Role of Social Engagement and Sense of Belonging of Assisted Living Residents: A Descriptive Study.

By

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DEDICATION

This dissertation is dedicated to my family who have kept me motivated through my research path.

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ABSTRACT

Background/Purpose: Despite the fact that the society is rapidly aging and the number of individuals moving into assisted living (AL) facilities are increasing, little is known about AL residents' psychological well-being. This dissertation includes three papers. The purpose was to (1) identify factors known to contribute to social engagement, (2) examine the relationship between social engagement and sense of belonging, and (3) examine the relationship between sense of belonging and psychological well-being of AL residents.

Methods: This dissertation includes three papers. The first paper is a systematic review is to identify factors known to contribute to social engagement. Three databases were searched, Ovid Medline, PsychINFO, and Web of Science with search terms of social engagement, interaction, activities, and exchange/support, relationships, and networks of older adults in AL and residential care facilities. Papers 2 and 3 report on a descriptive study conducted with face-to-face interviews with AL residents (n=100). The sense of Belonging Model was used to guide this research. Sense of belonging was measured with the Sense of Belonging Instrument- Psychological, social engagement was measured with the Lubben Social Network Scale and psychological well-being was measured with PROMIS instruments for depression, social isolation, and satisfaction with participation in social roles and activities. Multiple linear regression was conducted to examine the relationships between social engagement and sense of belonging, and sense of belonging and psychological well-being.

Results: The systematic review identified factors contributing to social engagement including functional disability, being married, hearing impairment, depression, being male, mealtime seating arrangements, and facility size (small facility). Quantitative results provided evidence that social engagement was the strongest predictor of sense of belonging, controlling for sample characteristics ($p < 0.001$). A lower level of sense of belonging was associated with higher levels of depression ($p = 0.0063$) and social isolation ($p = 0.0011$). Sense of belonging was not associated with satisfaction with participation in social roles and activities.

Conclusion: Social engagement played an important role in predicting sense of belonging, which influenced depression and social isolation of AL residents. More work is needed to fully understand residents' experiences of their social engagement as well as sense of belonging.

CHAPTER I

Introduction of Assisted Living and Problem Statement

Introduction

In the United States, there are 47.8 million older adults aged 65 years and over in 2015, comprising approximately 15% of the total population (United States Census Bureau, 2017). This is expected to increase to 98.2 million by 2060. Older adults will comprise one in four U.S. residents (United States Census Bureau, 2017). As individuals age, they experience a decline of their health and a limitation in their physical, sensory, and cognitive functions; 20% of older United States adults have chronic disabilities (Manton & Gu, 2001), 33% of them have physical limitations (Freedman & Martin, 1998), 33% have hearing impairments (Desai, Pratt, Lentzner, & Robinson, 2001), and 7-8% reported severe cognitive impairments (Freedman, Aykan, & Martin, 2001). Older adults experience difficulty performing activities of daily living ([ADLs], bathing, dressing, toileting) and instrumental activities of daily living ([IADL], shopping, using transportation, managing financial matters).

Advanced medical technology and improved medical care have increased individuals' life expectancy. Because more people live longer with functional disability, some need assistance such as in-home services from private agencies which not only aid with ADLs and IADLs but help meal preparation and cooking. Other people have family members involved in their care who can help them with routine daily care and managing their financial affairs, however many also search for long-term care placement to avoid burdening their families. Options for residential long-term care include nursing homes, assisted living, adult day care, and group homes. Among these, assisted living facilities are noted as one of the fastest growing residential settings for older adults nationwide and are becoming a popular choice for housing options for frail elders (Zimmerman, 2001).

Assisted Living

There are now 31,000 plus assisted living facilities. The number of individuals who move into AL facilities is increasing. Approximately one million individuals reside in AL facilities and this number is expected to almost double by 2030 (Belmonte, 2009). Despite the increasing number of AL facilities, there is no standard definition of assisted living. Assisted living facilities are typically defined as “nonmedical, community-based, residential settings that provide housing, food service, one or more personal services, and watchful oversight to frail elders” (Hawes, Wildfire, & Lux, 1993, p. 23). According to Caffrey et al. (2012), older adults who cannot live alone but do not require 24-hour supervision by nursing staff may qualify for placement in assisted living facilities. Assisted living was also defined as, “a congregate residential setting that provides or coordinates personal services, 24 hours supervision and assistance, activities, health related services” (Assisted Living Quality Coalition, 1998, p. 65).

A recent National Center for Health Statistics, [NCHS] data brief (Caffrey et al., 2012) indicated that for each day in 2010, 735,000 persons were residents of residential care facilities nationwide. The average length of stay in assisted living is typically 2.5 to 3 years (National Center for Assisted Living [NCAL], 2012). Caffrey and colleagues (2012) reported that the majority of residents living in AL facilities in 2010 were non-Hispanic, white, and female. While the predominant racial group is Caucasian, recent research indicates that the AL population is becoming more diverse including African Americans and people from rural areas, who were traditionally cared for in their own homes (Ball et al., 2005; 2010). A majority of AL residents are female (74%) and 85 years of age and older (54%) (NCAL, 2013). In 2010, the mean national total monthly charge per resident was $3,165. About three-quarters of all residents received assistance with bathing (72%), over one-half received assistance with dressing (52%), and more than one-third received assistance with toileting (46%) (Caffrey et al.). Over 40% of residents had Alzheimer's disease or other dementia suggesting that many residents have a high burden of functional and cognitive impairment. According to NCAL (2013), 70% of residents moved from their own home or apartment and 59% of residents move out of assisted living to transfer to a nursing facility.

As noted, the number of AL facilities is increasing nationwide. Currently, there are different terms for residential settings: boarding homes, adult care homes, adult foster care, personal care homes, and assisted living. Until the mid-1990s, the most frequently used term was board and care, but today all types of group residential care are referred to as 'assisted living' (Caffrey et al., 2012). The types and structure of assisted living facilities vary. An AL facility may consist of self-contained apartments with access to common areas such as dining and activity rooms. Residents can be independent in their own apartment or share their bedroom and bathrooms with other residents, while common areas are generally shared with others for socializing and dining purpose.

Existing evidence demonstrated that decision making process when relocating to a residential setting can be stressful to both elders and their family (Tracy & DeYoung, 2004). The primary decision makers on relocation are family members (Ball et al., 2000; Hawes & Phillips, 2000; Morgan, Eckert, Piggee, & Frankowski, 2006). Older adults' children also influenced relocations decisions due to personal preferences, guilt, and financial concerns (Chen et al., 2008; Neufeld, Lysac, MacNeill, & Lichenberg, 2004). It was reported that residents in their 80s move closer to their adult children who were retiring or approaching retirement. It was important for older adults to remain close to their family for their overall well-being (Port et al., 2005). Other times, older adults are hospitalized due to an acute illness and are discharged to long-term care facilities such as assisted living (Kane & Kane, 2001). More importantly, it was noted that if individuals made their own relocation decision, they see more gains from moving into AL such as feeling happier with their move (Ball et al., 2005; Rossen & Knafl, 2003) and higher level of satisfaction (young, 1998).

Assisted Living in Michigan

Michigan has approximately 10, 000 older adults residing in AL facilities licensed as Adult Foster Care homes and 11,000 living in licensed Homes for the Aged (Michigan Assisted Living Association, 2014). No generally accepted definition exists in Michigan. While a number of federal agencies generally evaluate quality of care and have jurisdiction over consumer protection in AL facilities, each individual state has their own regulations for monitoring quality care provided to residents. In Michigan, the

Bureau of child and Adult Licensing (BCAL), part of the Department of Human Services (DHS) assumes the responsibility (Michigan Assisted Living Association). The primary services of assisted living facilities include 24-hour staffing, assistance with activities of daily living, special programs for residents with dementia or Alzheimer’s disease, medication management, transportation to doctor’s appointment and community outings, and organized social and recreational activities. Michigan is one of the states in which some AL facilities are financially aided by Medicaid, Michigan (MI) Choice Waiver Program or simply the “waiver” (Michigan Assisted Living Association, 2015). Each participant can receive the basic services Michigan Medicaid covers, and one or more of the following services: home delivered meals, respite services, non-medical transportation, and others.

The primary philosophy of assisted living includes maximizing individuals’ dignity, autonomy, and independence, promoting a home-like environment, and meeting residents’ needs. It is designed to minimize the need for nursing homes, accommodate residents’ preferences and encourage family and community involvement (Assisted Living Quality Coalition, 1998, p. 65). A concept of ‘aging in place’ has recently been introduced to assisted living literature, as the number of older adults admitted to the facilities is increasing. ‘Aging in place’ is defined as, “remaining living in the community, with some level of independence, rather than in residential care” (Davey, Nana, de Joux, & Arcus, 2004, p. 133). It is a complex yet broad concept of pursuing aging well in people’s homes, neighborhoods, and communities while maintaining their connection to family and friends (Callahan, 1992; Wiles, Leibing, Guberm, Reeve, & Allen, 2011). Some have suggested that the concept of ‘aging in place’ could be applied to assisted living. According to Cutchin (2003), the model of aging in place in assisted living has core processes including, “creating meaning through place-centered activity and approximating home and community” (p. 1080). ‘Aging in place’ embraces social support, quality of social contacts (Callahan, 1993; Wiggins, Higgs, Hyde, & Blane, 2004) and emotional attachment to place and role of security (Rowles, 1993).

The social environment plays an important role in adjusting to relocation and establishing a sense of belonging. Social engagement is defined as interpersonal social relationships and active participation in social activities (Prohaska, Anderson, & Binstock, 2012) and “the degree of participation in interpersonal activities and the maintenance of meaningful connections with other people” (Bixter, Blocker, & Rogers, 2018). Social engagement is important for AL residents because it contributes to psychological well-being (Park, 2009). When older adults move into AL facilities, they may experience feeling distance from their previous neighborhood or community, and it will take time to establish social connections with other residents. This can disrupt their social relationships, which in turn can lead to loneliness (Jang et al., 2014). Feelings of loneliness can cause cognitive decline (Tilvis et al., 2004; Luanaigh & Lawlor, 2008) and increased mortality (Steptoe, Shankar, Demakakos, P., Wardle, 2013) among older adults.

Problems with social engagement can undermine a resident’s sense of belonging. Sense of belonging is briefly defined as the feeling of being connected and accepted with family, community, and society (Maslow, 1943) and feeling fit and congruent with others including their environment and organization (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992). Sense of belonging was identified as the third most significant basic human need (Maslow, 1943), and it is closely associated with finding meaning in life (Brewer, 2008; Lambert et al., 2013). People who feel they belong are able to express sense of life's meaning better than those who have less feelings of belonging (Lambert et al., 2013). We propose that residents who are socially engaged with others may feel that they fit in and are congruent with other residents and greater sense of psychological well-being.

Statement of the Problem & Purpose

Despite the significance of social engagement and sense of belonging, research examining these concepts is lacking. With an increase of individuals moving into AL facilities, there is a need to better understand factors that influence their quality of life, specifically factors that may influence social engagement, sense of belonging, and psychological well-being. While a research finding demonstrated that social engagement is significantly associated with psychological well-being (Park, 2009), the extent to which social engagement is related to residents' sense of belonging is unknown. Research also indicated that social engagement is associated with depression, yet there is a lack of evidence demonstrating the relationship between sense of belonging and psychological well-being.

Broadly speaking, the purpose of this dissertation is to fill in the gaps in knowledge regarding the role of social engagement and sense of belonging of AL residents. More specifically, the aims are to: (a) identify factors influencing social engagement, (b) examine what is known about factors contributing to sense of belonging, and (c) examine the relationship between sense of belonging and psychological well-being of AL residents. The results of this research will provide a fuller understanding of social engagement and sense of belonging for AL residents and this information can be used in the development of an intervention to promote psychological well-being and quality of life. To meet the aims (b) and (c), we used the sense of belonging model.

To meet these aims, in chapter 1, we explained the definition, facts and characteristics of AL residents, services, and philosophy of assisted living in the introduction. In chapter 2, we present a manuscript, titled, “Factors Influencing Social Engagement of AL Residents: A Systematic Literature Review”. A systematic literature review was conducted to investigate factors influencing social engagement. In chapter 3, we present a manuscript, titled, “Social Engagement is the Strongest Predictor of Sense of Belonging of Assisted Living Residents: A Descriptive Study”. In chapter 4, we present the third manuscript, titled, “The relationship between Sense of Belonging and Psychological Well-Being of Assisted Living Residents: A Descriptive Study”. Results are presented in each manuscript. Lastly, in chapter 5, we summarize and integrate the findings from the three studies and discuss potential implications.

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CHAPTER II

Factors Influencing Social Engagement of Assisted Living Residents: A Systematic Review.

Introduction

The number of older adults who are over age 65 has increased rapidly in our society, due to improved medical care and an increased life expectancy. According to the American Association of Retired Persons (AARP), there were 40 million people age 65 and over in the Unites States in 2010, accounting for 13% of the total population (Mollica & Houser, 2012). This will increase to 72 million, representing nearly 20% of the total U.S. population by 2030 and is expected to grow to approximately 98 million by 2060 (Aging Statistics, 2013). As people age, they tend to age with multiple chronic conditions and disability increases. As older adults become more disabled and dependent from comorbidities and functional limitations, they are likely to need long-term care services. Assisted living facilities are one of the choices for persons that can help maintain health and delay admission to nursing homes. Recently, the concept of ‘aging in place’ which was previously used in the community has been introduced in AL facilities. The ‘aging in place’ highlights the importance of embracing the social environment and residents’ feeling like home, but little is known about AL residents’ social environment, how they socially engage with others and the factors that influence their social engagement.

Social Engagement of Older Adults

Social engagement has been defined as interpersonal social relationships and active participation in social activities (Prohaska, Anderson, & Binstock, 2012). The major components of social engagement include participating in social activities, social interaction with at least two people, and social exchange which involves giving something or receiving something from others which includes social support (Prohaska et al.). As individuals grow older, social engagement is important to their psychological well-being (Baltes, 1996; Mendes de Leon, Glass, & Berkman, 2003). Most of the research in this area has been focused on social support, which is a component of social engagement. Higher levels of social support were positively related to more successful aging among assisted living residents (Glass, Mendes de Leon, Marottoli, & Berkman, 1999; Howie, Troutman-Jordan, & Newman, 2014).

Purpose of Systematic Literature Review

Despite the importance of social support and its association with successful aging, little work has been done to describe social engagement of AL residents and little is known about its effects on AL residents' psychological well-being. Many AL residents have experienced the loss of family and friends through death and illness prior to moving into AL facilities. With the move to AL facilities, they experience feeling distant from their neighborhood and community where they used to engage. All of this contributes to shrinking social networks and can lead to loneliness (Winningham & Pike, 2007). This disruption of social relationships can be stressful. Thus, promoting social engagement among residents can mitigate the stress and influence psychological well-being, but little is known about factors that contribute to residents' social engagement.

This systematic review aimed to identify factors known to contribute to social engagement of AL residents.

The Search Process

The keywords and MeSH terms of ‘social engagement’, ‘social support’, ‘social network’, ‘interpersonal relationship’, ‘social relationship’, ‘social interaction’, and ‘social integration’ were combined with the terms “factors”, “characteristics” and “determinants”, As AL facilities are called by different names in different states, ‘residential care facilities’ was included in addition to ‘assisted living’, which were then combined with the above mentioned terms by using “OR”. Age was filtered by ‘65 and older’. Three databases were used: Medline, PsychInfo, and Web of Science. A hand search from the identified publications was done in order to include all previous work conducted on the topic of the systematic review.

The Search Criteria

To refine the search, every manuscript that had the potential to meet inclusion criteria was retrieved.

Inclusions

Publications were included in the review if they were full text, peer-reviewed articles that explored social engagement including social relationship and social network of older residents of assisted living facilities. Only studies published in English were included. All years of publications were included.

Exclusions

Studies that did not remotely discuss any aspect of social engagement in AL facilities were excluded. Studies examining social engagement of nursing home residents or community dwelling population were excluded. Studies of group homes or those only focused on independent living facilities were excluded as well in order to primarily focus on AL environments. Independent living residents are more independent thus they receive minimal assistance and may not receive meals, housing, or laundry services. Review articles, commentaries, book chapters, or case studies were excluded.

Methodological Quality Assessment

The methodological quality of the quantitative studies was assessed using an instrument, Appraisal tool for Cross-Sectional Studies (AXIS tool) as all of the quantitative studies from the review used cross-sectional designs. This checklist includes 20 items in five domains including introduction, methods, results, discussion, and others including conflicts of interest (Downes, Brennan, Williams, & Dean, 2016). The AXIS tool does not provide a numerical scale, thus each item was rated as '+' (positive), '-' (negative) or 'N/A' (not available or not appropriate) on the bases of information provided in the article. A quality score (the percentage of all positive ratings) was assigned to each study, resulting in a possible score of 0-100%. A study was considered to be of higher quality if the methodological score was ≥ 70%. Details of each domain are shown in Appendix A. The methodological quality of the qualitative studies was assessed using Critical Appraisal Skills Programme (CASP) tool (Public Health Resource Unit, 2006). The CASP primarily includes three broad issues including whether the results of the review are valid, what the results are, and the results will help locally? The same scoring system used for quantitative studies was applied as above. Each item was rated as '+' (yes), '-' (no)', and 'N/A' (unclear or not available). A quality score was assigned to each study, with a potential score of 0-100%. A study was considered to be of high quality if the methodological score was > 70%. The tool has ten questions, which are presented in Appendix B.

Results

Identification and Selection of the Literature

One hundred forty-one records were initially identified, 133 were removed based on the inclusion and exclusion criteria, then eight were screened and one duplicate study was removed. Seven studies were retrieved from the databases (Zimmerman et al., 2007; Park et al., 2009; Van Leuven, 2010; Park, N. S., Zimmerman, S., Kinslow, K., Shin, H. J., & Roff, L. L., 2012; Park et al., 2013; Jang et al., 2014). Eight relevant and appropriate studies were added from a hand search (Ball, Lepore, Perkins, Hollingsworth, & Sweatman, 2009; Cutchin, Owen, & Chang, 2003; Kemp, C. L., 2008; Kemp, C. L., Ball, M. M., Hollingsworth, C., & Perkins, M. M., 2012; Park, N. S., 2009;; Sandhu, N. K., Kemp, C. L., Ball, M. M., Burgess, E. O., & Perkins, M. M., 2013; Street, D., Burge, S., Quadagno, J., & Barrett, A., 2007; Tsai, C.-F., Ouyang, W.-C., Chen, L.-K., Lan, C.-F., Hwang, S.-J., Yang, C.-H., Su, T. P., 2009). Figure 1 outlines the process involved in the systematic review and Table 1 shows the 15 studies that met inclusion criteria. These studies included seven quantitative, seven qualitative, and one mixed method design publications. The findings were categorized into negative factors and positive factors which contribute to social engagement. We further categorized factors at the personal, environmental, and organizational level.

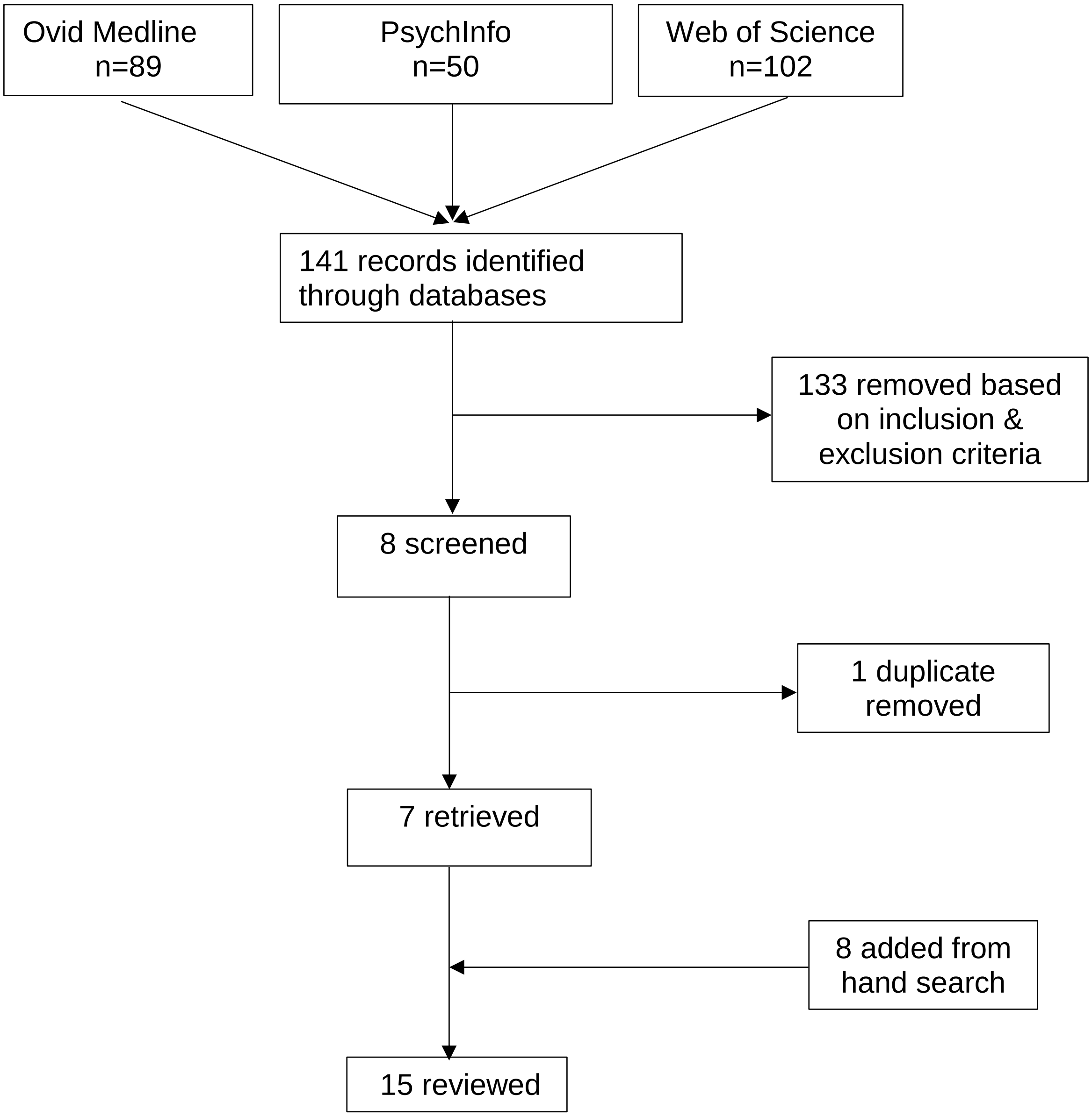

Figure 1. *Flow Diagram for Retrieval of Records*

Table 1.

A Summary of the Studies by Study Design

Author(s), Year	Aim	Sample Size	Method of Data Collection	Variables/Measures	Results with regards to Factors to Social Engagement and other Relevant Findings
Quantitative Studies					
Cutchin et al., 2003	To explore the roles of place attachment, nonfamily social involvement, place valuation, and individual characteristics in the process of becoming at home in assisted living residences.	275 residents	Cross-sectional	Questionnaires to capture place integration process including residents' interrelationships: - Social involvement inside and outside the AL residence -Place Attachment -Quality of life, satisfaction	-Positive factors: helping others who have a mobility issue and assisting staff contributed to place attachment and quality of life. -Other findings: Nonfamily social involvement played a pivotal role through which place attachment works to explain becoming at home.
Jang et al., 2014.	To explore the interactive role of functional disability and social engagement in predicting mental well-being	150 residents	Cross-sectional	-Social Engagement: Within and outside facility social activities - frequency of social contacts -Depression: Geriatric Depression Scale – Short Form (GDS-SF)	-Negative factor: Functional disability is negatively associated with social engagement both within and outside facility. -Other findings: The limited but available opportunities for social activities and interpersonal contacts within the facility seemed to bring substantial psychological benefits.
Park, 2009	To explore social engagement and its relationship to the psychological well-being of older adults residing in assisted living facilities (ALFs).	82 residents	Cross-sectional	Social Engagement: -Mealtime enjoyment Perceived friendliness of residents and staff - Multidimensional Scale of Perceived Social Support (MSPSS) -Reciprocity -Social Activity Participation Psychological Well-being: -Life Satisfaction Index-A -Center for Epidemiological Studies-Depression Scale. (CES-D).	-Positive factors: (a) friendly staff, (b) mealtime enjoyment. (a) Perceived friendliness of residents and staff was positively associated with life satisfaction and depressive symptoms. Opportunities for social activities promoted social engagement. (b) Mealtimes provided important opportunities for residents to interact with other residents and with staff members for a prolonged time on a regular basis.

Author(s), Year	Aim	Sample Size	Method of Data Collection	Variables/Measures	Results with regards to Factors to Social Engagement and other Relevant Findings
Sikorska, E., 1999[b]	To examine the relationship of organizational factors to resident satisfaction with assisted living, while controlling for resident characteristics.	156 residents in 13 facilities		-No measure for social engagement. -Sociocreational aids/activities -Resident Satisfaction Index (RSI)	-Positive factor: Smaller facility was positively associated with social engagement. -Other findings: More satisfied residents were also happier and more functionally independent.
Street et al., 2007	To examine how organizational characteristics, transition experiences, and social relationships impact three subjective measures of well-being among assisted living residents: life satisfaction, quality of life, and perception that assisted living feels like home.	681 residents	Secondary Data Analysis from Florida Study of Assisted Living	External and internal Social Relationships: -Frequency of family and friend contact -Organizational characteristics -Quality of Life, Life Satisfaction: used own questions	-Positive factor: Assisting staff as a valued role promoted social relationships and residents' well-being. -Other findings: Internal social relationships were the most consistently important predictor of resident well-being
Tsai et al., 2009	To identify the risk factors for poor social engagement among elderly veterans in Taiwan.	597 residents	Secondary Data Analysis from Resident Assessment Instrument (RAI) Minimum Data	Social Engagement: -Index of Social Engagement (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 life of facility; and (6) accepts invitations into most group activities. -Index of Unsettled Relationships (Un-SR) -Depression: GDS-SF	-Negative Factor: Depression was the most significant factor negatively associated with social engagement.

Author(s), Year	Aim	Sample Size	Method of Data Collection	Variables/Measures	Results with regards to Factors to Social Engagement and other Relevant Findings
Zimmerman et al, 2007	To describe the observed use of space and its association with resident social and affective behaviors in assisted living and examine their relationship to facility and resident characteristics	1,830 residents from 182 facilities	Secondary Data Analysis from CS-LTC	-Measure for social engagement not used. -Availability of Social and Recreational Activities scale of the Policy and Program Information Form (POLIF) -Other measures therapeutic Environment Screening Survey-Residential Care (TESS-RC).	-Negative factor: Residents living in smaller facilities were less likely to be engaged.
Qualitative Studies					
Ball et al., 2009	To provide understanding of how direct care workers (DCWs) in assisted living facilities (ALFs) interpret their relationships with residents and to identify factors that influence the development, maintenance, quality, and meaning of these relationships	43 participants (5 administrative staff, 38 direct care workers (DCWs) in 2 facilities	Participant observation, in-depth and informal interview	Interviews with DCWs re: work histories, work routines, social relationships, attitudes toward work and individuals in the work settings, and personal characteristics	-Positive Factor: DCWs who found meaning in their work positively associated residents' satisfaction and quality of social relationships between residents.
Kemp, C. L., 2008	To explore pathways couples lead to reside together and the context of marriage influencing couples' everyday lives in assisted living facilities	30 participants (20 married couples, and their 10 adult children) in 1 facility	Data analysis from a larger, exploratory study, "Married Couples in Assisted Living" In-depth, semi structured interviews	Interviews couples re: marital, family, and residential history, pathways to and life in assisted living facilities, issues of social support, plans and concerns for the future.	-Negative factor: Being married was negatively associated with social relationships.
Kemp et al., 2012	To examine coresident relationships in assisted living and identify factors influencing relationships	43 participants (27 Residents, 3 administrators, and 5 activity staff, 8 care staff in 3 facilities)	Data analysis from a 3-year mixed-method study, "Negotiating Social Relationships in Assisted Living: The Resident Experience"	Interviewed the sample re: residents' social relationships and relevant facility policies and practices, residents' nature of their co-resident relationship.	-Negative factors: functional disability, mealtime seating arrangements. -Positive Factor: Facility features. Presence of common areas promoted social engagement.

Author(s), Year	Aim	Sample Size	Method of Data Collection	Variables/Measures	Results with regards to Factors to Social Engagement and other Relevant Findings
			Participant observation, informal and formal, in-depth interviews		–Other findings: Relationships ranged from strangers to friends. Neighboring was a common way of social support, but not universal.
Park et al., 2012	To explore the experiences of social engagement among AL residents and explain its components and processes.	29 residents in 4 facilities	Semistructured in-depth interviews	Interviewed residents re: how they have your relationships with your family changed since you moved to this place and what it is like making friends at this place. Also asked who residents really count on when you need emotional support.	-Main findings: Complexity of social engagement are organized around 5 themes related to (a) characteristics of desired social relationships, (b) the perspective of time and loss influencing social investment, (c) barriers to social engagement based on age-related changes and AL practices, (d) perceived resources for social engagement at the individual- and organizational- level, and (e) strategies to develop/modify social relationships.
Park et al., 2013	To explore resident-to-resident and resident-to-staff relationships experienced and perceived by African American and Hispanic older adults in assisted living settings	30 participants (15 African American and 15 Hispanic older adults)	In-depth interviews	Interviewed residents re: the nature and process of social relationships with other residents and staff, e.g.) How residents descripted their relationship with other residents/staff, and if the considered any of them to be their friends.	-Positive factor: Sharing common interests and language could be a springboard for developing relationships in assisted living settings -Negative factor: Tensions existed in resident-to-resident and resident-to-staff relationships.
Sandhu et al., 2013	To examine the influences of physical and mental function on co-resident relationships in AL and identify the factors shaping the influence of functional status	20 participants (2 administrators, 3 activity staff members, 3 care staff members, and 12 residents in 9 facilities)	Participant observation, informal interviews, formal in-depth interviews	-For administrators and care staff: Co-resident relationships, factors influencing relationships including policies and practices. -For residents: their backgrounds, health status, support needs, and social support network, and co-resident relationships.	-Negative factor: functional disability, being married, cognitive impairment, hearing impairment, mealtime seating arrangement -Positive factor: Helping others with mobility issue, assisting staff as a valued role, smaller facility, and presence of common areas

Author(s), Year	Aim	Sample Size	Method of Data Collection	Variables/Measures	Results with regards to Factors to Social Engagement and other Relevant Findings
Van Leuven, 2010	To investigate the beliefs, values, life-styles, and health status of adults age 75 and older who identified themselves as healthy	18 participants (5 from assisted living facilities and 11 community dwelling older adults and)	Observation & interviews	Interviewed residents re: Their health status, meaning of being healthy as they age, activities they engage in to maintain or improve their health living environment contribute to your health.	-Positive factor: Older adults who perceive themselves as healthy are more actively engaged in their lives and Higher level of health status predicts better social engagement. -Other findings: Social engagement appeared to be a strong mediating factor against chronic illness and an important factor to successful aging.
Mixed Method Design					
Park et al., 2009	To explore unique experiences and challenges for older men in assisted living (AL) communities.	Quantitative-82, Qualitative-29 residents	In-depth face to face interviews	MSPSS to measure social engagement	-Negative Factor: Being male. Men’s social worlds are limited and AL practices do not favor men’s preferences.

Methodological Quality Assessment

Scores for methodological quality of quantitative studies are shown in Table 2. Percentage for the methodological quality was at least 70% across the studies with a range from 70% to 85%, which showed all were at least moderate quality. A common reason of studies not meeting 100% was that most studies did not report the rate of participation or reasons why subjects did not participate. Only one quantitative study indicated that data were collected by mailed survey, and the response rate was 77% for 1337 (Cutchin et al., 2003).

The sample size was adequate across the studies included in this review. The sample size for quantitative studies ranged from 82 to 1,830 with a total sample of 3,621 subjects. Only one study (Jang et al., 2014) explained justification of the sample size among seven quantitative studies. However, three studies were a secondary data analysis with sample sizes that ranged from 681 to 1,830 subjects; 681 from Florida Study of Assisted Living (Street et al., 2007), 597 from Resident Assessment Instrument (RAI) Minimum Data Set (MDS) (Tsai et al., 2009), and 1,830 from Collaborative Studies of Long-Term Care (CS-LTC) (Zimmerman et al., 2007). The sample size for qualitative studies ranged from five to 43 which consisted of a range of residents from five to 30, two to five administrative staff, three to five activity staff, three to 39 direct care workers/staff, and 10 children. The years of publications ranged from 1999 to 2014. Most studies were conducted in the U.S., except for one study in China.

The overall quality of the qualitative studies was considered good for the majority (80-90%) of the studies. All studies described their findings in-depth either via using thematic analysis or creating an explanatory model of the themes identified. The most common methodological limitation was a failure of researchers to critically examine their role, leading to potential bias associated with sample recruitment, data collection, and choice of facilities to be studied.

Table 2.

Overall Scores of the Methodological Quality Assessment for the Quantitative Studies

Author, Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	%
Sikorska, 1999	+	+	-	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-	+	17	85
Zimmerman et al., 2007	+	+	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	+	-	+	17	85
Cutchin et al., 2003	+	+	-	+	+	+	-	+	+	+	+	+	N/A	-	+	+	+	+	-	+	16	80
Jang et al., 2014	+	+	+	+	+	+	N/A	+	+	+	+	+	N/A	N/A	+	+	+	+	-	+	16	80
Park, 2009	+	+	-	+	+	+	-	+	+	+	+	+	-	-	+	+	+	+	-	+	15	75
Street et al., 2007	+	+	-	+	+	+	-	+	+	+	+	+	-	-	+	+	+	+	-	+	15	75
Tsai et al., 2009	+	+	-	+	+	+	-	+	+	+	+	+	+	-	+	+	+	+	-	+	14	70

Note. 1. Were the aims/objectives of the study clear? 2. Was the study design appropriate for the stated aim(s)? 3. Was the sample size justified? 4. Was the target/reference population clearly defined? (Is it clear who the research was about?) 5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation? 6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation? 7. Were measures undertaken to address and categorise non-responders? 8. Were the risk factor and outcome variables measured appropriate to the aims of the study? 9. Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously? 10. Is it clear what was used to determine statistical significance and/or precision estimates? 11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated? 12. Were the basic data adequately described? 13. Does the response rate raise concerns about non-response bias? 14. If appropriate, was information about non-responders described? 15. Were the results internally consistent? 16. Were the results presented for all the analyses described in the methods? 16. Were the results presented for all the analyses described in the methods? 17. Were the authors' discussions and conclusions justified by the results? 18. Were the limitations of the study discussed? 19. Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results? 20. Was ethical approval or consent of participants attained?

Negative Factors

Personal

The most commonly identified factors that negatively influenced social engagement were functional disability (four qualitative and one quantitative), being married (2 quantitative), depression (two quantitative and one qualitative), cognitive impairment (two qualitative), and hearing impairment (three qualitative).

Five studies identified that functional disability had a negative association with social engagement (Jang et al., 2014; Van Leuven, 2010; Park et al., 2012, Sandhu et al., 2013; Kemp et al., 2012). Functional disability was measured with scales assessing difficulty with performing physical activities. Reduced physical function limited opportunities for participation in social life. Residents reported feeling frustrated with those who are at a lower level of mobility or physical status and sometimes congregated with those who have the same functional level (Perkins et al., 2012). Residents whose functional status was low were socially isolated from others, because they were less involved in social activities and not integrated during mealtime conversations (Sandhu 2013). Two studies identified that pain related to arthritis negatively affect social engagement (Kemp et al., 2012; Sandhu et al.).

Three studies identified being married as negatively associated with social interaction with other residents. People with interdependent relationships such as married couples or romantic partners already have a built-in relationship, which impeded an opportunity to form a new relationship with others, particularly when caregiving is involved (Kemp et al., 2012). Being married, especially when one spouse is a primary caretaker in couples, negatively influenced the resident-resident relationship as couples spent their own time separately and this limited the opportunity to socialize with others (Kemp, 2008; Kemp et al., 2012, Sandhu et al., 2013). Although married couples have each other, they felt obligated to take care of one another, which limited social integration in the AL facilities. Kemp (2008) reported that even though couples helped with each other's physical needs such as dressing, they were not completely dependent on each other for emotional support or social activity. One husband enjoyed having private time from his wife such as going to a weekly Men's club.

Three studies identified depression as a significant barrier to social engagement in AL residents (Sandhu et al., 2013; Tsai et al., 2009; Jang et al., 2014). Sandhu et al. indicated that residents with depression can be socially withdrawn, less socially engaged in public spaces and spend more time in their room due to a lack of self-esteem or energy. In a Chinese veteran male population, among many factors such as poor cognition, visual and hearing impairment, unsettled relationships, and illiteracy, depression was the strongest predictor for social engagement (Tsai et al). Jang et al. also found that higher levels of depressive symptoms were associated with lower levels of social engagement of AL residents.

Two studies identified cognitive impairment as a barrier to social engagement (Ball et al., 2004; Park et al., 2012; Sandhu et al., 2013). Residents reported that building relationships and communicating with the cognitively impaired residents was a challenge; Residents expressed frustrations when trying to communicate with those who are cognitively impaired (Park et al., 2012; Sandhu et al., 2013). Cognitive impairment included primarily dementia-related, depression, and though less common, schizophrenia (Sandhu et al.). Residents' memory loss led to arguments which ultimately resulted in social distancing among residents.

Two studies identified that hearing impairment was a negative factor affecting social engagement of AL residents (Park et al., 2012; Sandhu et al., 2013). Residents reported feeling frustrated by talking with those who have hearing loss as they found themselves repeating what they said and complaining about other residents' hearing impairment (Sandhu et al., 2013). This negative experience resulted in avoidance of social connection and interaction (Sandhu et al., 2013). The same study indicated that residents with hearing impairment also did not enjoy being yelled at, which further results in social distancing from others. Though not as frequently as hearing impairment, vision impairment was a negative factor to social engagement; Residents also reported feeling frustrated with their own vision loss and with others who have poor vision which was considered as a barrier to social interaction (Sandhu et al., 2013).

Less frequently identified factors included being male (one qualitative and one quantitative). Men were less satisfied with their lives and less socially engaged with others than women (Park, Knapp, Shin, & Kinslow, 2009). Residents reported that AL facilities did not provide activities that meet men's emotional and social needs and desires. For instance, one of the most frequent activities offered in AL facilities is bingo and men desire to engage in more active activities than bingo (Park et al., 2009).

Environmental

Only one study, though with a large sample size, indicated that a smaller facility was not associated with social engagement (Zimmerman et al., 2007). If facilities had fewer than 16 beds, these were considered small. Residents who live in smaller facilities were more likely to be in public spaces, however they were 50% less likely to be engaged. The researchers explained that the restricted space of smaller facilities facilitated congregation of residents, though the space was not used for social engagement.

Organizational

Two quantitative studies found that the structure of the mealtime is important, and it can be a positive or negative factor affecting social engagement. Mealtime is a structured routine which can provide an opportunity for social gathering and building social relationships (Kemp et al., 2012). But negative experiences can be associated with the seating arrangements. For example, residents reported that they ran out of conversation topics when seated with the same residents during the meal times and this narrowed their social worlds (Kemp et al. 2012; Park et al., 2012).

Positive Factors

Personal

The most commonly identified factors that positively influenced social engagement were mobility (three quantitative) and relationship with staff (three qualitative and one quantitative). Three studies identified that residents helped others who had difficulty with mobility and difficulty participating in social activities (Cutchin et al., 2003; Kemp et al., 2012; Sandhu et al., 2013). Residents shared information about mobility-related problems such as arthritis and their treatments, joked about their experiences, and talked about how to improve their mobility (Sandhu et al., 2013). Additionally, some residents maintained their friendship by voluntarily checking on each other when one was not feeling well and they helped sicker residents (Park et al., 2013).

Four studies identified that residents also interacted with staff and participated in arranging social activities, which helped them to remain socially engaged. Performing a 'valued role' in helping with laundry tasks or making salads allowed residents to feel less isolated and depressed. These residents stated that they wanted to have a 'good life', helping others. Often, residents reported that they found staff members to be helpful as staff members were socially engaging and satisfied their needs of emotional comfort and connection (Park et al., 2013; Sandhu et al., 2013). Positive feelings toward staff was the most consistently important predictor of resident well-being (Street et al., 2007) and the interaction between staff and AL residents was considered to be an important factor to form a good resident-resident relationship (Cutchin et al., 2003).

Additional factors less frequently identified were age and ethnicity/language. Though younger residents did not feel as if they fit in to the facility where the majority of AL residents were older people, they were able to help older residents (Kemp et al., 2012). Reportedly, similar aged AL residents were found to be more reciprocal and had a degree of commonality (Kemp et al., 2012). Regarding race/ethnicity, one African American resident appreciated the activities that reflected African American culture because this facilitated the resident's sense of belonging to the AL facility (Perkins et al, 2012). Additionally, the role of language in developing relationships was noted in AL settings. For instance, Spanish-speaking residents confided with other Hispanic residents although they were originally from different nations (Park et al., 2013).

Environmental

Environmental factors were identified as predictors of social engagement. Two studies identified that smaller facilities (< 30 beds) with a lower number of residents and spacious hallways as well as a single-story structure facilitated the interaction among residents (Sandhu et al., 2013; Sikorska, 1999). Additionally, two studies indicated that common areas such as dining or activity rooms that are close to residents' rooms or apartments enabled residents to gather and interact more easily (Kemp et al, 2012; Sandhu et al., 2013).

Organizational

Assisted living administrative policies and regulations were sometimes used to promote meaningful relationships between direct care workers and residents. One study indicated that AL administrators encouraged staff to spend time with residents and function as private sitters to promote bonding, and authorized staff' workloads that accommodated building relationships with residents (Ball et al., 2009). Staff considered their workloads to be an important factor contributing to forming relationships with residents; workers emphasized that taking time to talk to residents was valuable and a key component in building trust and good long-term relationships. It was noted that residents found it important and helpful to interact with staff, and that staff as well were encouraged to get to know the residents. Workers were able to form close ties with residents and considered the AL residents as friends and a part of their family (Ball et al.). Finding background characteristics that are common in both direct care workers (DCWs) and residents were helpful in forming social relationships, such as matching their interests and stories.

Both negative and positive factors are organized by quantitative and qualitative studies in Table 3.

Table 3.

Studies Organized by Negative and Positive Factors Contributing to Social Engagement of Assisted Living Residents

	Quantitative	**Qualitative**
Negative factors		
Personal		
Functional Status: Functional Disability	Jang et al., 2014	Park et al., 2012 Sandhu et al., 2013 Kemp et al., 2012 Van Leuven, 2010
Marital Status: Being Married		Kemp, 2008 Kemp et al., 2012 Sandhu et al., 2013
Depression	Tsai et al., 2009 Jang et al., 2014	Sandhu et al., 2013
Cognitive Impairment		Park et al., 2012 Sandhu et al., 2013
Hearing Impairment		Park et al., 2012 Sandhu et al., 2013
Vision Impairment		Sandhu et al., 2013
Gender: Being Male		Park et al., 2013
Environmental		
Facility Size: Smaller Facility		Zimmerman et al., 2007
Organizational		
Mealtime Seating Arrangements		Kemp et al., 2012 Park et al., 2012
Positive factors		
Personal		
Mobility: Helping others		Cutchin et al., 2003 Kemp et al., 2012 Park et al., 2013 Sandhu et al., 2013
Assisting Staff as a Valued Role	Street et al., 2007	Cutchin et al., 2003 Park et al., 2013 Sandhu et al., 2013
Age: Helping Older Residents		Kemp et al., 2012
Same Ethnicity & Language		Perkins et al., 2012 Park et al., 2013
Environmental		
Facility Size: Smaller Facility		Sikorska, 1999 Sandhu et al., 2013
Facility Feature: Presence of Common areas		Kemp et al., 2012 Sandhu et al., 2013
Organizational		
Staff Work Environment and their Role		Ball et al., 2009

Internal and External Social Relationships

AL residents shared that they maintain their family and friends outside of AL to keep their emotional connections and to promote psychological well-being (Park et al., 2012; Street et al., 2007). Family members who live in the community provided residents transportation for shopping or medical appointments if needed as well as financial management (Park et al., 2012). Family members encouraged residents to participate in social activities and foster social life (Kemp et al., 2012). Relationships from the external social networks are considered valuable because residents were able to share affection and intimacy with family and friends. Simultaneously, residents were able to form and established new relationships within AL environments, to lessen loneliness and prevent social isolation by sharing their struggles (Park et al., 2012; Jang et al., 2014). When forming new social relationships, "future time perspective" plays an important role. Factors such as decline in health status, death, and discharge of residents themselves or others can influence how residents perceive their remaining time. Residents who value their social networks and relationships consider their time meaningful, which makes their relationships with others stronger (Park et al., 2012).

Discussion

From the systematic review, we identified negative and positive factors influencing social engagement of AL residents. More frequently identified negative factors of social engagement were functional disability, being married, depression, cognitive impairment, hearing impairment, being male, and mealtime seating arrangements. The small size of some facilities influenced social engagement both positively and negatively.

One of the personal factors which was most frequently identified was functional disability; disabled older adults reported a low degree of activity participation and a strong relationship between life satisfaction and social engagement (Jang et al., 2014). Older individuals who had more disabilities were less socially active. This finding was consistent with community dwelling older adults (Mendes de Leon, Glass, & Berkman, 2003; Isherwood, King, & Luszcz; 2012) and nursing home residents (Kolanowski, Buettner, Litaker, & Yu, 2006). Among the widowed who live in the community, poorer health was associated with lower level of social engagement (Isherwood et al., 2012).

Depression was a negative factor associated with social engagement. This finding was consistent with a community-dwelling cohort of persons age 65 and older (Glass et al., 2006). It was reported that the prevalence of depressive symptoms is at its lowest during middle age, however, increases during later adulthood until reaching its highest point in older adults age 80 years and older (Mirowsky & Ross, 1992). More than half of AL residents are 85 years and older (NCAL, 2016), therefore AL residents may be at an increased risk for depressive symptoms.

Hearing impairment was a negative factor that impacts social engagement. This finding was consistent with nursing home residents where hearing impairment was associated with inadequate communication which led to a low level of social engagement (Resnick, Fries, & Verbrugge, 1997). Vision impairment was a negative factor to social engagement, though only reported by one qualitative study. This is consistent with previous research of both AL and nursing home residents (Elliott, McGwin, & Owsley, 2010) and community-dwelling older adults (Whitson et al., 2007).

More work is needed to understand the prevalence of both hearing and vision impairment and how it influences AL residents’ social engagement and quality of life.

Another notable finding, though only identified by two studies, was that men had a limited social engagement. Similar research findings were previously reported; some studies indicated women have larger social networks than men (Veroff, Kulka, & Douvan, 1981) and receive more social support among adult individuals aged 18-55 (Turner & Marino, 1994) though in another study, the social network size among men and women was similar (Moore, 1990). Similar findings were reported for non-institutionalized older adults (Isherwood et al., 2012). Among the widowed, men experienced lower levels of social contacts and activities, making them more vulnerable to social isolation. Compared to men, wives tended to act as a “kin-keeper” during marriage and this may continue to facilitate remaining in social contact with their children during widowhood. Female’s social trait may be more useful in forming and maintaining their social relationships in AL facilities.

It is noteworthy to acknowledge that marital status influenced social engagement: Being married negatively affects social engagement. This finding was consistent with community dwelling older adults where the widowed were more socially engaged and participate in more social activities (Utz, Carr, Nesse, Wortman, 2002; Lopata, 1998). The authors explained that people who are widowed tend to stay socially connected with others as their coping strategy to compensate for their loss. Married couples residing in AL facilities is a unique setting, and it requires further work to learn how they interact with each other and other residents, and to what extent their social interaction contributes to their well-being.

The overall strength of evidence is moderate. There is a limited body of evidence describing social engagement and factors that influence social engagement of AL residents, given only 15 studies were obtained for the review. Among the 15 studies, half included qualitative designs and all of the quantitative studies were conducted in cross-sectional designs. Secondly, the quantitative studies used a variety of measures for social engagement including participation in social activities, frequency of contacts with family and friends, social support, perceived friendliness of residents and staff, and an Index of Social Engagement, which was designed for long-term care (nursing home) residents, rather than a single standard measure of social engagement which could include different components of social engagement of older adults. Future research is needed to develop an instrument which specifically assesses dimensions and components of social engagement of AL residents.

One potential limitation of this review can be selection bias. We screened references of identified studies which may have resulted in an overrepresentation of studies with positive results. Yet, we attempted to eliminate publication bias by finding and reporting studies with negative factors to social engagement as well. Another weakness was using a checklist which was not well-established, in order to assess methodological quality of quantitative studies. The AXIS tool has been recently published in 2016 to assess quality of cross-sectional studies and it has not been proved to improve quality of reporting studies.

Existing evidence is limited regarding the relationship between facility size and social engagement of AL residents. A small facility was identified as both a positive and negative factor. In nursing homes, residents in a smaller facility received more person-centered care compared to larger nursing homes (Yoon, Kim, Jung, & Ha, 2016) and experience fewer depressive symptoms and a better quality of life (Kane et al., 2007; Shippee et al., 2015). Additional work is needed to better understand the mechanisms regarding how facility characteristics such as facility design, size, or availability of common spaces can enhance social engagement in AL settings.

Summary

This was the first systematic review of research describing factors that influence social engagement of assisted living residents. More negative factors (functional disability, being married, depression, hearing impairment, being male, mealtime seating arrangements) were identified in contrast to a positive factor. Additional research is warranted to better understand social engagement and to ultimately identify methods for promoting social engagement of AL residents. Our findings can help guide future intervention studies testing whether promoting the positive factors and reducing negative factors can promote residents' social engagement. There is a limited volume of research in this area and synthesis of the existing research is challenging because there are no well-established measures of social engagement that are appropriate for AL residents. Future research, particularly qualitative studies, is strongly needed to initiate developing a standard measure of social engagement for AL residents.

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CHAPTER III

Factors Contributing to Sense of Belonging in Assisted Living Residents: A Descriptive Study

Introduction

When people move to assisted living (AL) facilities, their social environment changes and this can ultimately have a negative effect on their psychological well-being. There is a change in AL residents' social networks due to a loss of family and friends, moving away from home, and functional decline with disabilities (Pinquart & Sörensen, 2001). They are more likely to be depressed, have smaller social networks, and receive less emotional support (Chou & Chi, 2000). These changes can negatively affect their social engagement and ultimately their sense of belonging. There is some literature demonstrating the positive effects of social engagement, but little is known about factors influencing sense of belonging for AL residents. Theoretically, becoming more socially active and socializing with others will improve one's sense of belonging. In this paper, we identify factors that could influence sense of belonging for residents of AL facilities.

Sense of Belonging

Sense of belonging" is conceptually defined as how individuals feel accepted and fit within their community, environment, or societal systems (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992). Belonging has an ontological or existential discourse; Knowing with whom and where you belong is integral to human existence (Deewr, 2009, p. 7) and it is a basic need for human beings (Maslow, 1943). Sense of belonging is not the same as having close social relationships, rather it is closely associated with finding meaning in life (Brewer, 2008; Lambert et al., 2013). Feeling or experiencing belonging is closely related to emotionally resonates with others (Peers & Fleer, 2014). It offers the potential for sustained engagement (Sumsion & Wong, 2011, p. 37) and connects people with each other as a ‘psycho-social glue’ (Woodhead & Brooker, 2008). People who feel they belong are able to express sense of life’s meaning better than those who have less feeling of belonging (Lambert et al., 2013).

Another concept frequently examined is “sense of community”, which is a feeling of how people feel important and needed by each other, and “a shared faith that members’ needs will be met by their commitment together” (McMillan & Chavis, 1986). Disruptions to one’s sense of community can occur through relocation, which can be highly stressful to individuals (Brown & Perkins, 1992). Feelings of not belonging or social exclusion can lead to a lack of support networks (Bailey & McLaren, 2005). Similarly, feeling excluded from one’s social group or community can have negative outcomes such as poor well-being, depression and anxiety (Abrams, Hogg, Marques, 2005).

Sense of Belonging Model

The sense of belonging model will be used to guide this research. The sense of belonging model was introduced in 1996 (Hagerty, Williams, Coyne, & Early, 1996). A sense of belonging consists of valued involvement and a fit with other people, organizations, and environments and it can contribute to attribution of meaningfulness and serve as a foundation for emotional and behavioral response (Hagerty et al., 1996). The model embraces concepts including, “experiences of being valued, needed, or important with respect to other people, groups, or environments, and the experience of fitting in or being congruent with other people, groups, or environments through shared or complementary characteristics" (Hagerty et al., 1996, p. 236). The antecedents or precursors to sense of belonging are (1) energy for involvement, (2) desire for meaningful involvement, and (3) potential for shared or complimentary characteristics. The proposed consequences of sense of belonging include (1) involvement, (2) attribution of meaningfulness, and (3) foundation for emotional and behavioral responses. This model has not been tested with older adults, particularly AL residents, and further work is needed to examine the relationships of the constructs in the framework, which is shown in Figure 2.

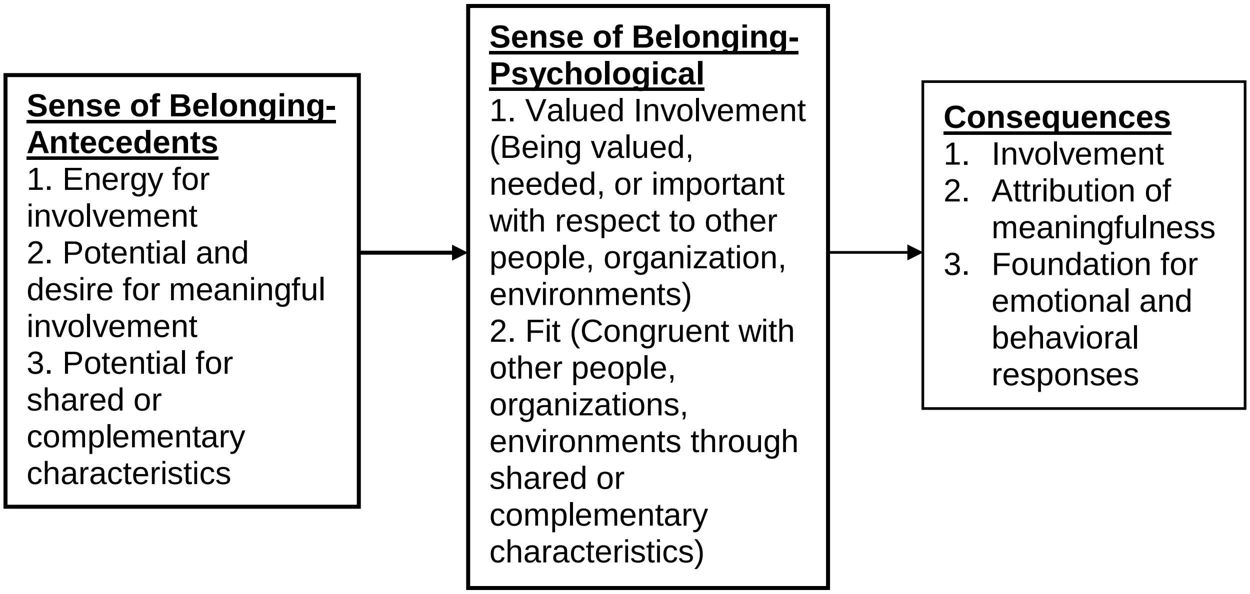

Figure 2. *A Concept Analysis of Sense of Belonging (Hagerty et al., 1996, p. 236)*

Additional Factors that May Influence Sense of Belonging

Little is known about other factors that influence sense of belonging of AL residents. Social engagement and factors related to social engagement could have a positive effect on sense of belonging. The positive impact of social engagement and social support on psychological well-being are clear for community dwelling older adults (Uche, 2013) and long-term care residents (Gilbert & Hirdes, 2000). However, most AL residents have experienced recent changes in their health and functioning and availability of social support. One study investigated and demonstrated that social engagement is associated with AL residents' psychological well-being (Park et al, 2009). When residents are in transition, promoting social engagement and social support could facilitate a successful transition to the new environment and ultimately lead to a healthy sense of belonging and psychological well-being. It is important to understand the factors that could influence sense of belonging through their effects on an individual's social environments, factors influencing social engagement identified in Chapter II including sensory impairment and physical function. Impairment or loss of hearing and vision as well as limitations of physical functioning are important because they could have a negative effect on people's ability to interact and engage with others.

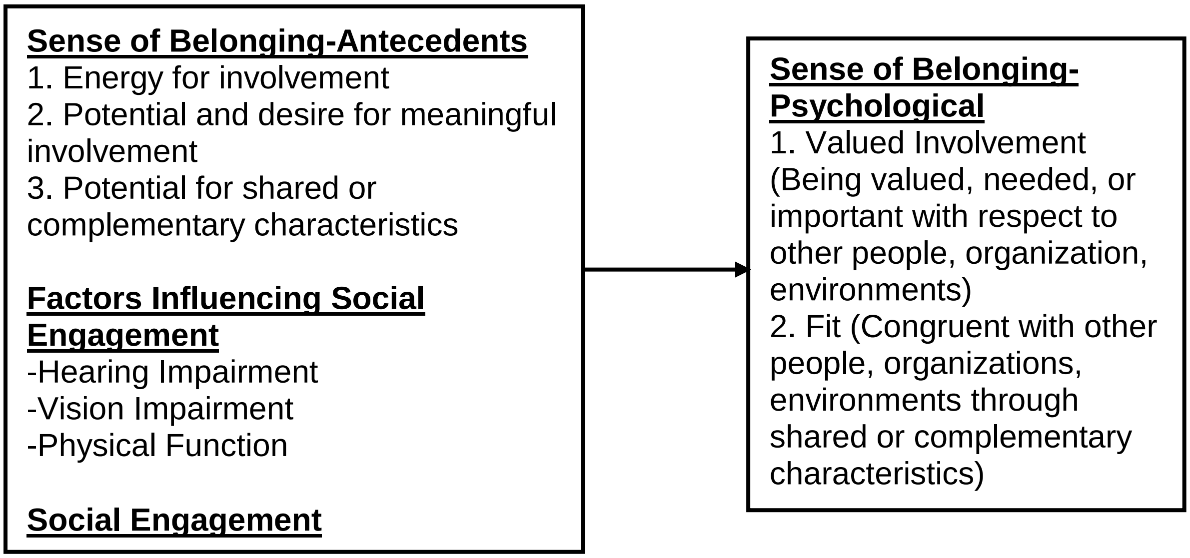

Figure 3. *Modified Conceptual Framework from Sense of Belonging Model*

Aim

The specific aim was to identify factors that influence sense of belonging including sense of belonging-antecedents, hearing impairment, vision impairment, physical function, and social engagement. It was hypothesized that these factors are significant predictors of sense of belonging for AL residents; higher level of sense of belonging-antecedents, lower level of hearing and vision impairment, higher level of physical function, and better social engagement predict residents' sense of belonging.

Methods

Site Recruitment, Participants, and Procedures

A convenience sample of AL residents was recruited from state-licensed assisted living facilities in Southeast Michigan. The study was exempt from the Internal Review Board at the University of Michigan. Data were collected between January and October in 2017. A total of 100 residents from five assisted living facilities were recruited. The size of the facilities ranged from 49 to 200 beds. Two residents participated from the smallest facility of 49 beds, 20 residents from a facility of 76 beds, 16 residents from a facility of 172 beds, 22 residents from a facility of 200 beds, and 40 residents from a facility of 115 beds. At the beginning of the resident recruitment, activity staff identified a few residents who may be willing to participate in the study, then the principle investigator approached to residents in public spaces to inquire their interest in participation. Four of the five AL facilities were for-profit organizations. The facilities had similar physical amenities including meal preparation, housekeeping, and laundry services. Each facility offered opportunities for residents to engage in both internal and external social activities.

Residents were screened to determine if they met the following inclusion criteria: (a) a Mini Mental Status Exam score that was equal to or exceeded the median score for age and education reported by residents as shown in Appendix C (Crum, Anthony, Bassett, & Folstein, 1993), (b) lived in the assisted living facility for a minimum of three consecutive months, (c) able to read, write, and speak the English language, and (d) was not acutely ill, such as having urinary tract infection which can cause confusion. Participants read the consent forms, or the principle investigator read each section of the consent form to those who needed assistance with reading. The survey was completed with the principle investigator’s assistance as needed and it took approximately an hour. The survey took place in a private space such as residents’ room or semi-private library in the facility. Each participant received $25 for completing the survey.

Demographics and Descriptive Information

Demographic data were collected including age, race/ethnicity, education attainment, employment status, comorbidity, activities of daily living (ADLs), instrumental activities of daily living (IADLs), and length of stay. Comorbidity was measured with Groll's functional comorbidity index which contains a list of 18 comorbidities such as arthritis, COPD, congestive heart failure, stroke, diabetes, and so on (Groll, To, Bombardier, & Wright, 2005). Independence of activities of daily living was measured with the Katz's Activities of Daily Living which includes six items of bathing, dressing, toileting, transferring, continence, and feeding (Katz, 1983). Subjects scored zero if they need help in doing the activities or one if they can perform the activities by themselves. The potential total score ranges from zero (very dependent) to six (independent). Lawton and Brody's Instrumental Activities of Daily Living was used to measure function or independence for instrumental activities of daily living (Lawton & Brody, 1969). This instrument includes ability to use telephone, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility of own medication, and ability to handle finances. Subjects select the items which most closely resemble their highest functional level with either zero or one. The potential total score ranges from zero (low function, dependent) to eight (high function, independent) for women and zero through five for men.

Instruments

Independent Variables

Sense of belonging-antecedents were measured with Sense of Belonging Instrument-Antecedents (SOBI-A). SOBI-A includes 14 items which measures antecedents to sense of belonging and ranges from four to 64. Items on SOBI-A includes, “I want to be a part of things going on around me” as related to energy for involvement, “It is important to me that I am valued or accepted by others” as related to potential and desire for meaningful involvement, and “I have qualities that can be important to others” for shared or complementary characteristics”. Reliability and validity of SOBI-A were examined among inpatient and outpatient clients with major depression, community college students, and retired Roman Catholic nuns (Hagerty & Patusky, 1995). Reliability of SOBI-A was supported by Cronbach’s alpha of 0.72, 0.63, and 0.76 respectively. For a randomly selected 100 students, test-retest reliability for SOBI-A at eight weeks was 0.66. Construct validity was measured with a significant difference in the means among the three groups; 26.58 for depressed patients, 28.04 for students, and 29.32 for nuns, which was examined with ANOVA (F-5.69, p=0.001).

Physical function was measured by Patient-Reported Outcomes Measurement Information System (PROMIS®) Physical Function (PF) Computerized Adaptive Test (CAT). PROMIS® PF CAT is available from htttp://www.nihPROMIS®.org. PROMIS® PF CAT includes questions such as, “Are you able to walk up and down two steps?” (Bruce, Fries, Lingala, Hussain, Krishnan, 2013). The minimum number of questions respondents must answer is four, and questions are derived from a pool of 12 items. Results are reported in T-scores and higher T-scores reflected higher physical function. PROMIS PF CAT has been validated in multiples studies. Internal consistency was high with a Cronbach’s alpha of 0.99 for 177 people with rheumatoid arthritis (RA) (Bartlett et al., 2015) and 0.98 for individuals who had orthopedic trauma (Hung et al., 2015). A test-retest reliability was examined with 98 people with osteoarthritis and ranged from 0.83-0.95 (Broderick et al., 2013).

Hearing impairment was measured by the Hearing Handicap Inventory for Elderly-Short (HHIE-S). The HHIE-Screening (HHIE-S) is a short version of the HHIE and is a 10-item standardized questionnaire which was developed to evaluate social and emotional impact of hearing loss for the noninstitutionalized elderly population (Ventry & Weinstein, 1982). It contains five items of social situations and five items of emotional effect. The emotional section evaluates respondents’ attitudes and emotional responses to hearing loss and the social section asks about the perceived effect of hearing loss in various situations. Respondents check “yes” (4 points), “sometimes” (2 points), and “no” (0 point) for each question. The total score of 0-8 suggests no hearing handicap, 10-24 is mild-moderate and 26-40 is significant hearing handicap. Thus, a score greater than eight indicates the presence of hearing handicap. Examples of questions include, “Does a hearing problem cause you to feel embarrassed when you meet new people?” and “Does a hearing problem cause you to have arguments with family members?” Higher the HHIE-S score reflects greater handicap. Test-retest reliability was 0.84 (Lichtenstein, Bess, & Logan, 1988) and internal consistency measured with Cronbach’s alpha was reported as 0.88-0.95 in a study that investigated 100 elderly individuals (Ventry & Weinstein, 1982).

Vision impairment was measured by Impact of Vision Impairment (IVI) Questionnaire. The IVI questionnaire is a patient-reported instrument which assesses participation in daily activities, restriction of participation, and vision-related quality of life (Weih, Hassell, & Keeffe, 2002). It contains 28 items using a five-point Likert scale, ranging from zero; not at all, to five; can’t do because of eyesight with a total range from zero to 132. Higher scores reflect greater vision impairment. Items of the questionnaire includes three subscales including reading and accessing information, mobility and independence, and emotional well-being. The questionnaire asks, “In the past month, how much has your eyesight interfered with the following activities such as reading labels on medicine, taking part in sports activities, or visiting friends/family”. The IVI questionnaire has been reported to be reliable and rigorously validated in individuals with legally blind persons in Australia (Finger et al., 2014), German patients with low vision (Finger et al., 2011), and in students (Cochrane, Lamoureux, & Keeffe, 2008).

Social engagement was measured by the Lubben Social Network Scale (LSNS). LSNS was previously used to assess community dwelling older adults’ perceived social support (Howie, Troutman-Jorden, & Newman, 2014), social connection of older adults (Adams, Sanders, & Auth, 2004; Douglas, Georgiou, & Westbrook, 2017) and social isolation (Rubinstein, Lubben, & Mintzer, 1994). In this paper, we used the LSNS as a proxy for social engagement. LSNS-6 item includes three questions of kinship (family) ties and a comparable set of three questions asking non-kinship (friends) ties for older adults (Lubben, 1988). The total score is calculated by summing all items, which ranges from 0 to 30, with a higher score indicating social support. A score lower than 12 indicates that an individual is at risk for social isolation. Examples of items include, “How many relatives do you see or hear from at least once a month?” and “How many friends do you feel close to such that you could call on them for help?” Item-total scale correlation coefficients ranged from 0.68 to 0.78, indicating homogeneity of the LSNS-6 items. Correlation coefficients of subscale scores to total scores were 0.82-0.91 for the

Family items and 0.80-0.90 for the Friends subscale. LSNS-6, and subscale scores are highly correlated with other measures such as emotional support, participation in group activities, and living with a partner, indicating good convergent validity (Lubben et al., 2006). In another study conducted on 196 older adults who live in both public and subsidized housing facilities. Person and item reliability were used and these are conceptually equivalent to Cronbach's alpha (Gray, Kim, Ciesla, & Yao, 2016). Person reliability was reported acceptable with 0.80 and item reliability was excellent with 0.94

Dependent Variable: Sense of Belonging

Sense of belonging was measured with the Sense of Belonging Instrument – Psychological (SOBI-P). SOBI-P consists of 18 items which measure valued involvement and fit with potential ranges from 18-72. Examples of questions include "I often wonder if there is any place on earth where I really fit in" and "I feel like an outsider in most situations". Higher SOBI-P scores reflect greater sense of belonging.

Hagerty and Patusky (1995) examined the two types of reliability; internal consistency and test-retest reliability with the same three groups selected for SOBI-A. Internal consistency reliability of SOBI-P was acceptable with a Cronbach's alpha of 0.93, 0.76 for depressed clients, and 0.76 for nuns. For a randomly selected 100 students, test-retest correlation for SOBI-P at 8 weeks was reported to be 0.84 and SOBI-A was 0.66. Construct validity was assessed with a known groups comparison. The patients with depression had a SOBI-P score (mean=43.49) lower than the students (mean=55.54) and groups of nuns (63.80). Construct validity of SOBI-P was supported by observed associations with loneliness, reciprocity, and social support (Hagerty & Patusky).

Data Analysis

Descriptive statistics are reported for all variables; no missing data were found. For questionnaires with Likert scales, mean scores and standard deviations were reported. Data analysis was conducted by using a software R. 3.4.3.

Multiple linear regression was used to explore the relationship between independent variables and dependent variables. Firstly, the assumptions of no multicollinearity were verified, and the normality, linearity, and homoscedasticity were satisfied to perform a multiple regression model. Level of significance was set at $p < .05$. Independent variables were sense of belonging-antecedents (SOBI-Antecedents), physical function (PROMIS® PF CAT), hearing impairment (HHIE-S), vision impairment (IVI Questionnaire), and social engagement (LSNS). The dependent variable of sense of belonging measured with sense of belonging-psychological (SOBI-P). Controlling variables were added: age (in years), gender (male=0, female =1), marital status (unmarried=0, married=1), and residents' length of stay (in months). Length of stay was added given longer stay was positively associated with quality of life in nursing home residents (Shippee, Henning-Smith, Kane, & Lewis, 2015).

Results

The total sample included 100 participants who completed all survey questionnaires. The mean age for the sample was 84 years old, ranged from 65 and 99 years. 70 % (n=70) of the residents were female and the majority (94%) were White and 66% were widowed. Ages ranged from 65 and 99 years. Residents reported a mean of 4.2 comorbidities. At least 48% of the residents attained an associate degree or higher. The average length of stay in AL was 39 months with a range from three months to 17.5

years. The most commonly identified comorbidity was arthritis (70%), followed by back pain or spinal stenosis (39%), depression (29%), and stroke/TIA (22%), and 41% of the residents reported having a history of cataract and glaucoma. The mean score for Activities of Daily Living was 5.46 with an actual range from one to six. Sample characteristics are provided in Table 4 and descriptive statistics for the independent and dependent variables are provided in Table 5.

Table 4.

Descriptive Characteristics of the Sample (n=100)

Characteristic	**Mean (SD)**	**Min-Max**
Age (Years)	84(8.1)	65-99
Groll's Comorbidity (0-18)	4.2(2.4)	0-12
KATZ Activities of Daily Living (1-6)	5.5(1.1)	1-6
Lawton and Brody Instrumental Activities of Daily Living (1-8)	4.7(1.7)	1-8
Length of Stay in Months	38(38)	3-210
Gender	%	
Female	70	
Male	30	
Race		
White	94	
Black	6	
Marital Status		
Widowed	66	
Married	17	
Divorced	11	
Single (Never Been Married)	6	
Educational Attainment		
Some High School	10	
High School Graduates	42	
Associate Degree	14	
Bachelor's Degree	15	
Master's Degree	17	
Doctorate Degree	2	

Seventy two percent of our sample reported a score ≤ 8 which showed no hearing impairment. 71% scored equal to and lower than 20 out of 132 on the IVI Questionnaire, though interestingly, 40% of the sample reported having either cataract or glaucoma. One resident was legally blind who scored 132. Twenty residents reported lower than 12 on LSNS suggesting they felt socially isolated. The SOBI-P score showed a wide range from 34 to 71.

Table 5

Descriptive Statistics of Dependent and Independent Variables (n=100)

Measure[a]	**Mean (SD)**	**Min-Max**[b]
HHIE-S	7.18 (8.58)	0-36
IVI-Questionnaire	19.77 (30)	0-132
PROMIS® Physical Function	35.01(8.84)	19.2-60.9
LSNS	18 (6.28)	3-30
SOBI-Antecedents	30 (3.49)	21-40
SOBI-Psychological	53 (4.84)	34-71

Note. [a]HHIE-S: Hearing Handicap Inventory-Screening, IVI Questionnaire: Impact of Vision Impairment Questionnaire, LSNS: Lubben Social Network Scale, SOBI-Antecedents: Sense of Belonging Instrument-Antecedents, SOBI-Psychological: Sense of Belonging Instrument-Psychological.

[b]Potential range for each measure: 0-40 for HHIE-S; 0-132 for IVI-Q; 0-30 for LNSN, 14-64 for SOBI-A; 18-72 for SOBI-P.

A positive, weak to moderate Pearson's Correlation was noted between the SOBI-P and LSNS (social engagement), r = .38. Both HHIE-S and IVI Questionnaire had a negative association with SOBI-P. Additional bivariate correlations are presented in Table 6.

Table 6.

Pearson's Correlations among Continuous Variables and Sense of Belonging-Psychological (n=100)

Measures	**HHIE-S**	**IVI Questionnaire**	**PROMIS® PF**	**LSNS**	**Length of Stay**	**SOBI-Psychological**
SOBI-Antecedents	.02	-.02	-.03	-.19	-.02	-.17
HHIE-S		.40***	-.34***	-.10	-.07	-.23*
IVI-Questionnaire			-.36***	-.09	-.04	-.27**
PROMIS® PF				.30**	-.03	.20*
LSNS					-.20*	.38***
Length of Stay						-.04

Note. Asterisks denote significant correlations, * p< 0.05, ** p< 0.01, *** p<0.001

HHIE-S: Hearing Handicap Inventory -Screening, IVI Questionnaire: Impact of Vision Impairment Questionnaire, LSNS: Lubben Social Network Scale, SOBI-Antecedents and SOBI-Psychological: Sense of Belonging Instrument-Antecedents and Psychological.

Social engagement (LSNS) was a significant predictor of sense of belonging (SOBI-P). Residents who had greater social engagement had a higher level of sense of belonging. The total variance explained by the model was 23%. Also, adding the controlling variables to the model did not show a statistically significant change and the entire model remained significant ($p<0.001$). The results of multiple linear regression are presented in Table 4.

Table 7.
Results of Multiple Linear Regression Predicting Sense of Belonging of AL Residents (n=100)

Variable	***B***	***SE***	***t***	**p**
SOBI-Antecedents	-.13	.13	-1.04	0.30
HHIE-S	-.05	.05	-.95	0.34
IVI Questionnaire	-.26	.17	-1.55	0.12
PROMIS® Physical Function	-.01	.05	-.31	0.75
Lubben Social Network Scale	.27	.07	3.52	0.0003*
Age	-.00	.06	-.08	0.93
Gender	-.39	1.01	-.04	0.69
Marital Status	.55	.54	1.02	0.31
Length of Stay	.00	.01	.26	0.80
R^2			.23	
Adjusted R^2			.15	

Note. *p < .0001
HHIE-S measures hearing impairment. IVI Questionnaires measures vision impairment.
Lubben Social Network Scale used as a proxy to measure social engagement

Discussion

Residents reported a wide range for sense of belonging from very low to high and social engagement was the only significant predictor of sense of belonging. The wide range for sense of belonging suggests that some AL residents feel isolated and do not experience a positive feeling of belonging. In fact, the mean score for sense of belonging (SOBI-P) was lower than for community-dwelling older adults and for those living in retirement villages (McLaren, Gomez, Bailey, & Van Der Horst, 2007). These results support the notion that AL residents are at an increased risk for being socially disconnected or isolated despite the fact that they live in close proximity to other residents in a facility.

To the best of our knowledge, this is the first study demonstrating that social engagement is associated with sense of belonging of AL residents. Residents' social network may become smaller and more limited as they lose their loved ones and move into assisted living. LSNS was used as a 'proxy' for social engagement. The LSNS included the number of family and friends that residents see regularly, feel close to, and at ease with, but it is unclear who their friends were. It could have been other residents, friends from their previous neighborhood or community, or staff members. Given the importance of social engagement, more work is needed to develop a standard measure of social engagement for older adults or AL residents. Qualitative studies may be useful to discover more about residents' social world and to identify components of social engagement for this population.

The fact that hearing impairment was not associated with sense of belonging is noteworthy. Hearing impairment can lead to poor communication among older adults, and hearing impairment was associated with a reduced quality of life in older adults who live at home and in nursing homes (Bazargan, Baker, & Bazarggan, 2001; Dalton et al., 2003). Our results showed that the majority of the sample reported mild hearing impairment, which likely caused a weak correlation to sense of belonging. This could be explained by the latest technology for hearing aids which is advanced to the point where it mitigates many of the issues associated with hearing impairment. Another reason could be older adults are less likely to report hearing problems compared to younger people (Wiley, Cruickshank, Nondahl, & Tweed, 2000). Also, subjects may have underestimated their hearing impairment, as self-report underestimates the prevalence of hearing loss (Nondahl et al., 1998).

Vision impairment was not a significant predictor of sense of belonging. The majority of our sample reported that vision impairment did not significantly interfere with their activities, which could explain why it was not a significant predictor in the model. Our sample reported a low level of vision impairment compared to other studies of AL residents who aged ≥ 60 years (Elliot, McGwin, and Oswly, 2013) and individuals who have cataract, macular degeneration, and glaucoma in rural Thailand (Ratanasukon et al., 2016). Our sample may have had a greater availability of assistive tools and devices for their vision impairment. More work is warranted to further explore experiences of AL residents with vision impairment and how it influences their quality of life.

Physical function was not associated with sense of belonging. The sample was fairly independent with respect to the level of ADLs. This can be explained by the fact that most residents use assistive devices including a cane, walker, electrical scooter and receive an assistance as needed by staff. It is common place to use the assisted devices and the facilities from the study all had hand rails and wide hallways, which can somewhat mitigate the physical impairment and does not interfere with their ability to interact with each other.

We did not observe a relationship between SOBI-A and SOBI-P and this was surprising. Different findings were reported in community-dwelling older adults and those who live in retirement housing where correlations between SOBI-A and SOBI-P was moderate, 0.58 (McLaren et al., 2007). We cannot explain this difference and additional work is needed to further explore this inconsistency with other populations.

One of the limitations of the study is a small sample size, which can be a barrier to generalizing the findings. The sample partially represents the AL population given their educational level is higher than AL population in the U.S., thus generalization should be cautioned. During data collection, activity staff from each facility identified a handful of residents who may be interested in participation in the study and these individuals may already be more socially engaged than others. Given this was a cross-sectional design, findings of this study did not reveal how residents' social relationships change over time. Longitudinal studies and qualitative designs should be considered in the future to learn how residents maintain their relationships and form new relationships as they age while experiencing more functional disability or comorbidities. Although our findings showed that there was no gender difference on social engagement or sense of belonging, additional research would help understand differences in women and men's perception of their social worlds. In the future, comparison studies will be necessary to discover the extent to which AL residents' experience differ from those in nursing homes or community dwelling older adults. Lastly, additional evidence is needed to provide information regarding factors at the facility level that contribute to sense of belonging such as facility size or presence of common areas.

Summary

This study was the first study to examine the relationship between social engagement and sense of belonging of AL residents. Residents reported a wide range for sense of belonging from very low to high and social engagement played an important role in predicting sense of belonging. Social engagement was the only variable from the conceptual model, that predicted sense of belonging. Further research is needed to fully understand factors that may influence sense of belonging. Future studies can build upon these findings to develop and test interventions to improve residents’ social engagement.

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CHAPTER IV

Sense of Belonging and Psychological Well-being of Assisted Living: A Descriptive Study

Introduction

Sense of belonging is defined as the feeling of being connected and accepted with family, community, and society that may share common interests and it was identified as the third most significant fundamental human need after physiological and safety needs such as food and shelter (Maslow, 1943). Feeling that an individual belongs with other people, an organization, and a greater community is important in finding a value and meaning in life (Lambert et al, 2013). It can impact how much individuals participate in the community and society, and ultimately contributes to their physical health, mental health, and quality of life. Because sense of belonging entails an individuals' feeling of being connected and secure, it is considered important for human development. A lower level of sense of belonging has been reported with greater depressive symptoms and less social interactions among undergraduate students (Steger & Kashdan, 2009). Only a few studies have been conducted on AL residents' sense of belonging and very little is known about AL residents' sense of belonging and how it may influence the mental or psychological well-being of AL residents.

Depression of Assisted Living Residents

Sense of belonging could affect depression. Residents in assisted living and residential care facilities are reported to be more depressed than community-dwelling older adults; 20 % to 43% of residents reported depressive symptoms whereas the rates for community dwelling older adults to be depressed were 8% to 16 % (Blazer, 2003). Similarly, AL residents reported high levels of depressive symptoms and low life satisfaction (Cummings & Cockerham, 2004). Relocation to assisted living can have a negative effect on social support networks, and it is associated with more symptoms of depression and loneliness (Cheng et al., 2011, Cummings, 2002; Winnigham & Pike, 2008).

Social Isolation of Assisted Living Residents

Older adults relocate to assisted living for multiple reasons including life changes such as loss of spouse, one partner in need of caregiving from another, inability to drive or lack of transportation, and functional disability such as mobility issues, sensory impairment, or dementia. Research has shown that relocation can lead to feelings of loneliness and social isolation for older adults (Johnson, 1996). Relocation can be disruptive and stressful as it may take some time to develop social connections and friendships with other people. People older than 80 years were found to be the loneliest (Pinquart & Sörensen, 2003). The average age of AL residents is 86.9 years old, putting them at an increased risk for loneliness. Little research has been done for social isolation or loneliness among assisted living residents.

Social Participation

Participating in social activities has multiple positive outcomes for older adults. Participating in leisure activities was associated with higher levels of life satisfaction for community-dwelling elders (Ragheb & Griffith, 2018) and psychological well-being for assisted living residents (Cummings, 2002). Activity theory posits that participation in social roles is important in adjustment with aging for older adults (Lemon, Bengtson, & Peterson, 1972; Longino & Kart, 1982). Those who participate in social roles and activities can achieve a better life satisfaction and successful aging. Despite the importance and benefits of participating in social activities, AL residents' experiences of social participation is relatively unknown. In particular, to what extent their sense of belonging in the facility attributes to their satisfaction with social participation is unknown.

Sense of Belong Model

There is no research describing the effects of sense of belonging on psychological well-being of AL residents. The sense of belonging model was used to guide this research which is shown in Figure 4. (Hagerty, Williams, Coyne, & Early, 1996).

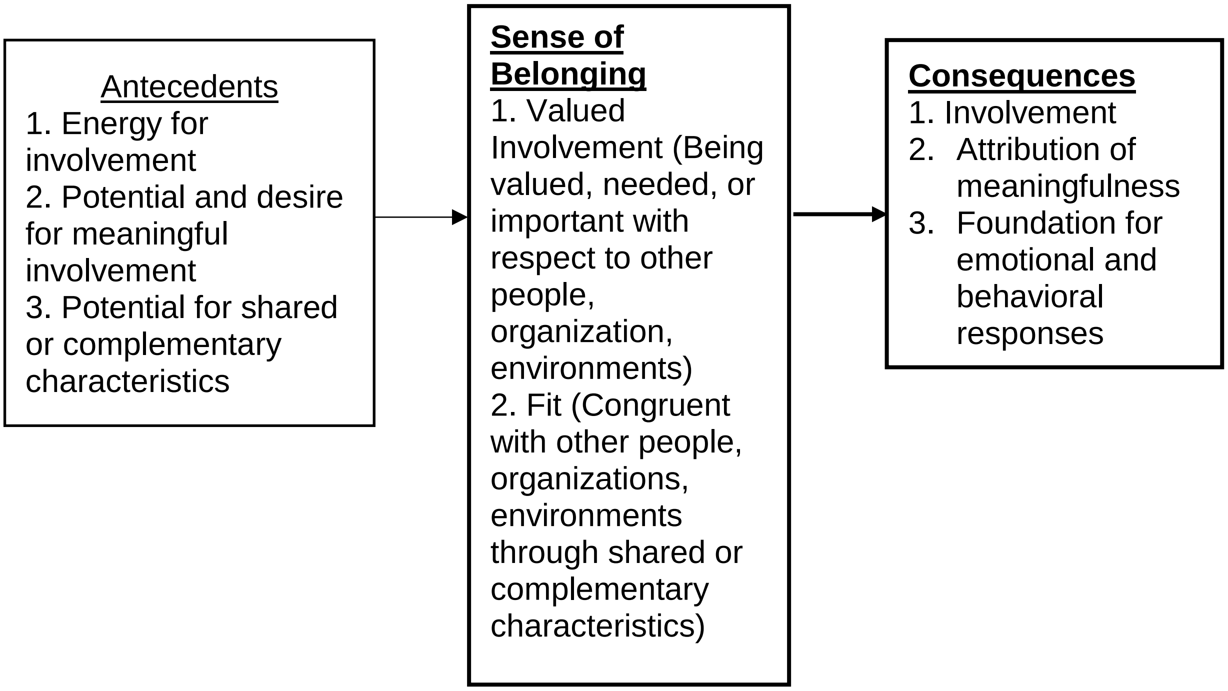

Figure 4. *A Concept Analysis of Sense of Belonging (Hagerty et al., 1996)*

We modified the above model to investigate the relationship between sense of belonging (middle box) and psychological well-being, which is presented in Figure 5. Evidence of psychological well-being in assisted living residents would include a low level of depression, low level of social isolation, and higher satisfaction with participation in social roles and activities. These three variables were chosen to measure psychological well-being because a better feeling or sense of belonging was found to be attributing to depression, and sense of belonging may enhance social connectedness which can lessen social isolation and improve residents' satisfaction with their roles and activities.

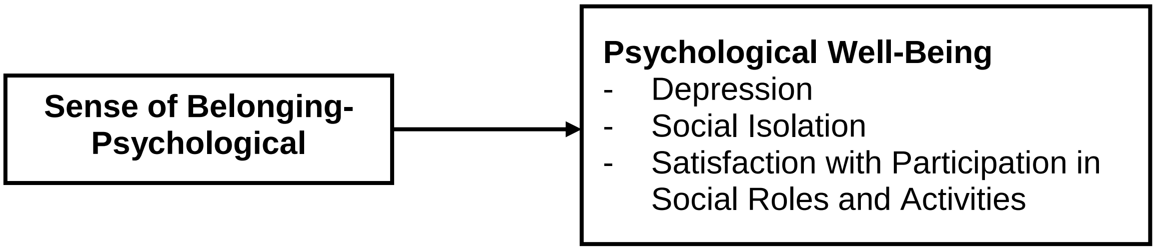

Figure 5. *Theoretical Framework Modified from Sense of Belonging Model*

Specific Aim

The specific aim was to examine the relationship between AL residents' sense of belonging and psychological well-being as reflected by depression, social isolation, and satisfaction with participation in social roles and activities. It was hypothesized that higher levels of sense of belonging will be associated with lower levels of depression, lower levels of social isolation, and higher level of satisfaction with participation in social roles and activities among residents.

An exploratory aim was to determine if sense of belonging is associated with psychological well-being, controlling for the predictors examined in paper 2 including age, gender, marital status, physical function, hearing impairment, vision impairment, and sense of belonging-antecedents, social engagement, and length of stay. It is also possible that differences may occur based on gender and marital status, thus we explored potential differences. We hypothesized that controlling for these variables will strengthen the relationship between sense of belonging and psychological well-being in AL residents.

Method

Site Recruitment, Participants, and Procedures

Procedures for site and participant recruitment were explained in detail in Paper 2. Briefly, a total of 100 residents were recruited and participated from five assisted living facilities in Southeast Michigan. The size of the facilities ranged from 49 to 200 beds and all facilities had similar amenities including housekeeping, laundry services, and meal preparation. All facilities had both internal and external social activities offered by social activity programs/life enrichment teams. Primary inclusion criteria for residents were their length of stay in the facility for at least three consecutive months and a Mini Mental Status Exam score that was equal to or exceeded the median score for age and educational level as presented in Appendix C (Crum et al., 1993). Refer to paper 2 for inclusion criteria for resident recruitment.

Demographics and Descriptive Information

Basic demographics were collected including age, race/ethnicity, education attainment, employment status, comorbidity (Groll, To, Bombardier, & Wright, 2005), activities of daily living (Katz, 1983), instrumental activities of daily living (Lawton & Brody, 1969), and length of stay (months).

Measures

Independent Variable

Sense of belonging was measured with the Sense of Belonging Instrument – Psychological (SOBI-P). SOBI-P has 19 items which assesses perceived sense of belonging including valued involvement and fit in individuals' environment and community. Examples of the items are, "I often wonder if there is any place on earth where I really fit in" and "I feel like an outsider in most situations". There is strong evidence for the reliability and validity of SOBI-P (Hagerty & Patusky, 1995).

Dependent Variables

Psychological well-being was operationalized with measures of depression, social isolation, and satisfaction with participation in social roles and activities. Patient Reported Outcomes Measurement Information System (PROMIS®) Computer Adaptive Test (CAT) were used to measure depression, social isolation, and satisfaction with participation in social roles and activities. With the CAT approach, each measure uses an item-bank and the order in which items are presented is based on the answers to previous items. This is an efficient approach and most subjects will require approximately four items to complete a given measure. All three PROMIS® Depression, Social Isolation, and Satisfaction with Participation in Social Roles and Activities CAT were used to reduce the physical burden on elderly participants by minimizing the time of administering survey. A T-score of 50 is the average for the United States population with a standard deviation of 10.

Depression was measured with PROMIS® Depression CAT. The PROMIS® Depression CAT is constructed from a bank of 12 items that assess respondents' negative mood such as feeling depressed or sad, views of self including their worthlessness, and social cognition such as loneliness, on a 5-point Likert scale ranging from never to always (Pikonis et al., 2011). The higher the score, the more depressed respondents feel. Reliability of the PROMIS® Depression scale was high with Cronbach's alpha of .91 with 1079 men with prostate cancer (Quach et al., 2016).

Social isolation was measured with the PROMIS® Social Isolation CAT which is taken from a bank of 14 items. Examples of items include, "I feel left out", "I feel that people barely know me" (Hahn et al., 2010). The potential responses range from never to always on a 5-point Likert scale. Higher scores reflect greater social isolation. Validity was supported by moderate negative correlations between PROMIS® Social Isolation CAT and the SF-36 or Functional Assessment of Cancer Therapy-General Populations (FACT-GP) (Hahn et al., 2014).

The PROMIS® Satisfaction with Participation in Social Roles and Activities was measured with CAT taken from a bank of 44 items in total. Examples of items include, "I am able to do all of my regular activities with friends" and "I am able to do all of my usual work" (Heinemann, Kisala, Hahn, & Tulsky, 2015). Reliability of PROMIS® Satisfaction with Participation in Social Roles and Activities CAT was supported by a test-retest correlation for reported Pearson's test-retest correlation of .78 (Heinemann et al., 2015).

Other variables that might influence depression, social isolation, and satisfaction with participation in social roles and activities are the factors examined in paper 2, including age, gender, marital status, physical function, hearing, vision impairment, and sense of belonging-antecedents, social engagement, and length of stay. Physical function was measured with PROMIS® Physical Function CAT. Hearing impairment was measured with Hearing Handicap Inventory Screening (Ventry & Weinstein, 1983). Vision impairment was measured with Impact of Vision Impairment Questionnaire (Weih, Hassell, & Keeffe, 2002). Sense of belonging – antecedents were measured with Sense of Belonging Instrument – Antecedents (Hagerty and Patusky, 1995), and social engagement was measured with Lubben Social Network Scale (Lubben, 1988).

Data Analysis

Mean with standard deviation of the SOBI-P and dependent variables were reported by gender and marital status. A multiple linear regression using Ordinary Least Squares (OLS) was conducted to explore the relationship of independent variables as they relate to the dependent variable. Data analysis was conducted by using a software R-3.4.3.

To address the aim of the study, bivariate correlations and multiple linear regression were employed. Then, to examine the exploratory aim, after determining that the assumptions of normality, linearity, and multicollinearity were not violated, three multiple linear regressions were employed to determine to what extent sense of belonging predicts each dependent variable. Homoscedasticity was examined via scatterplots and these indicated reasonable consistency of spread through the distribution of the predictors on the dependent variables.

For each regression, additional predictors were added which included age, gender, marital status, physical function (PROMIS® PF CAT), hearing impairment

(HHIE-S), vision impairment (IVI Questionnaire), sense of belonging-antecedents (SOBI-Antecedents), social engagement (LSNS), and length of stay. A significance level of p < .05 was used for all regressions.

Results

A total of 100 residents participated in the study. In brief, the mean age of participants was 84 years old with a range of 65-99. Seventy percent of the participants were female and 94% were Caucasian. The average length of stay was 39 months. The most prevalent comorbidity was arthritis (70%) followed by back pain or spinal stenosis (39%).

The mean score for SOBI-P was 53 (4.84). The mean scores for PROMIS® depression, social isolation, and satisfaction with participation in social roles and activities were not significantly different than 50, see Table 8. The mean scores for measures of independent variables are presented and organized by gender and marital status in Table 9. No gender differences were noted between SOBI-P and the dependent variables. No differences were observed by marital status.

Moderate correlations were observed between SOBI-Psychological and two of the three indicators of psychological well-being: PROMIS® Depression and PROMIS® Satisfaction with Participation in Social Roles and Activities r = - 0.39 and r = 0.36, respectively. Correlations among other study variables are shown in Table 10.

Table 8.

Mean (SD) of SOBI-P and Dependent Variables and T-test Results by Gender and Marital Status

Variable*	Female (n=70) M (SD)	Male (n=30) M (SD)	t	p	Unmarried (n=83) M (SD)	Married (n=17) M (SD)	t	p
SOBI-P	52.4(4.27)	52.2(6.04)	-0.17	0.86	51.96 (4.24)	53.05 (4.81)	0.53	0.59
PROMIS® Depression	51.12(7.78)	50.53(7.66)	-0.35	0.72	51.19(7.26)	49.72(7.95)	-0.96	0.34
PROMIS® Social Isolation	46.19(7.64)	48.27(7.20)	1.28	0.20	46.96(7.59)	47.12(6.85)	-0.51	0.61
PROMIS® Satisfaction with Participation in Social Roles and Activities	48.32(7.36)	47.71(9.0)	-0.32	0.74	47.29(7.04)	49.63(8.11)	0.83	0.41

Note. *Potential range for each measure as follows. SOBI-P (Sense of Belonging Instrument - Psychological):18-72. Total min-max scores for each measure as follows. SOBI-P: 34-71. PROMIS® Depression: 34.2-78.2. PROMIS® Social Isolation: 31.8-65.7. PROMIS® Satisfaction with Participation in Social Roles and Activities: 27.8-68.7.

Table 9.

Mean (SD) of Independent Variables and T-Test Results by Gender and Marital Status (n=100)

	Female (n=70)	**Male (n=30)**			**Unmarried (n=83)**	**Married (n=17)**		
Variable*	M (SD)	M (SD)	t	p	M (SD)	M (SD)	t	p
HHIE-S	7.14(8.67)	7.27 (8.51)	0.07	0.95	4.47(6.34)	7.73(8.90)	-1.79	0.08
IVI Q	18 (26.63)	23.9(35.54)	0.81	0.42	12.65(16.73)	21.23(31.40)	-1.61	0.11
PROMIS® PF	34.27(8.30)	36.71(9.92)	1.18	0.24	35.76(10.26)	34.84(8.58)	0.34	0.73
LSNS	17.12(6.14)	16.33(6.68)	-0.56	0.58	15.52(6.86)	17.17(6.16)	-0.91	0.37
SOBI-A	30.14(3.37)	31.3 (3.69)	1.47	0.14	29.35(5.01)	30.72(3.08)	-1.08	0.29

Note. * HHIE-S=Handicap Hearing Inventory-Screening, IVI Q=Impact of Vision Impairment Questionnaire, PROMIS® PF=Physical Function, LSNS=Lubben Social Network Scale, used as a proxy to social engagement, and SOBI-A=Sense of Belonging-Antecedents. Potential ranges for each measure: 0-40 for HHIE-S; 0-132 for IVI-Q; 14-64 for SOBI-A; 0-30 for LNSN.

Table 10.

Pearson's Correlation between All Continuous Variables (n=100)

Variable*	**PROMIS® Depression**	**PROMIS® Social Isolation**	**PROMIS® Satisfaction with Participation in Social Roles and Activities**
Age	-.20*	-.16	-.04
Handicap Hearing Inventory-Screening	.16	.11	-.28**
Impact of Vision impairment Questionnaire	.23*	.23*	-.38***
PROMIS® Physical Function	-.25*	-.18	.45***
Lubben Social Network Scale	.06	-.02	.22*
Sense of Belonging Instrument-Antecedents	-.19	.02	-.18
Length of Stay	-.18	-.13	.06
Sense of Belonging Instrument-Psychological	-.09	-.31**	-.23*
PROMIS® Depression		.56***	-.27**
PROMIS® Social Isolation			-.46***
PROMIS® Satisfaction with Participation in Social Roles and Activities			

Note. * p< 0.05 ** p < 0.01, *** p< 0.001

The results of the first multiple linear regression produced an adjusted R^2 of .25 ($F(10, 89\ \mathrm{df})=5.013$, $p < 0.001$) for the prediction of depression. Among these predictors, sense of belonging-antecedents, age, marital status, physical function, and length of stay were significant predictors of depression.

The results of the second multiple linear regression produced an adjusted R^2 of .19 ($F(10, 89\ \mathrm{df})=3.326$, $p=0.001$) for the prediction of social isolation. Among these predictors, age was a significant predictor of social isolation; the younger the residents were, residents were more socially isolated.

The third multiple linear regression was conducted to determine to what extent sense of belonging was associated with AL residents' satisfaction with participation in social roles and activities. The regression produced an adjusted R^2 of .33 ($F(10, 89\ \mathrm{df})=5.881$, $p<0.001$) for the prediction of satisfaction with participation in social roles and activities. Among these predictors, vision impairment was a significant predictor of satisfaction with participation in social roles and activities. The details of the three multiple linear regressions are shown in Table 11.

Table11.

Results of Multiple Linear Regressions of Depression, Social Isolation, and Satisfaction with Participation in Social Roles and Activities of AL residents (n=100)

	PROMIS® Depression			**PROMIS® Social Isolation**			**PROMIS® Satisfaction with Participation in Social Roles and Activities**		
Variable	**B**	**SE**	**p**	**B**	**SE**	**p**	**B**	**SE**	**p**
SOBI-Psychological	-.44	.15	.0063**	-.53	-3.35	.0011**	.28	.15	.0641
SOBI-Antecedents	-.41	.20	.0422*	-.08	-.40	.6887	-.32	.19	.1038
Age	-.18	.08	.0330*	-.17	.09	.0732	-.00	.09	.9866
Gender	.42	1.53	.7863	-1.38	1.56	.3780	.36	1.48	.8154
Marital Status	-.98	1.87	.6014	-.28	.84	.7358	.21	.79	.8013
PROMIS® Physical Function	-.21	.08	.0161*	-.09	.09	.2995	.27	.08	.0015**
HHIE-S	.07	.09	.4375	-.01	.09	.9004	-.06	.08	.4121
IVI Q	.04	.02	.2356	.03	.02	.2432	-.05	.02	.0240*
LSNS	.15	.12	.2051	-.02	.12	.8350	.08	.12	.4836
Length of Stay	-.03	.01	.0676	-.03	.01	.0838	.01	.01	.2823
R^2		.33			.27			.39	
Adjusted R^2		.25			.19			.33	

Note. * $p < 0.05$, ** $p < 0.01$

SOBI-Psychological=Sense of Belonging Instrument-Psychological, SOBI-A=Sense of Belonging-Antecedents, HHIE-S=Handicap Hearing Inventory-Screening, IVI Q=Impact of Vision Impairment Questionnaire, LSNS=Lubben Social Network Scale, used as a proxy to social engagement. Gender was coded with male=0, female=1. Marital status was coded with unmarried=0, married=1.

Discussion

Sense of belonging plays an important role in predicting psychological well-being of AL residents. Residents who reported a lower sense of belonging were more depressed and socially isolated. Additionally, the exploratory analysis showed that sense of belonging-antecedents, physical function, and age predicted depression.

Sense of belonging is an important concept for AL residents because not only is it a basic human need, but it predicts multiple positive outcomes. Our findings confirm findings of previous studies that have reported a relationship between sense of belonging and depression. Low levels of sense of belonging has been strongly associated with higher level of depression and loneliness in various populations, among college students (Hagerty et al., 1996; Hagerty & Williams, 1999), navy recruits (Sargent, Williams, Hagerty, Lynch-Sauer, & Hoyle, 2002), those aged 20-65 years in Italy (Prezza et al., 2001), and those who live in the rural-urban communities (McLaren, Jude, Hopes, & Sherritt, 2001). Additionally, sense of belonging was reported as a factor lessening loneliness among older adults in both community and residential care facilities in Spain (Prieto-Flores et al., 2011).

Sense of belonging was a predictor of social isolation; a low level of sense of belonging was associated with a higher level of social isolation. Social isolation is a factor leading to mortality and morbidity (Eng, Rimm, Fitzmaurice, & Kawachi, 2002). Socially isolated persons are at an increased risk of mortality compared to those with more social ties to friends, relatives, and communities (Eng et al., 2002). Improving social isolation can lead to social support and may protect older adults from falls (Cauley, Zmuda, Griffin, & Nevitt, 2003) and a decline in cognitive function or dementia

(Fratiglioni, Paillard-Borg, & Winblad, 2004). Because social isolation can lead to these majorly negative health outcomes, residents' sense of belonging should be enhanced to lessen social isolation. Interestingly, sense of belonging was not a predictor of satisfaction with participation in social roles and activities. It is unclear why sense of belonging was a predictor to depression and social isolation but not satisfaction with participation. It is possible that the closer examination of the instrument revealed that it may not be appropriate for AL residents, as certain questions assess an ability to perform certain activities which require a higher level of ADLs than what AL residents typically can perform.

Physical function is an important predictor of depression and satisfaction with participation in social roles and activities. Physical function for our sample was 35% lower than the general population in the U. S. Although the literature in assisted living is limited, a few studies have discussed the importance of physical function or functional status in relation to quality of life and depressive symptoms and high levels of physical function were associated with better mental health (Salguero, Martinez-Garcia, Molinero, & Marquez, 2010; Park, Thogersen-Ntoumani, Ntoumanis, Stenling, Fenton, & Veldhuijzen van Zanten, 2017). Generalizability should be cautioned. Salguero et al. (2010) conducted their study in senior housing and whether the senior housing is compatible with AL facilities in the Unites States is uncertain. Also, these studies were conducted in other cultures, Spain and United Kingdom, respectively.

Age was associated with depression for our sample; younger residents experienced higher levels of depression. Mixed findings were reported in the literature. Age is associated with depression: Incidence of major depression double after age 70-

85 years (Teresi, Abrams, Holmes, Ramirez, & Eimicke, 2001). Very old persons are particularly prone to mild depression and age is associated with depressive symptoms (Blazer, Burchett, Service, & George, 1991; Berkman et al.,1986; Blazer, 2003). With age, older adults can have functional disability, chronic illness, lower income, smaller social networks, all of which can contribute to depressive symptoms. Yet, a study from New Zealand reported that age was not related to depression (Alpass & Neville, 2003). Plausible explanation for our finding is that the older residents may have more functional disability and comorbidities making it challenging for young-old to have opportunities to socially engage with them.

Marital status was not associated with depression. Consistent to our findings, most research has indicated that married people have lower rates of depression and higher levels of happiness and psychological well-being than unmarried people aged 18-99 (Gove, Hughes, & Briggs-Style, 1990; Horwitz, White, & Howell-White, 1996; Kessler & Essex, 1992; Stack & Eshleman, 1998). The explanation argues that married people are exposed to fewer stressful experiences and that living with another person improves well-being. A person who lives alone feels more isolated from their social network and lack of a social network can create a lack of sense of belonging and security (Mirowsky & Ross, 1989). Older adults who were involved with a partner relationship were less lonely than those without a partner (Peters & Liefbroer, 1997). In particular, the community dwelling oldest-old experienced a higher level of depression due to an increase in their disability, less frequent contacts with others in their social network which causes social isolation (Lin, Dean, & Ensel, 1986; Antonucci, 1985).

Hearing impairment was not associated with any of the measures of psychological well-being and yet, findings from earlier research of community-dwelling middle age to older adults indicated that hearing impairment was associated with poorer mental health (Strawbridge, Wallhagen, Shema, & Kaplan, 2000), social isolation (Mick, Kawachi, & Lin, 2013), and depression and loneliness (Kramer. Kapteyn, Kuik, & Deeg, 2000; Dugan & Kivett, 1994). These studies explained that hearing impairment or hearing loss can cause a lack of social contact and social relationships. Our results can be explained by the fact that hearing impairment is less problematic because the technology of hearing aids has been advanced and newer hearing aids mitigated many of the hearing related issues in AL residents.

Length of stay was not associated with psychological well-being. Existing evidence provides mixed findings. Residents with a longer length of stay in nursing homes reported lower levels of perceived social support from family and greatest rate of depression (Commerford & Reznikoff, 1996; Barca, Engedal, Laks, & Selbaek, 2010), though longer stay was associated with better quality of life and engagement in nursing home residents (Shippee et al., 2015). Although the nature of living environments is different in nursing homes compared to assisted living, a potential explanation to our finding is that how long residents stay in their facility was not as important as the quality of their social relationships. Future research is needed to investigate if residents with shorter length of stay or those who just moved into an AL may have a smaller social network and whether it has any negative outcomes such as depression.

A few limitations of the study were noted. This was a cross-sectional study thus the causation cannot be determined. The principle investigator was not blinded to hypotheses and were unconsciously biased subjects' responses during the interview administration. Participants may have overestimated their physical function given that a self-report measure was used. Also, a bias may exist given activity staff identified residents who were more willing to participate in the study and those who are more willing to participate in the study may have reported a better psychological well-being. One factor that can influence residents' depression is how they were relocated in AL facilities; whether it was forced by family or it was a voluntary decision. Future research is needed to investigate why older adults move to AL and to assess if they were forced to move to AL due to their circumstances such as loss of family or functional disability. Additional research is needed to longitudinally examine the relationship factors influencing psychological well-being to learn what factors change over time throughout their life course in AL. Nonetheless, this study lays the foundation for future prospective studies which highlights the importance of sense of belonging and its association of psychological well-being.

Summary

In summary, the present study found that sense of belonging is an important predictor of psychological well-being including depression and social isolation. As expected, residents with higher (better) levels of physical function reported higher satisfaction with participation in social roles and activities. Younger residents reported more depressive symptoms and were more socially isolated.

This was the first research examining sense of belonging in AL residents and these findings highlight the importance of sense of belonging. Further research is needed to fully and carefully understand how sense of belonging affects psychological well-being of AL residents and to learn more about how to promote sense of belonging of AL residents.

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CHAPTER V

Summary of the Three Papers

This dissertation sought to better understand social engagement and sense of belonging of AL residents by (a) identifying factors known to influence social engagement, (b) examining the relationship social engagement and sense of belonging, and (c) examining the relationship between sense of belonging and psychological well-being. The first manuscript titled, “Factors Influencing Social Engagement of Assisted Living Residents: A Systematic Review”, identified factors that negatively influence social engagement including functional disability, depression, hearing impairment, being male, mealtime seating arrangements. Factors that positively influence social engagement were mobility and relationship with staff. A small facility size had both a positive and negative influence on social engagement. The second manuscript, “Relationship between Social Engagement and Sense of Belonging of Assisted Living Residents: A Descriptive Study” showed social engagement was the strongest predictor of sense of belonging after controlling for characteristics such as age, sex, gender, and length of stay. The third manuscript, “Relationship between Sense of Belonging and Psychological Well-Being of Assisted Living Residents: A Descriptive Study” demonstrated that sense of belonging was significantly associated with psychological well-being including depression and social isolation of AL residents. The primary finding of the dissertation is that social engagement and sense of belonging predicts psychological well-being. These findings provide an additional support for the sense of belonging model.

Due to the limited evidence of literature, additional work is needed to fully understand residents' experiences and perception of their social engagement as well as sense of belonging and its effects on psychological well-being and quality of life. Also, given our small sample size, additional work is needed with larger samples in different geographical locations to further examine the relationships between social engagement and sense of belonging as well as between sense of belonging and psychological well-being of AL residents. Given the importance of social engagement, future work is strongly needed to develop a standard quantitative measure of social engagement for AL residents. More qualitative information describing the elements of social engagement is warranted and will be useful to support the development of a new instrument. Having a quantitative instrument to measure social engagement would facilitate the study of larger groups of subjects and multiple contributing factors as described above.

Findings of the dissertation will be useful to nursing staff and direct care workers by documenting the importance of residents' social engagement is. To further advance the science, it would be useful to learn more about how AL staff establish and maintain social relationships with residents.

In conclusion, a key strength of the dissertation is it fills a gap in the literature by demonstrating the importance of social engagement and sense of belonging for AL residents. In essence, social engagement is vital to enhance sense of belonging which ultimately contributes to psychological well-being. More individuals are living longer with functional disabilities and choose to relocate to AL facilities. The need for social engagement in the AL facilities will be increasing, therefore, it is imperative to learn ways to maintain meaningful social engagement/relationships for AL residents to ultimately improve their quality of life. Sense of belonging is human’s basic need and provides a foundation and meaning for one’s being. An important next step is to learn mechanisms and methods to enhance sense of belonging to reduce negative outcomes such as social isolation and loneliness.

APPENDICES

Appendix A
Appraisal tool for Cross-Sectional Studies

	Question	Yes	No	Not Available
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who the research was about?)			
5	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aims of the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?			
10	Is it clear what was used to determine statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)			
11	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results presented for all the analyses described in the methods?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				
19	Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?			
20	Was ethical approval or consent of participants attained?			

Appendix B
Critical Appraisal Skills Programme (CASP)

Criteria:		**How well is this criterion addressed? (*Circle one option for each question*)**
Screening Questions		
1	Was there a clear statement of the aims of the research? HINT: Consider • what was the goal of the research • why it was thought important • its relevance	Yes Unclear or not available Not
2	Is a qualitative methodology appropriate? HINT: Consider • If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants • Is qualitative research the tight methodology for addressing the research goal	Yes Unclear or not available Not
Detailed Questions		
3	Was the research design appropriate to address the aims of the research? HINT: Consider • if the researcher has justified the research design (e.g. have they discussed how they decided which method to use)	Yes Unclear or not available Not
4	Was the recruitment strategy appropriate to the aims of the research? HINT: Consider • If the researcher has explained how the participants were selected • If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study • If there are any discussions around recruitment (e.g. why some people chose not to take part)	Yes Unclear or not available Not

5	Were the data collected in a way that addressed the research issue? HINT: Consider • If the setting for the data collection was justified • If it is clear how data were collected (e.g. focus group, semi-structured interview etc.) • If the researcher has justified the methods chosen • If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews are conducted, or did they use a topic guide) • If methods were modified during the study. If so, has the researcher explained how and why • If the form of data is clear (e.g. tape recordings, video material, notes etc.) • If the researcher has discussed saturation of data	Yes Unclear or not available Not
6	Has the relationship between researcher and participants been adequately considered? HINT: Consider • If the researcher critically examined their own role, potential bias and influence during (a) formulation of the research questions (b) data collection, including sample recruitment and choice of location • How the researcher responded to events during the study and whether they considered the implications of any changes in the research design	Yes Unclear or not available Not
7	Have ethical issues been taken into consideration? HINT: Consider whether • If there are details of how the research was explained to participants for the reader to assess whether ethical standards were maintained • If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study) • If approval has been sought from the ethics committee	Yes Unclear or not available Not
8	Was the data analysis sufficiently rigorous? HINT: Consider • If there is an in-depth description of the analysis process • If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data • Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process • If sufficient data are presented to support the findings • To what extent contradictory data are taken into account • Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation	Yes Unclear or not available Not

9	Is there a clear statement of findings? HINT: Consider • If the findings are explicit • If there is adequate discussion of the evidence both for and against the researcher's arguments • If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst) • If the findings are discussed in relation to the original research question	Yes Unclear or not available Not
10	How valuable is the research? HINT: Consider • If the researcher discusses the contribution the study makes to existing knowledge or understanding (e.g. do they consider the findings in relation to current practice or policy, or relevant research based literature • If they identify new areas where research is necessary • If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used	Yes Unclear or not available Not

Appendix C

Table 12.
Median Scores on Mini-Mental Status Examination by Age and Educational Level

Age(Years)	4th grade(4-6th)	8th grade (7-9th)	High school (10-12th)	College and beyond
65-69	22	26	28	29
70-74	22	25	27	28
75-79	21	25	27	28
80-84	20	25	25	27
>84	19	23	26	27