, 2012; Perkins et al., 2013).

4. Use a different scale to measure HRQoL than the interRAI HRQoL index we used in this dissertation. Our findings indicated that the mean score of HRQoL was better in YR than OR suggesting that YR were generally better in physical quality of life than OR. However, other aspects of quality of life such as psychosocial and emotional aspects were not captured in this index and were being reported poorly based on the previous studies looking at YR’s lived experiences, needs, and quality of life (Barber et al., 2020; Dwyer et al., 2019; Persson et al., 2009). Therefore, our findings suggest the need of a different
measurement to examine their HRQoL so that we may obtain a better picture of their life and find strategies to help them optimize it.

5. Prevent potential discrimination or reliance on stereotypes between younger and older residents in NHs. Our findings from the scoping review in Chapter 2 indicated that YR were reluctant to live with people who are terminally ill and/or older (Dwyer et al., 2019). This is a fairly common bias and deserves to be explored further. Burnes et al. (2019) systematically reviewed and summarized the interventions that could help reduce ageism and reported that ageism interventions demonstrated a strong significant relationship with attitudes (p < .001), knowledge (p < .001), and comfort (p < .001). However, the findings of statistical analysis showed no significant effect on anxiety or working with older adults. Burnes et al. suggested that combined interventions with education and intergenerational contact can maximize the effect on attitudes. As a result, NHs can provide education sessions for not only residents but also family and staff to help increase understanding of how to prevent and respond to similar situations.

6. Incorporate technology into residents’ daily lives. Pandemic conditions due to Covid-19 have required NHs to limit visitors and human contact even from staff members, which likely has heightened loneliness among NH residents. To prevent the spread of infection, government officials and medical experts have issued “stay at home” and “isolate in place” messages, and numerous NHs were locked down to prevent and reduce spread of the Covid-19 infection. The current situation remains unclear (CMS Home Health Agencies, 2021). Thus, using technology would be a great way for YR to connect with others as most of them grew up with the internet and 3C (computer, communications, and consumer electronics) products, usually refer to computers, tablets, mobile phones, digital
cameras, audio-visual playback hardware devices or digital audio players, and so on (Chen, 2011; Olson et al., 2011). The facilities’ program planners should set up events virtually to invite residents who are interested, especially YR, to meet with peers from different facilities. By doing so, they can build a community that could support each other and potentially improve their quality of life. Online peer-to-peer support interventions have been useful in other populations, including young adults with mental illness (Ali et al., 2015). Freeman et al. (2008) evaluated an online mutual support group for college students with psychological problems and reported a significant reduction in depressive symptoms in both intervention groups from pre- to postintervention. Our results indicated that YR were more prone to have a diagnosis of mental illnesses than OR. Thus, the method from Freeman et al. may be beneficial for future research that is interested in reducing depressive symptoms in YR and ultimately optimize their quality of life.

Implication in Older NH Residents

The findings from our study suggested strategies for improving NH quality of life.

1. Implement proper care practices for residents with dementia. Our findings reported that OR had higher prevalence of being admitted to and diagnosed with dementia. Therefore, executing proper care practices are vital. For instance, Ismail et al. (2020) published a guideline of dementia care practice including but not limited to dementia case finding and detection; use of non-cognitive markers of dementia for better dementia detection; risk reduction/prevention; psychosocial and nonpharmacological interventions; and deprescription of medications used to treat dementia. This information can be useful for policy makers and the lay public to inform a current and evidence-based approach to dementia, as well as to clinicians and researchers so that
they may provide better quality of care and ultimately improve residents’ quality of life.

2. Monitor the need for assistive devices and symptom management. Our findings indicated that HRQoL was better in YR than OR, suggesting that OR are likely in need of assistive devices and symptom management to meet their needs. It is important for the staff to monitor the risk of falls and other potential injuries that may occur with the use of assistive devices such as mobility aids (e.g., walker, cane, wheelchair) and hearing aids because OR may require time to adapt the use of those devices.

3. Use technology to help connect residents with support systems. OR may have better family support systems than YR because our findings indicated that majority of them were married or widowed. However, it is also possible that this difference was due to a limitation of the data, which does not report on parents or siblings that might be a source of support for YR. Therefore, NH policies should continue allowing family members, significant others, and close friends to visit frequently, which could help improve their well-being and psychosocial aspects of QoL. However, assisting them to get used to the online video platform or mobile phone will be a priority task during this period of time because the Covid-19 pandemic to the date of this dissertation is ongoing.

**Implications in Both Younger and Older NH Residents**

Obesity and mental wellness are two main concerns among all NH residents based on our findings. Therefore, organizations should design proper weight control programs, palatable low-calorie options, and education courses for those residents because there are many deleterious risk factors related to morbid obesity that can affect their quality of life (Pi-Sunyer, 2009).
Meanwhile, having a mental health therapist in house, increasing the frequency and duration of visits, and encouraging participation in routine recreational activities are shown to help improve wellness and quality of life (Bharucha et al., 2006). Overall, the implications require interdisciplinary teams to collaborate to implement appropriate solutions that can help improve their quality of life.

**Implications for Facilities and Organizations**

NHs have been encountering shortages of staff and high levels of burnout rate long before the Covid-19 pandemic began, and these were exacerbated during the pandemic (White et al., 2021; Xu et al., 2020). As a result, this circumstance may evoke a new standpoint to health care providers and facilities to think about the potential use of social robots to assist with care. To date, studies mainly used Paro, a seal-like companion robot, as an intervention tool in older people with dementia (Broekens et al., 2009; Chen et al., 2020; Moyle et al., 2017; Petersen et al., 2017). However, such robots are designed to function as pets, and their responses to users are pet-like. Also, it is difficult to keep the Paro’s fur clean, which may raise infection concerns (Hung et al., 2019). Fortunately, as new technology evolves, the latest generation of social robotics are life-like (e.g., robots Buddy, Zora) and can mimic sophisticated human social responses, so relationships are less likely to raise infection concerns (Jecker, 2020). Thus, this can be a promising new method to implement in the NH facilities in the near future.

Furthermore, more research is needed to evaluate whether NHs are appropriate to accommodate younger residents and, if not, what other housing options, such as home care, can be provided in Canada.

**Future Research Directions**

Future research will be needed to determine appropriate interventions, especially for the YR, such as the kind of activities, outings, and community resources that can benefit this age
group. Examining whether those interventions have a significant impact in their overall quality of life will be useful as well. Moreover, future research can use our results as a basis for new measures of health conditions, outcomes, and resource use for NHYR as well as to examine weight loss interventions, mental illness, and symptom management in NH residents. We also recommend future research compare the individual characteristics between younger and older NH residents international. Comparing the differences and similarities will allow us to consider what kind of suggestions could be provided based on what we found in this study.

In summary, clinical and nonclinical characteristics of younger people are substantially different from those of older NH residents, and these are some suggestions to help the younger population to develop better mental wellness, physical health, and overall well-being as well as treating them with respect and dignity so that they can establish a better quality of life in NHs.

**Conclusions**

Potential consequences regarding NHYRs have become alarming topics in many countries. These issues require interdisciplinary teams to implement appropriate solutions that can help improve YRs’ quality of life. Overall, we summarized YRs’ lived experiences, needs, and quality of life and provided suggestions for future interventions to optimize their quality of life. Then we described and compared individual characteristics between younger and older NH residents in Western Canada. The findings indicated that the individual characteristics and HRQoL of younger and older NH residents were substantially different by age and thus require different care approaches. To maximize the benefits and manage the risk associated with the YR in NHs, the government should support continuing education and updated information to health care providers including caregivers who are at the frontline taking care of them. Furthermore, NHs must establish a safety net for younger NH residents and offer age-appropriate activities for them to socialize that can be sustained over the long-term to prevent social isolation, reduce
inequality, and promote social inclusion among younger NH residents. Overall, we are now learning to coexist with the pandemic, and everyone is navigating to find a new normal way to live. It is our hope that what is learned from the experience of NH might be able to be generalized to other LTC services.
REFERENCES


