**Patterns of Depression in Ontario Long-Term Care Facilities
and the Role of Language**

by Erica Ihn

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiner.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

Background: Little is known about the mental health and care provided to older adults who may not speak English and those who reside in long-term care facilities (LTCFs), particularly their experiences with depression. Limited English proficiency (LEP) has been found to complicate medical practice and may be a barrier to depression treatment.

In Ontario, ethno-specific nursing facilities exist to provide care that is consistent with the cultural preferences of different ethnic groups, including language preferences. An important feature of these facilities is having staff and residents who speak the same language as immigrant residents. However, these facilities often have long-wait lists and are in high demand among older adults of different ethnic backgrounds.

With the aging population, there may be an increasing number of immigrant older adults entering care, creating a diverse resident population. Providing care to older adults who may have LEP may be a challenging but critical process for identifying and appropriately treating depression in both mainstream and ethno-specific homes.

Objectives: The purpose of this study was to examine patterns of depression among LTCF residents who have different language preferences. This study also examined depression outcomes among nursing facilities that have 'high' and 'low' concentrations of residents who do not speak English or French.

Methods: Secondary data analysis was conducted on data derived from the Minimum Data Set (MDS 2.0) for LTCF residents living in Ontario. Observations were stratified according to primary language spoken which was English, French or Other. Bivariate analyses was used to determine statistically significant predictors for depression symptoms in each language group. Using generalized estimating equations, final adjusted models were created for the English, French and Other residents that allowed to predict depressive symptoms. LTCFs that had a 'high' concentration of 'other' language speaking residents were also identified. Facilities with a 'low' concentration of 'other' language speaking residents were identified as mainstream facilities. Depression quality indicators were used to identify improvement or decline in rates in depressive symptoms, adjusted for resource intensity.

Results: The results of this study showed residents who did not speak English or French were found to be more cognitively impaired and less socially engaged. At admission and the follow-up assessment, 25.3% and 27.5% of Other language speaking residents, 32.2% and 36.3% of English residents, and 29.0% and 31.3% of French residents had depressive symptoms as indicated by the Depression Rating Scale. The smallest proportion of residents with depressive symptoms taking antidepressants was the Other language group where, at admission, 49.9% of residents were taking antidepressants while 52.9% were taking antidepressants at follow-up. The factors associated with depressive symptoms for the English residents were aggressive behaviour, unpleasant mood in the morning, pain, health instability, cognitive impairment, limitations in activities of daily living, anxiety, depression diagnosis, and sex. Logistic regression using generalized estimating equations identified the admission factors predictive of depressive symptoms at follow-up for the French residents were aggression, pain, cognitive impairment, and

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a reduced social interaction. The factors that were significant in predicting depressive symptoms for the Other language speaking residents were aggressive behaviour, pain, cognitive impairment, depression diagnosis and age. For the depression quality indicators, the French and Other language speaking residents were found to have higher rates of improvement in depressive symptoms and lower rates of decline in symptoms compared to the English speaking residents. Higher rates of improvement and lower rates of decline in depressive symptoms were found in the 'high' concentration facilities for all residents, regardless of language.

Conclusion: Residents who do not speak English or French experience differences in depressive symptoms and treatment compared to the other language groups. Language barriers experienced by residents can create challenges for staff in identifying depressive symptoms and providing treatment. This may be the case for older adults who not only speak a different primary language but are also documented as being more cognitively impaired or display acts of aggressive behaviour. The benefits of ethno-specific facilities are evident given that quality of depression care was better, regardless of language, for facilities with higher concentrations of non-English speaking residents. However, due to high demand and lack of availability, immigrant older adults may need to reside in mainstream facilities where they may experience a language barrier. More research to inform policy is needed in order to provide culturally appropriate mental health care for these residents.

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LIST OF ABREVIATIONS

ABS – Aggressive Behavior Scale
ATD – Antidepressants
ADL – Activities of Daily Living
CAPs – Clinical Assessment Protocols
CCC – Complex Continuing Care
CMI – Case Mix Index
CHESS – Changes in Health, End-Stage Disease, Signs and Symptoms
CIHI – Canadian Institute for Health Information
CPS – Cognitive Performance Scale
DRS – Depression Rating Scale
GEE – Generalized Estimating Equations
ISE – Index of Social Engagement
LEP – Limited English Proficiency
LTCF – Long-term Care Facility
MDS 2.0 – Minimum Data Set 2.0
QI – Quality Indicator
QICu - Quasi-Akaike Information Criterion unadjusted
RAI-MDS – Resident Assessment Instrument – Minimum Data Set
RUG-III – Resource Utilization Group III
SAS – Statistical Analysis Software
SES – Socioeconomic Status

1. LITERATURE REVIEW

Canada is experiencing an aging population that includes a substantial proportion of immigrant older adults. In 2014, 15.7% of Canada's population (one in six Canadians) was aged 65 years and older (Statistics Canada, 2014a). The number of Canadians aged 65 years and older is expected to double in the next 25 years to an estimated number of 10.4 million (one in four Canadians) (Employment and Social Development Canada, 2014). By 2030, 22% of Canada's population will be 65 years of age or older (Statistics Canada, 2014c). Immigrants make up 28% of the older adult population (Statistics Canada, 2010) and the proportion of immigrants in the older adult population is 10 percent greater than the general population (Ng, 2012).

Older adults are found to be at greater risk for mental illness particularly depression (Seitz, Purandare, & Conn, 2010). This may be due to various factors such as loss of social relationships, lower socioeconomic status and age related illness (WHO, 2013). For example, in Quebec, older adults who reported deterioration in physical health were more vulnerable to psychiatric disorders such as depression and anxiety (Préville, Boyer, Vasiliadis, Grenier, Streiner, Cairney, & Brassard, 2010). Some additional health related factors related to mental illness in seniors include multiple functional impairments and various physiological and psychosocial stressors due to old age (Borson, Bartels, Golenda, Gottlieb, & Meyers, 2001).

Depression comes in many different forms and this has created varying prevalence rates in older adults. Depression is not uniformly experienced in older adults and the type and severity of symptoms can differ. Major depression has been found in 2% to 5% of older adults (Mottram, Wilson, & Strobl, 2006) which is lower compared to the prevalence of depressive symptoms. Depressive symptoms have been found to be present in 15% of older adults living in the community (Blazer, 2003). In a study on the older adult population in Quebec, 1.1% had major

depression and 5.7% had minor depression (Préville et al., 2008). Minor depression is still considered clinically significant and requires further examination (Blazer & Hybels, 2005).

For older adults, depression often exacerbates other health issues or symptoms. Studies have found depression to be associated with behaviour problems due to dementia (Menon et al., 2001) and loneliness (Luo, Hawkley, Waite, & Cacioppo, 2010). Increased risk of mortality has also been found among older adults with depression. For instance, in a study examining the association between risk of death and depression, older adults with depression were twice as likely to die when compared to older adults without depression (Gallo et al., 2013).

Delivering services to meet the mental health needs of immigrants in Canada has been challenging because of the heterogeneity of this group. In 2011, immigrants made up 20% of Canada's population (Statistics Canada, 2013). Asia as well as the Middle East comprised Canada's largest source of immigrants and there was also an increase in immigrants from Africa, the Caribbean, Central and Southern America (Statistics Canada, 2013). The influx of immigrants also creates a more multilingual society. In addition to English and French, the 2011 National Health Survey estimated that there are more than 200 other different languages spoken in Canada (Statistics Canada, 2013). The Chinese languages (Cantonese, Mandarin and other) were reported as the most widely used. Other languages included Arabic, Italian, German, Portuguese, Persian (Farsi), and Polish. This wide diversity in languages creates challenges for service providers who rely on verbal communication to understand the needs of older adults.

To date, there has been little research on immigrant residents and their experiences of depression in LTCFs. Various studies have examined the relationship between race and mental illness in LTCFs where African American residents have been found to reside in nursing homes with poor quality of care compared to Caucasians (Siegel et al., 2012; Stevens, Owen, Roth,

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Clay, Bartolucci, & Haley, 2004; Sengupta, Decker, Harris-Kojetin, & Jones, 2012; Jones, Marcantonia, & Rabinowitz, 2003). Most of the studies examining depression among immigrant older adults take place in the community and focus on barriers to mental health service use (Gerst, Al-Gratrif, Beard, Samper-Ternent, & Markides, 2010; Jang, Roh, & Chiriboga, 2014; Akincigil et al., 2011; Sorkin, Ngo-Metzger, & De Alba, 2010). Even though there are different levels and forms of health services in LTCFs, immigrant older adults can still experience barriers to care and may be even at greater risk for developing depression due to various factors such as migratory grief (Casado & Leung, 2001), financial hardship (Mui & Kang, 2006), and the changing family dynamic (Kim, Sangalang, & Kihl, 2012). The negative symptoms associated with depression and future trends in aging within the immigrant population will mean a growing interest in the mental health needs of this group.

The following literature review will provide a background on depression among immigrant older adults and the influence of culture on depression and depressive symptoms. This review will then discuss language and how older adults with limited English proficiency (LEP) may be at greater risk for developing depression and how they may be less likely to receive treatment. Language barriers can create further challenges in attaining treatment for depression in immigrant populations. Finally, the literature review will examine research on depression in LTCFs which can be used towards improving care for older adults with LEP.

1.1. Immigrant Older Adults

In the year 2013, over 10% of immigrants were ages 65 years or older (Government of Canada, 2015). Chui, Maheux and Tran (2007) found 90% of immigrant seniors were found to live in a Census Metropolitan Area such as Toronto, Montreal and Vancouver where there are more ethno-specific services and ethnic communities. In 2013, about 40% of immigrants made

residence in Ontario (Government of Canada, 2015). Among the top 10 countries of origin, over 30% of immigrants arrived from China, the Philippines and India (Government of Canada, 2013).

In Canada, immigrants have created a more linguistically diverse society. Studies have found 93% of Canadian born seniors are able to speak English or French, compared to only 31% in the immigrant senior population (Chui et al., 2007). More than 30% of new immigrants to Canada are unable to speak English or French (Government of Canada, 2015). The most common non-English and non-French languages are Tagalog, Chinese and Punjabi (Government of Canada, 2015). The increasing diversity in immigrants combined with the variety of languages spoken presents multiple challenges to health professionals in LTCFs including understanding health needs of residents or understanding other important information related to health.

Immigrants may experience different trajectories of health when arriving in new country. This is known as the 'healthy immigrant effect'. Initially, immigrants may be in better health than non-immigrants but their health worsens over time (McDonald & Kennedy, 2004). This decline may be due to barriers encountered in health care as well as increased risk for poor health outcomes such as chronic disease and mental illness (Kennedy, McDonald, & Biddle, 2006; Subedi & Rosenberg, 2014; Ng, Pottie, & Spitzer, 2011; Ali, 2002; Saposnik, Redelmeier, Fuller-Thomson, Lon, & Ray, 2010). This can be in part due to socioeconomic status (SES), employment and legal status as well as LEP which can also create barriers to accessing health care (Derose, Escarce, & Lurie, 2007). Older immigrants are an even more vulnerable group who are also at risk for poor mental and physical health (Prus, Tfaily, & Lin, 2010).

Immigrant older adults are found to be at greater risk for depression where they have been found to have a 1.71 higher odds of depression compared to non-immigrants (Ladin &

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Reinhold, 2013). The consequences associated with immigration often make individuals vulnerable to mental health issues (Shin, Han, & Kim, 2007) and this vulnerability is further intensified when immigrants experience health issues associated with aging (Dong, Chang, Wong, & Simon, 2012). One study using measures of self-rated mental health and depressive symptoms found older Korean Americans were at risk for mental health problems including depression (Jang, Park, Kim, Kwag, Roh, & Chiriboga, 2012). In the United States, older adults from Mexico were at greater risk for depressive symptoms compared to older adults of Mexican descent who were born in the United States (Gerst et al., 2010). In 11 European countries, immigrant older men were found to experience a higher likelihood of depression when compared to their native-born counterparts (Ladin & Reinhold, 2013). Experiences of aging and immigration can significantly impact mental health as well as increase the odds for depressive symptoms in older immigrant adults.

Culture and Mental Illness

Canada is continually increasing in cultural diversity and differing cultural perspectives can have a major impact on policy decisions and practices in the health care system. Leininger (2001), a nursing theorist defines culture as "learned, shared, and transmitted values, beliefs, norms, and lifeways of a specific individual or group that guide their thinking, decisions, actions, and patterned ways of living" (p. 46). Culture can shape the lives of older adults, particularly immigrant older adults, whose culture may be different from the cultural practices of their home country. Culture also influences the ways in which older adults perceive health which can shape treatment practices (Kleinman, 2004). Therefore, in working towards improving the health of this population, the experiences of culture from an immigrant standpoint must be considered. This study will refer to the culture of immigrant and ethnic older adults and their experiences

with depression where one's spoken language will be used as a proxy measure. The following section will examine the ways in which culture influences mental illness, specifically depression.

Acculturation

Acculturation is a process where a group or individual adopts the values, traditions and language of a host culture (Mills & Henretta, 2001). This process can be very stressful for immigrant older adults because they have fewer resources to help them adapt to a new country (Casado & Leung, 2001). Acculturation is a socially and psychologically stressful event and can sometimes lead to acculturative stress. After immigration, stresses associated with moving to another country have been found to be intensified by factors such as culture shock, language barriers, and interpreting differences between one's goals and accomplishments (Wilmoth & Chen, 2003). Theoretically, acculturative stress is based on the idea that unfamiliar social structures, culture clashes and social isolation that occur during acculturation can create sources of tension which can result in mental and physical health issues (Kiefer, 1974). Understanding the relationship between acculturation and mental health can help to identify causes of mental illness to help direct treatment.

Studies have also looked at the relationship between acculturation and depression among specific cultural groups. In the United States, older Mexican Americans who were less acculturated and lacked the knowledge and language to effectively navigate health services were found to be at risk for depression (González, Haan, & Hinton, 2001). In a study examining Chinese, Korean, Indian, Filipino, Vietnamese and Japanese older adults found those who were experiencing acculturation stress were at greater risk for developing depression (Mui & Kang, 2006). A study with older Kurdish refugees in the United States found that greater proficiency over the English language and greater social support was associated with lower rates of

depressive symptoms (Cummings, Sull, Davis, & Worley, 2011). In the United States, high acculturative stress was found to be associated with high depression scores in Korean older adults (Han, Kim, Lee, Pistulka, & Kim, 2007). In Canada and the United States, depression was found to be linked to low levels of acculturation in older Asian immigrants (Kuo, Chong, & Joseph, 2008).

When transitioning to a new country, older immigrants may experience a cultural clash making them vulnerable to mental health problems. In Canada, South Asian older adults were at a greater risk for depression if they had stronger ties to their cultural values (Lai & Surood, 2008). These older adults may experience challenges when trying to adjust to the host's cultures values and beliefs especially if there are discrepancies with their own culture. In addition, the living and environmental hardships experienced by immigrant older adults may have contributed negatively to their mental health. For example, many older Chinese immigrants have experienced trauma and loss including the death of family members, time in refugee camps, forced relocation, poverty and unemployment (Lai, 2003). Experiences of older immigrants support the multiple jeopardy theory which states that aging makes quality of life and health worse for minorities (Chow, 2012) and can make them vulnerable to poor mental health outcomes. Immigration, adapting to a new country and the potential stresses associated with aging underscore the importance of examining mental health among immigrant older adults.

Views of Depression

The cultural background of immigrant older adults may influence their understanding of mental illness. Cultural barriers, including lack of formal education and LEP can affect a person's understanding and recognition of depression as an illness. For instance, compared to their Canadian born peers, older Chinese immigrants were significantly less able to recognize

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depression as a mental illness (Tieu, Konnert, & Wong, 2010). Only 11.3% of the Chinese sample used words like "depression" or "depressed", while 74.0% of the Canadian sample correctly identified depression when given a case vignette of someone with depression. Another study on older Chinese immigrants in the U.S. found that participants had a limited knowledge of depression and the implications it can have on one's health (Dong, Chen, Chang, & Simon, 2013). However, participating in health workshops, the older Chinese adults improved in their understanding of depression risk factors and consequences.

Many immigrant older adults do not see internal or biological factors as cause for depression. Immigrant older adults are more likely to perceive depression as a social problem or an emotional way to cope with stressful situations (Karasz, 2005). When mental health professionals were asked about the beliefs of South East Asian older adults, many agreed that the older adult community tended to consider causes of depression or feelings of sadness to be associated with socio-environmental stressors as opposed to biological factors (Lee, Lytle, Yang, & Lum, 2010). They also found that cultural beliefs affected South Asian older adults' ability to understand, recognize and respond to mental illness. A study on Korean American older adults found that this group did not recognize depression as a mental illness with some viewing the symptoms as reactions to life stresses (Lee et al., 2010). In the United Kingdom, Black Caribbean, South Asian, and White British older adults understood depression as an illness caused by social and personal events due to old age (Lawrence et al., 2006). In addition, older adults who were taking antidepressants were found to be more likely to acknowledge the psychological symptoms of depression and recognized depression as a serious mental health issue that required clinical and medical intervention.

Manifestation of Depression among Immigrant Older Adults

Culture can influence the manifestation of depression in immigrant older adults. In ethnic minority groups, depression may often be reflected through somatic or physical symptoms and signals of distress specific to a cultural group (Ahmed & Bhugra, 2006). Chang et al. (2008) compared the prevalence rates of major depressive disorders in Korea and the United States. This study found that symptoms of depression differed where Koreans were more likely to express low energy and difficulties concentrating whereas Americans were more likely to describe experiencing a depressed mood. The somatic presentation of mood disorders have been found to be one of the most common reasons for seeking help in older Chinese adults to avoid the stigma associated with mental illness (Lim, Chang, Yu, Chiu, Chong, & Kua, 2011).

The language used by older immigrants to describe depressive symptoms also appears to be culturally influenced. Among South Asians, somatic representations of depressive symptoms are common (Lai & Surood, 2008). Chinese respondents have been found to be more reluctant to report psychological distress and when they do report issues to clinicians, they are more likely to focus on physical symptoms when compared to western populations (Jimenez, Alegria, Chen, Chan, & Laderman, 2010). Depressed Chinese older adults were found to report symptoms such as headaches and weakness as opposed to emotional symptoms such as nervousness and suicidal thoughts (Lai, 2003). Chinese outpatients were also found to report more somatic symptoms when compared to Euro-Canadians who reported more psychological symptoms (Ryder et al., 2008). Physical expressions may overshadow or act as barriers in the detection of mental illness (Bhugra & Mastrogianni, 2004). This can result in clinicians focusing on symptoms that are more physical and apparent as opposed to the psychological symptoms of mental illness.

Treatment Engagement

Culture can shape one's beliefs on how to treat depression and influence help-seeking behaviours. Hmong and Cambodian elders were found to be unaware depressive symptoms can be treated and did not know mental health services were available to manage depression (Lee et al., 2010). When treatments were sought out, patients in health care settings that were culturally different from their own were less likely to comply with treatment (Jimenez, Bartels, Cardenas, Daliwal, & Alegria, 2012). Non-adherence or discontinuation of treatment for immigrants can be due to the concerns of side effects when using psychotropic medications (Cooper et al., 2003), belief that antidepressants are addictive (Givens, Houston, Van Voorhees, Ford, & Copper, 2007) and distrust with mental health professionals due to bias or racism perceived my immigrants (Jimenez et al., 2010).

Individuals from ethnic minority groups are less likely to seek treatment for depression by a professional. Tieu et al. (2010) found that older Chinese immigrants in Canada believed complete or partial recovery of depression was possible without clinical help. The underutilization of mental health professionals and health services for immigrant groups can also be due to a lack of awareness. A study with Chinese and Tamil communities in Toronto, Canada found these groups were often unaware of available mental health services including those funded by the Ministry of Health (Sadavoy, Meier, & Ong, 2004). More information about available mental health services to these groups may allow for more individuals to be treated appropriately.

Some immigrant older adults have been found to have limited resources to deal with their mental health problems. With little command of the English language and fewer social supports, many older immigrants rely on their younger relatives or family members for support, reducing the likelihood of pursuing mental health treatment (Lai, 2003). A study looking at Korean older

adults examining the associations among acculturation stress, social support and depression, found that older adults used adult children as their main source of support even when they had a living spouse (Han et al., 2007). Older adults may also feel that relying on family members as interpreters is problematic because they may not wish to disclose personal information. Access to mental health services can be even more challenging because of geographical barriers where seniors may live in rural areas while culturally sensitive services are often located downtown (Sadavoy et al., 2004).

Help-seeking behaviour remains an issue when trying to manage depression in ethnic communities due to the stigma associated with mental illness. Similar to non-immigrant groups, the stigma associated with mental illness continues to be a barrier to finding mental health services for immigrants (Lee et al., 2010). Some cultural groups find mental health a taboo subject. Among older Chinese groups, mental illness is often stigmatized which may be related to the under use of mental health services and treatment (Li & Browne, 2000). Stigma and feelings of shame lead to delays in seeking help for depressive symptoms. In South Asian culture, mental illness often brings shame and dishonour to the family (Conrad & Pacquiao, 2005). Perceived stigma was a factor that often resulted in the discontinuation of antidepressants among Latino outpatients in the United States (Sirey et al., 2001). Immigrant older adults may choose and prefer to remain silent on their symptoms of depression.

1.2. Language Barriers

Language barriers have been found to limit economic opportunities and access to health and social services for older immigrants (Kim et al., 2012). Various studies have found that those with LEP have poor health status compared to those who can speak English (Ponce, Hays, & Cunningham, 2006; Cheng, Chen, & Cunningham, 2007; Derose et al., 2007; DuBard & Gizlice,

2008). When older non-English speaking immigrants were compared to English speaking older adults, the non-English speaking immigrants had higher rates of serious mental illness such as mood, anxiety and substance use disorders and were more likely to rate their health as poor (Kim, Worley, Allen, Vinson, Crowther, Parmelee, & Chiriboga, 2011). Immigrant older adults are at risk for mental illness and language barriers can create further challenges when trying to seek treatment.

LEP immigrants face major barriers to mental health service use in North America. When older adults are unable to fully utilize mental health services, symptoms may be left untreated and can diminish quality of life. Language barriers often create challenges for patients who are attempting to initiate conversations and communicate symptoms during a visit (August, Nguyen, Ngo-Metzger, & Sorkin, 2011). These barriers not only affect communication by the older immigrant but also how the physician or care professional communicates, interacts, or responds to older immigrants. LEP individuals were found to have a lower likelihood for referral to a mental health professional due to language barriers between patients and doctors (Yeo, 2004). This creates further barriers when trying to attain appropriate mental health treatment. A study on immigrant use of mental health services found that Latino immigrants were less likely to use mental health services when they were non-proficient in English (Kim et al., 2011). This may shed light on why so many immigrants prefer to speak to health workers in their own language. For example, a study on immigrants in Toronto, Ontario found that Chinese immigrants preferred physicians who spoke in their own language (Wang, 2007). This need can greatly impact how much older adults are willing to or can inform their doctors about health issues they are experiencing.

For both young and old age groups, language has been found to be a barrier to health service use. For instance, English-only speakers (mean age 46 years) in Quebec were found to be less likely to have a designated primary care physician and to have lower levels of mental health service use than persons speaking French (Ngwakongnwi, Hemmelgarn, Musto, King-Shier, & Quan, 2012). When comparing Spanish-only speaking and English speaking Hispanics (ages 18 to 65 years or older), the Spanish-only speaking Hispanics had poorer access to care and utilized less preventative care such as breast and prostate screening, dental care and immunizations than Hispanics who were able to speak English (Dubard & Gizlice, 2008). An American study on Latinos (ages 18 to 65 years and older) found that those with LEP had more negative experiences when accessing health care services such as difficulty getting an appointment and not having consistent sources of care (Pippins, Alegria, & Haas, 2007). Another study on length of stay and English proficiency found that immigrants with a shorter stay (less than 10 years) and LEP had lower or less access to care (Lebrun, 2012). It is evident language and immigrant status can contribute to a reduced access to health care services.

Various studies have examined the relationship between language barriers and depression in older adults. Among Chinese older adults in the United States, command of the English language was found to be inversely related to depressive symptoms (Lai, 2004). When examining measures of acculturation, such as English fluency, among older Mexicans living in the United States, those who had a greater command of the English language were at a lower risk for depression (Krause & Goldenhar, 1992). Language barriers can pose many challenges in diagnosing and treating depression because of the heavy reliance on verbally expressing symptoms as well as understanding treatment plans. Newcomers to Canada deal with many issues including language barriers while at the same time adapting to a new health culture and

not knowing where and how to access available mental health services (Wu, Penning, & Schimmele, 2005; Zanchetta & Poureslami, 2006). These factors can greatly influence health outcomes of immigrant older adults.

When symptoms are not properly managed due to language barriers, older immigrants may be at greater risk for poor health and can further stress the health care system. Language barriers may prevent immigrant older adults from fully utilizing available health services in the community and may put older adults at greater risk for using LTCFs due to declining health and increased dependency. The challenges in identifying and treating depression among older adults in the community may be due to comorbidities and issues related to polypharmacy which are factors also commonly experienced in LTCFs. Older immigrant adults' experiences in the community can impact their health status upon admission to a facility as well as influence the quality of care they receive. For example, studies have found older adults living in rural areas are found to be in poor health and often have lower income, lack of adequate housing and poor access to health services (Bacsu, Jeffery, Johnson, Martz, Novik, & Abonyi, 2012; Sylvestre, Christopher & Snyder, 2006). These factors play a role in the health needs of residents upon admission into a LTCF.

1.3. Language Barriers in Long-Term Care Facilities

Language and cultural barriers may prevent immigrant older adults from utilizing all health services. The aging immigrant population (Durst, 2005), barriers to health care services in the community (Sorkin, Nguyen, Ngo-Metzger, 2011), and lack of family supports (Jang, Kim, Chiriboga, & Cho, 2008) are factors that can diminish health and may also create an increasing need for LTCFs. In Canada, ethno-specific nursing homes have long-wait lists and are in high demand (Cheng, 2005) indicating a need for culturally based nursing and support services.

Ethno-specific nursing homes pay more attention to cultural factors such as language and food which creates a more engaging environment for residents from a particular cultural group (Runci, Redman, & O'Connor, 2005). LTCFs that do not incorporate the cultural background of residents can create issues in the delivery of quality care. In Australia, a comparison of Chinese residents in ethno-specific nursing homes and mainstream nursing homes found better quality of care in ethno-specific homes (Goh, Low, & Brodaty, 2010). Specifically, this study found that even though levels or rates of depression were not significantly different between the two homes, the ethno-specific home had less antipsychotic use and a higher number of residents taking antidepressant therapy with lower depression scores.

Research on immigrant older adult experiences, particularly residents who do not speak English in LTCF is limited due to ethnic older adult's preferences to live independently at home or with their adult children (Shin, 2008). For many immigrant families, the responsibility to care for aging parents is left to adult children. Filial piety is a set of values evident in Asian culture that stresses the responsibilities of the adult children or adult son to care for their parents and is commonly practiced among immigrant families (Hsueh, Hu, & Clarke-Ekong, 2008). Aging parents are assumed to live with their adult children if they are no longer able to care for themselves. These values may be a factor for the stigma surrounding nursing homes by immigrant older adults.

Studies examining older immigrant preferences for living arrangements have found most participants prefer community and independent living situations. For instance, older Korean immigrants indicated a preference for informal or mixed care scenarios such as living with family members or receiving support from family members in addition to community services (Min, 2005). A second study on older Korean Americans found that they preferred to live

independently in senior housing or live with adult children instead of a nursing home (Shin, 2008). Therefore, the transition to a nursing home may be difficult and stressful, particularly for immigrant older adults who are used to being cared for by family members.

Language barriers are structural barriers to the use of LTCFs and may explain the limited research on the experiences of immigrant older adults in long-term care. A study conducted on Asian Americans in the United States found differing cultural norms and language as barriers to using LTCFs (Mold, Fitzpatrick, & Roberts, 2005). On the other hand, immigrant older adults who spoke English were two times more likely to use LTCFs when compared to older adults who did not speak English (Fuller-Thomson & Chi, 2012). Mexican American families have also cited challenges in using LTCFs due to language barriers as well as being unaware of the services or facilities available (Administration on Aging, 2003).

Language barriers are not solely experienced by immigrants who do not speak English but can also be present due to mental illness. In advanced stages of dementia, there has been reported a reversion in language dominance, whereby one's second language which has been used daily for years or decades recedes and the first language becomes more prominent (Schmid & Keijzer, 2009; Forbat, 2003; Paradis, 2008). In addition, individuals who do have a command of the English language may have severe dementia that impairs their ability to communicate (Small & Gutman, 2002). Impairment of verbal skills has often been related to lower levels of participation in social activities and increased isolation (Potkins et al., 2003). Isolation and loneliness has critical implications on one's health including increased mortality and poor quality of life (Routasalo & Pitkala, 2003). Given that about half of nursing home residents have been found to have Alzheimer's disease and dementia, there is a need to consider cultural barriers to care, particularly for residents who speak a different language (Gruber-Baldini, Zimmerman,

Boustani, Watson, Williams, & Reed, 2005). Various tools and resources, in addition to ethno-specific nursing facilities have been utilized to overcome language barriers in nursing homes. This indicates the need for culturally based care in nursing homes. In medical and home care settings, language interpretation services for those with LEP have been utilized in some parts of Canada (Ngwakongwi et al., 2012). Communication boards have been used by staff in some long-term care homes (Camp, Burant, & Graham, 1996). However, the use of these tools may be difficult for residents with cognitive and language impairments.

Depression care in LTCFs may be improved if more attention is given to the culture and language preferences of residents. If immigrant older adults with LEP are unable to care for themselves in the community and are in need of urgent care, many of them may need to utilize mainstream LTCFs that are not culturally specific. Even if older adults may experience language barriers within the facility they are placed in, the utilization of LTCFs may be unavoidable. Identifying depression among residents of any culture is critical because symptoms can worsen or further exacerbate other health issues.

1.4.   Depression in Long-Term Care Facilities

The research surrounding depression among immigrants in long-term care is limited. However, various studies have examined depression in LTCFs and the issues surrounding delivering quality care service. Depression has been found to be the most prevalent psychiatric mood disorder affecting older nursing home residents (American Geriatrics Society & American Association for Geriatric Psychiatry, 2003). In Canada, among 50,000 residents living in LTCFs, 44 percent had a diagnosis and/or symptoms of depression when using data from the MDS 2.0 assessment (CIHI, 2010c). In New York, among 319 nursing home residents, 44.2 percent of residents had significant depressive symptoms (Teresi, Abrams, Holmes, Ramirez, & Eimicke,

2001). These findings are much greater than the presence in communities. The prevalence of major depression in Canadian community dwelling older adults was found to be 2.8 to 3.7% (Crabb & Hunsley, 2006) and over 20 percent in nursing homes (Reinhardt, 2014). Another study in Ontario, Canada found 12 percent of older home care clients had depressive symptoms which was lower compared to 23.6 percent of complex continuing care (CCC) patients (Szczerbińska, Hirdes, & Życzkowska, 2011).

The high number of depression disorders and symptoms in long-term care is not solely experienced in North America, but internationally as well. In Thailand, one quarter (23%) of a small sample of older residents were found to have major depressive disorder (Wongpakaran & Wongpakaran, 2012). The authors stated that many of these residents were abandoned by family members or rejected by their local community. In the Netherlands, the prevalence of depression was found to be three to four times higher in nursing home settings than community settings (Jongenelis, Pot, Eisses, Beekman, Kluiter, & Ribbe, 2004). In the United Kingdom, 15 percent of older adults living in the community were found to be depressed compared to 40 percent of those living in nursing homes (Ron, 2004). In Taiwan, 81.8 percent of residents in nursing homes were identified as being depressed which was greater than the proportion of older adults living in community settings (Lin, Wang, Huang, 2007). On the other hand, a study in Korea found that 39.3 percent of the sample who lived in the community showed signs of depression as opposed to only 24.0 percent of older adults in nursing homes (Chung, 2008). The community dwelling older adults in this study may have been more isolated and secluded from their children and friends. Therefore, they may have had greater feelings of loneliness and depression. The high prevalence found in these studies indicates that depression is not an issue solely experienced in

America. Many older adults in LTCFs are at risk for developing depression including immigrants who often deal with more stresses due to culture and language.

Factors Associated with Depression

Depression is rarely diagnosed alone and is often accompanied by other disorders and physical illnesses that can diminish quality of life. One study examined the relationship between depression and health status among 97 Japanese American older adults (Gellis & Taguchi, 2004). Depression was significantly associated with health status and all respondents had at least one chronic medical condition, with heart disease as the most prevalent. A meta-analysis completed by Huang, Dong, Lu, Yue, & Liu (2010) found that chronic disease and having poor self-rated health are factors predictive of depression in older adults. Heart disease was also found to be associated with depression in nursing homes (Jones et al., 2003). A study investigating the prevalence of depressive symptoms among older adults admitted to LTCF's in Ontario, Canada found that older women, residents with moderate cognitive impairment and residents with increased ADL loss were at greater risk for depression (Neufeld et al., 2014). In the Netherlands, residents who had visual impairment, functional limitations and stroke were at greater risk for depression (Jongenelis et al., 2004).

Various studies have also looked at the association between diabetes and depression in older adults. In the United States, individuals with diabetes were twice as likely to have diagnosed depression (Egede, Zheng, & Simpson, 2002). A study among older Chinese adults found that among older adults with depression, 26 percent of them also had diabetes (Chou & Chi, 2005). Treatments are available for both diabetes and depression and their use may result in improved medical outcomes for older adults.

Depression has also been found to be associated with other mental health disorders and health issues. One study examined the prevalence of depression and its association with cognitive impairment among Japanese older adults living in the community (Hidaka et al., 2012). Mild cognitive impairment was more prevalent in older adults with depression (26.2%) than those not showing any signs of depression (17.9%). Another study looked at symptoms of depression among residents with dementia in a nursing home (Verkaik, Francke, van Meijel, Ribbe, & Bensing, 2009). The prevalence of depression in dementia in LTCFs was 19% where the most prominent depressive symptoms were depressed mood, irritability and fatigue. Older adults living in LTCFs often have poor health status. This may be particularly true for immigrant older adults who may diminish in health status while living independently in the community. The factors surrounding admission to a nursing home can identify immigrant older adults who may be at greater risk for depression.

Treatment of Depression

Developing methods to appropriately treat depressive symptoms in LTCFs has provided many challenges. Delivering care to immigrant residents can be even more difficult because clinicians need to be aware of the cultural beliefs and practices of a resident which can interfere with depression diagnosis and treatment (Kleinman, 2004). Older adults may not be receiving any form of treatment for their depression which means if it is left untreated, symptoms can exacerbate other health problems such as feelings of pain due to arthritis (Katon, Lin, Kroenke, 2007). The course of depression may be diverse and treatment should be tailored to residents' individual needs and preferences.

Pharmacological and psychotherapeutic treatments have been found to be effective in treating depression in older adults (Snowden, Sato, & Roy-Byrne, 2003; Cody & Drysdale, 2013;

American Geriatrics Society & American Association for Geriatric Psychiatry, 2003). The methods used in treating immigrant residents will depend on their current health status, severity of symptoms, and preferences of the clinician and resident. One study recommended selective serotonin reuptake inhibitors (SSRIs) as opposed to psychotherapy to prevent depression recurrence in older adults 70 years and older (Reynolds III et al., 2006). The individuals within this particular study were found to be older, cognitively impaired and experienced multiple illnesses which may explain why the efficacy of psychotherapy could not be demonstrated. Alternatively, a study found those older adults with minor depression or dysthymia were more likely to benefit from psychotherapy as opposed to antidepressants (Pinquart, Duberstein, & Lyness, 2006). However, these studies stressed the importance of tailoring treatment plans based on resources available, costs and preference of the older adults.

Antidepressant use has been extensively examined in other sub-populations which may assist in improving the treatment of older adults living in LTCFs. For instance, home care clients were found to have less appropriate drug treatment when they were experiencing a number of health issues (Dalby et al., 2008). Research within home care and CCC units found that less than half of residents with depressive symptoms were treated with antidepressants, particularly among older residents (Szczerbińska et al., 2011). The poor treatment of depressive symptoms in the community seems to also be observed in LTCFs. One study found that by the follow-up assessment, over half of newly admitted LTCF residents with depressive symptoms were not prescribed antidepressant medication (Neufeld, Freeman, Joling, & Hirdes, 2014). Among cancer patients in CCC hospitals, those more likely to be treated for depression were patients within the terminal phase of illness which resulted in reductions in psychological distress for those treated

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(Gruneir, Smith, Hirdes, & Cameron, 2005). It is evident that the setting in which older adults reside and the time in which older adults live within a LTCF can influence treatment decisions.

There have also been studies investigating treatment of depression in LTCFs in various countries. Antidepressant use in LTCFs was examined in Canada, Iceland, and Czech Republic (Hirdes, Ikegami, Jónsson, Topinková, Maxwell, & Yamauchi, 2000). In each of the countries about half of the residents taking antidepressants had no evidence of being depressed. This may have been related to ongoing treatment of depression or poor prescribing practices of physicians in LTCFs. Another study examining the levels of depression in Chinese residents living in Sydney found that residents living ethno-specific nursing homes had more appropriate antidepressant therapy and lower levels of antipsychotics used (Goh et al., 2010). Addressing depression in LTCFs is not an issue solely found in Canada, but other various countries who deal with issues related to delivering mental health care to older adults.

Under Detection and Under Treatment

Treating depression in LTCFs is difficult and delivering depression care to immigrant residents can prove to be even more challenging due to language barriers. Regardless of language or immigrant status, depression in nursing homes is often undetected and undertreated (Schnelle, Wood, Schnelle, & Simmons, 2001; Snowdon, 2010). A study completed by Levin, Wei, Akincigil, Lucas, Bilder, and Crystal (2007) found that 23 percent of residents with a depression diagnosis were not treated with psychotherapy nor antidepressants. When depression is recognized, less than one quarter of affected nursing home residents receive treatment (Cohen, Hyland, & Kimhy, 2003) and those who receive treatment often receive suboptimal interventions such as inappropriate medication treatment (Brown, Lapane, & Luisi, 2002).

Many factors pose challenges in recognizing and treating depression. Residents'

communication barriers and cognitive impairment, clinicians' focus on more observable medical

conditions, normalisation of depression in old age, and a lack of trained staff in mental health

(Martin et al., 2008) can cause depression to be overlooked in senior populations. Staff may also

under detect symptoms because of difficulties with assessment. Assessments are often based on

observations as opposed to resident's responses to standardized screening questions (Martin et

al., 2008; Koehler et al., 2005). Residents' responses may not always accurately reflect their

experiences of depression or they may suffer from cognitive or language impairment.

Diagnosing depressive symptoms by clinicians can be further complicated with residents who do

not have a command of the English language. Depression diagnosis may also rely heavily on

residents to verbally express their symptoms to clinicians as indicated in the use of the Geriatric

Depression Scale (Yesavage et al., 1983). If there is a language barrier or language impairment,

depressive symptoms may be overlooked in this group (Teresi et al., 2001).

There are many challenges associated with treating depression in LTCFs. These

challenges may also be present when trying to treat and diagnose depression in immigrants.

Studies have found that older immigrants are at risk for developing depression when living in the

community due to factors such as acculturative stress (Jang, Kim, & Chiriboga, 2005), health

(Wu, Tran, & Amjad, 2004) and lack of family support (Kuo et al., 2008). Risk factors for

depression in this group may still be present when entering long-term care settings.

This study will focus on the experiences related to depression of older adults who do not

speak English in LTCFs. Older adults who do not speak English are at risk for developing

depression. This study hopes to add to the knowledge on depression in LTCFs and examine

whether LEP older adults with depression are being recognised. The study will also examine

whether there are differences in depression care among English speaking, French speaking and Other language speaking residents. In doing so, this study aims to identify any quality care issues among these groups and whether language barriers put residents at risk for poor mental health care. It should be noted that one's spoken language is not a direct measure of culture. Instead, it is a proxy measure of culture and acculturation that has been used in previous studies (Seicean, Neuhauser, Strohl, & Redline, 2011; Salant & Lauderdale, 2003; Chakraborty & Chakraborty, 2010). The language one speaks in a LTCF can be used as an indicator of one's immigration status, ethnicity, and cultural background. LTCFs can be a starting point in addressing depression among LEP older adults. Practices and services can be tailored to meet the needs of these residents with the goal of quality depression care to all residents.

2. PURPOSE

The purpose of this study was to examine the relationship between nursing home residents' primary language and depressive symptoms and diagnosis in LTCFs. Specifically, this thesis focused on answering the following research questions:

1. What is the prevalence of depression diagnosis and patterns of depressive symptoms among nursing home residents who have different primary languages? What is the prevalence of antidepressant use and receipt of psychotherapy according to depressive symptoms and diagnosis?

2. What resident characteristics at admission are predictive of depressive symptoms at follow up assessments among residents who speak different languages?

3. What is the quality of care related to depression following admission to a nursing home among different language groups?

3. METHODS

3.1. Design

A retrospective cohort study using secondary analysis was used to examine patterns of depressive symptoms, variables associated with depressive symptoms and the quality of care in Ontario LTCFs. Data for the secondary analysis was collected using the MDS 2.0 and was stored in the Continuing Care Reporting System (CCRS) database. The MDS 2.0 is completed upon admission, on a quarterly basis and when there is a significant change in a resident's health status.

3.2. Sample

The sample was established using MDS 2.0 admission assessment data among all persons admitted into an Ontario LTCF between 2010 and 2013. Residents were then followed to their second assessment following admission which included the full annual assessment, quarterly assessment or any discharge assessment. The second assessment must have been completed between 45 and 165 days. These values are often used in calculating quality indicators using target and prior assessments (CIHI, 2014). Residents' first episode of care was analyzed when they had more than one episode because the goal of this study was to examine residents' first experience with the long-term care sector. Residents who were under the age of 65 and died after their admission assessment and before their second assessment were excluded from this study. Residents who had a missing admission assessment or second assessment were also excluded from this study. In addition, residents who had missing DRS scores at time 1 or time 2 were also excluded from the sample. Figure 1 shows how the sample was selected.

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│ LTCF Observations = 1,976,102   │
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                │          ┌──────────────────────────────┐
                │    ═════>│ Non-Ontario residents =      │
                │          │ 455,269                      │
                ▼          │ Age at assessment was less   │
                           │ than 65 years of age = 98,332│
┌─────────────────────────┐└──────────────────────────────┘
│ 1,422,501 observations  │
└─────────────────────────┘
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┌──────────────────────────────────────────────────────────────┐
│ Selecting residents' first and second assessments in most      │
│ recent episode = 129,540                                       │
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│ Selecting residents with a gap of 45 to 165 days between their │
│ first and second assessment = 123,593                          │
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│ Selecting residents who have an admission assessment and       │
│ full or quarterly assessment = 117,014                         │
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                │          ┌──────────────────────────────┐
                │    ═════>│ Residents who had missing    │
                │          │ DRS scores at time 1         │
                ▼          │ (admission) or time 2 (second│
                           │ assessment) = 49             │
┌──────────────────────────┐└─────────────────────────────┘
│ Total Sample = 116,965   │
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│ English = 95,374 │ │ French = 4548    │ │ Other = 17,043   │
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Figure 1. Flow diagram – Selection of English, French and Other residents for analysis

3.3. Assessment Instrument

The MDS 2.0 is an assessment tool that can be used by various disciplines. It has been tested in LTCFs and evaluated for its reliability and validity. The MDS 2.0 is completed by clinicians upon admission, every three months (90 days) and if a resident experiences a change in their health status (CIHI, 2010b). It contains over 350 items related to the health status of residents (Huang & Carpenter, 2011). When the items on the MDS 2.0 were tested in 13 nursing homes in five states, the items met a reliability coefficient of .7 or greater in various areas such as a resident's cognitive ability and level of activities of daily living (Hawes, Morris, Phillips, Mor, Fries, & Nonemaker, 1995). Over 80% of the items in the MDS 2.0 resulted in reliability coefficients of .4 or higher and more than half of the items resulted in coefficients of .6 or higher (Hawes et al., 1995). The MDS 2.0 also includes embedded applications for promoting quality of care, including Clinical Assessment Protocols (CAPs) and individual and facility level quality indicators (Sales, O'Rourke, Draper, Teare, & Maxwell, 2011). Outcome measures have also been developed and validated for use including the Cognitive Performance Scale (Morris et al., 1994), Activities of Daily Living Scale (Morris, Fries, & Morris, 1999) and the Depression Rating Scale (Burrows, Morris, Simon, Hirdes, & Phillips, 2000). Quality indicators derived from the MDS are used to identify potential problems and have been important in measuring quality care practices (Hutchinson et al., 2010).

3.4. Dependent Variable

The dependent variable, 'symptoms of depression' was derived from the Depression Rating Scale (DRS). The DRS is a measure of seven depressive symptoms: (1) negative statements; (2) persistent anger; (3) expressions of unrealistic fears; (4) repetitive health complaints; (5) repetitive anxious complaints; (6) sad/pain/worried facial expression; (7)

tearfulness. Each of these items located in Section E1 of the MDS was coded on a 3 point scale (0=not exhibited in the last 30 days; 1=exhibited up to 5 days per week; 2=exhibited daily or almost daily [6-7 days per week]) based on observations in the last 30 days. The scale scores ranged from 0 to 14 with a score of 0 indicating no symptoms of depression were observed. A score of 3 has been found to be associated with mild depression and higher scores indicate increasing depression (Burrows et al., 2000). For this study, DRS scores were dichotomized (symptoms of depression versus no symptoms of depression) where scores of 0 to 2 was set equal to the value of 0 (no symptoms of depression). Scores of 3 and greater was set equal to the value of 1 (symptoms of depression). These collapsed variables indicated when depressive symptoms were appropriate to address through further assessment and treatment.

3.5. Independent Variables

Language

The language variable was assessed according to item AB8 of the MDS 2.0 which codes the resident's "primary language". These variables were nominal in nature. Section AB8 of the MDS 2.0 asks for a resident's primary language defined as "the language the resident primarily speaks or understands" (CIHI, 2005, p. 70). This was determined by resident and family interviews in addition to observing the resident. The primary language of the resident was coded as three letters. For example, English is coded as 'eng', Dutch is coded as 'dua' and Polish is 'pol'. Only codes for English and French were provided by CIHI for this study while all other languages were grouped into a category called "Other". This was for privacy purposes so that LTCFs with small numbers of residents who spoke languages other than English or French could not be identified. For this study, 'English' was set equal to 0, 'French' was set equal to 1, and 'Other' was set equal to 2.

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Facility Concentration of 'Other' Language Speaking Residents

The concentration of 'other' language speaking residents within LTCFs was also determined. This was used to identify facilities that have a large concentration of Other language speaking residents. The concentration of Other speaking residents was determined first by calculating the number of Other speaking residents within each facility. Second, the prevalence of Other speaking residents in each facility was rank ordered to determine the percentile concentrations across 641 facilities in Ontario. Third, cut-points were calculated based on the top decile concentrations. Facilities whose concentration was ranked in the top decile were considered 'high' concentration while the lower 89% were considered 'low' concentration. Figure 2 shows the distribution of 'other' language speaking residents across facilities.
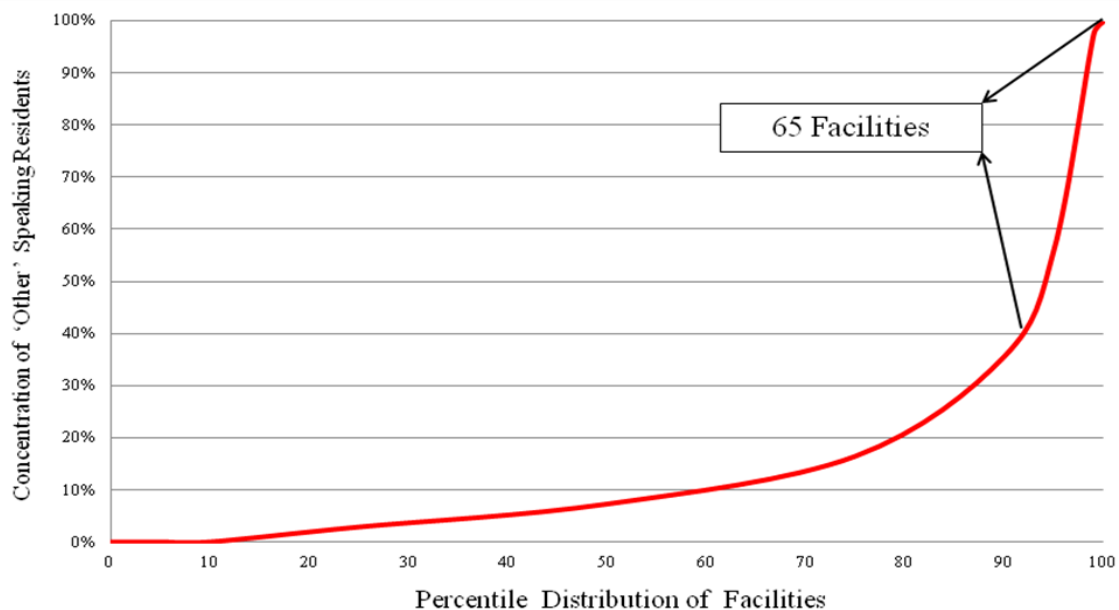
Figure 2. Distribution of 'other' language speaking residents across facilities

Demographics

Demographic characteristics such as age (AA3a), sex (AA2), marital status (A5), and education level (AB7) were included. These variables were found to be associated with depression in later life (Cairney & Krause, 2005). Age was defined in 10 year increments using a 4 category variable (0=65-74; 1=75-84; 2=85-94; 3=95 and older). For sex, male was set equal to 0 and female was set to the value of 1. Marital status was divided using a 6 category variable (0=never married; 1=married; 2=widowed; 3=separated; 4=divorced; 5=unknown). Education level was grouped by using a 3 category variable (0=less than high school; 1=finished high school/technical school or more; 2=unknown).

Sleep Disturbance

Sleep disturbance was assessed using two variables from Section E1 of the MDS 2.0: unpleasant mood in morning (j) and insomnia or change in usual sleep pattern (k). Insomnia and increased number of awakenings was found to be related to clinical depression (Taylor, Lichstein, Durrence, Reidel, & Bush, 2005). These variables are scored based on values of 0 (the behaviour is not exhibited in the last days), 1 (the behaviour was exhibited up to 5 days a week), and 2 (the behaviour was exhibited daily or almost daily). For the purposes of this study, these two variables were coded using the following: 0=indicator not exhibited in the last 30 days; 1=indicator exhibited up to 5 days a week or almost daily.

Loss of Interest

Level of interest in social activities was assessed using Section E1 of the MDS 2.0 using two variables: withdrawal from activities or interest (o) and reduced social interaction (p). Studies have found that social, religious, and cultural activities as well as human interaction predict good health and lower depression scores (Cuypers, Krokstad, Holmen, Knudtsen,

Bygren, & Holmen, 2011). Both items in the 'loss of interest' section of the MDS 2.0 refers to "a change in a resident's usual pattern" (CIHI, 2005, p. 55). The item 'withdrawal from activities of interest' assesses the level of interest in activities or interactions with friends and family. The item 'reduced social interaction' looks at whether residents are less talkative and whether residents isolate themselves. These variables are scored based on values of 0 to 2: 0 is when the behaviour is not exhibited in the last days; 1 is if the behaviour was exhibited up to 5 days a week and 2 is when the behaviour was exhibited daily or almost daily. For the purposes of this study, these two variables were coded using the following: 0=indicator not exhibited in the last 30 days; 1=indicator exhibited up to 5 days a week or almost daily.

Sensory Function

Two measures of sensory function were examined: hearing and vision. A study with older adults with sensory loss found that a large proportion of this sample experienced depression indicating some sort of association (McDonnall, 2009). Hearing (C1) on the MDS 2.0 is assessed on a four point scale (0=hears adequately; 1=minimal difficulty; 2=hears in special situation only; 3=highly impaired or absence of useful hearing). For this study, the 'hearing' variable was dichotomized (adequate versus impaired). This categorization was also based on Capella-McDonall's (2005) study where those who had a little trouble, a lot of trouble hearing or were completely deaf were identified as having a hearing loss. A score of 0 was set equal to the value of 0 (adequate) and scores of 1 through 3 was set equal to the value of 1 (impaired).

Vision (D1) on the MDS 2.0 is assessed using a 5 point scale (0=adequate; 1=impaired; 2=moderately impaired; 3=highly impaired; 4=severely impaired). For this study, the 'vision' variable was dichotomized (adequate versus impaired). This categorization was similar to Capella-McDonall's (2005) study on sensory loss where those with no sensory loss were

compared to those who had any level of vision loss. A score of 0 was set equal to the value of 0 (adequate) and scores of 1 through 4 were set equal to a value of 1 (impaired).

Activities of Daily Living

Depression has also found to be associated with lower activities of daily living in Indonesia, Vietnam and Japan (Wada et al., 2005). Activities of daily living (ADL) performance was assessed using the ADL Long-Form. The ADL Long-Form includes seven of the ADL items (Section G1) and the resulting scale score ranges from 0 to 28 (Morris et al., 1999). The 7 ADL items used are (1) dressing, (2) personal hygiene, (3) toilet use, (4) locomotion on unit, (5) transfer, (6) bed mobility, and (7) eating. Each ADL item is coded on a 5 point scale (0=independent; 1=supervision; 2=limited assistance; 3=extensive assistance; 4=total dependence; 8=activity did not occur). This scale has been reported to be sensitive to change in a resident's ADL capacity (Morris et al., 1999; Carpenter, 2006). For this study, ADL results were collapsed into a 6 category variable: 0=0-4 [most independent]; 1=5-9; 2=10-14; 3=15-19; 4=20-24; 5=25-28 [most dependent]. This categorization was done according to CIHI's (2005) study on Ontario's CCC population.

Cognition

Cognitive impairment has been found to be predictive of depression among residents in LTCFs (Wongpakaran & Wongpakaran, 2012). Cognitive performance was assessed using the Cognitive Performance Scale (CPS) (Morris et al., 1994). It is a 7 level hierarchical scale ranging from 0 (no impairment) to 6 (very severe impairment). It uses 5 cognitive MDS 2.0 items: (1) comatose; (2) problem with short-term memory; (3) cognitive skills for daily decision making; (4) being understood by others; (5) total dependence in eating performance. This scale has been found to correlate well with the Mini-Mental State Examination (MMSE) (Gruber-Baldini et al.,

2003). The CPS scores range from: 0=intact; 1=borderline intact; 2=mild impairment; 3=moderate impairment; 4=moderately severe impairment; 5=severe impairment; 6=very severe impairment.

Residents were also assessed using the 'making self understood' variable (C4) and 'ability to understand others' variable (C6). Older adults who were found to have communication difficulties were more likely to be depressed (McDonnall, 2009). The 'making self understood' variable was used in the CPS scale (Morris et al., 1994) and was evaluated independently in addition to the CPS scale to examine differences between language groups. This variable was related to a resident's ability to express information and was coded on a 4 point scale (0=understood; 1=usually understood; 2=sometimes understood; 3=rarely or never understood). For this study, this variable was coded as the following: 0=understood; 1=usually understood; 2=sometimes understood; 3=rarely or never understood.

Residents' were also assessed using the 'ability to understand others' variable. This variable referred to a resident's ability to understand verbal information and content and was coded on a 4 point scale (0=understood; 1=usually understood; 2=sometimes understood; 3=rarely or never understood). For this study, this variable was coded as follows: 0=understands; 1=usually understands; 2=sometimes understands; 3=rarely or never understands.

Health Stability

The Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) Scale was used to identify residents at risk of serious health decline. This scale has been found to be significant in predicting mortality in nursing home residents with neurological conditions as well clients and patients in home care settings and CCC hospitals (Hirdes, Poss, Mitchell, Korngut, & Heckman, 2014). It uses a 6 point scale from 0 being equal to 'not at all unstable' to 5 being equal

to 'highly unstable' with higher scores to be predictive of adverse outcomes likely poor self-rated health and mortality (Hirdes, Frijters, & Teare, 2003). Items for this scale include (1) change in decision making, (2) change in ADL status, (3) vomiting, (4) peripheral edema, (5) dyspnea, (6) end-stage disease, (7) weight loss, (8) insufficient fluid, (9) dehydration, (10) decrease in food or fluid and (11) fluid output exceeds input. For this study, the coding for the CHESS Scale scores was as follows: 0 [no health instability]; 1 [minimal health instability]; 2 [low health instability]; 3 [moderate health instability]; 4 [high health instability]; 5 [very high health instability].

Behaviour

Depression has been found to be associated with aggressive behaviours in nursing homes (Cassie & Cassie, 2012). The Aggressive Behaviour Scale (ABS) is used to measure behaviour problems where scores ranged from 0 to 12. A score of 1 to 4 on the ABS is a sign of mild to moderate aggressive behaviour, whereas a score of 5 or more means there is the presence of severe aggression. The items located in Section E4 of the MDS 2.0 are as follows: (1) verbal abusive behavioural symptoms; (2) physical abusive behavioural symptoms; (3) socially inappropriate or disruptive behavioural symptoms; (4) resists care. The frequency of the ABS items on the MDS 2.0 are scored using the following: 0=behaviour not exhibited in the last 7 days; 1=behaviour occurred 1 to 3 days in the past 7 days; 2=behaviour occurred 4 to 6 days in the past 7 days but less than daily; 3=behaviour occurred daily. A strong relationship was found between the ABS and the aggressive subscale of the Cohen Mansfield Agitation Inventory (p<0.001) (Perlman & Hirdes 2008). Based on previous research, ABS results were coded as the following: 0=none; 1-2=moderate; 3-5=severe; 6-12=very severe.

Pain

Pain levels have been found to be associated with depression symptoms in long-term care (Cipher & Clifford, 2004). For the purposes of this study, residents' pain was assessed using the Pain Scale. The scale score ranges from 0 to 3 where a score of 0 reflects no pain and a score of 3 indicates that the resident is in severe (horrible/excruciating) pain (Fries, Simon, Morris, Flodstrom, & Bookstein, 2001). The items from the MDS 2.0 (Section J2) used for this scale include (1) frequency and (2) intensity of pain. This scale has been found to be valid in detecting pain in nursing homes residents (Fries et al., 2001). For this study, values were coded as the following: 0=no pain; 1=less than daily pain; 2=mild to moderate pain; 3=severe pain.

Social Engagement

Social engagement in late life was also found to be associated with depressive symptoms (Glass, De Leon, Bassuk, & Berkman, 2006). Social engagement levels were identified using the Index of Social Engagement (ISE). The scale ranges from 0 to 6 where a score of 0 means severe withdrawal from social engagement and where a score of 6 indicates that the resident often participates in social activities (Mor et al., 1995). The 6 items (Section F1) are the following dichotomous items: (1) at ease interacting with others; (2) at ease doing planned or structured activities; (3) at ease doing self-initiated activities; (4) establishes own goals; (5) pursues involvement in the life of the facility; (6) accepts invitations to most group activities. Tests on the ISE results showed it to be a reliable and valid indicator of residents' involvement level in social activities (Mor et al., 1995). For this study, ISE score was dichotomized (low social engagement versus considerable participation) where a score of 0 to 2 was set equal to 0 (low social engagement) and scores of 3 to 6 was set equal to 1 (considerable participation).

Disease Diagnoses

Residents were also assessed based on disease diagnoses. The diseases residents can be diagnosed for are located in Section I1a to I1uu of the MDS 2.0. Foebel, Hirdes, Heckman, Kerogoat, Patten, and Marrie (2013) assessed interRAI assessments such as the MDS 2.0 and tested the validity of disease diagnosis within this section. This study found neurological diseases and chronic conditions had a specificity ranging from 0.80-1.00 indicating high specificity. There are 47 different diseases listed and are categorized according to type of disease: Endocrine/metabolic/nutritional; heart/circulation; musculoskeletal; neurological; psychiatric mood; pulmonary; sensory; other. Diseases are only checked when they have a relationship to cognitive status, level of mood and behaviour, treatment, nursing monitoring, ADL level, or mortality. The disease conditions require a physician diagnosis that was also documented on their record. They did not include conditions/diagnoses that have been resolved or no longer affect the resident's functioning or care plan.

The endocrine/metabolic/nutritional diseases (I1a-I1c), heart/circulation diseases (I1d-I1k), musculoskeletal diseases (I1l-I1p), neurological diseases (I1q, I1s-I1u, I1w-I1ee), pulmonary diseases (I1jj-I1kk), and sensory diseases (I1ll-I1oo) was coded as the following: 0=no diagnosis; 1=1 or more diagnoses.

Alzheimer's and/or dementia (I1r and/or I1v), Anxiety disorder (I1ff), depression (I1gg), bipolar disorder (I1hh), and schizophrenia (I1jj) was coded as the following: 0=no diagnoses; 1=diagnosis.

Comorbidity

The comorbidity of residents was also considered. Disease diagnoses were located in section I1 of the MDS. The disease conditions required a physician diagnosis that was also

documented on their record. Previous documentation and medical records were also used (CIHI, 2005). This section documents the presence of diseases that have a relationship to the resident's current overall status. Conditions or diagnoses that have been fully treated or no longer negatively affect the resident's functioning are also included. This is a continuous variable measured by the number of disease diagnoses a resident has. For this study, the number of disease diagnoses was collapsed into 4 category variables: 0=no diagnoses; 1=1-2; 2=3-4; 3=5 and more.

Mental Health History

Residents' mental health history was also examined. Section AB9 records whether a resident had any history of mental illness. Depression is considered a highly recurrent mental disorder (Burcusa & Iacono, 2007) and having any mental health history may be predictive of depressive symptoms. This section of the MDS 2.0 is intended to document a primary or secondary diagnosis of a psychiatric illness or developmental disability (CIHI, 2005). To check the "yes" response, there must be written documentation of a condition. In addition, a verbal report from a resident or resident's family member of a mental health history is not considered valid documentation. For this study, mental health history was coded using the following: 0=no, 1=yes.

Receipt of Psychological Therapy

Section P1be of the MDS 2.0 records the total number of days and minutes residents receive psychological therapy by a licensed mental health professional. Older adults with depression have been found to benefit from psychological therapy (Pinquart et al., 2006) and this section indicated whether residents were receiving any form of treatment alongside medications. In this section of the MDS 2.0, health workers record whether psychotherapy was given after

admission by a mental health professional such as a social worker or psychiatric nurse (CIHI, 2005). Box A counts the number of days of therapy administered for 15 minutes or more and Box B records the total number of minutes provided in the last 7 days. For the purposes of this study, 'receipt of psychological therapy' was coded as the following: 0=no and 1=yes.

Medications

The medication domains to be examined in this study were the following: number of medications (O1); new medications (O2); psychotropic drugs (O4a-O4c); antipsychotics (O4a); antianxiety (O4b); antidepressant (O4c); hypnotics (O4d). The number of medications is a continuous variable that measures the number of different medications the resident received in the past 7 days. For this study, the number of medications was collapsed into a 5 category variable: 0=not used; 1=1-4; 2=5-9; 3=10-14; 4=15 and more.

'New medications' was a variable indicating whether the resident was currently receiving medications that were initiated in the last 90 days. For this study, this variable was coded as the following: 0=no; 1=yes.

Psychotropic medications are commonly used to treat depression as well dementia in nursing homes (Briesacher et al., 2005). Psychotropic medications included the use of an antipsychotic, anti-anxiety, or antidepressant in the last 7 days. The number of days during the last 7 days is recorded for each medication. For this study values were kept categorical and were coded as the following: 0=not used in the past 7 days; 1=used in the past 7 days.

The use of antipsychotics, antianxiety, antidepressant and hypnotics were assessed individually. These medications were coded as the following: 0=not used in past 7 days; 1=used in past 7 days.

RUG-III Categories (44 Group Category)

Residents' Resource Utilization Group (RUG-III) categories were also assessed; the RUG-III categories group residents that have similar clinical characteristics and levels of resource use (Fries, Schneider, Foley, Gavazzi, Burke, & Cornelius, 1994). These are calculated using clinical assessment data derived from the MDS 2.0 to determine periods of care per resident also known as the RUG weighted patient day (CIHI, 2011). The prevalence of major depression and chronic medical conditions has been found to involve greater health resource utilization such as emergency department visits (Egede, 2007). There are seven categories and each category has multiple RUG-III groups. Categories were ordered in a hierarchy from most (Special Rehabilitation) to least resource intensive (Reduced Physical Function). The seven categories used were coded as the following: 1=Special Rehabilitation; 2=Extensive Services; 3=Special Care; 4=Clinically Complex; 5=Impaired Cognition; 6=Behaviour Problems; 7=Reduced Physical Function.

RUG-III categories were cross-tabulated by DRS symptoms for each language group. This provided information on whether a specific language group who utilized more resources also had signs of depression.

Case Mix Index (CMI)

Residents' case mix index (CMI) values were also assessed in relation to depressive symptoms. The CMI is a cost weight that reflects the resource use of an individual within a specific RUG group (CIHI, 2011). A greater average CMI among residents indicated a greater case-mix compared to the average among all residents. The average CMI values were determined for each language group.

3.6.   Depression Quality Indicators

Variables from the MDS 2.0 were used to calculate quality indicators (QIs) which are measures used to monitor quality of care in LTCFs (CIHI, 2013). Topics covered by the QIs include various health functions such as incontinence and activities of daily living (Jensdottir, Rantz, Hjaltadottir, Guđmundsdòttir, Rook, & Grando, 2003).

The MDS 2.0 QIs have gone through several generations of evaluation and refinement. The most recent third generation QIs are now in use and include an updated approach to risk adjustment (Jones, Hirdes, Poss, Kelly, Berg, Fries, & Morris, 2010). Two third generation quality indicators were examined in this study. First, the 'percent of residents who improve their mood or remain free from symptoms of depression' (MOD04) examined the percentage of residents who were observed to have fewer depressive symptoms since the prior assessment or who have not developed depressive symptoms. The numerator was the number of residents who satisfy the following conditions: (1) DRS score at admission is greater than 0 and the score on the next assessment is less than the DRS score on the admission assessment; (2) residents who have a DRS score of 0 at admission and following quarterly assessment. The denominator was the total number of residents with a valid admission and quarterly assessment who had a DRS score greater than 0 at admission.

The second QI examined the 'percent of residents who decline in mood from symptoms of depression' (MOD4A) examined the percentage of residents who experience an increase in depressive symptoms after admission. The numerator included residents whose DRS scale score at admission was lower than the DRS score on the current assessment. The denominator included all residents with a valid admission and quarterly assessment. Each QI was also adjusted by CMI values (Jones et al., 2010), an indicator of the resource intensity of residents (CIHI, 2010b).

3.7. Statistical Analysis

All statistics were performed using SAS version 9.2 for Windows. Statistical analysis was performed for each language group.

Descriptive Statistics

Descriptive statistics were generated to describe the sample using standard demographics as well as the other independent variables to examine general health characteristics. Using cross sectional analysis, means, standard deviations and confidence intervals were generated for continuous variables. As for categorical variables, frequencies were calculated.

Research Questions

The first research question examined the prevalence of depression diagnosis and patterns of depressive symptoms among the sample of nursing home residents by language. The prevalence of depressive symptoms at admission and at second assessment was calculated based on the presence or absence of DRS scores equal to or greater than 3 among residents. The percentage of persons with scores of 0 to 2 and 3 or more on the DRS was described at time 1 and time 2 among the language groups. Symptoms were also examined based on 'low' and 'high' concentration facilities as well as antidepressant use and psychological therapy use. The prevalence of treatment for those with and without symptoms was also analyzed.

Depression diagnosis (I1gg) and depressive symptom categories (DRS scores: 0 to 2 and 3 or greater) were also calculated for residents at time 1 and time 2. These variables were used to create the following classifications: 1) No symptoms and no diagnosis; 2) Symptoms and no diagnosis; 3) Symptoms and diagnosis; 4) No symptoms and diagnosis. These categories were initially used by CIHI (2010c) to examine symptoms and diagnosis of depression in residents living in residential care facilities. These categories allowed for a more comprehensive look at

depression recognition practices. In addition to the prevalence of depressive symptoms and categories, antidepressant use and receipt of psychological therapy was also examined for time 1 and time 2. The prevalence of depressive symptoms and diagnosis was analyzed according to treatment use.

The second research question examined factors associated with depressive symptoms at time 2 (second assessment) among different language groups. A bivariate analysis using chi-square values was carried out between the dependent variable 'depressive symptoms' at time 2 (second assessment) and each independent variable. This study focused on resident characteristics such as age and mental health history as opposed to facility characteristics such as antidepressant use. The variables associated with the following domains were used: demographic variables, mood and behaviour and mental health characteristics, and clinical features. As used in the descriptive analysis, continuous variables were converted into categorical variables and the category with the lowest value was used as a reference. A chi-square test was conducted to determine any significant relationships between the variables.

Within each of the language groups, variables that were found to be significantly associated with depressive symptoms from the bivariate analyses were entered into a multivariate logistic regression model using generalized estimating equations (GEE). The GEE approach was used because it accounted for clustering of observations (correlation of responses) within each facility. The GENMOD procedure in SAS with the REPEATED statement was used to specify the GEE procedure. A p-value of 0.05 was set for statistical significance at the bivariate levels.

Models were stratified by language to predict depressive symptoms at time 2 (second assessment) using resident characteristics at time 1 (admission). Three separate models were created to determine if any predictors of depressive symptoms were unique to each language

group. The models for each language group were adjusted using continuous DRS scores at time 1 (admission). DRS scores at admission were likely to be the strongest predictor of depressive symptoms at follow up. Therefore, the model held the DRS score at baseline constant to identify other variables that independently contributed to depressive symptoms. For each model, variables with the strongest bivariate relationships were entered first followed by variables that had progressively higher p-values. If multiple variables had the same p-value, the strongest predictors (those with the highest odds ratios) were entered first. To select predictors for the final model, the QICu statistic developed by Pan (2001) and significance levels were also used. A lower QICu value indicated a better fitting model.

Variables were included in the model as long as the p-value was less than 0.05 and QICu values were decreasing. To examine multicollinearity during the model building process, addition and deletion effects were analyzed by examining the effects of adding and removing variables from the model on the p-values of other variables. Also, variables that had a variance inflation factor (VIF) value of 5 or under were included in the final model. If the VIF was greater than 5, the least significant variables were removed from the model and tested again. Each model was also run as a logistic regression with the same set of predictor variables in order to report the c-statistic for each model.

Finally, quality of care related to depression following admission to a nursing home among different language groups was examined using two previously validated quality indicators available for use with the MDS 2.0. The QIs 'percent of residents who improve their mood or remain free from symptoms of depression' (MOD04) and 'percent of residents who decline in mood from symptoms of depression' (MOD4A) were assessed. These QIs were calculated in the form of a numerator and denominator for each resident and then aggregated to each language

group. The QIs were then stratified according to 'low' and 'high' concentration facilities of 'other' language speaking residents. The denominator for each QI included those within each language group and within each type of facility. For example, the percent of English residents who declined in mood from symptoms of depression in 'low' concentration facilities was calculated by taking the proportion of English residents whose DRS score was higher at follow-up than at admission and dividing that by all English residents residing in 'low' concentration homes. Each quality indicator was also risk adjusted based on stratification of case-mix index values (Jones et al., 2010). The means and confidence intervals were generated to assess how the QI scores differed by language groups.

3.8.   Ethics Approval

Ethics approval was obtained from the Office of Research Ethics (ORE) at the University of Waterloo (ORE Certificate #19952).

4.   RESULTS

4.1.   Descriptive Statistics

Sample Characteristics

Table 1 compares the frequency and distribution of demographic variables between the English, French and Other speaking residents at baseline. Differences in the proportion of residents in each language group was found to be statistically significant (χ^2=190.90, df = 6, p <.0001). The mean age for the Other speaking residents was 85 years of age and 84 years of age for the English and French language group. For each language group, there was a greater proportion of females than males. However, a non-significant statistical relationship was found between language and sex. Marital status was found to be statistically significant across all three

samples. The Other language group had the highest proportion of residents whose highest level of education was less than a high school education.

Table 2 presents the frequency and distribution of Depression Rating Scale (DRS) scores and mental health characteristics between the English, French and Other speaking residents at baseline. The difference in DRS scores between the language groups was statistically significant ($p<.0001$) where the English speaking residents had the highest DRS scores (mean = 2.1) and the greatest proportion of residents (22.2%) who showed signs of depressive symptoms, compared to 19.7% for Other and 19.0% for French speaking residents.

The French speaking group was found to have the greatest proportion of residents experiencing insomnia. On the other hand, they had the smallest proportion of residents who experienced 'unpleasant mood in mornings'. The French speaking group had the greatest proportion of residents for every psychiatric/mood disease. In addition, 10% of the French group were documented as having a mental health history at admission whereas 8.4% and 7.1% of English and Other residents had a mental health history, respectively. These results were found to be statistically significant ($p<.0001$). The Other language group was found to have the smallest proportion of residents who were diagnosed with Alzheimer's and/or dementia whereas the French residents had the greatest proportion. With 2.1% of residents, the English group had the greatest proportion of residents receiving psychological therapy at admission. In addition, 0.9% and 1.8% of French and Other speaking residents were receiving psychological therapy. These results were statistically significant ($p<.0001$).

Table 3 presents the frequency and distribution of clinical features between the English, French and Other speaking residents. The proportion of residents with hearing impairment was similar for all language groups, ranging from 39.2% to 39.8%. The Other speaking residents had

the greatest proportion of those with vision impairment (50.3%) and the French residents had the smallest proportion (41.9%). The Other language speaking residents had significantly greater scores for the ADL Long-Form Scale (χ^2=1010.40, df = 10, p <.0001) and CPS (χ^2=682.03, df = 10, p <.0001). On the other hand, the Other residents held the lowest scores on the ISE Scale (χ^2=1428.51, df = 12, p <.0001), CHESS Scale (χ^2=39.94, df = 4, p <.0001), and Pain Scale (χ^2=268.52, df = 6, p <.0001). Compared to the French and English speaking residents, the Other group also had a significantly greater proportion of residents who had difficulties in making themselves understood by others and a greater proportion of residents who rarely or never understood others.

The Other language speaking residents had a slightly higher proportion of residents with mild to severe aggression as indicated by the ABS (χ^2=24.99, df = 4, p <.0001). The French residents were found to have the smallest proportion of residents with ABS scores of 1 and greater. The results for the ABS was statistically significant for the three sample groups (p <.0001).

The French and English speaking residents had significantly greater scores than the Other language group on the CHESS Scale and Pain Scale. For disease diagnoses, the French speaking residents had a significantly greater number of comorbid conditions as well as the greatest proportion of residents with endocrine/metabolic/nutritional diseases, musculoskeletal diseases, and pulmonary diseases. The Other language group had the greatest proportion of residents with heart/circulation diseases and the English language group had the greatest proportion of residents with a sensory disease.

Table 1. Comparison of the frequency and distribution of demographic variables between English, French and Other speaking residents at admission (time 1)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
Age (Mean ± SD)	(84.4 ± 7.7)		(84.0 ± 7.6)		(85.0 ± 7.1)		
95% Confidence intervals	84.3, 84.4		83.8, 84.2		84.8, 85.1		
	N	%	N	%	N	%	
65-74	10889	11.4	525	11.6	1378	8.1	<.0001
75-84	33181	34.8	1703	37.4	6246	36.7	
85-94	44078	46.2	2005	44.1	7993	46.9	
95 and older	7226	7.6	315	6.9	1426	8.4	
Sex							
Male	28616	30.0	1360	29.9	5213	30.6	0.6442
Female	66666	69.9	3183	70.0	11814	69.3	
Marital Status							
Never married	7037	7.4	397	8.8	624	3.7	<.0001
Married	24558	25.9	1161	25.6	4731	27.9	
Widowed	54812	57.8	2636	58.2	10589	62.4	
Separated	1621	1.7	99	2.2	266	1.6	
Divorced	5234	5.5	159	3.5	510	3.0	
Unknown	1647	1.7	77	1.7	244	1.4	
Education							
Less than high school	28271	29.6	1788	39.3	7555	44.3	<.0001
Finished high school/technical school or more	32129	33.7	736	16.2	3027	17.8	
Unknown	34974	36.7	2024	44.5	6461	37.9	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Table 2. Comparison of the frequency and distribution of the Depression Rating Scale scores, mood and behaviour patterns, and mental health characteristics between English, French and Other speaking residents at admission (time 1)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
Depression Rating Scale (Mean ± SD)	(2.1 ± 2.4)		(1.9 ± 2.4)		(1.7 ± 2.1)		
95% Confidence intervals	2.1, 2.1		1.8, 2.0		1.7, 1.7		
	N	%	N	%	N	%	
0 – 2 [no symptoms]	64650	67.8	3229	71.0	12738	74.7	<.0001
3 -5 [symptoms of possible major or minor depression]	21188	22.2	897	19.7	3232	19.0	
6 + [symptoms of severe depression]	9536	10.0	422	9.3	1073	6.3	
Sleep Disturbances							
Unpleasant mood in morning	17449	18.3	737	16.2	2912	17.1	<.0001
Insomnia or change in usual sleep pattern	14246	15.0	704	15.5	2409	14.1	0.0118
Loss of Interest							
Withdrawal from activities of interest	18675	19.6	787	17.4	3145	18.5	<.0001
Reduced social interaction	22411	23.5	953	21.0	3694	21.7	<.0001
Dementia							
Alzheimer's and/or Dementia	58133	61.0	2814	61.9	10213	59.9	0.0140
Psychiatric / Mood Disease(s)							
Anxiety disorder	6890	7.3	467	10.3	963	5.7	<.0001
Depression	24347	25.5	1282	28.2	4152	24.4	<.0001
Bipolar disorder	1616	1.7	105	2.3	203	1.2	<.0001
Schizophrenia	2043	2.1	120	2.6	383	2.3	0.0642
Mental Health History							
No history	87415	91.7	4093	90.0	15833	92.9	<.0001
History	7959	8.4	455	10.0	1210	7.1	
Receipt of Psychological Therapy							
No	93384	97.9	4506	99.1	16729	98.2	<.0001
Yes	1990	2.1	42	0.9	314	1.8	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Table 3. Comparison of the frequency and distribution of clinical characteristics of English, French and Other speaking residents at admission (time 1)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
	N	%	N	%	N	%	
Functional Features							
Hearing							
Adequate	57647	60.7	2730	60.2	10320	60.8	0.7915
Impaired	37262	39.3	1799	39.8	6644	39.2	
Vision							
Adequate	52951	55.8	2629	58.1	8433	49.7	<.0001
Impaired	41958	44.2	1900	41.9	8531	50.3	
Activities of Daily Living (ADL) Long Form Scale (Mean± SD)	(15.4 ± 8.5)		(14.7 ± 9.0		(17.4 ± 8.3)		
95% Confidence Interval	15.3, 15.4		14.4, 14.9		17.3, 17.5		
0 – 4 [most independent]	13911	14.6	836	18.4	1682	9.9	<.0001
5 – 9	12660	13.3	670	14.7	1830	10.7	
10 - 14	13852	14.5	640	14.1	2308	13.5	
15 – 19	19982	21.0	773	17.0	3231	19.0	
20 – 24	19010	19.9	834	18.3	3762	22.1	
25 – 28 [most dependent]	15959	16.7	798	17.5	4230	24.8	
Index of Social Engagement (ISE) Scale (Mean ± SD)	(2.9 ± 1.9)		(3.0 ± 2.0)		(2.2 ± 1.8)		
95% Confidence Interval	2.9, 2.9		3.0, 3.1		2.3, 2.4		
0 – 2 [lower social engagement]	41334	43.3	1912	42.0	9702	56.9	<.0001
3 – 6 [considerable participation]	54040	56.7	2636	57.9	7341	43.1	
Cognitive Function							
Cognitive Performance Scale (CPS) (Mean ± SD)	(2.7 ± 1.7)		(2.7 ± 1.8)		(3.0 ± 1.8)		
95% Confidence Interval	2.7, 2.7		2.7, 2.8		3.0, 3.1		
0 = Intact	13115	13.8	639	14.0	1679	9.9	<.0001
1 = Borderline intact	12154	12.7	554	12.2	1805	10.6	
2 = Mild impairment	17045	17.9	804	17.7	2983	17.5	
3 = Moderate impairment	29865	31.3	1269	27.9	4599	27.0	
4 = Moderately severe impairment	5219	5.5	249	5.5	1958	11.5	
5 = Severe impairment	10712	11.2	653	14.4	1910	11.2	
6 = Very severe impairment	7264	7.6	380	8.4	2117	12.4	

Making Self Understood (Mean ± SD)	(0.7 ± 0.9)		(0.7 ± 0.9)		(1.1 ± 1.0)		
95% Confidence Interval	0.7, 0.7		0.7, 0.8		1.1, 1.0		
0 = Understood	50735	53.2	2447	53.8	6269	36.8	<.0001
1 = Usually understood	27734	29.1	1201	26.4	5361	31.4	
2 = Sometimes understood	11135	11.7	616	13.5	3349	19.6	
3 = Rarely or never understood	5770	6.1	284	6.2	2064	12.1	
Ability to Understand Others (Mean ± SD)	(0.8 ± 0.9)		(0.8 ± 0.9)		(1.1 ± 1.0)		
95% Confidence Interval	0.8, 0.8		0.8, 0.9		1.1, 1.0		
0 = Understands	43100	45.2	2044	44.9	5401	31.7	<.0001
1 = Usually understands	33025	34.6	1481	32.5	6031	35.4	
2 = Sometimes understands	14656	15.4	803	17.6	3986	23.4	
3 = Rarely or never understands	4593	4.8	220	4.8	1625	9.5	
Behavioural Symptoms							
Aggressive Behaviour Scale (ABS) (Mean ± SD)	(1.4 ± 2.3)		(1.3 ± 2.2)		(1.5 ± 2.4)		
95% Confidence Interval	1.4, 1.5		1.2, 1.4		1.5, 1.5		
0 [no signs of aggression]	54424	57.1	2745	60.4	9610	56.4	<.0001
1 – 4 [mild to moderate aggression]	31034	32.5	1370	30.1	5582	32.7	
5 and greater [severe aggression]	9916	10.4	433	9.5	1851	10.9	
Diagnoses							
Number of Comorbid Conditions (Mean ± SD) *p*-value	(5.1 ± 2.4)		(5.4 ± 2.6)		(4.8 ± 2.2)		
No diagnosis	507	0.5	23	0.5	103	0.6	<.0001
1 – 2	11927	12.5	484	10.6	2233	13.1	
3 – 4	30454	31.9	1289	28.3	6115	35.9	
5 and more	52486	55.0	2752	60.5	8592	50.4	
Endocrine / Metabolic / Nutritional Disease(s)	35500	37.2	1978	43.5	6638	39.0	<.0001
Heart / Circulation Disease(s)	68066	71.7	3280	72.4	12558	74.0	<.0001
Musculoskeletal Disease(s)	54430	57.1	2622	57.7	9474	55.6	0.0009
Pulmonary Disease(s)	16259	17.1	1067	23.6	2123	12.5	<.0001
Sensory Disease(s)	23141	24.4	1056	23.3	3599	21.2	<.0001

Other Health Related Factors							
Change in Health, End-Stage, Disease, Signs and Symptoms (CHESS) Scale (Mean ± SD)	(0.9 ± 1.0)		(0.9 ± 1.0)		(0.8 ± 1.0)		
95% Confidence Interval	0.8, 0.9		0.9, 0.9		0.8, 0.8		
0 = No health instability	45361	47.6	2092	46.0	8709	51.1	<.0001
1 = Minimal health instability	28468	29.9	1361	29.9	4816	28.3	
2 = Low health instability	14195	14.9	740	16.3	2331	13.7	
3 = Moderate health instability	5282	5.5	255	5.6	855	5.0	
4 = High health instability	1930	2.0	92	2.0	309	1.8	
5 = Very high health instability	138	0.1	8	0.2	23	0.1	
Pain Scale (Mean ± SD)	(0.7 ± 0.9)		(0.7 ± 0.9)		(0.5 ± 0.8)		
95% Confidence Interval	0.7, 0.7		0.7, 0.7		0.7, 0.7		
0 = No pain	53848	56.5	2435	53.5	10608	62.2	<.0001
1 = Less than daily pain	22908	24.0	1214	26.7	3828	22.5	
2 = Mild to moderate severe pain	15962	16.7	770	16.9	2279	13.4	
3 = Severe pain	2656	2.8	129	2.8	328	1.9	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Figure 3 compares CPS scores among the three language groups. The Other language speaking residents had the smallest proportion of residents with intact cognition (χ^2=682.03, df = 10, p <.0001).

Figure 4 presents the proportion of English, French, or Other speaking residents scoring at various levels of the 'ability to make understood' variable. The French and English speaking residents maintained the greatest proportion of those who can make themselves understood. The Other language group had the greatest proportion of residents who were usually understood, sometimes understood, and rarely or never understood by others.

Figure 5 presents data on the proportion of residents scoring at different levels of the 'ability to understand others' variable. The French and English speaking residents had the

greatest proportion of those who understand others. The Other language group had the greatest

proportion of residents who rarely or never understand others.
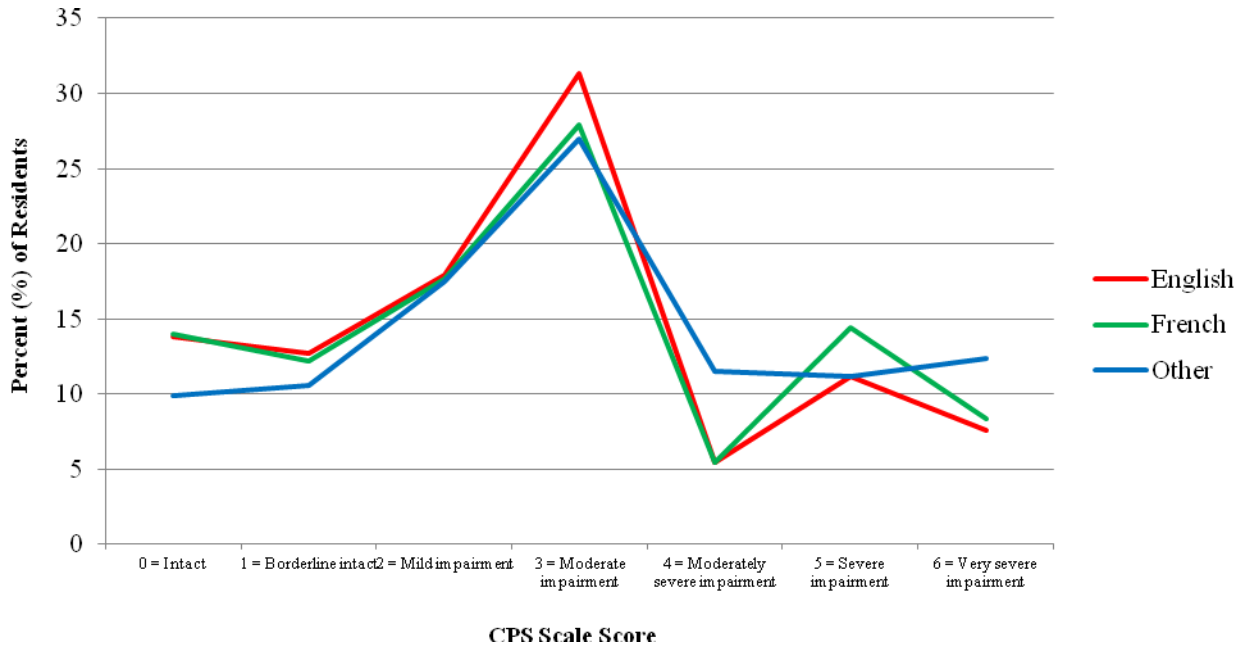
Figure 3. Cognitive Performance Scale (CPS) at baseline for English, French and Other residents
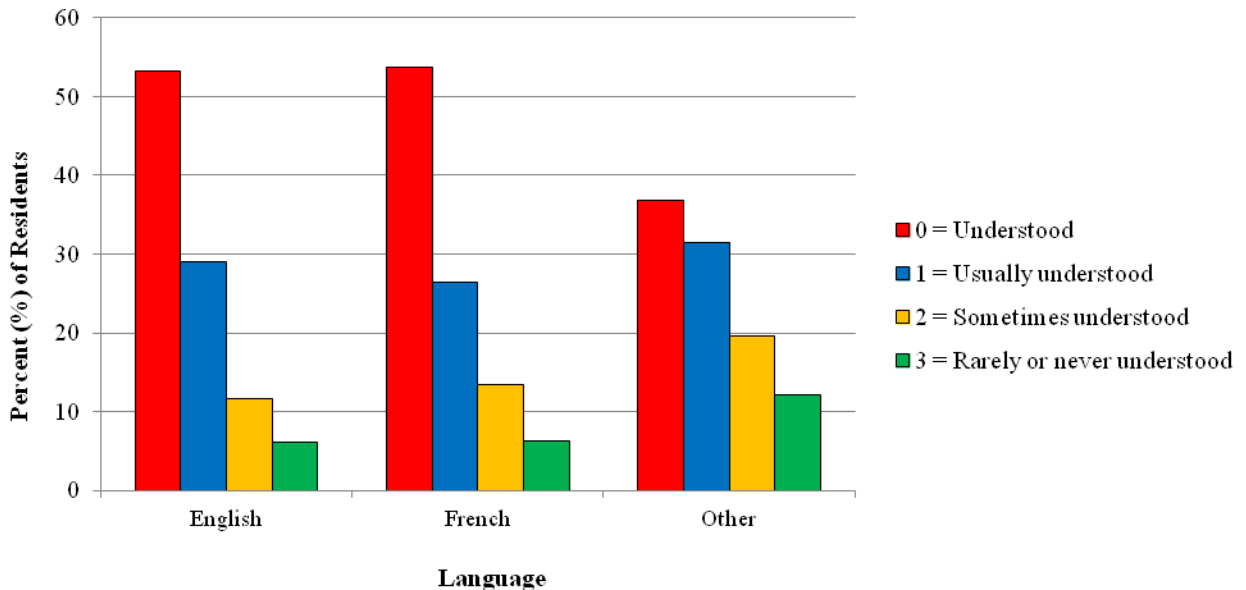
Figure 4. The proportion of residents scoring at each level of the 'ability to make self-understood' variable at baseline for English, French and Other residents
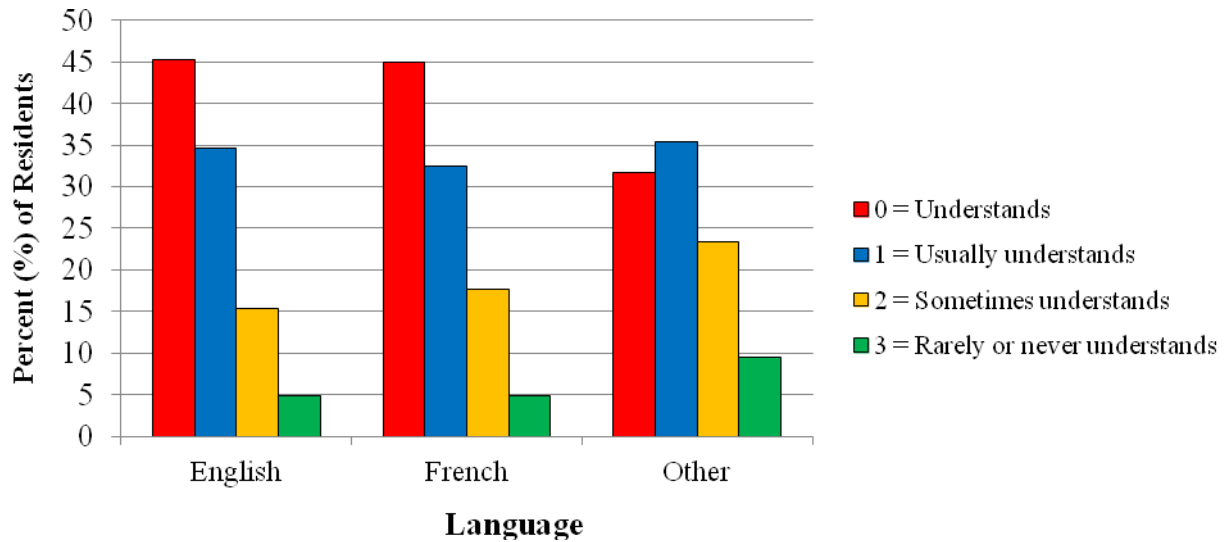
Figure 5. The proportion of residents scoring at each level of the 'ability to understand others' variable at baseline for English, French and Other speaking residents

Table 4 compares the frequency and distribution of medication use for the sample. The French language group used a significantly greater number of medications than the English and Other language speaking residents. They also had a significantly greater number of residents using antipsychotics, antianxiety, antidepressant and hypnotic medications. The Other language speaking residents had the smallest proportion of residents taking these medications. On the other hand, the Other language group had the greatest proportion of residents using new medications that were initiated in the last 90 days.

Table 5 compares the frequency and distribution of RUG-III categories and CMI values between the English, French, and Other language speaking residents. The English and French speaking residents had greater mean RUG-III scores compared to the Other language group. On the other hand, the greatest mean CMI value was held by the Other language group.

Table 4. Comparison of the frequency and distribution of medication use between English, French and Other speaking residents at admission (time 1)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
	N	**%**	**N**	**%**	**N**	**%**	
Number of medications (Mean ± SD)	(10.3 ± 4.9)		(11.1 ± 5.0)		(9.8 ± 4.8)		
95% Confidence Interval	10.2, 10.3		10.9, 11.2		9.7, 9.9		
Not used	575	0.6	29	0.6	128	0.8	<.0001
1 – 4	8041	8.5	304	6.7	1694	10.0	
5 – 9	35901	37.7	1475	32.5	6782	39.8	
10 – 14	35088	36.9	1734	38.2	6085	35.8	
15 – 19	12765	13.4	787	17.3	1951	11.5	
20 – 27	2812	3.0	212	4.7	382	2.2	
New medications initiated during the last 90 days*							
No	37467	48.5	1794	47.1	6455	46.9	0.0012
Yes	39814	51.5	2012	52.9	7308	53.1	
Psychotropic medications used in the past 7 days							
No	33085	34.7	1309	28.8	6896	40.5	<.0001
Yes	62289	65.3	3239	71.2	10147	59.5	
Antipsychotics	29688	31.1	1523	33.5	5273	30.9	0.0027
Antianxiety	15746	16.5	823	18.1	2409	14.1	<.0001
Antidepressants	44765	46.9	2479	54.5	6848	40.2	<.0001
Hypnotics	6568	6.9	401	8.8	1024	6.0	<.0001

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

* = 11% of the data is missing

Table 5. Comparison of the frequency and distribution of RUG III categories and CMI values between English, French and Other speaking residents at admission (time 1)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
	N	%	N	%	N	%	
RUG III (44 Group Category) (Mean ± SD)	(5.2 ± 1.9)		(5.2 ± 1.9)		(5.0 ± 2.0)		
95% Confidence Interval	5.2, 5.2		5.2, 5.3		5.0, 5.0		
1 = Special Rehabilitation	6369	6.7	313	6.9	1420	8.3	<.0001
2 = Extensive Services	2830	3.0	161	3.5	860	5.1	
3 = Special Care	6701	7.0	269	5.9	1109	6.5	
4 = Clinically Complex	21679	22.7	927	20.4	4338	25.5	
5 = Impaired Cognition	12936	13.6	716	15.7	1787	10.5	
6 = Behaviour Problems	2841	3.0	109	2.4	368	2.2	
7 = Reduced Physical Functions	42018	44.1	2053	45.1	7161	42.0	
Case Mix Index (CMI) (Mean ± SD)	(0.675 ± 0.194)		(0.660 ± 0.201)		(0.714 ± 0.208)		
95% Confidence Interval	0.674, 0.676		0.654, 0.666		0.711, 0.717		

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Facility Concentration of 'Other' Language Speaking Residents

Table 6 presents the findings when creating the facility concentration variable. The top decile, or 90%, of the prevalence of 'other' speaking residents within a facility was used to create this variable. If individual facilities had 32% or more of Other residents, they were labelled as 'high' concentration facilities. In total, there was found to be 576 facilities that had less than a 32% concentration of Other residents and 65 facilities that had a greater than 32% concentration of Other residents.

Table 7 presents the findings for the 'ability to make self understood' variable according to 'low' and 'high' concentration facilities for the Other language group. There was a greater proportion of Other language residents who were 'understood' by others in the 'high' concentration facilities compared to the 'low' concentration facilities. They also had a smaller

proportion of residents who were 'rarely or never understood' in the 'high' concentration facilities as opposed to the 'low' concentration facilities.

Table 8 presents the findings for the 'ability to understand others' variable according to 'low' and 'high' concentration facilities for the Other language group. There was a greater proportion of Other speaking residents who 'understand' others in the 'high' concentration facilities. The Other speaking residents 'rarely or never understand' others more often in the 'low' concentration facility.

Table 6. Characteristics for 'low' and 'high' concentration facilities

	Number of Facilities N = 641			
	Low×		High°	
	N	**%**	**N**	**%**
	576	89.9	65	10.1
	Number of Residents N = 116965			
	Low×		High°	
Language	**N**	**%**	**N**	**%**
English	90452	94.8	4922	5.2
French	4505	99.1	43	1.0
Other	8595	50.4	8448	49.6

× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

Table 7. *Other* language speaking residents' 'ability to make self understood' in long-term care facilities

OTHER Language	Low× N = 8595		High ° N = 8448	
Making Self Understood	**N**	**%**	**N**	**%**
0 = Understood	2729	31.8	3540	41.9
1 = Usually understood	2761	32.1	2600	30.8
2 = Sometimes understood	1901	22.1	1448	17.1
3 = Rarely or never understood	1204	14.0	860	10.2

× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

Table 8. O*ther* language speaking residents' 'ability to understand others' in long-term care facilities

OTHER Language	Low× N = 8595		High ° N = 8448	
Ability to Understand Others	N	%	N	%
0 = Understands	2337	27.2	3064	36.3
1 = Usually understands	3079	35.8	2952	34.9
2 = Sometimes understands	2257	26.3	1729	20.5
3 = Rarely or never understands	922	10.7	703	8.3

× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

4.2. Prevalence of Diagnosis and/or Symptoms of Depression

This section seeks to determine whether there was a difference in prevalence in symptoms of depression as well as 'depression symptoms and diagnosis' categories. Table 9a and 9b examines the prevalence of depressive symptoms at time 1 (admission) and time 2 (second assessment).

At time 1 and time 2, the English speaking residents had the greatest proportion of those with symptoms of depression. The English residents had the greatest increase for those with depressive symptoms. From time 1 to time 2, the proportion of those with depressive symptoms increased by 4% for the English residents. On the other hand, the French and Other speaking residents increased by only 2%.

Table 9a. Prevalence of depressive symptoms between English, French and Other language speaking residents at time 1 (admission)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
Depressive Symptoms	**N**	**%**	**N**	**%**	**N**	**%**	
0 – 2 [no symptoms]	64650	67.8	3229	71.0	12738	74.7	<.0001
3 + [symptoms]	30724	32.2	1319	29.0	4305	25.3	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Table 9b. Prevalence of depressive symptoms between English, French and Other language speaking residents at time 2 (second assessment)

	English N = 95374		French N = 4548		Other N = 17045		p-value[a]
Depressive Symptoms	**N**	**%**	**N**	**%**	**N**	**%**	
0 – 2 [no symptoms]	60741	63.7	3123	68.7	12365	72.5	<.0001
3 + [symptoms]	34633	36.3	1425	31.3	4680	27.5	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Antidepressant Use

Table 10a and 10b shows how many residents with depressive symptoms were taking antidepressants at time 1 and time 2. For example, at time 1, 64.2% of French residents who had symptoms of depression were taking antidepressants. The Other language speaking residents had the smallest proportion of residents taking antidepressants for time 1 and time 2. For example, at time 2, 52.9% of Other residents with symptoms of depression were taking antidepressants as opposed to 57.5% for the English residents.

Table 10a. Proportion of residents with and without depressive symptoms receiving antidepressants at time 1 (admission)

	English				French				Other			
	No ATD N = 50609		Yes ATD N = 44765		No ATD N = 2069		Yes ATD N = 2479		No ATD N = 10195		Yes ATD N = 6848	
Depressive Symptoms	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0 – 2 [no symptoms]	36559	56.6	28091	43.5	1597	49.5	1632	50.5	8036	63.1	4702	36.9
3 + [symptoms]	14050	45.7	16674	54.3	472	35.8	847	64.2	2159	50.2	2146	49.9

ATD = Antidepressants

Table 10b. Proportion of residents with and without depressive symptoms receiving antidepressants at time 2 (second assessment)

	English				French				Other			
	No ATD N = 47260		Yes ATD N = 48114		No ATD N = 1903		Yes ATD N = 2645		No ATD N = 9708		Yes ATD N = 7335	
Symptoms of Depression	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0 – 2 [no symptoms]	32528	53.6	28213	46.5	1445	46.3	1678	53.7	7502	60.7	4861	39.3
3 + [symptoms]	14732	42.5	19901	57.5	458	32.1	967	67.9	2206	47.1	2474	52.9

ATD = Antidepressants

Psychological Therapy by a Licensed Mental Health Specialist

Table 11a and 11b is similar to table 10a and 10b. However, this table exams whether those with depressive symptoms were receiving therapy by a mental health professional. For example, at time 2, 2.2% of French residents with depressive symptoms were receiving therapy. The greatest proportion of residents with depressive symptoms receiving therapy was the English residents. At time 1 and time 2, 2.4% and 2.3% of English residents with depressive symptoms were receiving therapy. At time 1, the French residents with depressive symptoms had the smallest proportion of residents receiving therapy and at time 2, the Other residents with depressive symptoms had the smallest proportion of residents receiving therapy.

Table 11a. Proportion of residents with and without depression receiving therapy at time 1 (admission)

	English				French				Other			
	No Therapy[γ] N = 93384		Therapy[γ] N = 1990		No Therapy[γ] N = 4506		Therapy[γ] N = 42		No Therapy[γ] N = 16729		Therapy[γ] N = 314	
Depressive Symptoms	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0 − 2 [no symptoms]	63409	98.1	1241	1.9	3205	99.3	24	0.7	12515	98.3	223	1.8
3 + [symptoms]	29975	97.6	749	2.4	1301	98.6	18	1.4	4214	97.9	91	2.1

[γ] provided by a licensed mental health specialist

Table 11b. Proportion of residents with and without depression receiving therapy at time 2 (second assessment)

	English				French				Other			
	No Therapy[γ] N = 93636		Therapy[γ] N = 1738		No Therapy[γ] N = 4463		Therapy[γ] N = 85		No Therapy[γ] N = 16771		Therapy[γ] N = 272	
Symptoms of Depression	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0 − 2 [no symptoms]	59787	98.4	959	1.6	3069	98.3	54	1.7	12179	98.5	184	1.5
3 + [symptoms]	33854	97.8	779	2.3	1394	97.8	31	2.2	4592	98.1	88	1.9

[γ] provided by a licensed mental health specialist

Depressive Symptoms and Diagnosis of Depression

Table 12a and 12b compares the frequency and distribution of 'depressive symptoms and diagnosis' categories between the three groups at time 1 and time 2. For example, at time 2, 15.6% of English residents had no symptoms of depression and a diagnosis of depression. At both time 1 and time 2, the Other residents had the greatest proportion of residents in the 'no symptoms and diagnosis' category whereas the English residents had the smallest proportion. The French residents were found to have the greatest proportion to have 'no symptoms and diagnosis' at time 1 and time 2. At time 1 and time 2, the Other residents had the smallest proportion of residents in the 'symptoms and diagnosis' category whereas the English residents had the greatest.

Table 12a. Comparison of the frequency and distribution of depressive symptoms and diagnosis categories between English, French, and Other language speaking residents at time 1 (admission)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
Symptoms of Depression and Diagnosis	N	%	N	%	N	%	
No symptoms and no diagnosis	49822	52.2	2396	52.7	9948	58.4	<.0001
Symptoms and no diagnosis	21205	22.2	870	19.1	2943	17.3	
No symptoms and diagnosis	14828	15.6	833	18.3	2790	16.4	
Symptoms and diagnosis	9519	10.0	449	9.9	1362	8.0	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Table 12b. Comparison of the frequency and distribution of depressive symptoms and diagnosis categories between English, French, and Other language speaking residents at time 2 (second assessment)

	English N = 95374		French N = 4548		Other N = 17043		p-value[a]
Symptoms of Depression and Diagnosis	N	%	N	%	N	%	
No symptoms and no diagnosis	45896	48.1	2273	50.0	9490	55.7	<.0001
Symptoms and no diagnosis	23681	24.8	928	20.4	3192	18.7	
No symptoms and diagnosis	14845	15.6	850	18.7	2873	16.9	
Symptoms and diagnosis	10952	11.5	497	10.9	1488	8.7	

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

Antidepressant Use and Symptoms or Diagnosis of Depression

Table 13a and 13b show the prevalence of antidepressant use among residents with symptoms of depression and diagnosis categories. For example, at time 1, 47.1% of French residents who had 'symptoms and no diagnosis' were not taking antidepressants. For the English, French and Other speaking residents taking antidepressants, the greatest proportion was in the 'symptoms and diagnosis' category and the smallest proportion was in the 'no symptoms and no diagnosis category at time 1 and time 2. For all categories at time 1 and time 2, the Other residents had the smallest proportion of residents taking antidepressants. For example, at time 2, the proportion of Other residents with 'no symptoms and diagnosis' taking antidepressants was 74.6% as opposed to 81.2% for the English residents.

When comparing the 'symptoms and no diagnosis' category and 'no symptoms and diagnosis' category, there was a greater proportion of residents taking antidepressants if they had 'no symptoms and diagnosis'. For example, at time 1, 84.6% of French residents in the 'no symptoms and diagnosis' category were taking antidepressants as opposed to only 52.9% in the 'symptoms and no diagnosis' category.

Table 13a. Prevalence of antidepressant use among residents with symptoms of depression and diagnosis categories between English, French and Other language speaking residents at time 1 (admission)

	English N = 95374				French N = 4548				Other N = 17043			
	No ATD		Yes ATD		No ATD		Yes ATD		No ATD		Yes ATD	
Symptoms of Depression and Diagnosis	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
No symptoms and no diagnosis	33506	67.3	16316	32.8	1469	61.3	927	38.7	7294	73.3	2654	26.7
Symptoms and no diagnosis	12295	58.0	8910	42.0	410	47.1	460	52.9	1853	63.0	1090	37.0
No symptoms and diagnosis	3053	20.6	11775	79.4	128	15.4	705	84.6	742	26.6	2048	73.4
Symptoms and diagnosis	1755	18.4	7764	81.6	62	13.8	387	86.2	306	22.5	1056	77.5

ATD = Antidepressants

Table 13b. Prevalence of antidepressant use among residents with symptoms of depression and diagnosis categories between English, French and Other language speaking residents at time 2 (second assessment)

	English N = 95374				French N = 4548				Other N = 17043			
	No ATD		Yes ATD		No ATD		Yes ATD		No ATD		Yes ATD	
Symptoms of Depression and Diagnosis	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
No symptoms and no diagnosis	29743	64.8	16153	35.2	1325	58.3	948	41.7	6771	71.4	2719	28.7
Symptoms and no diagnosis	12957	54.7	10724	45.3	403	43.4	525	56.6	1904	59.7	1288	40.4
No symptoms and diagnosis	2785	18.8	12060	81.2	120	14.1	730	85.9	731	25.4	2142	74.6
Symptoms and diagnosis	1775	16.2	9177	83.8	55	11.1	442	88.9	302	20.3	1186	79.7

ATD = Antidepressants

Psychological Therapy by a Licensed Mental Health Specialist and Symptoms or Diagnosis of Depression

Table 14a and 14b examine the proportion of residents receiving therapy by diagnosis and symptoms of depression. At time 1 and time 2, the Other residents with 'symptoms and diagnosis' had the smallest proportion of residents receiving therapy and the English residents had the greatest proportion. For example, at time 2, 2.2% of Other residents with 'symptoms and diagnosis' were receiving therapy as opposed to 2.9% of English residents. For all categories, there was a decrease in the proportion of residents receiving therapy for the English and Other residents and an increase in the proportion of residents receiving therapy for the French residents. For example, 1% of French residents with 'no symptoms and diagnosis' at time 1 were receiving therapy and this increased to 2.4% at time 2. On the other hand, 2.0% of Other residents at time 1 were receiving therapy and this decreased to 1.6% at time 2.

Table 14a. Comparing depressive symptoms and diagnosis categories between English, French and Other language speaking residents receiving therapy at time 1 (admission)

	English				French				Other			
	No Therapy[γ] N = 93384		Therapy[γ] N = 1990		No Therapy[γ] N = 4506		Therapy[γ] N = 42		No Therapy[γ] N = 16729		Therapy[γ] N = 314	
Symptoms of Depression and Diagnosis	N	%	N	%	N	%	N	%	N	%	N	%
No symptoms and no diagnosis	48909	98.2	913	1.8	2380	99.3	16	0.7	9782	98.3	166	1.7
Symptoms and no diagnosis	20731	97.8	474	2.2	863	99.2	7	0.8	2883	98.0	60	2.0
No symptoms and diagnosis	14500	97.8	328	2.2	825	99.0	8	1.0	2733	98.0	57	2.0
Symptoms and diagnosis	9244	97.1	275	2.9	438	97.6	11	2.5	1331	97.7	31	2.3

[γ] provided by a licensed mental health specialist

Table 14b. Comparing depressive symptoms and diagnosis categories between English, French and Other language speaking residents receiving therapy at time 2 (second assessment)

	English				French				Other			
	No Therapy[γ] N = 93636		Therapy[γ] N = 1738		No Therapy[γ] N = 4463		Therapy[γ] N = 85		No Therapy[γ] N = 16773		Therapy[γ] N = 272	
Symptoms of Depression and Diagnosis	N	%	N	%	N	%	N	%	N	%	N	%
No symptoms and no diagnosis	45211	98.5	685	1.5	2239	98.5	34	1.5	9354	98.6	137	1.4
Symptoms and no diagnosis	23217	98.0	464	2.0	911	98.2	17	1.8	3137	98.3	55	1.7
No symptoms and diagnosis	14571	98.2	274	1.9	830	97.7	20	2.4	2827	98.4	47	1.6
Symptoms and diagnosis	10637	97.1	315	2.9	483	97.2	14	2.8	1455	97.8	33	2.2

[γ] provided by a licensed mental health specialist

Changes in Depression Diagnosis and Symptoms from Admission to Second Assessment

Table 15 compares the change in 'depression diagnosis and symptoms' categories from time 1 to time 2. The changes between time 1 and time 2 are stratified by langauge as shown on the far left side of the table. This table demonstrates a few things. First, it gives a picture of what residents were like at admission. Second, the table also shows the prevalence of 'depression diagnosis and symptoms' at time 2. Third, the table shows the change in depressive patterns from time 1 and time 2.

The Other speaking residents in the 'symptoms and diagnosis' category at time 1 and 'symptoms and diagnosis' category at time 2, had the smallest proportion of residents compared to the French and English residents. About 70% of Other speaking residents, 71% of English speaking residents, and 73% of French speaking residents who had 'symptoms and diagnosis' at time 1 did not change by time 2. About 85% of Other speaking residents, 79% of English, and 82% of French residents remained in the 'no symptoms and no diagnosis' category from time 1 to time 2. Among Other residents with 'no symptoms and no daignosis' at time 1, 11.7% had 'symptoms and no diagnosis' at time 2 and 2.5% had 'no symptoms and diangosis' at time 2.

Table 15. The frequency and distribution of symptoms of depression and diagnosis at time 1 (admission) and time 2 (second assessment) for each language group

	TIME 2							
TIME 1	No symptoms and no diagnosis		Symptoms and no diagnosis		No symptoms and diagnosis		Symptoms and diagnosis	
	N	%	N	%	N	%	N	%
ENGLISH								
No symptoms and no diagnosis	39260	78.8	8531	17.1	1507	3.0	524	1.1
Symptoms and no diagnosis	5589	26.4	14514	68.5	244	1.2	858	4.1
No symptoms and diagnosis	831	5.6	224	1.5	11007	74.2	2766	18.7
Symptoms and diagnosis	216	2.3	412	4.3	2087	21.9	6804	71.5
FRENCH								
No symptoms and no diagnosis	1977	82.5	326	13.6	78	3.3	15	0.6
Symptoms and no diagnosis	253	29.1	571	65.6	8	0.9	38	4.4
No symptoms and diagnosis	36	4.3	12	1.4	670	80.4	115	13.8
Symptoms and diagnosis	7	1.6	19	4.2	94	20.9	329	73.3
OTHER								
No symptoms and no diagnosis	8463	85.1	1161	11.7	247	2.5	77	0.8
Symptoms and no diagnosis	861	29.3	1949	66.2	34	1.2	99	3.4
No symptoms and diagnosis	134	4.8	29	1.0	2275	81.5	352	12.6
Symptoms and diagnosis	32	2.4	53	3.9	317	23.3	960	70.5

Antidepressant Use - Facility Concentration and Patterns of Depression

Table 16a and 16b show the prevalence of depressive symptoms in 'low' and 'high' language concentration facilites. At time 1 and time 2, for all groups, symptoms of depression were more prevalent in the 'low' concentration facilities. At time 1 and time 2, the English residents had the greatest proportion of those with symptoms. The French residents were found to have the smallest proportion of residents with symptoms of depression at both time 1 and time 2 for both types of facilites.

Comparing the results for time 1 and time 2, the trend was an increase in depressive symptoms regardless of facility concentration with the exception of the French residents in the 'high' concentration facilities. There was a decrease in the proportion of French residents with depressive symptoms in the 'high' concentration facilities. At time 1, 18.6% of the French

residents in the high concentration facilities had symptoms of depression and at time 2, 16.3%

had symptoms.

Table 16a. Prevalence of depressive symptoms in 'low' and 'high' concentration facilities at time 1 (admission)

	English				French				Other			
	Low× N = 90452		High° N = 4922		Low× N = 4505		High° N = 43		Low× N = 8595		High° N = 8448	
Depressive Symptoms	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
No symptoms	60965	67.4	3686	74.9	3194	70.9	35	81.4	6158	71.7	6580	77.9
Symptoms	29487	32.6	1237	25.1	1311	29.1	8	18.6	2437	28.4	1868	22.1

× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

Table 16b. Prevalence of depressive symptoms in 'low' and 'high' concentration facilities at time 2 (second assessment)

	English				French				Other			
	Low× N = 90452		High° N = 4924		Low× N = 4505		High° N = 43		Low× N = 8596		High° N = 8449	
Depressive Symptoms	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
No symptoms	57142	63.2	3599	73.1	3087	68.5	36	83.7	5855	68.1	6510	77.1
Symptoms	33310	36.8	1323	26.9	1418	31.5	7	16.3	2741	31.9	1939	23.0

× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

Facility Concentration and Antidepressant Use

Table 17a and 17b examines the patterns of antidepressant use among residents with and

without depressive symptoms in the 'low' and 'high' concentration facilities. For example,

47.8% of English residents living in a 'high' concentration facility who had symptoms of

depression were taking antidepressants at time 1. At time 1 and time 2, the 'low' concentration

facilities had greater antidepressant use compared to the 'high' concentration facilities. For

example, at time 1, 40.4% of Other residents who had no symptoms of depression were using

antidepressants as opposed to only 33.7% in the 'high' concentration facilities. There was also an

increase in the proportion of antidepressant use from time 1 to time 2 for the English and Other

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speaking residents. For example, English residents with no symptoms of depression and who were living in the 'low' concentration facilities had an increase in antidepressant use from 44.0% to 46.9%.

Table 17a. Depressive symptoms and patterns of antidepressant use in 'low' and 'high' concentration facilities at time 1 (admission)

	English				French				Other			
	Low×		High°		Low×		High°		Low×		High°	
	N	%	N	%	N	%	N	%	N	%	N	%
No symptoms												
No ATD	34169	56.1	2390	64.9	1575	49.3	22	62.9	3673	59.7	4363	66.3
ATD	26796	44.0	1295	35.1	1619	50.7	13	37.1	2485	40.4	2217	33.7
Symptoms												
No ATD	13404	45.5	646	52.2	469	35.8	3	37.5	1123	46.1	1036	55.5
ATD	16083	54.5	591	47.8	842	64.2	5	62.5	1314	53.9	832	44.5

ATD = Antidepressants
× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

Table 17b. Depressive symptoms and patterns of antidepressant use in 'low' and 'high' concentration facilities at time 2 (second assessment)

	English				French				Other			
	Low×		High°		Low×		High°		Low×		High°	
	N	%	N	%	N	%	N	%	N	%	N	%
No symptoms												
No ATD	30353	53.1	2175	60.4	1423	46.1	22	61.1	3336	57.0	4168	64.0
ATD	26789	46.9	1424	39.6	1664	53.9	14	38.9	2519	43.0	2342	36.0
Symptoms												
No ATD	14046	42.2	686	51.9	455	32.1	3	42.9	1215	44.3	991	51.1
ATD	19265	57.8	637	48.2	963	67.9	4	57.1	1526	55.7	948	48.9

ATD = Antidepressants
× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

4.3. Factors Associated with Symptoms of Depression among English, French, and Other Speaking Residents

Bivariate Analysis – Demogrpahic Variables

Bivariate analysis was used to determine symptoms of depression (DRS scores of 3 or greater) at time 2 using baseline variables. Table 18 examines demographic variables at admission and their relation to depressive symptoms at time 2. The odds of having depression was found to be greatest in the 95 years and older group for the English and Other language speaking residents compared to those 65 to 74 years of age. The French residents on the other hand, were found to be less likely to have depressive symptoms in the 95 years and older group. However, this was not found to be statistically significant ($p = 0.2092$). Males in all three groups were found to be less likely than females to have depressive symptoms at time 2. In the Other language group, residents who were divorced were found to be more likely to be depressed whereas in the English language group, residents who were widowed were 1.14 times more likely to be depressed compared to those who were never married. For all three groups, residents who had a high school education or more were found to be less likely to have depressive symptoms compared to those with less than a high school education.

Table 18. Percentage of residents with depressive symptoms (DRS scores of 3+) and bivariate logistic regression results examining the odds of having symptoms of depression at time 2 (second assessment) by demographic variables at time 1 (admission) stratified by language

Baseline Variables	English N = 95374			French N = 4548			Other N = 17043		
	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]
Age									
65 – 74	34.6	1.00*		36.0	1.00*		23.4	1.00*	
75 – 84	36.1	1.07 (1.02-1.12)	0.0037	31.0	0.80 (0.65-0.98)	0.0303	28.3	1.29 (1.13-1.48)	0.0002
85 – 94	36.8	1.10 (1.05-1.15)	<.0001	30.4	0.78 (0.63-0.95)	0.0137	27.5	1.24 (1.09-1.42)	0.0016
95 and older	37.3	1.13 (1.06-1.20)	0.0001	31.8	0.83 (0.62-1.11)	0.2092	28.0	1.27 (1.08-1.51)	0.0053
Sex									
Female	39.0	1.00		32.8	1.00		29.1	1.00	
Male	30.0	0.67 (0.65-0.69)	<.0001	27.8	0.79 (0.69-0.91)	0.0008	23.6	0.75 (0.70-0.81)	<.0001
Marital Status									
Never married	34.4	1.00		31.2	1.00		25.3	1.00	
Married	34.9	1.02 (0.97-1.08)	0.4629	29.5	0.92 (0.72-1.18)	0.5256	26.9	1.09 (0.90-1.31)	0.4060
Widowed	37.5	1.14 (1.09-1.21)	<.0001	31.7	1.02 (0.81-1.28)	0.8597	28.0	1.15 (0.95-1.38)	0.1526
Separated	34.4	1.00 (0.89-1.12)	0.9569	36.4	1.26 (0.79-2.00)	0.3293	25.2	0.99 (0.71-1.38)	0.9668
Divorced	34.1	0.99 (0.92-1.06)	0.7378	31.5	1.01 (0.68-1.50)	0.9611	29.0	1.21 (0.93-1.57)	0.1630
Unknown	34.5	1.00 (0.91-1.11)	0.9427	38.5	1.38 (0.87-2.19)	0.1717	22.9	0.87 (0.64-1.20)	0.4139

Education									
Less than high school	37.6	1.00		32.2	1.00		28.6	1.00	
Finished high school / technical school or more	35.9	0.93 (0.90-0.96)	<.0001	28.1	0.83 (0.68-1.00)	0.0466	24.8	0.83 (0.75-0.91)	<.0001
Unknown	35.7	0.93 (0.90-0.96)	<.0001	31.8	0.98 (0.86-1.13)	0.7966	27.3	0.94 (0.87-1.01)	0.0917

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

* Reference category

Bivariate Analysis – Mood and Behaviour Patterns

Table 19 shows the results of depressive symptoms based on mood and behaviour patterns as well as bivariate odds of having depressive symptoms at time 2 based on these variables. For all three groups, residents who were documented as having a mental health history at time 1 (admission) were found to be more likely to have depressive symptoms at time 2 (second assessment). For example, French residents who were documented as having had a mental health history were found to be 1.48 times more likely to have depressive symptoms at time 2 (second assessment) compared to those with no mental health history.

Sleep disturbance and loss of interest in activities was found to be statistically significant in determining depressive symptoms at time 2 for all language groups. In addition, loss of interest was found to be more strongly associated with depressive symptoms in the Other language group compared to the English language group. For example, Other residents who had 'reduced social interaction' were 2.05 times more likely to have depressive symptoms at time 2 (second assessment) compared to those who did not have a 'reduced social interaction', whereas the English residents were 1.91 times more likely to have depressive symptoms. The English residents with a diagnosis of Alzheimer's and/or dementia were 1.25 times more likely to have depressive symptoms as opposed to 1.20 times more likely for the Other residents.

For the psychiatric/mood diseases, anxiety was a stronger predictor of depressive symptoms for the English and Other residents whereas bipolar disorder was the strongest predictor for the French residents. These results were found to be statistically significant ($p<.05$). Having schizophrenia was the weakest in predicting depressive symptoms at time 2 for all language groups. However, these results were not statistically significant ($p>.05$).

Table 19. Percentage of residents with depressive symptoms (DRS scores of 3+) and bivariate logistic regression results examining the odds of having symptoms of depression at time 2 (second assessment) by mood and behaviour patterns and mental health characteristics at time 1 (admission) stratified by language

Baseline Variables	English N = 95374			French N = 4548			Other N = 17043		
	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]
Sleep Disturbances									
Unpleasant mood in morning	60.6	3.44 (3.32-3.56)	<.0001	57.9	3.88 (3.30-4.57)	<.0001	50.9	3.54 (3.26-3.84)	<.0001
Insomnia or change in usual sleep pattern	53.0	2.25 (2.17-2.33)	<.0001	48.7	2.43 (2.06-2.86)	<.0001	44.0	2.39 (2.18-2.61)	<.0001
Loss of Interest									
Withdrawal from activities of interest	50.0	2.03 (1.96-2.09)	<.0001	52.2	2.96 (2.53-3.46)	<.0001	40.2	2.06 (1.90-2.24)	<.0001
Reduced social interaction	48.1	1.91 (1.85-1.97)	<.0001	50.7	2.89 (2.50-3.35)	<.0001	39.5	2.05 (1.90-2.22)	<.0001
Dementia									
Alzheimer's and/or Dementia	38.3	1.25 (1.22-1.29)	<.0001	33.0	1.23 (1.08-1.40)	0.0019	28.9	1.20 (1.12-1.29)	<.0001
Psychiatric / Mood Disease(s)									
Anxiety disorder	49.0	1.76 (1.67-1.85)	<.0001	39.8	1.52 (1.25-1.85)	<.0001	41.1	1.93 (1.69-2.20)	<.0001
Depression	41.9	1.38 (1.34-1.42)	<.0001	37.1	1.44 (1.25-1.64)	<.0001	33.6	1.48 (1.37-1.59)	<.0001
Bipolar Disorder	42.0	1.28 (1.15-1.41)	<.0001	41.0	1.54 (1.04-2.28)	0.0327	34.5	1.40 (1.04-1.87)	0.0247
Schizophrenia	36.5	1.01 (0.92-1.10)	0.8842	31.7	1.02 (0.69-1.50)	0.9361	29.5	1.11 (0.89-1.38)	0.3649

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Mental Health History									
No history	35.9	1.00*		30.4	1.00*		27.2	1.00*	
History	40.5	1.21 (1.16-1.27)	<.0001	39.3	1.48 (1.21-1.81)	0.0001	30.9	1.20 (1.06-1.36)	0.0053

a = p-value is associated with chi-square test for differences in proportions between 3 independent variables

* Reference category

Bivariate Analysis – Clinical Features

Table 20 displays the results of the bivariate analysis using clinical variables to examine the presence of depressive symptoms at time 2 for each language group. Impairment in vision and hearing was found to predict depressive symptoms for all lanugage groups. These results were found to be significant except in the Other language group where impaired hearing was not significant ($p = 0.1299$). Impairment in vision and hearing had the highest bivariate odds ratio in the French group. For example, French residents with impaired hearing were 1.36 times more likely to have depressive symptoms as opposed to those who did not have impaired hearing.

All levels of the ADL Long-Form Scale were found to be significant in predicting depressive symptoms in all three groups ($p<.05$). The strongest association was found with ADL scores of 20 to 24 which is one level below the 'most dependent' level. For example, English residents with ADL scores of 20 to 24 were 2.13 times more likely than those with scores of 0 to 4 to have depressive symptoms at time 2. ADLs were more strongly associated with depressive symptoms in the English residents as opposed to the French and Other speaking residents.

ISE Scale scores were found to be significant in predicting depressive symptoms for all three groups ($p<.0001$). Residents with greater participation levels were less likely to have depressive symptoms at time 2. For example, the English residents who had scores of 3 to 6 (considerable participation) were 0.81 times less likely to have depressive symptoms. In addition, the Other residents had the strongest association between having a considerable participation level and depressive symptoms.

Residents having a CPS score of 5 or severe impairment were the most likely to have depressive symptoms. For example, English speaking residents with severe impairment were 2.32 times more likely to have depressive symptoms compared to those with intact cognition.

Interestingly, residents with CPS scores of 6 or very severe impairment were the least likely to have depressive symptoms at time 2. For example, the Other residents were only 1.20 times more likely to have depressive symptoms at time 2 when they had very severe impairment.

For the 'making self understood' variable, residents who were 'usually understood' were the most likely to have depressive symptoms at time 2. On the other hand, residents who were 'rarely or never understood' were less likely to have depressive symptoms at time 2. These results were similar to the 'ability to understand others' variable where residents who 'usually understands' were more the most likely to have depressive symptoms in the English and French language group. The Other residents who 'sometimes understand' were 1.70 times more likely to have depressive symptoms compared to those who 'frequently understand'.

Having severe aggression or an ABS score of 5 and greater was found to be the strongest predictor of depressive symptoms. As ABS scores increased in severity, so did the odds ratios. The Other speaking residents were found to have the strongest association with depressive symptoms when they had severe aggression. For example, the Other residents who had severe aggression were 5.61 times more likely to have depressive symptoms compared to those who had no signs of aggression. Results for these findings was statistically significant ($p<.05$).

For the English and Other language group, the more conditions residents had, the more likely they were to have depressive symptoms. On the other hand, French residents with 1 or more conditions were less likely to have depressive symptoms. The results for the French were statistically insignificant ($p>.05$).

Examining the disease diagnoses, musculoskeletal disease diagnosis was the strongest in predicting depressive symptoms compared to heart/ciculation diseases, pulmonary diseases, and sensory diseases. For example, English speaking residents with a musculoskeletal disease

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diagnosis were 1.20 times more likely to have depressive symptoms comapred to those who did not have a diagnosis. English speaking residents with a sensory disease diagnosis were only 1.10 times more likely to have depressive symptoms compared to residents who did not have a diagnosis.

Having a CHESS Scale score of 4 or 'high health instability' was the strongest predictor of depressive symptoms for the English and Other speaking residents. For example, the Other speaking residents who had 'high health instability' were 2.49 times more likely to have depressive symptoms compared to those with 'no health instability'. Having a CHESS Scale score of 5 or having 'very high instability' was the strongest predictor of depressive symptoms for the French speaking residents.

A Pain Scale score of 3 was the strongest predictor of depressive symptoms for all residents. For example, English speaking residents who were in severe pain were 2.85 times more likely to have depressive symptoms compared to those with no pain. The Other language group had the strongest association between Pain Scale scores where residents in severe pain were 4.56 times more likely to have depressive symptoms. The results for the Pain Scale scores for all three language groups was found to be significant ($p < .0001$).

Table 20. Percentage of residents with depressive symptoms (DRS scores of 3+) and bivariate logistic regression results examining the odds of having symptoms of depression at time 2 (second assessment) by clinical features at time 1 (admission) stratified by language

Baseline Variables	English N = 95374			French N = 4548			Other N = 17043		
	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]	Symptoms of Depression (%)	Bivariate Odds Ratio (95% CI)	p-value[a]
Functional Features									
Hearing									
Adequate	35.1	1.00*		28.6	1.00*		27.0	1.00*	
Impaired	38.1	1.14 (1.11-1.17)	<.0001	35.3	1.36 (1.20-1.54)	<.0001	28.1	1.06 (0.98-1.13)	0.1299
Vision									
Adequate	34.3	1.00		29.4	1.00		26.4	1.00	
Impaired	38.8	1.21 (1.18-1.25)	<.0001	33.9	1.23 (1.09-1.40)	0.0013	28.5	1.11 (1.04-1.19)	0.0019
Activities of Daily Living (ADL) Long Form Scale									
0 – 4 [most independent]	25.7	1.00		22.5	1.00		20.6	1.00	
5 – 9	34.6	1.53 (1.45-1.62)	<.0001	30.6	1.52 (1.21-1.91)	0.0004	24.5	1.26 (1.07-1.47)	0.0051
10 – 14	36.9	1.69 (1.61-1.78)	<.0001	32.3	1.65 (1.31-2.08)	<.0001	28.7	1.55 (1.34-1.80)	<.0001
15 – 19	40.0	1.93 (1.84-2.02)	<.0001	36.2	1.96 (1.57-2.44)	<.0001	30.0	1.65 (1.44-1.90)	<.0001
20 – 24	42.3	2.13 (2.03-2.23)	<.0001	37.5	2.07 (1.67-2.57)	<.0001	31.2	1.75 (1.53-2.01)	<.0001
25 – 28 [most dependent]	34.6	1.53 (1.46-1.61)	<.0001	29.2	1.42 (1.14-1.78)	0.0020	25.5	1.32 (1.15-1.52)	<.0001

Index of Social Engagement (ISE) Scale									
0 – 2 [lower social engagement]	39.0	1.00		36.2	1.00		28.8	1.00	
3 – 6 [considerable participation]	34.3	0.81 (0.79-0.84)	<.0001	27.8	0.68 (0.60-0.77)	<.0001	25.6	0.85 (0.79-0.91)	<.0001
Cognitive Function									
Cognitive Performance Scale (CPS)									
0 = Intact	25.3	1.00		17.5	1.00		18.1	1.00	
1 = Borderline intact	32.4	1.41 (1.34-1.49)	<.0001	28.9	1.91 (1.45-2.51)	<.0001	22.9	1.35 (1.14-1.59)	0.0004
2 = Mild impairment	34.6	1.56 (1.49-1.64)	<.0001	29.4	1.96 (1.52-2.52)	<.0001	26.9	1.66 (1.43-1.93)	<.0001
3 = Moderate impairment	42.3	2.16 (2.07-2.26)	<.0001	38.8	2.98 (2.36-3.76)	<.0001	31.3	2.06 (1.79-2.37)	<.0001
4 = Moderately severe impairment	41.9	2.13 (1.99-2.27)	<.0001	33.7	2.40 (1.72-3.34)	<.0001	32.6	2.19 (1.88-2.56)	<.0001
5 = Severe impairment	44.0	2.32 (2.19-2.45)	<.0001	40.0	3.13 (2.42-4.05)	<.0001	33.5	2.28 (1.95-2.67)	<.0001
6 = Very severe impairment	27.0	1.09 (1.02-1.17)	0.0084	21.1	1.26 (0.91-1.73)	0.1646	20.9	1.20 (1.02-1.41)	0.0311
Making Self Understood									
0 = Understood	33.2	1.00		29.1	1.00		23.2	1.00	
1 = Usually understood	42.7	1.50 (1.45-1.54)	<.0001	37.1	1.44 (1.25-1.67)	<.0001	31.8	1.55 (1.42-1.68)	<.0001
2 = Sometimes understood	40.7	1.38 (1.32-1.44)	<.0001	34.6	1.29 (1.07-1.56)	0.0077	31.3	1.51 (1.38-1.66)	<.0001
3 = Rarely or never understood	24.8	0.67 (0.62-0.71)	<.0001	19.4	0.59 (0.43-0.80)	0.0007	22.8	0.98 (0.87-1.10)	0.7270

Ability to Understand Others									
0 = Understands	31.1	1.00		27.5	1.00		21.8	1.00	
1 = Usually understands	41.8	1.59 (1.54-1.64)	<.0001	35.6	1.45 (1.26-1.68)	<.0001	30.9	1.61 (1.48-1.75)	<.0001
2 = Sometimes understands	42.4	1.63 (1.57-1.70)	<.0001	35.6	1.46 (1.22-1.73)	<.0001	32.3	1.70 (1.55-1.87)	<.0001
3 = Rarely or never understands	26.4	0.80 (0.74-0.85)	<.0001	22.3	0.75 (0.54-1.05)	0.0958	21.9	1.01 (0.88-1.15)	0.9214
Behavioural Symptoms									
Aggressive Behaviour Scale (ABS)									
0 [no signs of aggression]	26.5	1.00		21.9	1.00		17.8	1.00	
1 – 4 [mild to moderate aggression]	45.3	2.30 (2.23-2.37)	<.0001	42.3	2.62 (2.27-3.01)	<.0001	35.0	2.49 (2.31-2.68)	<.0001
5 and greater [severe aggression]	62.4	4.61 (4.41-4.82)	<.0001	56.8	4.70 (3.81-5.81)	<.0001	54.8	5.61 (5.04-6.23)	<.0001
Diagnoses									
Number of Comorbid Conditions									
No diagnosis	26.8	1.00		39.1	1.00		19.4	1.00	
1 – 2	32.0	1.28 (1.05-1.57)	0.0143	25.0	0.52 (0.22-1.23)	0.1355	26.7	1.51 (0.92-2.49)	0.1023
3 – 4	33.8	1.39 (1.14-1.69)	0.0011	28.9	0.63 (0.27-1.48)	0.2901	24.4	1.34 (0.82-2.19)	0.2423
5 and more	38.9	1.73 (1.42-2.11)	<.0001	33.5	0.78 0.34-1.82)	0.5701	29.9	1.77 (1.08-2.89)	0.0226
Endocrine / Metabolic	36.1	0.99 (0.96-1.01)	0.3025	31.5	1.01 (0.89-1.15)	0.8849	27.3	0.98 (0.92-1.05)	0.6277

Nutritional Disease(s)									
Heart / Circulation Disease(s)	36.6	1.04 (1.01-1.07)	0.0071	31.0	0.95 (0.83-1.09)	0.4616	27.3	0.98 (0.91-1.06)	0.5558
Musculoskeletal Disease(s)	38.2	1.20 (1.17-1.24)	<.0001	32.2	1.10 (0.97-1.25)	0.1291	28.7	1.15 (1.07-1.23)	<.0001
Pulmonary Disease(s)	37.8	1.08 (1.04-1.12)	<.0001	30.7	0.96 (0.83-1.12)	0.6072	29.3	1.11 (1.00-1.22)	0.0457
Sensory Disease(s)	37.9	1.10 (1.06-1.13)	<.0001	30.7	0.96 (0.83-1.12)	0.6293	27.7	1.02 (0.94-1.10)	0.6912
Other Health Related Factors									
Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) Scale									
0 = No health instability	30.8	1.00		26.0	1.00		23.5	1.00	
1 = Minimal health instability	37.9	1.37 (1.33-1.42)	<.0001	32.0	1.35 (1.16-1.56)	<.0001	29.3	1.35 (1.25-1.46)	<.0001
2 = Low health instability	44.2	1.78 (1.71-1.85)	<.0001	39.5	1.86 (1.56-2.22)	<.0001	32.4	1.56 (1.41-1.72)	<.0001
3 = Moderate health instability	47.8	2.06 (1.95-2.19)	<.0001	41.6	2.03 (1.55-2.65)	0.0001	38.0	2.00 (1.72-2.31)	<.0001
4 = High health instability	52.9	2.52 (2.30-2.76)	<.0001	47.8	2.62 (1.72-3.98)	<.0001	43.4	2.49 (1.98-3.14)	<.0001
5 = Very high health instability	47.1	2.00 (1.43-2.80)	<.0001	50.0	2.85 (0.71-11.44)	0.1393	34.8	1.74 (0.74-4.10)	0.2085

Pain Scale									
0 = No pain	31.0	1.00		25.1	1.00		22.3	1.00	
1 = Less than daily pain	40.6	1.52 (1.47-1.57)	<.0001	35.5	1.64 (1.42-1.91)	<.0001	32.0	1.64 (1.51-1.78)	<.0001
2 = Mild to moderate pain	44.7	1.80 (1.74-1.87)	<.0001	40.8	2.06 (1.73-2.44)	<.0001	39.7	2.29 (2.09-2.53)	<.0001
3 = Severe pain	56.1	2.85 (2.63-3.08)	<.0001	53.5	3.42 (2.40-4.91)	<.0001	56.7	4.56 (3.65-5.70)	<.0001

a = *p*-value is associated with chi-square test for differences in proportions between 3 independent variables

* Reference category

Multivariate Analyses

Table 21 displays the results for the final adjusted model for the English residents. The model held the DRS score at baseline constant to determine other variables associated with depressive symptoms. Out of the 30 variables examined, 9 were found to be significant in predicting depressive symptoms at time 2. Holding all other variables constant, sex was found to be significant in the model where males were less likely to have depressive symptoms when compared to females. English speaking residents who had 'unpleasant mood in morning' were 1.18 times more likely to have depressive symptoms compared to those who did not have an 'unpleasant mood in morning'. The variables with the strongest association to depressive symptoms were high levels of aggressive behaviour and pain. English speaking residents with ABS scores of 5 and greater were 1.48 times more likely to have depressive symptoms compared to those who had no aggressive behaviour. Residents with Pain Scale scores of 3 were 1.42 times more likely to have depressive symptoms compared to those with no pain.

Quadratic terms for the CPS and CHESS scores were evaluated to account for curvilinear relationships with depressive symptoms. Figure 6 displays the results for the CPS. From levels 1 to 2, there was an increase in odds followed by a decrease in odds with CPS levels 3 to 6. Figure 7 displays the results for the CHESS Scale where from levels 1 to 2, there was an increase in odds followed by a decrease in odds from levels 3 to 5. The final model resulted in a c-statistic of 0.828 which indicates a strong fit for the model.

Table 21. Results of multivariate logistic regression using generalized estimating equations examining resident characteristics at time 1 (admission) as predictors of depressive symptoms (DRS score of 3+) at time 2 (second assessment) among English speaking residents

	English				
Variables	**Parameter Estimates**	**Standard Error**	***p*-value**	**Odds Ratio**	**Odds Ratio (95% CI)**
Depression Rating Scale (DRS) (0-14) at Time 1 (Admission)	0.5147	0.008731	<.0001	1.67	1.64, 1.70
Age					
75-84 vs. 65-74					
85-94 vs. 65-74					
95 and older vs. 65-74					
Sex					
Male vs. Female*	-0.2167	0.01631	<.0001	0.81	0.78, 0.83
Marital Status					
Married vs. Never married					
Widowed vs. Never married					
Separated vs. Never married					
Divorced vs. Never married					
Unknown vs. Never married					
Education					
Finished high school / technical school or more vs. Less than high school					
Unknown vs. Less than high school					
Sleep Disturbances					
Unpleasant mood in morning	0.1693	0.02165	<.0001	1.18	1.14, 1.24
Insomnia or change in usual pattern					
Loss of Interest					
Withdrawal from activities of interest					
Reduced social interaction					
Dementia					
Alzheimer's and/or Dementia					
Psychiatric / Mood Disease(s)					
Anxiety	0.1551	0.02827	<.0001	1.17	1.10, 1.23
Depression	0.05137	0.01699	0.0097	1.05	1.02, 1.09
Bipolar disorder					
Schizophrenia					
Mental health history					
History vs. No history*					
Hearing					
Impaired vs. Adequate*					

Vision					
Impaired vs. Adequate*					
Activities of Daily Living (ADL) Long Form Scale					
5-9 vs. 0-4	0.1797	0.02802	<.0001	1.20	1.13, 1.26
10-14 vs. 0-4	0.2323	0.02878	<.0001	1.26	1.19, 1.33
15-19 vs. 0-4	0.2604	0.02877	<.0001	1.30	1.23, 1.37
20-24 vs. 0-4	0.1927	0.03086	<.0001	1.21	1.14, 1.29
25-28 vs. 0-4	0.05774	0.03454	0.4263	1.06	1.00, 1.13
Index of Social Engagement (ISE) Scale					
3-6 vs. 0-2*					
Cognitive Performance Scale (CPS)	0.1694	0.01406	<.0001	1.18	1.15, 1.22
CPS - Quadratic Term	-0.03367	0.002332	<.0001		
Making Self Understood					
1 vs. 0					
2 vs. 0					
3 vs. 0					
Ability to Understand Others					
1 vs. 0					
2 vs. 0					
3 vs. 0					
Aggressive Behaviour Scale (ABS)					
1-4 vs. 0	0.2095	0.01824	<.0001	1.23	1.19, 1.28
5 and greater vs. 0	0.3898	0.03220	<.0001	1.48	1.39, 1.57
Number of Comorbid Conditions					
1-2 vs. No diagnosis					
3-4 vs. No diagnosis					
5 and more vs. No diagnosis					
Endocrine / Metabolic Nutritional Disease(s)					
Heart / Circulation Disease(s)					
Musculoskeletal Disease(s)					
Pulmonary Disease(s)					
Sensory Disease(s)					
Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) Scale	0.06294	0.01892	<.0001	1.06	1.03, 1.11
CHESS – Quadratic Term	-0.01861	0.005986	0.0006		
Pain Scale					
1 vs. 0	0.1590	0.01981	<.0001	1.17	1.13, 1.22
2 vs. 0	0.2054	0.02252	<.0001	1.23	1.18, 1.28
3 vs. 0	0.3529	0.04696	<.0001	1.42	1.30, 1.56
Model Fit^	C-statistic: 0.828				

* Reference category
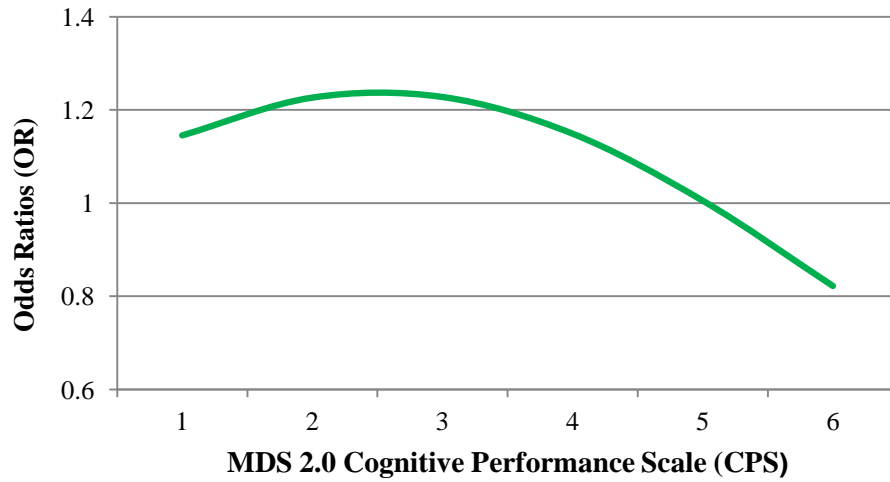^ The c-statistic was derived by running the model using logistic regression

Figure 6. Adjusting for baseline Depression Rating Scale (DRS) at time 1 (admission) - Odds ratios for each level of the CPS in predicting depressive symptoms at time 2 among English residents
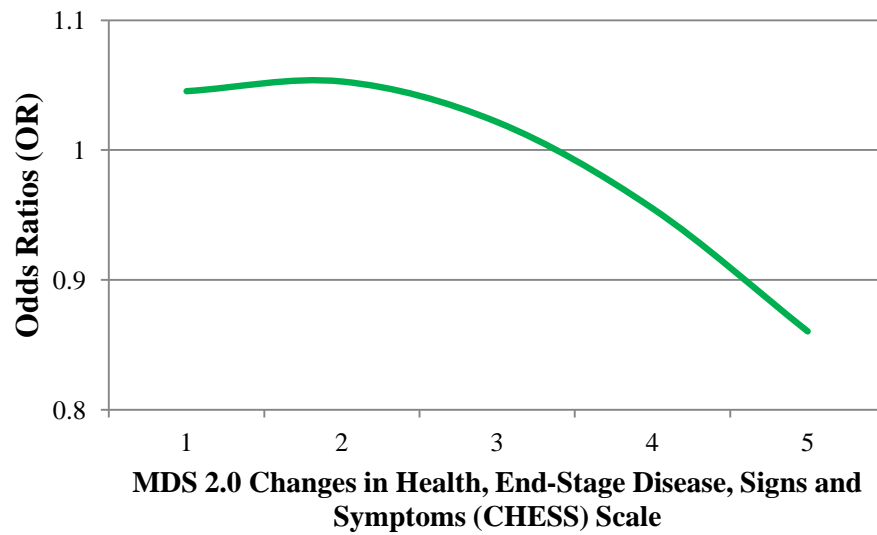

Figure 7. Adjusting for baseline Depression Rating Scale (DRS) at time 1 (admission) - Odds ratios for the CHESS Scale in predicting depressive symptoms at time 2 among English residents

Table 22 displays the results for the final model for the French speaking residents. Out of 30 variables, 5 variables were found to be significant in predicting depressive symptoms at time 2. These variables were depression diagnosis, aggressive behaviour, pain, cognitive impairment and reduced social engagement. A Pain Scale score of 3 had the strongest association to depressive symptoms for the French residents. French residents who were in severe pain were 1.84 times more likely to have depressive symptoms at time 2. Unlike the final model for the English group, ABS scores of 1 to 4 was a stronger predictor of depressive symptoms compared to those with scores of 5 and greater. For example, French residents with ABS scores of 1 to 4 were 1.30 times more likely to have depressive symptoms compared to 1.28 times more likely for French residents with scores of 5 and greater. Figure 8 presents the odds ratios for the CPS. Similar to the English model, the CPS produced a curvilinear relationship where lower CPS scores indicated a higher odds ratio compared to higher CPS scores which produced a lower odds ratio. The final model resulted in a c-statistic of 0.845 which indicates a strong model fit.

Table 22. Results of multivariate logistic regression using generalized estimating equations examining resident characteristics at time 1 (admission) as predictors of depressive symptoms (DRS scores of 3+) at time 2 (second assessment) among French speaking residents

Variables	Parameter Estimates	Standard Error	*p*-value	Odds Ratio	Odds Ratio (95% CI)
French					
Depression Rating Scale (DRS) (0-14) at Time 1 (Admission)	0.5709	0.03995	<.0001	1.77	1.64, 1.91
Age					
75-84 vs. 65-74					
85-94 vs. 65-74					
95 and older vs. 65-74					
Sex					
Male vs. Female*					
Marital Status					
Married vs. Never married					
Widowed vs. Never married					
Separated vs. Never married					
Divorced vs. Never married					
Unknown vs. Never married					
Education					
Finished high school / technical school or more vs. Less than high school					
Unknown vs. Less than high school					
Sleep Disturbances					
Unpleasant mood in morning					
Insomnia or change in usual pattern					
Loss of Interest					
Withdrawal from activities of interest					
Reduced social interaction	-0.2515	0.0949	0.0081	1.25	1.05, 1.49
Dementia					
Alzheimer's and/or Dementia					
Psychiatric / Mood Disease(s)					
Anxiety					
Depression					
Bipolar disorder					
Schizophrenia					
Mental health history					
History vs. No history*					

Hearing					
Impaired vs. Adequate*					
Vision					
Impaired vs. Adequate*					
Activities of Daily Living (ADL) Long Form Scale					
5-9 vs. 0-4					
10-14 vs. 0-4					
15-19 vs. 0-4					
20-24 vs. 0-4					
25-28 vs. 0-4					
Index of Social Engagement (ISE) Scale					
3-6 vs. 0-2*					
Cognitive Performance Scale (CPS)	0.2860	0.06947	0.0001	1.33	1.16, 1.53
CPS – Quadratic Term	-0.05139	0.01104	<.0001		
Making Self Understood					
1 vs. 0					
2 vs. 0					
3 vs. 0					
Ability to Understand Others					
1 vs. 0					
2 vs. 0					
3 vs. 0					
Aggressive Behaviour Scale (ABS)					
1-4 vs. 0	0.2655	0.08404	0.0034	1.30	1.11, 1.54
5 and greater vs. 0	0.2467	0.1319	0.1525	1.28	0.99, 1.66
Number of Comorbid Conditions					
1-2 vs. No diagnosis					
3-4 vs. No diagnosis					
5 and more vs. No diagnosis					
Endocrine / Metabolic Nutritional Disease(s)					
Heart / Circulation Disease(s)					
Musculoskeletal Disease(s)					
Pulmonary Disease(s)					
Sensory Disease(s)					

Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) Scale					
1 vs. 0					
2 vs. 0					
3 vs. 0					
4 vs. 0					
5 vs. 0					
Pain Scale					
1 vs. 0	0.2912	0.08794	0.0010	1.34	1.13, 1.59
2 vs. 0	0.3860	0.1010	0.0002	1.47	1.21, 1.79
3 vs. 0	0.6109	0.2364	0.0252	1.84	1.16, 2.93
Model Fit^	C-statistic: 0.845				

* Reference category
^ The c-statistic was derived by running the model using logistic regression
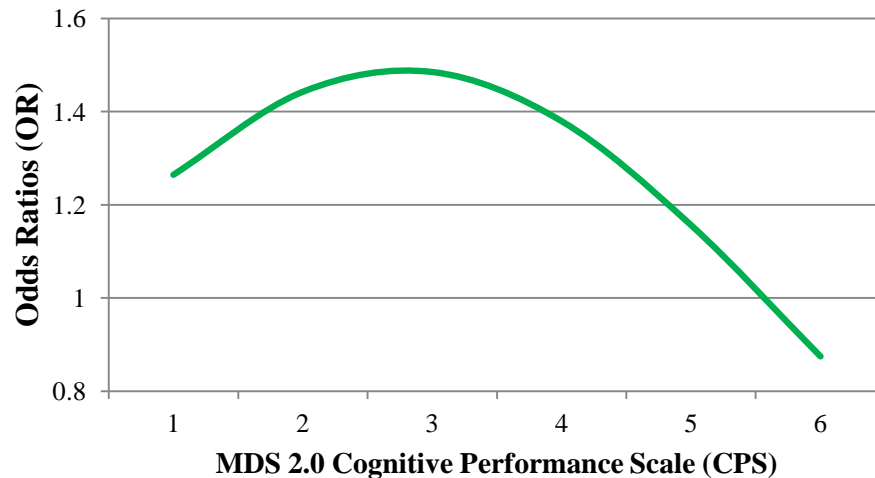
Figure 8. Adjusting for baseline Depression Rating Scale (DRS) at time 1 (admission) - Odds ratios for the CPS in predicting depressive symptoms at time 2 (second assessment) among French residents

Table 23 presents the results for the final model for the Other speaking residents. Out of the 30 variables initially included in the model, 5 variables in addition to the DRS score at baseline was found to be statistically significant in predicting depressive symptoms at time 2. These variables were age, depression diagnosis, cognitive impairment, aggressive behaviour and pain. Holding all other variables constant, higher ABS and Pain Scale scores were found to be the most strongly associated with depressive symptoms for the Other residents. Residents with an ABS score of 5 and greater were 1.87 times more likely to have depressive symptoms and residents with scores of 3 and greater were 1.80 times more likely to have depressive symptoms. Similar to the English and French model, the model was adjusted for the curvilinear CPS relationship. Figure 9 presents the odds ratios for the CPS in predicting depressive symptoms. From CPS scores of 1 to 2, the odds of having depressive symptoms increased. CPS scores of 2 and greater resulted in a lower odds ratio. The c-statistic for the final model was 0.851 which indicates a strong model fit. The Other language residents also had the highest c-statistic value compared to the English and French language residents.

Table 23. Results of multivariate logistic regression using generalized estimating equations examining resident characteristics at time 1 (admission) as predictors of depressive symptoms (DRS score of 3+) at time 2 (second assessment) among Other speaking residents

Other					
Variables	**Parameter Estimates**	**Standard Error**	**_p_-value**	**Odds Ratio**	**Odds Ratio (95% CI)**
Depression Rating Scale (DRS) (0-14) at Time 1 (Admission)	0.6103	0.02060	<.0001	1.84	1.78, 1.92
Age					
75-84 vs. 65-74	-0.2582	0.0855	0.0025	1.26	1.09, 1.45
85-94 vs. 65-74	-0.2288	0.0842	0.0066	1.24	1.08, 1.43
95 and older vs. 65-74	-0.3152	0.1067	0.0031	1.36	1.14, 1.63
Sex					
Male vs. Female*					
Marital Status					
Married vs. Never married					
Widowed vs. Never married					
Separated vs. Never married					
Divorced vs. Never married					
Unknown vs. Never married					
Education					
Finished high school / technical school or more vs. Less than high school					
Unknown vs. Less than high school					
Sleep Disturbances					
Unpleasant mood in morning					
Insomnia or change in usual pattern					
Loss of Interest					
Withdrawal from activities of interest					
Reduced social interaction					
Dementia					
Alzheimer's and/or Dementia					
Psychiatric / Mood Disease(s)					
Anxiety					
Depression	0.1158	0.04287	0.0148	1.12	1.03, 1.22
Bipolar disorder					
Schizophrenia					
Mental health history					
History vs. No history*					
Hearing					
Impaired vs. Adequate*					
Vision					
Impaired vs. Adequate*					

Activities of Daily Living (ADL) Long Form Scale					
5-9 vs. 0-4					
10-14 vs. 0-4					
15-19 vs. 0-4					
20-24 vs. 0-4					
25-28 vs. 0-4					
Index of Social Engagement (ISE) Scale					
3-6 vs. 0-2*					
Cognitive Performance Scale (CPS)	0.08145	0.03544	0.0072	1.08	1.01, 1.16
CPS – Quadratic Term	-0.02299	0.005314	0.98		
Making Self Understood					
1 vs. 0					
2 vs. 0					
3 vs. 0					
Ability to Understand Others					
1 vs. 0					
2 vs. 0					
3 vs. 0					
Aggressive Behaviour Scale (ABS)					
1-4 vs. 0	0.3142	0.04359	<.0001	1.37	1.26, 1.49
5 and greater vs. 0	0.6238	0.06297	<.0001	1.87	1.65, 2.11
Number of Comorbid Conditions					
1-2 vs. No diagnosis					
3-4 vs. No diagnosis					
5 and more vs. No diagnosis					
Endocrine / Metabolic Nutritional Disease(s)					
Heart / Circulation Disease(s)					
Musculoskeletal Disease(s)					
Pulmonary Disease(s)					
Sensory Disease(s)					

Changes in Health, End-Stage Disease, Signs and Symptoms (CHESS) Scale					
1 vs. 0					
2 vs. 0					
3 vs. 0					
4 vs. 0					
5 vs. 0					
Pain Scale					
1 vs. 0	0.1593	0.04150	<.0001	1.17	1.08, 1.27
2 vs. 0	0.3224	0.05701	<.0001	1.38	1.23, 1.54
3 vs. 0	0.5898	0.1373	<.0001	1.80	1.38, 2.36
Model Fit^	c-Statistic: 0.851				

* Reference category

^ The c-statistic was derived by running the model using logistic regression
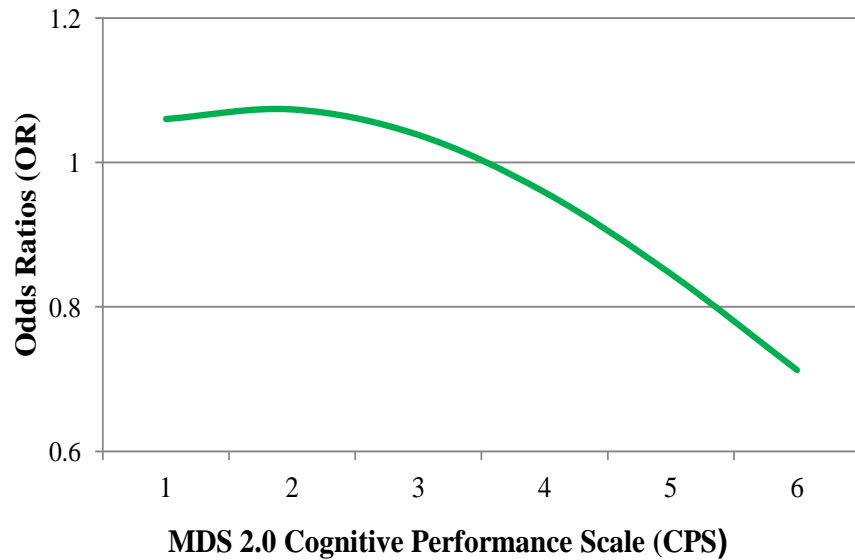
Figure 9. Adjusting for baseline Depression Rating Scale (DRS) at time 1 (admission) - Odds ratios for CPS in predicting depressive symptoms at time 2 (second assessment) among Other residents

4.4. Quality Care Related to Depression

This section examines quality indicator (QI) scores for each language group as well as the sample as a whole. The assessment at time 1 (admission) and time 2 (second assessment) were used to calculate these QI scores. The following QIs tracked the change in depressive symptoms over time, specifically between the time 1 and time 2 assessments.

Table 24 displays the QIs for each language group as well as the entire sample. The French residents had the highest percent of residents who improved in mood and depressive symptoms. The English and Other language groups had similar improvement rates. However, the French speaking residents had wider confidence intervals compared to the rest of the samples and therefore could possibly have a greater or lower improvement rate. The smallest percent of residents who declined in mood symptoms were the Other speaking residents. The highest rate of improvement was held by the French speaking residents.

Table 24. Comparison of adjusted depression quality indicators between language groups

	English	French	Other	ALL
Quality Indicator				
Percent of residents who improve their mood or remain free from symptoms of depression (%)	46.8	51.8	48.7	47.2
95% Confidence Intervals	45.8, 47.7	47.5, 56.1	46.9, 50.5	46.3, 48.2
Percent of residents who decline in mood from symptoms of depression (%)	32.9	30.1	28.7	32.1
95% Confidence Intervals	31.3, 33.0	26.8, 33.4	27.2, 30.1	31.3, 33.0

Table 25 displays the QIs according to 'low' and 'high' facility concentrations of 'other' language speaking residents. For all three samples, there was a higher improvement rate in the 'high' concentration facilities. For example, for the Other language group, the percent for improvement was 55.2 percent in the 'high' concentration facility compared to 47.0 percent in the 'low' concentration facility. All three language groups had a higher rate of decline in the

'low' concentration facility. For example, in the English speaking group, the decline rate was 33.6 percent in the 'low' concentration facilities compared to only 25.5 percent in the 'high' concentration facility. For the French residents, there was a larger range between the 'low' and 'high' concentration facilities for both QIs. For example, the results for the French group indicate that residents living in 'high' concentration facilities had a 19% greater improvement rate in depressive symptoms compared to the 'low' concentration facilities. The English and Other residents had a 6 and 8 percent greater improvement rate in the 'high' concentration facilities compared to the 'low' concentration facilities.

Table 25. Quality indicators based on 'low' and 'high' concentration facilities

	English		French		Other	
Quality Indicator	**Low×**	**High°**	**Low×**	**High°**	**Low×**	**High°**
Percent of residents who improve their mood or remain free from symptoms of depression (%)	46.3	52.5	51.8	70.9	47.0	55.2
95 % Confidence Intervals	45.3, 47.3	48.6, 56.5	47.4, 56.1	54.7, 87.2	45.0, 49.1	51.5, 59.0
Percent of residents who decline in mood from symptoms of depression (%)	33.6	25.5	30.1	16.9	30.9	22.2
95 % Confidence Intervals	32.7, 34.4	22.5, 28.4	26.8, 33.4	2.8, 31.0	29.3, 32.5	19.5, 24.9

× less than 32 percent of residents speak 'other'
° greater than 32 percent of residents speak 'other'

5. DISCUSSION

The purpose of this study was to examine the relationship between nursing home residents' primary language and depressive symptoms and diagnosis as well as predictors of depressive symptoms for each language group. Few studies have compared resident characteristics based on their spoken primary language. First, the descriptive results for the English, French and Other language group are discussed. Second, the prevalence of depressive symptoms and depression diagnosis are discussed and compared between the three samples.

Third, the variables used to predict depressive symptoms at time 2 are discussed. Fourth, results from the depression QIs used to examine quality of care related to depressive symptoms are discussed and compared between the three groups. Fifth, the limitations of this study are presented. Finally, recommendations for future research on this topic and implications this study may have on policy and practice are discussed.

5.1. Descriptive Statistics

The descriptive statistic results indicate many similarities and differences between the English, French and Other language groups that may provide a better understanding of the association between depression and language fluency. Variation was found in functional features such as the ADL Long-Form Scale where the Other residents had the greatest proportion of those 'most dependent'. These results are similar to other studies examining ADL limitations in immigrant groups (Fuller-Thomson & Chi, 2012; Fuller-Thomson, Brennenstuhl, & Hurd, 2011). Providing care to aging parents is often a task left to adult children. Feelings of responsibility and duties to provide care within the family is a strong cultural norm within immigrant families (Shanley et al., 2012). Immigrant older adults also prefer to live independently or with family members when they are no longer able to care for themselves (Sereny, 2011). This may explain why the Other language residents had greater limitations in ADL. With the stigma associated with LTCFs and their lower odds of using long-term care services, particularly among older adults who do not speak English (Fuller-Thomson & Chi, 2012), immigrant older adults may only enter LTCFs as a last resort. Therefore, they may be in state where they cannot care for by themselves or be cared for family members. Other residents who are admitted into care may be more impaired in ADL and more dependent on services.

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Higher ADL Scale results may also be explained by the higher CPS Scale scores in the Other speaking residents. Studies have found associations between cognitive impairment and ADL functions in older adults residing in LTCFs (Carpenter, Hastie, Morris, Fries, & Ankri, 2006; Bürge, von Gunten, & Berchtold, 2013). In nursing home residents, cognitive impairment was found to negatively impact functions related to eating and personal hygiene (Carpenter et al., 2006).

The focus of this study was to examine the ways in which language barriers and depressive symptoms were related to one another in LTCFs, specifically how depressive symptoms were experienced by the Other speaking residents. However, the French sample produced interesting results that may add to the current knowledge on language barriers and mental illness. The French speaking residents could have been experiencing language barriers as well if they did not know or understand English and were residing in a mainstream nursing facility. These group of residents may not have been Canadian nationalists, but from countries where French is their mother-tongue. Similarly to the Other speaking residents, it is possible that their experiences and characteristics could partly be explained by language barriers. For example, the French residents had the greatest proportion of residents using antipsychotics, antianxiety, antidepressants, and hypnotics. When these residents experience language barriers, pharmacotherapy may be the only viable option when compared to psychotherapy.

The French group had the greatest proportion of those with a psychiatric/mood disorder where anxiety and depression was the most prevalent. These results are similar to previous studies on French speaking residents living in Quebec where there was a high rate of mental illness particularly with depression and anxiety (Préville et al., 2008; McCusker et al., 2014). In addition to having a greater proportion of residents having a psychiatric disorder, the French

language group also had the greatest number of comorbid conditions. Potvin et al. (2012) found that when French speaking older adults in Quebec were diagnosed with a psychiatric disorder, they also had greater odds of having two or more other psychiatric mood disorders. Even though the results of this study and previous studies differ in the provinces they were conducted in, it may indicate that Canadian French residents may be at risk for psychiatric mood disorders and adverse events may go untreated if language barriers are present. This is additional knowledge and brings awareness to nursing homes in identifying symptoms experienced by all residents.

Compared to the English and Other speaking residents, the French residents also had a greater proportion of those with a mental health history and the smallest proportion of those receiving psychological therapy at admission. These results may explain why the French residents, on average, were taking the most number of medications. The number of medications and category of drugs this group was taking may reflect the type of treatment French older adults received in the community for mental health issues. Studies have found a high prevalence of medications used in treating mental disorders in older adults living in Quebec (Préville et al., 2011). In Ontario, French speaking residents from Quebec, who moved to Ontario may continue their previous treatment process.

Results from this study report a greater proportion of residents using antidepressants compared to the Préville et al. (2011) study. However, Préville et al. (2011) study was conducted with French older adults living in the community as opposed to a LTCF where residents are often found to experience a higher rate of mental illness. Results from this study compared to previous research completed on French older adults living in Quebec need to be interpreted with caution because most of the previous studies took place within the province of Quebec where 80 percent

of the population speaks French (Statistics Canada, 2014b). Therefore, access to French speaking resources and services will be much more accessible in Quebec as opposed to Ontario.

This study also found variance in cognitive function among the English, French and Other residents. The results for the CPS scores indicate that the Other residents were more cognitively impaired than the English and French residents. These findings are similar to previous studies comparing cognitive decline in immigrant and non-immigrant older adults (Krueger, Bhaloo, & Rosenau, 2009; Wilbur et al., 2012). However, it differed from previous studies where cognitive impairment was not as prevalent in immigrants compared to non-immigrants, possibly due to the 'healthy immigrant effect' (Hill, Angel, Balistreri, & Herrera, 2012), where new immigrants have been found to be in good physical and mental health compared to non-immigrants. The results of this study indicate that the Other speaking residents may have poorer cognitive function compared to the English and French speaking residents. In addition to the greater proportion of residents with higher CPS scores, the Other language group also had a greater proportion of those who were rarely 'made self understood' and rarely able to 'understand others'. The 'making self understood' variable is one of the items used in calculating the CPS which may explain the higher CPS scores.

Cognitive impairment is often associated with Alzheimer's disease and dementia (Jotheeswaran, Williams, & Prince, 2010; Gaugler, Yu, Krichbaum, & Wyman, 2009; Magaziner et al., 2000). It was interesting to find that even though the proportion of Other speaking residents with Alzheimer's disease and/or dementia was smaller compared to the English and French residents, CPS scores were higher in the Other language group. Dementia and/or Alzheimer's disease is often associated with cognitive decline and when examining the diagnosis of this illness within the Other group, it is unclear whether the Other language group was in

reality more cognitively impaired or whether a language barrier was misrepresented as having poor cognition. The variables associated with calculating the CPS includes items such as the 'making self understood' variable and 'procedural memory' which relies heavily on the ability to communicate and express one's thoughts. When one's primary language differs, demonstrating strong 'procedural memory' or the capacity to 'make self understood' will not be as apparent to staff. Furthermore, when examining the 'making self understood' variable by the 'low' and 'high' concentration facilities, Other speaking residents had the smallest proportion of residents who were 'rarely understood' in comparison to the 'low' concentration facility and the English and French speaking residents. This is additional evidence suggesting cognitive impairment may be less prevalent compared to the English and French speaking residents.

The prevalence of Alzheimer's and/or dementia in this study has been consistent with other research completed in LTCFs where more than half of residents have been found with this diagnosis (CIHI, 2010a). As expected, the results for this diagnosis was also found to be greater than those found among home care clients where 21.5% of clients were found to have a diagnosis of Alzheimer's and/or dementia (Maxwell et al., 2013). Reynolds, Hanson, DeVellis, Henderson and Steinhauser (2008) and Proctor and Hirdes (2001) found residents who were in less pain were also more likely to be cognitively impaired. This study found the Other speaking residents were reported to have less pain possibly due to greater cognitive impairment which may make it more difficult to detect pain as the resident cannot express their discomfort. At the same time, we can argue that not being able to speak English is a barrier to assessing pain in residents which may be reflected by the lower Pain Scale scores in the Other residents.

When examining the Other residents living in 'low' and 'high' concentration facilities, the 'making self understood' and 'ability to understand others' variables tell a different story

from the original descriptive analysis. The Other residents' ability to communicate with others was rated higher (better able to communicate) in the 'high' concentration facilities compared to the 'low' concentration facilities. This is similar to Runci et al. (2005) study where Italian residents who spoke no English or very limited English engaged in less communication in mainstream LTCFs compared to residents in ethno-specific LTCFs. The residents within this study also had severe dementia and were cognitively impaired. Another study by Runci, Eppingstall, & O'Connor (2012) also found similar results where Greek and Italian residents with dementia also had greater communication in ethno-specific nursing facilities despite speaking limited English.

It may be possible that the 'making self understood' variable which is used to calculate the CPS, regardless of one's language proficiency, is not being accurately assessed as a measure of cognition. Instead, the Other speaking residents were misrepresented as being more cognitively impaired because they were unable to communicate with staff in these 'low' concentration facilities. Poor cognition is often associated with less treatment given in managing pain (Reynolds et al., 2008), greater restraint use in managing aggressive behaviour (Burton, German, Rovner, & Brant, 1992; Engberg, Castle, & McCaffrey, 2008), and greater use of feeding tubes (Teno et al., 2010) in LTCFs. It may be that one's ability to communicate is impaired, regardless of cognitive status and their needs may not be adequately recognized nor addressed.

5.2. Prevalence of Diagnosis and/or Symptoms of Depression

Results for this study suggest differences in the prevalence of symptoms and diagnosis among the English, French and Other language group. This study has also found differences in its results compared to other research that been completed on depression in older adults. Using

interRAI data, the results of this study found depressive symptoms to be greater for all language groups at time 1 and time 2 compared to previous studies that have examined depressive symptoms in palliative patients (Fisher et al., 2014) and home care clients (Dalby et al., 2008). Examining the demographic variables for this sample, residents were much older compared to subjects used in previous studies. As age increases, so does the likelihood of experiencing multiple chronic health conditions that may also be associated with depression (Fiest, Currie, Williams, & Wang, 2011). This study also consisted of more females than males where females are found to experience depression more frequently than males (Schoevers, Beekman, Deeg, Jonker, & Tilburg, 2003). However, this is contrary to Djukanović, Sorjonen, and Peterson's (2014) study where more male residents were found to report depressive symptoms compared to females. The residents of this study were also taking more medications than clients receiving care in the community (Gamble, Hall, Marrie, Sadowski, Majumdar, & Eurich, 2014; Dalby et al., 2008). Older adults taking multiple medications have been found to be more likely to have with depressive symptoms (Onder et al., 2012).

Results of this study found depressive symptoms to be greater in the English, French and Other language speaking residents compared to previous studies in LTCFs and CCC hospital/units (Jones et al., 2003; Szczerbińska et al., 2011). This may be due to various factors including a larger sample size in this study as well as greater ADL Long-Form Scale scores which was on average 14 or greater. Poor ADL functioning has been found to be associated with depressive symptoms among older adults (Szczerbińska et al., 2011). The CHESS and CPS scores were also much greater in this study compared to previous research in LTCFs (Lee, Chau, Hui, Chan, & Woo, 2009). Similar to other studies (Gruber-Baldini et al., 2005; Thakur &

Blazer, 2008), the results of this study indicate that greater cognitive impairment, functional

limitations and medical illness are associated with depression in LTCFs.

This study also found an increase in depressive symptoms from time 1 to time 2 which

was similar to results in previous research (Neufeld et al., 2014; Akincigil et al., 2011). There are

various factors that can explain this increase including better observation and detection of

depressive symptoms over time by staff as well as improved therapeutic rapport with residents.

However, similar to other research, this study found that factors that may be related to declining

health, such as pain, are related to depressive symptoms in residents (Hjaltadottir, Ekwall,

Nyberg, & Hallberg, 2012).

Studies examining culture and immigrant older adults have been varied in findings

related to patterns of depressive symptoms. Research has found immigrant older adults as well

those who speak limited English are vulnerable to depression (Mui & Kang, 2006; Pumariega,

Rothe, & Pumariega, 2005). Previous research has also found when there is a presence of a

language barrier, immigrants are less likely to receive a diagnosis or treatment. For example, a

study found when older Mexican men did not speak English, they were less likely to receive a

diagnosis of depression compared to older Mexican men who could speak both English and

Spanish (Hinton, et al., 2012). On the other hand, Diwan's (2008) study found no difference in

depressive symptoms when comparing English speaking and non-English speaking older adults

living in the United States. Compared to Hinton et al. (2012) and Diwan (2008) who examined

specific ethnic groups, this study which had a larger sample size, found depressive symptoms to

be less prevalent in the Other language group at time 1 and time 2.

In addition to language barriers, other cultural factors can hinder depression recognition

in LTCFs which may explain why the Other language residents had a lower prevalence of

depressive symptoms compared to the English and French speaking residents. Within many cultures, there is a stigma associated with mental illness (Jang et al., 2007). The stigma associated with depression may prevent residents from asking for help for their symptoms. There is a greater likelihood of receiving treatment when older adults have less stigma towards mental illness and see it as a biological cause (Raue, Weinberger, Sirey, Meyers, & Bruce, 2011; Evans-Lacko, Brohan, Mojtabai, & Thornicroft, 2012). It is possible that a similar proportion of the Other residents had depressive symptoms compared with the English and French speaking residents; these symptoms may have gone unrecognized by staff, particularly in cases where the Other residents did not ask for help or show familiar forms of distress. On the other hand, the lower prevalence of depressive symptoms within the Other language group may have nothing to do with poor recognition or poor detection of symptoms. Cultural factors can play a role in protecting against depression and the proportion of Other language group with depressive symptoms may be lower than the English and French residents. For example, stronger ties to religion (Mui & Lee, 2014), and a sense of belonging to one's community (Kim et al., 2012) are often associated with immigrant culture. These factors can all play a role minimizing depressive symptoms in the Other language residents.

Similar to previous studies, one was more likely to receive antidepressants if they had a depression diagnosis as opposed to having depressive symptoms (CIHI, 2010; Shah, Schoenbachler, Streim, & Meeks, 2014; Akincigil et al., 2011). DRS scores of 3 or greater are used to identify residents who may be at risk for depression and may need further assessment (Burrows et al., 2000). It may be possible that after further evaluation of the resident, symptoms were found to be severe enough so they were diagnosed as having depression and given antidepressants in order to reduce symptoms. Also, it may be possible their symptoms were not

severe enough to be taking antidepressants or other treatment options were explored. This may explain why depression treatment is more strongly based on an MDS 2.0 diagnosis as opposed to having symptoms alone.

Similar to previous studies, this study found that antidepressant use was more commonly used among residents with depressive symptoms as opposed to psychological therapy (Unützer et al., 2003). As indicated by the low prevalence of those receiving therapy for the English, French and Other speaking residents, psychological services may not be as available or accessible compared to antidepressants in LTCFs. Hirdes, Mitchell, Maxwell and White (2011) found even though there was a high level of depression, cognitive impairment and behavioural issues in Canadian LTCFs and Ontario CCC hospital/units, mental health services or behavioural therapy was limited or unavailable to residents and patients. When examining specific characteristics associated with the Other speaking residents, staff may feel language barriers impede the ability to administer therapy to this group. If there is no specialist on site that speaks the same language as immigrant residents, then antidepressant use may be the only viable treatment option. In addition, immigrant residents may be less reluctant to receive therapy due to the stigma associated with mental illness and cultural norms of dealing with matters privately or within the family. Depending on the severity of symptoms, therapy alone or when combined with antidepressant use has been found to be effective in minimizing depressive symptoms (Alexopoulous, 2005; Reynolds III et al., 2006; Pinquart et al., 2006).

In this study, fewer Other language residents with symptoms and no symptoms were treated with antidepressants at both time 1 and time 2 than residents speaking English or French. This may be due to various factors. The Other language group had a greater proportion of residents who were 85 years or older. Changes in drug metabolism and increased drug blood

concentrations have been associated with older age (Hilmer, McLachlan, & Le Couteur, 2007).

Use of certain medications or polypharmacy in older adults can result in drug-drug interactions

or adverse events such as cognitive impairment (Jyrkkä, Enlund, Lavikainen, Sulkava, &

Hartikainen, 2011), falls (Damián, Pastor-Barriuso, Valderrama-Gama, & de Pedro-Cuesta,

2013), or a decreased ability to perform activities of daily living (Crentsil, Ricks, Xue, & Fried,

2010). Declines in physical function due to drug use could be a concern particularly among the

Other residents where they had a greater mean ADL Long-Form Scale score compared to the

English and French speaking residents. The Other speaking residents had on average a similar

number of comorbid conditions to the other groups. However, the Other residents had a greater

proportion of those with heart/circulation diseases which may be given priority treatment over

depression. Studies have found cardiovascular medications to be commonly associated with

adverse drug reactions in older adults (Gurwitz et al., 2003; Marcum et al., 2012). With the

possibility of drug-drug interactions in mind, the use of cardiac drugs to treat heart disease may

be chosen over the use of antidepressants in treating depressive symptoms.

Antidepressant use was also examined based on 'low' and 'high' concentration facilities.

This study found antidepressant use was less prevalent in the 'high' concentration facilities for

English, French and Other speaking residents with and without symptoms. The 'high'

concentration facilities may have more resources and treatment options that are used over

antidepressants. For example, these homes may have the ability to encourage more physical

activity or encourage residents to practice their religious/spiritual beliefs which has been found

to improve or protect against depression (Salguero, Martínez-García, Molinero, & Márquez,

2011; Miller, Wickramaratne, Gameroff, Sage, Tenke, & Weissman, 2014). Within these

facilities, residents may share the same cultural background. It may be possible that greater

participation in culturally specific social activities in these LTCFs may be emphasized and focused on instead of the use of pharmacotherapy. These activities may provide more positive social relationships that can possibly meet the mental health needs of this group of residents. In addition, rates of depression were also found to be lower in the 'high' concentration homes. Therefore, there may be less need for the use of antidepressants.

A lower proportion of the Other language residents in the 'high' concentration facilities used antidepressants compared to English or French residents. The results for the Other speaking residents was similar to previous studies on ethno-specific and mainstream facilities. In ethno-specific facilities, residents who had severe dementia and were LEP were found to be using less antipsychotics and benzodiazepines (Runci et al., 2005; Runci et al., 2012). This study also found the prevalence of depressive symptoms to be higher in the 'low' concentration homes which differed from Goh et al. (2010) study which found no differences in the prevalence depressive symptoms between mainstream and ethno-specific nursing facilities. Contrary to this study, Goh et al. (2010) also found antidepressants to be used less in mainstream nursing homes as opposed to the Chinese ethno-specific nursing facility. In the 'high' concentration facilities, the ability to communicate in one's primary language may have allowed for ease of communication and interaction between residents and nurses and less disruptive behaviours that may have been caused by miscommunication or lack of understanding. Therefore, the reliance on antidepressants to treat depressive symptoms in LTCFs may be reduced and other forms of treatment may be utilized when one's primary language is compatible with others in the home.

5.3. Factors Associated with Depressive Symptoms

The multivariate analyses identified several factors that were significant in predicting depressive symptoms in the English, French and Other speaking residents after controlling for

baseline DRS scores to reduce its effect on other variables at admission. Results from the descriptive statistics indicated many differences between the three groups. The reason three separate models were created according to primary language was to understand which of these characteristics was most significantly associated with symptoms. If one model was created for the entire sample, unique differences or similarities between language groups that are predictive of symptoms at follow up would not be appropriately identified.

Interestingly, the stratified models based on primary language resulted in similar findings. The common variables related to depression at follow-up in each of the models were the CPS, ABS, and the Pain Scale. Many studies have examined the relationship between these factors and depression. For example, cognitive decline due to dementia has been found to be a risk factor for depression (Huang et al., 2010; Szanto et al., 2012). Studies have also found a reverse relationship as well where depression was found to be a risk factor for cognitive impairment when it influenced abilities such as memory and reasoning (Ng, Niti, Zaw, & Kua, 2009; Yen, Rebok, Gallo, Jones, & Tennstedt, 2011; Raji, Reyes-Oritz, Kuo, Markides, & Ottenbacher, 2007). In addition, depressive symptoms have been found to be predictive of Alzheimer's and dementia (Wilson et al., 2002). Older women who did not have depressive symptoms but had a history of depression were also found to be at a higher risk of developing dementia (Goveas, Espeland, Woods, Wassertheil-Smoller, & Kotchen, 2011). Even though cognitive impairment is often associated with illnesses such as dementia and Alzheimer's disease, these illnesses were not found to be significant in predicting depressive symptoms in these models. It may be the case that these illnesses had a collinear relationship with the CPS scale. Therefore, they were found to be non-significant in predicting depressive symptoms compared to the CPS. A curvilinear relationship was found between the CPS and DRS scores as

well as CHESS and DRS scores. This relationship indicates that there was a positive relationship then negative relationship between the variables as the severity in the scales increased. These findings indicate that as residents decline in health either through cognitive impairment or experience more complex health issues, depressive symptoms were not as prevalent and/or more difficult to detect. These results are similar to other studies, such as Hoover et al. (2010) who found residents who were severely cognitive impaired were less likely to be identified with depression. The English, French and Other language speaking residents in this study may have had depressive symptoms that were overshadowed by observations of cognitive impairment and health decline resulting in a lower odds ratio towards the more extreme end of the scale.

The ABS was also a predictor of depressive symptoms for all three language groups. With the exception of the French residents, as there was an increase in aggressive behaviour, the likelihood of depressive symptoms also increased. Depression and aggression or agitation often occur together among LTCF residents, particularly those with poor ADL functioning and cognitive impairment (Menon et al., 2001; Voyer, Verreault, Azizah, Desrosiers, Champoux, & Beddard, 2005). Residents in Canada who were diagnosed with depression were more likely to have higher ABS scores (Perlman & Hirdes, 2003). Aggression displayed by residents may be a sign that some of their health needs are not being appropriately treated such as treatment for pain (Rosemann, Backenstrass, Joest, Rosemann, Szecsenyi, & Laux, 2007).

The DRS and the ABS are related in various ways. One of the symptoms assessed on the DRS is 'persistent anger and irritability with self or others' which can be in the form of aggressive behaviour. A study found positive social interactions and care characterized by factors such as speaking to residents in a relaxed and calm voice and calling residents by their first name was associated with lower behavioural symptoms due to depression in Korean

residents living in long-term care settings in the United States (Kim, 2012). Aggression and depression are found to be associated with one another which is why residents exhibiting aggressive behaviours should be assessed for mental illnesses such as anxiety or depression (Koopmans, Zuidema, Leontjevas, & Gerritsen, 2010).

This study also found the Other language group had ABS and Pain Scale scores that were more strongly associated with depressive symptoms compared to the English speaking residents. Whether this is strictly due to language barriers experienced by residents is in question. Talerico, Evans, and Strumpf (2002) found LTCF residents with dementia who were unable to communicate had higher levels of depression as well as physical and verbal aggression. The Other residents' inability to communicate their needs to staff and frustrations due to language barriers may be misrepresented as, or resulted in aggressive behaviour.

Studies have found associations between pain and depression (Gruber-Baldini et al., 2005; Smalbrugge, Jongenelis, Pot, Beekman, & Eefsting, 2005; Rosemann et al., 2007). There is the question of why Pain Scale scores were more significant for the Other residents compared to the English residents. If language barriers were present, it may be that the Other residents who were in severe pain demonstrated their symptoms through aggressive behaviour. The Pain Scale requires complaints of pain from residents and the frequency of the pain is also documented (Fries et al., 2001). Ferrell, Ferrell, and Rivera (1995) completed a pain study on nursing home residents, excluding those who could not speak English. Even when residents were found to have severe cognitive impairment, pain was expressed through complaints. Staff may be observing pain in residents through other forms such as facial expressions and mood (Zwakhalen, Koopmans, Geels, Berger, & Hamers, 2009). When pain is recognized in the Other speaking

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residents, it was more strongly associated with depressive symptoms compared to the English speaking residents.

5.4.   Quality of Care Related to Depression

The QIs examined were 'percent of residents who improve their mood or remain free from symptoms of depression' and 'percent of residents who decline in mood from symptoms of depression'. Findings from this study indicate that the French and Other speaking residents had greater improvement rates and lower decline rates compared to the average sample. However, these results need to be interpreted with caution because the differences were insignificant as indicated by overlapping confidence intervals. When examining the English speaking residents, this group had lower rates of improvement and higher rates of decline compared to the remaining sample. There were various factors that may have contributed to these results. With the exception of the French speaking residents, the English speaking residents had a greater number of comorbid conditions. Studies have found that more medical conditions have been associated with depression in the older adult group (Richardson et al., 2012). The types of conditions the English residents had may have also influenced their depressive rates. For example, with the exception of the French residents, the English residents had a greater proportion of those with diseases that have been associated with depression in previous studies such as musculoskeletal (Gerrits, van Oppen, van Marwikj, van der Horst, & Penninx, 2013), pulmonary disease (Hanania et al., 2011) and sensory disease (Capella-McDonnall, 2005; McDonnall, 2009). Despite these differences, this was accounted for by adjusting for residents' CMI values which took into account the medical complexity of individuals.

When comparing the English speaking residents to the Other speaking residents, communication patterns and capabilities may allow for better identification of depressive

symptoms which may partly explain the lower improvement and higher decline rates in the English language group. The English speaking residents may demonstrate symptoms that were more easily observable by staff in LTCFs as opposed to the Other language group where results may have been under reported. Hinton et al. (2012) found older adults who did not speak English were less likely to be diagnosed with depression compared to those who spoke English. The English speaking residents had a greater proportion of residents who were able to 'make self understood' and 'ability to understand others'. Therefore, they may have been able to easily express signs of distress. The DRS also includes items that require verbalization of depressive symptoms. For example, residents making negative statements and repetitive health complaints. If the Other language group experienced a language barrier with staff, not all the items on the DRS would have been apparent.

When the QI results were stratified by 'low' and 'high' concentration facilities, all three groups had higher rates of improvement and lower rates of decline in the 'high' concentration facilities. The strengths of the 'high' concentration facilities was most evident in the Other language group. The 'high' concentration facilities may have qualities that protect residents from depressive symptoms or are more responsive to the needs of non-English speaking residents. Studies have found that those from minority groups prefer community care over nursing home care (Min, 2005; Shin, 2008). Transitioning to a LTCF may be a traumatic experience for immigrant residents and one may assume they may decline in mental health status. However, being surrounded by those who share the same struggles and experiences may create a sense of support and community within these homes. Sharing the same language as other residents has been found to be an important predictor of quality of life in LTCFs (Park, Carrion, Young, Salmon, & Roff, 2013; Runci et al., 2012). Living in a nursing home where residents share not

only the same language, but the same cultural beliefs and values can create a more supportive nursing home environment. In addition, to cater to a specific immigrant group, these facilities often hire staff who share the same cultural background as residents. When residents were able to communicate with staff, there was a decrease social isolation in facilities which can also reduce depressive symptoms (Park et al., 2013; Street, Burge, Quadagno, & Barrett, 2007). Residents may also have more of their health needs met because there are no language barriers impeding their ability to communicate their needs.

In this study, it is not known for sure whether within the 'high' concentration facilities, the Other speaking residents were all from one cultural background or spoke the same language. However, immigrant residents living in these facilities can still share a common history that can allow for stronger bonds to be formed between residents of different cultures and spoken language. At the same time, it is possible that the Other residents in the 'high' concentration facilities did share the same language based on the results for the 'making self understood' variable and 'ability to understand others' variable where Other residents in these facilities were frequently understood by others. More data on the specific languages these residents spoke is needed to be able to identify ethno-specific homes.

The QI results for the 'high' concentration facilities should be interpreted with caution. These findings imply that compared to the 'low' concentration facilities, the 'high' concentration facilities may provide better quality depression care. However, it is possible that the 'high' concentration facilities may have more resources within their homes to be able to provide quality depression care and/or prevention. The quality of care may have nothing to do with the characteristics or profile of this sample, but the facilities capacity to cater to such residents. When examining racial disparities in American nursing homes, Smith, Feng, Fennel, Zinn and

Mor (2007) found black residents tended to reside in facilities where there was limited resources to appropriately deliver good quality care to residents. This study found that black residents were more likely to receive poor quality care not because of their race or cultural background, but due to the types of facilities they resided in. The findings from this study can also be applicable to the 'low' concentration facilities. The lower rates of improvement and greater rates of decline in depressive symptoms within the Other speaking residents in the 'low' concentration facilities may not have anything to do with the samples' culture or language proficiency. It may be due to the facilities capacity to provide care to this group.

The 'high' concentration facilities not only benefited the Other residents, but the English and French group also had better improvement and decline rates in these facilities. Even though these residents were documented as speaking English or French, it is possible that these residents were of immigrant status and possibly bilingual. These residents may not have experienced any sort of language barrier and may have benefited from the culturally specific resources provided by these homes similarly to the Other language speaking residents. Ethno-specific facilities were created to deliver health services to a specific cultural or minority group. English and French residents who differ culturally and linguistically to immigrant residents may also benefit from these homes as well. These types of facilities may instil a more inclusive resident population, not just for those of a specific culture but for all residents.

Due to the diverse resident population, there has been increasing research in the area of cultural competency in LTCFs (Parker & Geron, 2007; Taylor & Alfred, 2010; Tayab & Narushima, 2014). Cultural competency is a process nurses or health workers incorporate into their everyday practice to effectively work with patients or residents that differ culturally from their own in order to deliver the most effective and appropriate care (Campinha-Bacote, 1998).

This involves getting to know and understanding the culture and values of residents from ethnic and minority groups. Cultural competency is a model in which ethno-specific nursing facilities may use to cater to a specific group. Through cultural competent practices, staff may not just focus on learning about immigrant residents, but the background and culture of English and French speaking residents. This may create a sense of belonging within the home and enforce positive relations between with staff and residents, which has also been found to be associated with lower levels of depressive symptoms (McLaren, Turner, Gomez, McLachlan, & Gibbs, 2013; Snowdon & Fleming, 2008). Further research in this area will be needed to fully understand the relationship between ethno-specific facilities and depressive symptoms.

5.5.   Strengths and Limitations

There were several strengths related to this study. One of the strengths of this study was the use of secondary data collected using the MDS 2.0. The MDS 2.0 is a reliable and valid instrument that has been implemented across Canada, and internationally in countries such as Iceland, Japan and the Czech Republic (Hirdes et al., 2000). The comprehensiveness of the assessment allowed for comparisons in not just depression, but many other health components such as cognition, social engagement and activities of daily living. The measures embedded within the MDS 2.0 are based on sound principles of assessment design with reliable and valid items and scales. The collection of this data is also managed by CIHI who provide ongoing training and support to assessors as well as data quality checks.

The longitudinal use of the MDS 2.0 allowed for the examination of the prevalence of depressive symptoms at admission and patterns of change over time. Using QIs, this study was able to examine whether there was a decline or improvement in depressive symptoms after admission. In doing so, this study was able to compare how depressive symptoms may be

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experienced differently among the different language groups. Further research can also benefit from data on decline or improvement rates in LTCFs in order to monitor effects of treatment and identify areas of unmet needs. The QIs are also good measures when examining how a facility is doing in dealing with depressive symptoms among their residents.

A limitation of this study was that specific languages other than English or French could not be identified. Due to confidentiality, information on the primary language spoken by the Other residents could not be identified. Immigrants and cultural groups experience depression differently and may also have differing symptoms of depression. For example, Chinese older adults living in the United States had depressive symptoms that were reflected through feelings of helplessness and feelings of worthlessness (Dong et al., 2012). On the other hand, South Asian older adults living in Canada were more likely to express depression through feelings of pain (Conrad & Pacquiao, 2005). Without knowing the specific language spoken by the Other residents, this study assumed that depressive symptoms and causes of depression were the same for all residents in this group. In addition, this study could not define the 'high' concentration facilities as ethno-specific homes because there was little evidence these facilities catered to or provided resources that were for a specific language group.

A second limitation was that this study assumed that residents who were documented as speaking 'other' were limited in English proficiency. However, the Other speaking residents may know enough English to not experience any sort of barrier when communicating with staff. The 'other' language may have been documented because of the older adult's preference in speaking in their primary language. This part of the assessment does not in any way mean that these residents had no skill in the English language. Older adults who have resided in Canada for many

years may be able to speak some English and may not experience as much of a language barrier as older adults who have recently immigrated.

For the purposes of this study, the author assumed English and French speaking residents did not experience language barriers in the facilities in which they resided. Various studies have examined French residents in Canada and majority of these studies took place in French speaking nursing homes in Quebec (Préville et al., 2008; Gobert & D'hoore, 2005). The French and English speaking residents may have also experienced language barriers in the homes they resided in. For example, English residents could experience language barriers if they were residing in ethno-specific facilities.

Among 'high' concentration homes, it cannot be assumed that all 'other' language speaking residents were of the same cultural background or spoke the same language. Having a lack of available ethno-specific homes and a small immigrant population may mean facilities are comprised of individuals from diverse backgrounds. Based on results from this study, there is a possibility that these residents may have shared the same language in these homes. When compared to the English and French residents, the Other residents had the greater proportion of those rarely understood by others or were never able to understand others. However, when these variables were stratified according to facility concentration, the Other residents had a smaller proportion of those who were rarely or never understood by others in the 'high' concentration facilities compared to the 'low' concentration facilities. It is also safe to assume that attempts may be made by facilities to keep together residents who speak the same language. This not only reduces isolation among immigrant residents but is also a more efficient method of delivering care because language and culture resources can be directed at resident groups that need these

services. However, without more research and data, knowledge on whether these residents all spoke the same language will still be in question.

5.6. Future Research

There are various ways in which this study informs future research. To understand the experiences of depression within LTCF residents who do not speak English as their primary language, it will be important to examine the experiences of depression among specific immigrant groups in LTCFs. Most immigrant groups not only share the same primary language but also the same cultural background and heritage creating a social network within the home that is often seen to benefit the health of those living in the community. In these studies it would be important to measure length of stay in Canada among immigrants in LTCFs as this indicator is often used in calculating levels of acculturation. Understanding the length of time immigrants have resided in Canada also gives a better indication of their English level as well as adjustment level prior to immigration. Older adults who immigrated later in life have been found to be more likely to have poor self-rated health (Okafor, Carter-Pokras, Picot, & Zhan, 2013). Therefore, understanding health in LTCFs among immigrants would require knowledge of tenure in Canada.

This study created models using resident characteristics for each language group. However, it would be interesting to see how facility characteristics at admission and over time, predict depressive symptoms at time 2. This not only gives an indication of the quality of treatment practices in the homes but also an indication of the treatment experiences among language groups who reside in different types of facilities. Some examples of the types of facility characteristics to examine include rural and urban facilities, nurse to resident ratio, restraint use, and types of medications administered including antidepressant use.

Further research is needed examining the relationship between aggressive behaviour, cognition, and depression. The ABS and CPS were common predictors for the English, French and Other speaking residents. It would be of benefit to analyze what it is about the Other residents that predispose them to exhibit aggressive behaviour and experience cognitive impairment in this group. Could it be due to misunderstandings or frustrations between residents and staff due to differences in primary language? There may also be a benefit to examine the associations between one's primary language and cognitive status. The Other residents had a smaller proportion of residents diagnosed with Alzheimer's and/or dementia compared to the English and French residents. However, the results of this study indicate that the Other residents were more likely to be perceived as being cognitively impaired and were also less likely to be understood for most of the time by others. Whether language barriers are causing residents to be misrepresented as cognitive impairment is still in question and will need further research.

This study examined predictors of depressive symptoms at the next assessment following admission. Further longitudinal evaluation of trends in depressive symptoms are important for understanding whether symptoms continue to improve or decline as well as whether residents were appropriately administered effective treatment. This study also focused on resident characteristics at admission in predicting depressive symptoms at time 2. Examining resident characteristics at time 2 as well as examining any sort of change within these features can allow for researchers to predict depressive symptoms further along time as well as put practices in place to prevent symptoms from occurring.

5.7. Implications for Policy and Practice

Ethno-Specific Nursing Facilities

This study is meant to be a starting point in further research as well as bring awareness to the experiences of older adults with language barriers and depressive symptoms in LTCFs. The benefits of ethno-specific facilities are evident. The 'high' concentration facilities were found to have greater improvement and lower rates of decline in depressive symptoms among the Other speaking residents. The qualities of these homes may be beneficial in identifying opportunities for improvement among other homes. This will involve collaboration between facilities. Mainstream nursing homes can learn about language resources utilized in ethno-specific facilities as well as any other culturally competent practices utilized by these homes.

Out of 641 LTCFs in Ontario, this study identified 65 'high' concentration facilities where there was a greater prevalence of Other speaking residents. With the number of immigrants entering Canada each year, 65 culturally specific homes may not be enough to adequately sustain the older adults within this group. Currently, there are long-wait lists for these facilities indicating a high need (Cheng, 2005).

Creating more ethno-specific facilities may not be a viable option because of cost and resources. It may be beneficial to cluster residents who share a common primary language as indicated on the MDS 2.0. Facilities may also benefit from hiring staff who are bilingual and share a common language with residents. Even having one staff member in a mainstream nursing home who can translate can allow for greater interaction and collaboration with residents.

Acculturation Level

Immigrants who were less acculturated and more tied to their cultural values and practices were found to be more depressed (González et al., 2001). There are currently acculturation measurement tools used in the United States such as the Acculturation Rating Scale for Mexican Americans (ARSMA) II (Cuellar, Arnold, & Maldonado, 1995) and the

Bidimensional Acculturation Scale (BAS) for Hispanics (Marin & Gamba, 1996). These tools can also be utilized in LTCFs to either make decisions on whether older adults are in need of ethno-specific care or can also be used to identify residents who are more vulnerable to depressive symptoms.

Family Participation and Relations

The importance of family relations and support was consistent throughout the literature in detecting and treating depression in older immigrant adults (Yu, Li, Cuijpers, Wu, & Wu, 2012). Due to the stigma associated with mental illness, keeping mental health issues within the family is often a cultural norm (Jang et al., 2007). In addition, older adults often look to adult children to care for them when they are no longer able to care for themselves (Shin, 2008). In treating depression among immigrant older adults who do not speak English, involving family in the treatment process will be critical. Whether they are used as translators or informants on the mental health history of their loved ones, family members need to be part of the process. Compared to staff, family members may be better at recognizing changes in their aging parent, particularly declines in mood. Family members will be an important factor in detecting depressive symptoms and will be a valuable resource for LTCFs.

Transparency on QI Results

Health Quality Ontario (HQO) is an independent government agency that works towards improving the health of Ontarians (www.hqontario.ca). One of the key features of this group is their use of public reports of LTCFs. HQO makes publicly available QI results for falls, incontinence, pressure ulcers and the use of physical restraints. It would be of value to include depression indicators. By reporting and making available these QI results, Ontarians can have knowledge on the current state of LTCFs and care in mental health.

MDS 2.0 – Cognition Items and Need of Translator Item

It would be beneficial to nursing home staff for CIHI to provide more education on how to complete the MDS 2.0 assessment with residents who may not speak English. This study found there may be some bias particularly with the cognitive items of the assessment such as the 'making self understood' variable or 'ability to understand others' variable. For residents who may experience language barriers, these variables may be documented similarly to those residents who experience cognitive issues. Therefore, the Other residents will be found to have more impairment when expressing or comprehending verbal information. It may also be helpful for nursing home staff to hire translators when completing this part of the assessment. Observing the communication behaviours of residents when interacting with translators may reveal that the resident can easily engage in conversation with others.

The MDS 2.0 may benefit from additional items to be added to gain a further understanding of the cultural or linguistic background of the residents. For example, the MDS Home Care assessment used for those living in the community includes an item to indicate whether clients need the use of a translator when speaking with assessors. This additional knowledge will provide knowledge on whether mainstream nursing homes are appropriate for these residents. In addition, with the item on the 'primary' language the older adult speaks, it will be more effective in clustering together residents who may experience language barriers.

6. CONCLUSION

Residents who did not speak English or French were found to have lower depressive symptoms and were less likely to be treated for symptoms when compared to the English and French speaking residents. Factors such as aggressive behaviour and cognitive impairment were found to be strongly associated with depressive symptoms in the Other speaking residents. Signs

of distress or symptoms of depression may be overshadowed by observed aggressive behaviour or cognitive impairment reducing the likelihood of Other language speaking residents to receive a diagnosis or any form of treatment.

The benefits of LTCFs that may cater specifically to those who do not speak English or French are evident. They not only are a benefit to immigrant older adults but also residents who may not experience any language barriers. Culturally competent practice not only brings more awareness to those who differ culturally, but also instils a more welcoming and caring environment that positively influences residents of all backgrounds.

Immigrants who do come to Canada are more likely to be young to middle aged. However, most permanent residents of Canada do live here well into old age. The issues surrounding language barriers may continue to progress as the population ages. With the increasing need for LTCFs, practices need to be able to meet the needs of this diverse group. More research can also be done on the experiences of depression in immigrant older adults and how factors such as language and culture can influence treatment and symptoms.

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