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Nursing Homes and Loneliness Among Older Adults in the United States

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ABSTRACT

Many studies have revealed that older adults experience varying rates of loneliness depending on their living arrangements, yet few have been measured in nursing homes. I assess rates of loneliness among aging adults across different living arrangements, including nursing homes. Analyzing nationally representative longitudinal survey data from the United States, I observe older adults in all living arrangements and whether the transition into nursing homes is linked with increased rates of loneliness. Findings indicate that older adults living in nursing homes are at a 3.0 higher odds of experiencing loneliness compared to those living independently. When controlling for demographic and family variables, older adults were still at a higher odds of experiencing loneliness. However, when taking into account health variables, older adults living in nursing were at a lower risk of experiencing loneliness compared to those living independently. When moving from community living into nursing homes, respondents experienced a 0.512 increase in loneliness. When stratifying by gender, men were at a higher risk of experiencing loneliness, regardless of controls or not. Additionally, men also experienced a higher increase in loneliness when moving into nursing homes compared to their female counterparts.

Keywords: Loneliness; Nursing homes; Health and Retirement Study; Aging; United States

Introduction

Public health officials have become increasingly concerned about the loneliness older adults face today. Loneliness among older adults was recently declared a global epidemic by the US Surgeon General, with approximately 43% of adults aged 60 and older claiming to be lonely (Murhty, 2017; Donovan & Blazer, 2020). This raises concern because heart disease, a weakened immune system, and Alzheimer's disease are a few of the many health issues linked with loneliness (Cacioppo, Hawkley & Norman, 2011). In fact, loneliness has been found to have the same impact on mortality as smoking 15 cigarettes a day (Pomeroy, 2019). According to scholars, loneliness is the perceived social isolation, not the objective social isolation a person faces (Hawkley & Cacioppo, 2010). It results from a breakdown between the desired social relations a person wants and the actual social relations a person experiences (Hawkley & Cacioppo, 2010). As old age often coincides with life events such as widowhood, loss of family and friends, and retirement, all which diminish important social connections, older adults are especially vulnerable to loneliness (Dykstra, 2009).

Among the older demographic, prior research has shown that living arrangements are a key factor for predicting loneliness (Kim & Fredriksen-Goldsen, 2016). According to these studies, older adults living with a spouse show lower levels of loneliness in contrast to those living alone. Additionally, research has also found that older adults that are socially isolated and lonely when living in the community are at a higher risk of being institutionalized (Brock & O'Sullivan, 1985). However, nursing homes can exacerbate loneliness in older adults due to the lack of intimate relationships (British Columbia Ministry of Health, 2004). Regardless of these contradictory findings, research has largely ignored the change in loneliness when transitioning from independent living into nursing homes. As the number of US adults aged

65 and older is expected to double in the next 30 years, from 48 million today, to over 88 million by 2050, these demographic shifts raise concern for future nursing home demands (Wolinsky, 1992; U.S. Census). Despite this, little is known about loneliness among nursing home residents in the United States.

In this article, I assess rates of loneliness among older American adults across all living arrangements, including nursing homes. Using nationally representative longitudinal data, I study aging adults in all living arrangements and estimate who has a higher likelihood of experiencing loneliness when living in nursing homes. I also analyze the transition from independent living into nursing homes and whether it is linked with a change in loneliness. Finally, I study gender differences of loneliness in the separate living arrangements. In the following sections, I review past research that examines loneliness and social isolation among aging adults. Then, I explore why the move from independent living into nursing homes is a major transition for older adults. Finally, I investigate gendered differences in loneliness among older adults.

Background

Loneliness and Social Isolation

Increase in loneliness and social isolation among aging adults are increasingly observed throughout the United States (Colby & Ortman, 2015). Often used interchangeably, social isolation and loneliness are closely related, yet simultaneously distinct concepts within scientific research. In literature, social isolation is typically used as an objective measure of the number of social relationships and contacts an individual has (Gierveld & Tilburg, 2006). In comparison, loneliness is an individual's perception of being alone, often resulting from inadequate social relationships (Hawkley & Cacioppo, 2010). For instance, an individual

could be social isolated with few social contacts yet feel fulfilled with their social circumstances. Conversely, an individual could have frequent social contacts yet feel that these relationships are insufficient, resulting in feelings of loneliness. Most importantly, loneliness is consistently associated with feelings of distress and unpleasantness (Perlman & Peplau, 1981; Cacioppo, et al. 2002).

Living arrangements are important when predicting loneliness among older adults due to it being the most frequent social context they are embedded in (Russell, 2009). Different living arrangements often correspond with different experiences and rates of loneliness (Kim & Fredriksen-Goldsen, 2016). Today, most adults in their 50s and 60s live with a spouse, while other adults live with their immediate family, such as adult children and siblings (U.S. Census, 2017). A small percentage of adults live alone or in long-term care facilities; however, this proportion is expected to increase (de Jong Gierveld, Dykstra, & Schenk, 2012 ; U.S. Census, 2017).

Among older adults, those living with a spouse are less lonely compared to adults in all different types of living arrangements (Greenfeild & Russell, 2011). Spousal relationships may provide a high degree of perceived social support that increases an older adult's protection against loneliness (Hawkley et al., 2008; Cacioppo et al., 2006). Notably, an international study found that a greater proportion of nursing home residents experienced loneliness in contrast to community-dwelling adults, regardless of interdependent living arrangements observed in the community-dwelling adults (Prieto-Flores et al., 2011). As the proportion of older adults increases, nursing home admissions are expected to rise, potentially increasing the number of lonely adults (U.S. Census, 2017; Wolinsky, 1992).

Transitions into Nursing Homes

Aging adults often face cognitive decline and physical challenges, hindering their ability to complete activities of daily living (ADLs) (Victor, et al. 2000). Nursing homes assist with ADLs and provide constant medical care (Satariano, Haight, & Tager 2002). Despite this aid, most aging adults hope to avoid ever moving into a nursing home (Leggett, et al. 2011). Often, aging adults associate nursing homes with decreased independence and increased mortality (Leggett et al., 2011). Furthermore, the transition from aging at home to moving into a nursing home is often the last step in a chain of stressful events (Fraher & Coffey, 2011). Studies have shown that prior to moving into nursing homes long-term, aging adults experience traumatic events due to complex medical needs (Fraher & Coffey, 2011). Events, such as hospitalization for varying periods or receiving intermittent overnight respite care in nursing homes, build on the negative associations made with long-term care (Coleman, 2003 ; Fraher & Coffey, 2011). Therefore, the transition is often a reluctant one. Moreover, adjusting to implemented routines and regulations has proven challenging for residents following move-in (Wiersma & Dupuis, 2010). A few studies have shown that nursing home residents experience higher rates of loneliness; however, to the best of my knowledge, no study has looked at nursing home loneliness in a US context (Drageset, et al. 2013; Jongenelis et al. 2004; Prieto-Flores et al., 2011; Tse, Leung & Ho, 2012).

Gender Differences

Research has well-established that spousal relationships provide the biggest protection against loneliness later in life (Hawkley et al., 2008; Cacioppo et al., 2006). Unfortunately, old age often coincides with life events, such as widowhood. Prior work has revealed that spousal death disrupts important social networks and has a strong link with

loneliness (Andersson, 1998). As women, on average, have a longer life expectancy than men, women may be more vulnerable to loneliness because they are more likely to experience the loss of a spouse (Lee et al. 2001). Despite this, research on loneliness and widowhood produce inconsistent results. A few studies have shown that older men demonstrated stronger depressive feelings when losing a spouse compared to women (van Grootheest et al. 1999; Lee at al. 2001). In contrast, many studies have shown that widowhood revealed no sex differences in depressive symptoms or mortality. (Li et al. 2005; Sasson et al. 2014; Manor & Eisenbach, 2003; Moon et al. 2013). At the same time, a study found that widowhood produces worse health outcomes for older women than older men (Perkins et al. 2016). These inconsistencies suggest that gender differences may exist, and that widowhood does not affect older men and women in the same way (Umberson et al. 1992).

Past research has also revealed conflicting results between men and women when measuring loneliness earlier in life. A study found that men typically have higher loneliness scores on the UCLA scale than their female counterparts (Borys & Perlman, 1985). Women, however, admitted to their feelings of loneliness more compared to men (Borys & Perlman, 1985). Lastly, a recent study has shown that men and women, on average, experience similar levels of loneliness across their entire life span (Maes, et al. 2019). Despite these contradictory findings and older adults' vulnerability to loneliness, few studies have compared loneliness between older men and women in the United States.

Present Study

Prior work has provided some insight into loneliness among nursing homes residents (Drageset, et al. 2013; Jongenelis et al. 2004; Prieto-Flores et al., 2011; Tse, Leung & Ho,

2012). It is, however, vital to address this topic in a US context, since nursing home admissions are expected to rise in the next three decades along with their growing older population (U.S. Census, 2017; Wolinsky, 1992). Furthermore, the shift into institutional living has been associated with increased loneliness, indicating why it is imperative to understand this among US adults (British Columbia Ministry of Health, 2004). I address the gaps in the literature regarding loneliness among older adults in different living arrangements by studying the following questions:

Do rates of loneliness differ for aging US adults living in nursing homes compared to those in independent living?

Does moving from independent living into nursing homes affect loneliness in aging US adults?

Do US aging men and women experience different levels of loneliness when living in a nursing home?

Method

Data

I am using the Health and Retirement Study (HRS), a biennial longitudinal study that surveys older American adults. This study uses a multi-stage area probability design and oversamples African-Americans, Hispanics and Floridians. The interviews were conducted in-person or on the telephone. I drew my analytic sample from the RAND HRS data for four reasons. First, the data is nationally representative of the older US population. Second, it's one of the only studies that follows older adults into nursing homes. Third, the data includes questions about loneliness in different living arrangements. Lastly, the longitudinal nature of the data allows me to capture the transition from independent living into nursing homes.

Analytic Sample

Of the 591,262 panel observations, I only included observations which the respondent answered the survey themselves. People in nursing homes may be more likely to rely on proxies to answer questions and in the Health and Retirement Study, proxies are not asked questions regarding loneliness. Therefore, I limited my sample to respondent who answered the survey themselves in order to capture loneliness. My sample only includes respondents from waves 4 onwards, because nursing home weights were not available for previous waves. I weighted the data to be nationally representative of individuals in the examined age range during the 2000-2018 survey years. Considering older adults are more likely to live in nursing homes, I limited my sample to HRS respondents aged 50 and above who have answered whether they felt lonely or not. I excluded 815 panel observations because there was missing data on my demographic, family and health variables. Thus, my analytic sample consists of 111,815 panel observations between the years 2000 and 2018. The data is adjusted for clustered standard errors.

Dependent variable

The dependent variable is whether the respondent felt lonely or not. The HRS study uses the Center for Epidemiological Studies Depression (CESD) scale to measure depression. The CESD questionnaire asks whether the respondent experiences a range of negative feelings, one of them being loneliness. In each interview, participants were asked, “Much of the time during the past week, have you felt lonely?” to which the respondent replied yes or no. Past studies have shown that single-item measures of loneliness, such as the Center for Epidemiological Studies Depression, are reliable and assess loneliness well (Newmyer et al. 2020).

Primary independent variable

The primary independent variable are respondents' living arrangements. Living arrangement is a categorical variable with the following two categories; nursing home and not in nursing home. For my study, a nursing home indicates an institutional dwelling that provides residential accommodations and healthcare for elderly people. Not in a nursing home indicates that respondents do not live in an institution that provides any accommodation or health care. The primary independent variable for my second research question captures a move from living interpedently to a nursing home.

Control variables

I also included a number of confounding factors as controls in my analysis: age at interview, sex, race/ethnicity, partnership status (partnered versus not partnered), educational attainment, trouble with any of the 5 Activities of Daily Living (ADLs), trouble with any of the 3 Independent Activities of Daily Living (IADLs), whether the respondent had any overnight hospital stays in the last two years and total cognitive score. Age at interview is broken down into three age categories: "50-64", "65-79" and "80+". Race/ethnicity is coded as "non-Hispanic white", "non-Hispanic black", "Hispanic" and "other race". Education is coded as "less than high school", "high school or GED", "some college with no degree earned" and "college and above".

For the health variables "trouble with any of the 5 ADLS", "trouble with any of the 3 IADLS" and "any overnight hospital stays in the last two years", each was coded as dummy variables. The total cognitive score sums the total word recall and mental status summary scores, resulting in a range of 0-35. The total word recall test sums the immediate and delayed word recall of 10 words. The mental status test sums the scores of the serial 7s test,

backwards counting from 20, naming regular objects, reporting today's date and naming the current president and vice-president of the United States. Adding the score from these two tests gives the total cognitive score (0-35). Controlling for these four health variables is important, because cognitive and functional impairment are very prevalent among nursing home residents. Up to two-thirds of American nursing home residents have some type of cognitive impairments, such as Alzheimer's disease, and over 75% of nursing homes residents require assistance with ADLs (Gaugler et al. 2014; Gabrel, 2000).

Analytic Approach

First, I use logistic regression models to analyze the likelihood of loneliness among older adults in different living arrangements. Three sets of multivariate nested models, one for the entire sample, one for men and another for women, control for respondents' age, race/ethnicity, partnership, education, any trouble with ADLs, any trouble with IADLs, any overnight hospital stays in the last two years and cognitive score. In Model 1, I regress just the primary independent variable in order to establish baseline differences. In Model 2 and 3, I analyze the likelihood of loneliness among older adults in different living arrangements controlling for sociodemographic variables. In Model 4, I run the same model but include the additional four health variables.

Results

Sample Characteristics

Table 1 presents descriptive characteristics for all independent variables used in my analysis (N=111,815). Weighted percentages are presented for the total sample (N=111,815) (column 1), respondents living in a nursing home (N=1,352) (column 2), respondents not living in a nursing (N=110,463) (column 3) and Chi-square results (column 4). Results show

that almost forty percent of respondents in nursing homes are lonely. The distribution of lonely adults not living in nursing homes is lower (17.31%). It is more common for older adults living in nursing homes to have difficulty with ADLs (71.02%) and experience an overnight hospital stay in the last two years since interview (59.14%). There is a greater distribution of people without a partner in nursing homes (86.16%) than people not living in nursing homes (42.92%).

The last row in my table presents the weighted means and standard deviations of the cognitive score of the total sample (column 1), respondents living in nursing homes (column 2) and respondents not living in nursing homes (column 3). Respondents living in nursing homes had a lower cognitive score mean (14.79±6.00, $p < 0.001$) compared to those living independently (22.24±5.08, $p < 0.001$).

Nested Logistic Regression Models

Table 2, 3 and 4 present results from a 4-level nested logistic regression predicting loneliness by living arrangements among older adults. Table 2 presents the results for the entire sample, Table 3 presents the results for the men in the sample and finally, Table 4 presents the results for the women in the sample. Table 2, Model 1 shows that nursing home residents are at a 3.00 higher odds of being lonely compared to older adults living outside of nursing homes. When controlling for age, gender and race, results from Model 2 reflect that nursing home residents are still at a higher odds of being lonely compared to older adults not living in nursing homes (OR=2.36). Taking into account partnership status and educational attainment, Model 3 displayed similar trends to Models 1 and 2, where male nursing home residents were at a high odds of being lonely (OR=1.76). Model 3 also showed that older adults living in nursing homes with a partner had 73% lower risk of being lonely compared to

older adults that were not partnered. Model 4, on the other hand, displayed different results than the trends observed in Models 1-3. When controlling for health variables, nursing home residents were at a lower risk of experiencing loneliness compared to adult men living outside of nursing homes. Furthermore, odds of loneliness decrease by 4% for every unit increase in cognitive score among adults living in nursing homes, emphasizing the impact of health on loneliness.

Table 3 showed similar trends to Table 2. In Model 1, results show that men living in nursing homes have a 4.15 higher odds of being lonely compared to older male adults living outside of nursing homes. When controlling for age, gender and race, results from Model 2 reflect that male nursing home resident are still at a higher odds of being lonely compared to older male adults not living in nursing homes (OR=3.58). Taking into account partnership status and educational attainment, Model 3 displayed similar trends to Models 1 and 2, where male nursing home residents were at a higher odds of being lonely (OR=2.16). Model 3 also showed that older men living in nursing homes with a partner had a 81% lower risk of being lonely compared to older men that were not partnered. Model 4 in Table 3 displayed different results observed in Table 2, Model 4. When controlling for health variables, male nursing home residents were at the same risk of experiencing loneliness compared to adult men living outside of nursing homes, showing that men in poor health experience similar levels of loneliness regardless of living arrangement.

Table 4, Model 1 shows that female nursing home resident are at 2.46 higher odds of being lonely compared to older female adults living outside of nursing homes, a lower odds compared to men in Table 3. When controlling for age, gender and race, results from Model 2 reflect that female nursing home residents are still at a higher odd of being lonely compared

to older female adults not living in nursing homes (OR=2.04). Taking into account partnership status and educational attainment, Model 3 displayed similar trends to Models 1 and 2, where the female nursing home residents were at a higher odd of being lonely (OR=1.67). Model 4 mimicked results observed in Table 2, Model 4. When controlling for health variables, female nursing home residents were at a 0.86 lower risk of experiencing loneliness compared to adult women living outside of nursing homes.

Fixed Effects

Table 4 presents logit coefficients from fixed effects logistic regression predicting the changes in loneliness among older adults. Across all three samples, Model 1 showed that a change from independent living to nursing homes is associated with an increase in loneliness, with men displaying the biggest increase (COEF=0.698). When taking into account health variables in Models 2, an increase of loneliness is still observed among both men and women, but not as significant of a change observed in Models 1. Women experience an increase of 0.208 in loneliness when moving into nursing home, while men experience and increase twice as big (COEF=0.412). This shows that regardless of health status, women are better able to cope with loneliness when experiencing a change in living arrangement. Finally, across all samples, a change in cognitive score is associated with a decrease in loneliness.

Discussion and Conclusion

As people age, they are more likely to move into collective dwellings, such as nursing homes (Adams, Sanders & Auth, 2004). This study used nationally representative longitudinal survey data from the Health and Retirement Study to investigate loneliness among older American adults. I focus on all living arrangements, including nursing homes,

because it is the most frequent social context older adults are engaged in and previous studies have demonstrated the importance of living arrangements when predicting loneliness (Russell, 2009).

My findings show that almost forty percent of US nursing home residents are lonely, a higher proportion than those living in community. These findings are similar to those from international studies (Prieto-Flores et al., 2011; Dragest, et al. 2013). Moreover, my results show that older adults are at a higher risk of experiencing loneliness when living in nursing homes compared to living outside of nursing homes. Similarly, my results mimic the broad research regarding partnership and loneliness. Previous studies have shown that living with a spouse provides the biggest protective barrier against loneliness and my results display this in a nursing home context (Greenfeild & Russell, 2011). In fact, my results show that nursing home residents with a partner have a 73% lower risk of being lonely compared to residents that are unpartnered. Furthermore, an increase in loneliness is observed when older adults transition from independent living into nursing homes.

There are also, however, many more important patterns. Female respondents displayed lower risk of experiencing loneliness in nursing homes compared to male respondents. Similarly, when transitioning from independent living into nursing homes, male respondents experienced a larger increase in loneliness compared to women. This shows that women are better able to cope with loneliness when moving into and living in nursing homes compared to their male counterparts. Finally, when considering health conditions, such as difficulty with ADLs, IADLs, frequent overnight hospital stays and cognitive conditions, older women were at a lower risk of experiencing loneliness in nursing homes compared to those living in nursing homes. Older women in poorer health may experience better care

when in a nursing home, decreasing their feelings of loneliness. Men, on the other hand, have the same risk of experiencing loneliness in nursing homes as they do living independently when experiencing poor health, potentially indicating similar care in both living arrangements. These findings are new and future research should go into greater death to explore the impact of health on loneliness among older adults.

My study builds on the growing body of literature on the understanding of loneliness among older adults in different living arrangements. In terms of living arrangements, nursing homes are not always associated with increased risk of loneliness. In my study, adults that face cognitive decline and physical challenges were at a lower odds of experiencing loneliness when living in nursing homes. There are several reasons why this may be. One, is that living independently while experiencing poor health could impede on an individual's mobility and prevent social participation in their communities (Victor, et al. 2000). Once in a nursing home, residents are embedded in an immediate social community where they are able to interact with more people on a regular basis (Leggett, et al. 2011). This could give them a chance to build relationships they otherwise would not have had access to (Fraher & Coffey, 2011). A second reason could be more frequent participation in leisure activities. Activity theory claims that mental and physical activity preserves happiness in old age (Achenbaum & Bengston, 1994). Therefore, activity engagement can be a protector against loneliness for older adults and nursing homes may provide age-friendly activities that are not observed as often in other living settings (Satariano, Haight & Tager 2002). A third possible reason could be frequent access to health care. Research has shown that poor mental and physical health are strongly connected, and receiving continual care in a nursing home could aid in decreasing loneliness of older adults (Leggett, et al. 2011; Trivedi, 2004).

This study has many strengths, including its use of longitudinal and self-reported data, but it does have some limitations. First, the data examined surveyed respondents biennially. The CESD questionnaire asks whether the respondents felt lonely in the past week from the interview. Therefore, it may not capture the accurate feelings of the respondent over the broad period of time between interviews. Although the survey may miss these periods of time that could have indicated loneliness, it does capture longer-term trends in loneliness that may appear as adults age. Next, I was not able to include information about nursing home resident's spousal living arrangements. The HRS asks questions regarding living arrangements and partnership status, but it does not ask whether nursing home residents are living in the same facility with a spouse. Since prior research investigating loneliness has shown the importance of partnership status, future research should do an extensive investigation in a nursing home context.

My study makes five contributions to the research on loneliness in older adults across different living arrangements. First, I provide important evidence of loneliness among nursing home residents in the United States. In past international studies, older adults in nursing homes were more likely to be lonely than their community-dwelling counterparts (Prieto-Flores et al., 2011), and my study reflects this in a US context. Second, I examine the transition from independent living into nursing homes. Prior research has either measured loneliness in one living arrangement or compared two different samples across two different living arrangements at one point in time (Prieto-Flores et al., 2011; Dragest, et al. 2013). An important advantage of having longitudinal data is being able to capture the transition from one living arrangement into another using fixed effects models. Removing omitted variable bias by measuring changes within a group across time is an advantage that cross-sectional

analysis can not estimate. Third, this study focused on nursing homes residents, whereas other work has mostly focused on non-institutionalized adults. Loneliness among this population is important because of population aging and expected high demand of nursing home admissions (Wolinsky, 1992). Better understanding these connections could enhance social intervention programs in nursing homes. Fourth, I was able to demonstrate gender differences in loneliness. As women are more likely to move into nursing homes due to longer life expectancy, gaining an understanding of loneliness by taking into account gender is important. Lastly, I examine loneliness among older adults controlling for demographic, socioeconomic, family and health variables. Most past research has used smaller samples while only controlling for few variables. The longitudinal nature of the HRS data allowed me to examine loneliness of older adults in different settings while including important factors that contribute to the research.

Table 1.
Characteristics of the Analytic Sample, Health and Retirement Study 2000-2018 (N=111,815)

	Total Sample N=111,815	Nursing Home N=1,352	Not in Nursing Home N=110,463	*t* test[a]
Lonely				***
Yes	17.52%	38.57%	17.31%	
No	82.48%	61.43%	82.69%	
Age group				***
50-64	18.42%	0%	18.59%	
65-79	61.25%	29.89%	61.56%	
80+	20.33%	70.11%	19.85%	
Gender				***
Male	43.88%	28.83%	44.03%	
Female	56.12%	71.17%	55.97%	
Race/Ethnicity				***
Non-Hispanic White	80.72%	88.46%	80.65%	
Non-Hispanic Black	9.16%	7.53%	9.18%	
Hispanic	5.12%	1.35%	5.15%	
Other	5.00%	2.66%	5.02%	
Partnership Status				***
Married/Partnered	56.67%	13.84%	57.08%	
Not Married/Partnered	43.33%	86.16%	42.92%	
Education				
<HS	19.41%	25.91%	19.34%	***
HS/GED	35.06%	37.96%	35.03%	
Some college	22.47%	18.20%	22.51%	
≥ College	23.07%	17.93%	23.12%	
ADL Trouble				***
Yes	16.50%	71.02%	15.97%	
No	83.50%	28.98%	84.03%	
IADL Trouble				***
Yes	8.41%	47.91%	8.03%	
No	91.59%	52.09%	91.97%	
Overnight Hospital Stay				***
Yes	28.13%	59.14%	27.83%	
No	71.87%	40.86%	72.17%	
Cognitive Score				***
(Range: 0-35)	22.17 (5.14)	14.79 (6.00)	22.24 (5.08)	

Note: Ns are unweighted, percentages are weighted
Sampling weights are combined person level and nursing home weights provided by Health and Retirement Study (2018).
[a]Results of *t* test that tests for differences between respondents in nursing homes and respondents not in nursing homes.
*p<.05, **p<.01, ***p<.001.

Table 2.
Odds ratio of weighted logistic regression analysis predicting loneliness among older adults, Health and Retirement Study 2000-2018 (N=111,815)

	Model 1	Model 2	Model 3	Model 4
Nursing home (not in nursing home)	3.00***	2.36***	1.76***	0.88
Age group (50-64)				
65-79	-	0.93*	0.83***	0.78***
80+	-	1.56***	1.02	0.72***
Gender (male)				
Female	-	1.53***	1.09**	1.13***
Race (non-Hispanic White)				
Non-Hispanic Black	-	1.47***	0.96	0.80***
Hispanic	-	2.03***	1.53***	1.37***
Other	-	1.70***	1.40***	1.23***
Partnership status (not married/partnered)	-	-	0.27***	0.28***
Married/Partnered				
Education (<HS)	-	-	0.64***	0.78***
HS/GED	-	-	0.55***	0.71***
Some college	-	-	0.41***	0.58***
≥College	-	-	-	1.85***
ADL Trouble (no ADL trouble)	-	-	-	1.69***
IADL Trouble (no IADL trouble)	-	-	-	1.18***
Overnight Hospital Stay (no overnight hospital stay)	-	-	-	0.96***
Cognitive	.003	.023	.092	0.119
R^2				

Note: Adjusted for cluster standard errors.
Sampling weights are combined person level and nursing home weights provided by Health and Retirement Study (2018).
*p<.05, **p<.01, ***p<.001.

Table 3.
Odds ratio of weighted logistic regression analysis predicting loneliness among older men, Health and Retirement Study 2000-2018 (N=46,891)

	Model 1	Model 2	Model 3	Model 4
Nursing home (not in nursing home)	4.15***	3.58***	2.16***	1.00
Age group (50-64)				
65-79	-	0.78***	0.82***	0.75***
80+	-	1.40***	1.18**	0.81**
Race (non-Hispanic White)				
Non-Hispanic Black	-	1.58***	0.97	0.82**
Hispanic	-	1.80***	1.43***	1.34***
Other	-	1.52***	1.44***	1.32**
Partnership status (not married/partnered)	-	-	0.19***	0.20***
Married/Partnered				
Education (<HS)	-	-	0.68***	0.83***
HS/GED	-	-	0.64***	0.84***
Some college	-	-	0.47***	0.70***
≥College	-	-	-	1.99***
ADL Trouble (no ADL trouble)	-	-	-	1.89***
IADL Trouble (no IADL trouble)	-	-	-	1.21***
Overnight Hospital Stay (no overnight hospital stay)	-	-	-	0.96***
Cognitive	.003	.017	.117	0.148
R^2				

Note: Adjusted for cluster standard errors.
Sampling weights are combined person level and nursing home weights provided by Health and Retirement Study (2018).
*p<.05, **p<.01, ***p<.001.

Table 4.
Odds ratio of weighted logistic regression analysis predicting loneliness among older women, Health and Retirement Study 2000-2018 (N=64,924)

	Model 1	Model 2	Model 3	Model 4
Nursing home (not in nursing home)	2.46***	2.04***	1.67***	0.86
Age group (50-64)				
65-79	-	1.06	0.86***	0.81***
80+	-	1.72***	1.01	0.73***
Race (non-Hispanic White)				
Non-Hispanic Black	-	1.41***	0.97	0.80***
Hispanic	-	2.18***	1.57***	1.38***
Other	-	1.82***	1.40***	1.19*
Partnership status (not married/partnered)	-	-	0.35***	0.36***
Married/Partnered				
Education (<HS)	-	-	0.62***	0.75***
HS/GED	-	-	0.51***	0.65***
Some college	-	-	0.37***	0.51***
≥College	-	-	-	1.79***
ADL Trouble (no ADL trouble)	-	-	-	1.59***
IADL Trouble (no IADL trouble)	-	-	-	1.16***
Overnight Hospital Stay (no overnight hospital stay)	-	-	-	0.96***
Cognitive	.002	.017	.069	0.094
R^2				

Note: Adjusted for cluster standard errors.
Sampling weights are combined person level and nursing home weights provided by Health and Retirement Study (2018).
*p<.05, **p<.01, ***p<.001.

Table 5.
Logit coefficients from unweighted fixed effects logistic regression analysis predicting changes in loneliness among older adults, Health and Retirement Study 2000-2018

	Sample # of obvs= 29,292 # of groups= 5,407		**Men in sample** # of obvs= 9,474 # of groups= 1,814		**Women in sample** # of obvs= 19,818 # of groups= 3,593	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Change from Independent living into Nursing Home	0.512***	0.263*	0.698***	0.412	0.445***	0.208
Change in ADL Trouble	-	0.309***	-	0.416***	-	0.261***
Change in IADL Trouble	-	0.420***	-	0.434***	-	0.410***
Change in Overnight Hospital Stay	-	0.073*	-	-0.001	-	0.110**
Change in Cognitive Score	-	-0.024***	-	-0.028***	-	-0.022***

*p<.05, **p<.01, ***p<.001.

References

Achenbaum, W.A. and Bengtson, V.L. (1994). Re-Engaging the Disengagement Theory of Aging: On the History and Assessment of Theory Development in Gerontology. *The Gerontologist 34:6*, 756-763.

Andersson, L. (1998). Loneliness research and interventions: A review of the literature. *Aging & Mental Health, 2:* 264–274.

Boamah, S. A., Weldrick, R., Lee, T.-S. J., and Taylor, N. (2021). Social Isolation Among Older Adults in Long-Term Care: A Scoping Review. *Journal of Aging and Health*, *33:*7-8, 618-632.

Borys S. and Perlman D. (2011). Gender Differences in Loneliness. *Personality and Social Psychology Bulletin, 11:1*, 63-74.

Cacioppo J.T., Hawkley L.C., Norman G.J., and Berntson, G. G. (2011). Social Isolation. *Annals of the New York Academy of Sciences 1231*:1, 17-22.

Cacioppo, J. T., Hawkley, L. C., Crawford, L. E., Ernst, J. M., Burleson, M. H., Kowalewski, R. B., Malarkey, W. B., Van Cauter, E., and Berntson, G. G. (2002). Loneliness and health: Potential mechanisms. *Psychosomatic Medicine, 64*:3, 407-417.

Colby, S. and Ortman J. (2015). Demographic Changes and Aging Population. *Rural Health Information Hub*. Retrieve from:https://www.ruralhealthinfo.org/toolkits/aging/1/demographics

de Jong Gierveld, J., Pearl A. Dykstra, and Schenk, N. (2012). Living arrangements, intergenerational support types and older adult loneliness in Eastern and Western Europe. *Demographic Research*, *27*, 167-200.

Donovan, N. J., and Blazer, D. (2020). Social Isolation and Loneliness in Older Adults: Review and Commentary of a National Academies Report. *The American Journal of Geriatric Psychiatry 28:12*, 1233-1244.

Drageset, J., Geir E. E., Kirkevold, M, and Ranhoff, A. H. (2013). Emotional Loneliness Is Associated with Mortality Among Mentally Intact Nursing Home Residents with and Without Cancer: a Five-year Follow-up Study. *Journal of Clinical Nursing 22:1-2*, 106-114.

Dykstra, P. (2009). Older Adult Loneliness: Myths and Realities. *European Journal of Ageing 6:2*, 91-100.

Fraher, A., and Coffey, A. (2011). Older people's experiences of relocation to long-term care: Anne Fraher and Alice Coffey investigate the factors that can influence the decision to move into a residential setting and how well individuals adjust to their new situation. *Nursing Older People*, *23*:10, 23-27.

Gabrel C.S. (2000). An overview of nursing home facilities: data from the 1997 National Nursing Home Survey. *Advanced Data 3*:11, 1-12.

Gaugler, J. E., Yu, F., Davila, H. W., and Shippee, T. (2014). Alzheimer's Disease and Nursing Homes. *Health Affairs (Project Hope)* 33:4, 650-57.

Greenfield, E. A., and Russell, D. (2011). Identifying Living Arrangements That Heighten Risk for Loneliness in Later Life: Evidence From the U.S. National Social Life, Health, and Aging Project. *Journal of Applied Gerontology*, *30*:4, 524-534.

Gierveld, J. D. J., and Tilburg, T. V. (2006). A 6-item scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. *Research on Aging, 28*:5, 582-598.

Jongenelis, K., Pot, A. Eisses, A. M., Beekman, A. T., Kluiter, T. and Ribbe, M. (2004).

Prevalence and Risk Indicators of Depression in Elderly Nursing Home Patients: The AGED Study. *Journal of Affective Disorders 83*:2, 135-142.

Kim, H., and Fredriksen-Goldsen, K. I. (2016). Living Arrangement and Loneliness Among Lesbian, Gay, and Bisexual Older Adults. *The Gerontologist.* 56:3, 548-558.

Lee, C. D. and Bakk, L. (2001). Later-life transitions into widowhood. *Journal of Gerontology 35*:3, 51-63.

Lee, G. R., Demaris, A., Bavin, S., and Sullivan, R. (2001). Gender differences in the depressive effect of widowhood in later life. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *56*:1, S56-S61.

Leggett, S. J. E., Davies, S., Hiskey, S., & Erskine, J. A. K. (2011). The Psychological Effects of Considering a Move into Residential Care: An Age-Related Study. *Journal of Housing for the Elderly*, *25*:1, 31-49.

Li, Y. (2007). Recovering from spousal bereavement in later life: does volunteer participation play a role? *Journal of Gerontology 62*:4, S257-S266.

Manor, O. and Eisenbach, Z. (2003). Mortality after spousal loss: are there socio demographic differences? *Sociology Science 56*:2, 405-413.

Moon, J.R., Glymour, M.M., Vable, A.M., Liu, S.Y. and Subramanian, S.V. (2013). Short- and long-term associations between widowhood and mortality in the United States: longitudinal analyses. *Journal of Public Health 36*:3, 382-389.

Murthy, V. (2017). Work and the loneliness epidemic. *Harvard Business Review.* Retrieve from: https://hbr.org/2017/09/work-andthe-loneliness-epidemic

Newmyer, L., Verdery, A. M., Margolis, R., and Pessin, L. (2020). Measuring Older Adult Loneliness across Countries. *The Journals of Gerontology. Series B, Psychological*

Sciences and Social Sciences.

Perkins, J.M., Lee, H., James, K.S., Oh, J., Krishna, A., Heo, J. and Subramanian, S.V. (2016). Marital status, widowhood duration, gender and health outcomes: a cross-sectional study among older adults in India. Public Health 16: 1032.

Perlman, D., and Peplau, L. A. (1981). Toward a social psychology of loneliness. Academic Press. *Personal relationships in disorder* 31-56.

Pomeroy, C. (2019). Loneliness is harmful to our nation's health. *Scientific American*. Retrieve from: https://blogs.scientificamerican.com/observations/loneliness-is-harmful-to-our-nations-health/

Prieto-Flores, F. (2011). Factors Associated With Loneliness of Noninstitutionalized and Institutionalized Older Adults. *Journal of Aging and Health, 23*:1, 177-194.

Russell, D. (2009). Living Arrangements, Social Integration, and Loneliness in Later Life: The Case of Physical Disability. *Journal of Health and Social Behavior, 50:4*, 460-475.

Sasson, I. and Umberson, D. J. (2014) Widowhood and depression: new light on gender differences, selection, and psychological adjustment. *Journal of Gerontology, 69*: 1, 135-145.

Satariano, W. A., Haight, T. J., and Tager, I. B. (2002). Living arrangements and participation in leisure-time physical activities in an older population. *Journal of Aging and Health, 14*:4, 427-451.

Trivedi, M. (2004). The link between depression and physical symptoms. *Primary Care Companion Journal of Clinical Psychiatry, 6*:1, 12-16.

Tse, M., Leung, R. and Ho, S. (2012). Pain and psychological well-being of older persons

living in nursing homes: an exploratory study in planning patient-centred intervention. *Journal of Advanced Nursing, 68*:2, 312-321.

A Profile of Older Americans: 2017. (2017). *U.S. Census Bureau*. Retrieve from: https://acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2017OlderAmericansProfile.pdf

van Grootheest, D.S., Beekman, A.T.F., Broese van Groenou, M.I. and Deeg, D.J.H. (1999). Sex differences in depression after widowhood. Do men suffer more? *Society Psychiatrist Epidemiology 34:* 7, 391-398.

Victor, C., Scambler, S., Bond, J., and Bowling, A. (2000). Being alone in later life: loneliness, social isolation and living alone. *Reviews in Clinical Gerontology, 10*:4, 407-417.

Wolinsky, F., Callahan, C., and Fitzgerald, J. (1992). The risk of nursing home placement and subsequent death among older adults. *Journal of Gerontology 47*:4, 173-182.

Yang, F., and Gu, D. (2021). Widowhood, widowhood duration, and loneliness among older adults in China. *Social Science & Medicine*, *283*: 114179-114179.