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Loneliness and social isolation risk factors in community-dwelling older adults receiving home health services

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Abstract

Background Social isolation and loneliness are highly prevalent in older adults. Older adults who are receiving home health services (HHS) post hospital discharge are at high risk for social isolation and loneliness related to multimorbidity and functional decline. Yet, the prevalence of social isolation and loneliness in this population is not commonly described.

Methods We analyzed electronic health record (EHR) data from 2,026 community-dwelling older adults (mean age 77.5 ± 8.2, 61.7% female, 35% Black/African American, 42.2% Hispanic) who were discharged with HHS from three acute care facilities in Bronx County, NY. Marital and living alone status were assessed as proxy measures for social isolation. Loneliness was assessed with a one-item loneliness question. The prevalence and overlap between loneliness and social isolation risk factors were examined with descriptive and inferential statistics. Logistic regression models were used to examine correlates of loneliness, living alone, and marital status.

Results Of 2,026 individuals, 29.5% lived alone, 33.5% were married, and 11.6% reported feeling lonely at least some of the time. Those who lived alone had better cognitive and physical function, were more likely to be female, White/Caucasian, and lonely– and less likely to need assistance with activities of daily living (ADLs). Individuals who were unmarried or living alone were more likely to be lonely. After adjusting for covariates, Black/African Americans and those who had better cognitive function had lower odds of loneliness. Living alone, depressive symptoms, multimorbidity, functional impairment were associated with increased odds of being lonely, after adjusting for covariates.

Conclusions Risk for social isolation is highly prevalent among diverse, homebound older adults. Home health care is ideally situated for loneliness assessment and intervention for an otherwise hard to reach, vulnerable population. EHR data can be leveraged to identify individuals at risk and additional brief indicators integrated into the EHR (e.g., validated loneliness assessment, social isolation metrics) may be valuable to facilitate identification and stratification of individuals at risk.

Keywords Loneliness, Social isolation, Community-dwelling, Home health care

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Introduction

Social isolation and loneliness are highly prevalent in older adults and are associated with negative health outcomes, including cognitive and functional decline, increased risk for dementia, frailty, depression, and mortality [1–5]. Up to 43% of older adults in the United States are lonely [3] and 1 in 4 older adults are socially isolated [6]. Older adults who are socially connected and supported, those who are married or live with others, and those who are not lonely have better cognitive and physical function and live longer compared to those who have poor social support, are unmarried, live alone, or are lonely [4, 7–10].

Social isolation and loneliness fall under the umbrella term of social connection that is commonly used to encompass the many ways that human beings interact with others [11, 12]. Three key aspects of social connection are the (1) structural, (2) functional, and (3) quality aspects [11–13]. Structural aspects include social network size or relationship status. Functional aspects include social support, social engagement, and loneliness. Quality aspects include marital or relationship quality. Importantly, all 3 aspects of social connection are important to consider for a broad understanding of how social connection influences health outcomes [12]. Social isolation is commonly defined as a composite of objective isolation, which includes structural aspects of relationships such as the number of people in one's social network, or one's marital status and functional aspects of relationships such as the availability of support and level of social engagement [11]. Loneliness is commonly defined as a negative feeling of dissatisfaction with the quantity or quality of social relationships [11]. While social isolation and loneliness may overlap, they are distinct constructs. One who is objectively alone (e.g., few social contact and little social support) may not feel lonely, and another who is surrounded by others may feel lonely or alienated [13].

Older adults are not predisposed to loneliness or social isolation compared to people in other age groups, and survey data showed levels of loneliness decrease with age [14]. Older adults, however, are more likely to be exposed to risk factors for loneliness and social isolation such as widowhood, living alone, retirement, and multimorbidity [13]. While loneliness and social isolation are prevalent across demographic, socioeconomic, and cultural boundaries, lower income, underrepresented (e.g., race or sex) older adults, and those who experience discrimination or marginalization are more likely to be lonely [11]. Ten million middle-aged and older adults live in poverty, and a recent AARP (American Association of Retired Persons) survey of older adults aged 45 and older reported low-income older adults (<$25,000 annual income) were lonelier than higher income older adults [15]. The literature on racial/ethnic differences in loneliness and social isolation are mixed [6, 16] and research on diverse, representative samples of older adults are sparse. Additionally, while there were no significant differences in older adults' loneliness by gender [17], men may be more socially isolated than women [6]. These data indicate underrepresented and socioeconomically disadvantaged older adults as particularly vulnerable to loneliness and associated poor health outcomes.

Both social isolation and loneliness are common in older adults, but the two are not highly correlated with one another [18] and it is unclear if and by how much they co-occur. Transitions of care, or periods when individuals are transferring from one level of healthcare to another (e.g., from hospital to home) are a particularly vulnerable window when individuals may need increased social support. Support may come in many forms including transportation home from the hospital and to medical appointments, help managing self-care or medication regimens, help managing instrumental activities of daily living (IADLs) or activities of daily living (ADLs), and a friend to spend time with when confined to the home or to provide a listening ear. Loneliness and social isolation are associated with increased healthcare utilization, including acute care and ambulatory visits, and institutionalization [19–21].

The purpose of this study was to (1) describe the prevalence of loneliness and risk factors for social isolation in a representative population of older adults discharged home from the hospital with home health services (HHS), (2) describe the co-occurrence of loneliness and social isolation, and (3) describe the correlates of social connection in this population. We saw an opportunity, through our interconnected acute care and HHS, to leverage available data to answer these questions. The opportunity presented because a loneliness question was recently mandated by the Centers for Medicare and Medicaid Services (CMS) as part of routine assessments for patients admitted to HHS and social isolation data (e.g., marital status, living arrangements) was available in the same dataset. Additionally, given our health system services a large population of underrepresented older adults who are uncommonly included in research, the current work addresses this gap in social connection research.

Methods

Study population and setting

This was a descriptive, retrospective analysis of data from 2,026 patients discharged home with HHS from the 3 hospitals in the Montefiore Health System in Bronx, NY. This health system is the largest provider of health services in Bronx, NY and extends to surrounding counties. Bronx County has a population of 1,379,946 based on 2022 US census estimates and 26.4% of the population live in poverty [22]. The county is ethnically diverse

(44.3% Black; 56.6% Hispanic) and 14.4% of the population is aged 65 and over [22]. This analysis included data readily available in the Outcome and Assessment Information Set OASIS-E Manual universally collected upon admission to HHS as mandated by the Centers for Medicare and Medicaid Services, as well as data available through the EHR. The data include individuals who received services from one hospital-based certified home health agency, which includes approximately 70% of all patients discharged home with HHS from the system's hospitals in the Bronx. Criteria for HHS admission include a provider order, homebound status (e.g., the individual has difficulty leaving the home without assistance), and skilled need (e.g., the individual requires skilled nursing, physical, speech, or occupational therapy). We included data that was collected from January 1, 2023, through December 31, 2023, to create a manageable dataset and provide a snapshot of patients in the health system discharged home with HHS over a discrete period. If an individual had multiple admissions over the one-year period, we included only the first admission in the analysis to avoid multiple entries for one individual and because loneliness and social isolation status may change over the course of multiple admissions.

Human ethics and consent to participate declarations

This research was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained via the Albert Einstein College of Medicine Institutional Review Board. As a retrospective analysis of de-identified data, no consent to participate was required. Individuals provided consent for clinical care at the time of service. Clinical trial number: not applicable.

Social isolation

We used data on living alone and marital status to characterize risk factors for social isolation. We considered these variables separately given that the dataset did not include information on social engagement or social network which are commonly considered in social isolation definitions [23] and living and marital status alone do not adequately represent social isolation. In the standardized questionnaire, patients are asked whether they lived alone, lived with another person, or lived in a congregate situation. Living arrangements were further characterized as around the clock, regular daytime, regular nighttime, short-term assistance, or no assistance available. For these analyses, living arrangements was recoded as living alone or not living alone. Those living alone, regardless of available assistance were considered living alone and those living with others were considered not living alone. Marital status was extracted from the electronic health record (EHR) using data from the index admission. Participants were categorized as married, widowed, divorced, single, legally separated, or significant other. For regression analyses, marital status was categorized as married or not married. We considered those who declared a significant other in the married category.

Loneliness

Loneliness was assessed by the following one-item question: "How often do you feel lonely or isolated from those around you?" Responses were registered as never, rarely, sometimes, often, always, decline to respond, or unable to respond. We considered responses of "never" or "rarely" not lonely, and "sometimes", "often" or "always" as lonely. The single-item loneliness question was previously shown to be a valid assessment tool for loneliness screening, and identified individuals as lonely comparatively to longer validated tools [24].

Demographic covariates

Covariates were selected based on prior associations with social isolation and loneliness. Age was considered the patient's stated age upon admission to HHS. Sex was self-reported as male or female. Race was based on self-report and included 7 categories: White/Caucasian, Black/African American, American Indian or Alaskan Native, Native Hawaiian, or Other Pacific Islander, Asian, Other, or Unknown. Ethnicity was based on self-report and included Hispanic/Latino or Non-Hispanic/Latino. The need for interpreter was extracted via the EHR and reported as a categorical variable whether the patient required an interpreter or not.

Cognitive function

Cognition was assessed using the Brief Interview for Mental Status (BIMS) [25] which is widely used to assess cognitive status upon admission to inpatient rehabilitation facilities (IRF), subacute rehabilitation (SAR), and HHS. The BIMS was not administered to patients with severe cognitive impairment or delirium or who were unable to participate in the interview. The assessment included a test of repetition of 3 words, temporal orientation, and recall. Scores were added to compute one summary BIMS score based on the number of correct responses and number of items recalled. Scores ranged from 0 to 15; higher scores were considered better cognition.

Functional status

Physical function was assessed by ability to complete activities of daily living (ADLs), including grooming, bathing, toileting, dressing, transferring, and ambulating. Function was assessed at the time of admission to home care and not the patient's baseline prior to hospital admission. For these analyses, individuals who were

independent were considered without disability and those who required any level of assistance with ADLs were considered to have a disability. The history of falls was assessed by self-reported history of 2 or more falls in the past 12 months. We additionally included a self-reported, categorical item of decline in mental, emotional, or behavioral status in the past 3 months.

Sensory impairment

Hearing was assessed via self-reported ability to hear using hearing aid or other devices if normally used. Individuals were considered hearing impaired if they reported moderate or severe difficulty hearing. Vision was assessed via self-reported ability to see in adequate light with the use of glasses or another assistive device. Individuals were considered visually impaired if they reported moderate or severely impaired vision.

Depressive symptoms

Depressive symptoms were assessed using a 2-item Patient Health Questionnaire (PHQ-2) [26]. The patient was asked "Over the last 2 weeks, have you been bothered by any of the following problems: 1) little interest or pleasure in doing things, and 2) feeling down, depressed, or hopeless." Items were rated as yes, no, or no response. If items were rated "yes," symptom frequency was assessed by 0 "never or 1 day"; 1 "2–6 days/several days"; 2 "7–11 days/half or more of the days"; or 3 "12–14 days/nearly every day." Higher scores indicated the presence of increased depressive symptoms.

Comorbidities

A comorbidities score was a composite measure of the sum of 11 medical conditions: dementia, chronic obstructive pulmonary disease, congestive heart failure, stroke, cancers, AIDS/HIV, myocardial infarction, peripheral vascular disease, peptic ulcer disease, renal disease, diabetes. Conditions were coded as present or absent. Conditions were considered present if the patient's data included an ICD-10 code for the included conditions. The following variables from the OASIS questionnaire were also included as they paint a picture of individuals who may require additional support in managing chronic disease and may differ amongst those who are more vs. less socially isolated. Difficulty with adherence to medical instructions, including medications, diet, or exercise, in the past 3 months was assessed via self-report. Polypharmacy was considered as a categorical variable whether the patient was currently taking 5 or more medications [27]. We included a categorical variable for patients who had any one of the following high-risk drug classes in their medication regimen: antipsychotic, anticoagulant, antibiotic, opioid, antiplatelet, or hypoglycemic.

Other covariates

Multiple hospital admissions in the last 6 months were considered more than 1 hospitalization in the 6 months prior to admission to home care. We included a categorical variable for receipt of a social work referral as an indicator of high social need as identified by the HHS nurse.

Data analysis

We ran descriptive statistics for the sample overall, and by those who lived alone vs. those who lived with others. We used t-tests tests to compare continuous variables and Chi Square tests to compare categorical variables to describe the sample. Data was also examined as a function of age, race, ethnicity, and sex. Data were presented in means, SD and percentages. We ran separate logistic regression models for loneliness, marital status, and living alone status to identify and compare correlates of each. Covariates known to be associated with loneliness, living alone, and marital status were added to the models including demographic variables, cognitive and physical function, sensory impairment, comorbidities, and depression. The final model was built using a backwards elimination method; non-significant predictors that were not previously associated with loneliness or social isolation were removed. The living alone and marital status models were adjusted for loneliness and the loneliness model was adjusted for marital status and living alone.

Results

Summary characteristics of participants

Baseline characteristics of participants were summarized in Table 1. Of the 2,026 participants, 61.7% were female with a mean age of 77.5 (SD 8.2; range 65–104). Participants were diverse, with 35% of participants identifying as Black/African American and 42.2% identifying as Hispanic/Latino. An additional 15% of participants identified as White/Caucasian, 3.2% identified as Asian, 0.3% identified as American Indian/Alaskan Native, and another 0.3% identified as Other Pacific Islander. Most participants communicated in English while 23.3% required an interpreter. 33% of participants were married, 22.3% were widowed, 8.6% were divorced, 29.9% were single, 3.3% were legally separated, and 0.9% reported a significant other. 33.4% of participants were referred to social work by the home health nurse and 11.6% reported being lonely at least some of the time. A large portion of participants reported deficits in ADLs. Most participants reported a need for assistance with grooming (75%), bathing (88.1%), toileting (97.7%), transferring (98.9%), and ambulation (93.0%) and 10.5% reported a fall in the past 12 months. Most participants did not report sensory impairment; 22.4% reported hearing impairment and 32.5% reported vision impairment. Participants had a mean of 3.2 comorbidities (SD 1.8), and a mean score

Table 1 Baseline characteristics of participants overall and by living alone

	Overall (*n* = 2,026)	Living Alone (*n* = 597)	Not Living Alone (*n* = 1,425)	*p*-value
Demographics, % (*n*)				
Age (years), mean, SD	77.5 ± 8.2	77.4 ± 8.4	77.6 ± 8.1	0.64
Female	61.7 (1,249)	69.0 (412)	58.5 (834)	< 0.001
Race				0.008
White/Caucasian	15.0 (303)	16.4 (98)	14.3 (204)	
Black/African American	35.0 (709)	35.2 (210)	35.0 (499)	
American Indian/Alaskan Native	0.3 (6)	0.34 (2)	0.3 (4)	
Asian	3.2 (64)	1.01 (6)	4 (57)	
Other Pacific Islander	0.3 (6)	0.67 (4)	0.1 (2)	
Other/unknown	46.3 (938)	46.4 (277)	46.3 (659)	
Ethnicity				0.15
Hispanic/Latino	42.2 (855)	45.1 (269)	41.0 (584)	
Non-Hispanic/Latino	52.3 (1,059)	50.4 (301)	53.1 (756)	
Social Factors, % (*n*)				
Lonely	11.6 (229)	18.6 (110)	8.6 (119)	< 0.001
Need for Interpreter	23.3 (471)	19.8 (118)	24.7 (352)	0.04
Social work referral	33.4 (676)	38.4 (229)	31.4 (447)	0.002
Marital Status				< 0.001
Married	33.5 (697)	8.9 (53)	43.8 (624)	
Widowed	22.3 (452)	29.5 (176)	19.4 (276)	
Divorced	8.6 (175)	13.9 (83)	6.5 (92)	
Single	29.9 (605)	41.7 (249)	24.8 (354)	
Legally Separated	3.3 (67)	4.2 (25)	3.0 (42)	
Significant Other	0.9 (18)	0.3 (2)	1.1 (16)	
Other/Unknown	1.5 (30)	1.5 (9)	1.5 (21)	
Functional Status				
Disability in ADLs, % (*n*)				
Grooming	75.0 (1516)	68.7 (410)	77.7 (1,106)	< 0.001
Bathing	88.1 (1780)	86.3 (515)	88.8 (1,265)	0.10
Toilet transfer	97.7 (1975)	97.0 (579)	98.0 (1,396)	0.15
Transferring	98.9 (1998)	98.7 (589)	99.0 (1,409)	0.56
Ambulation	93.0 (1879)	90.6 (541)	94.0 (1,338)	0.007
Fall in past 12 months, % (*n*)	10.5 (213)	11.4 (68)	10.2 (145)	0.42
Sensory Impairment, % (*n*)				
Hearing	22.4 (452)	22.1 (132)	22.5 (320)	0.86
Vision	32.5 (657)	34.3 (205)	31.7 (452)	0.26
Comorbidities				
Comorbid conditions, mean, SD	3.2 ± 1.8	3.3 ± 1.8	3.2 ± 1.8	0.19
Depression (PHQ-2), % (*n*)	15.3 (302)	16.4 (97)	14.9 (205)	0.39
Cognitive Status (BIMS), mean, SD, range 0–15	13.3 ± 3.1	13.6 ± 2.7	13.1 ± 3.3	0.005
Disease Self-management, % (*n*)				
High-risk drug use	10.6 (214)	10.1 (60)	10.8 (154)	0.61
Polypharmacy	96.5 (1,956)	97.0 (579)	96.6 (1,376)	0.63
Non-adherence	44.8 (908)	48.9 (292)	43.2 (615)	0.02
Decline in past 3 months*	28.1 (569)	28.5 (170)	28.0 (399)	0.83
Multiple hospital readmissions	49.5 (1002)	51.8 (309)	48.6 (693)	0.20

Note. SD = standard deviation; ADL = Activities of Daily Living; BIMS = Brief Interview for Mental Status. *Decline in mental, emotional, or behavioral status in the past 3 months that may impact the ability to remain safely at home

of 13.3 (SD 3.1) on the BIMS test for cognitive function. 15% of participants scored positive for depression via the PHQ-2 screen. Most participants (96.5%) were on five or more drugs and 10.6% reported use of high-risk drug categories. Many participants (44.8%) reported difficulty with adherence to medication/self-management regimen over the past 3 months. Approximately half of participants (49.5%) had multiple hospital admissions over the past 6 months.

Characteristics of participants who lived alone vs. Not alone

Out of a total of 2,026 participants, 597 (29.5%) lived alone. Participants who lived alone were more likely to be female, less likely to be married, more likely to report

Table 2 Living alone, marital status, and loneliness by age, gender, race, and ethnicity

	Living Alone (*n* = 597)	**Married (*n* = 697)**	**Lonely (*n* = 229)**
Gender, %(*n*)	$p < 0.001$	$p < 0.001$	$p = 0.69$
Female	69.0 (412)	41.6 (290)	60.3 (138)
Male	30.1 (185)	58.4 (407)	39.7 (91)
Age Groups, % (*n*)	$p = 0.92$	$p = 0.02$	$p = 0.32$
Aged 65–79	63.5 (379)	67.1 (468)	61.6 (141)
Aged 80 and older	36.5 (218)	32.9 (229)	38.4 (88)
Race, % (*n*)	$p = 0.004$	$p < 0.001$	$P = 0.005$
Black/African American	35.2 (210)	31.9 (222)	32.3 (74)
White/Caucasian	16.4 (98)	15.9 (111)	22.7 (52)
Asian	1.01 (6)	5.3 (37)	3.49 (8)
Other	47.4 (283)	46.9 (327)	41.5 (95)
Ethnicity, % (*n*)	$p = 0.15$	$p = 0.46$	$p = 0.11$
Hispanic/Latino	45.1 (269)	40.3 (281)	39.7 (91)
Non-Hispanic/Latino	50.4 (301)	54.1 (377)	57.2 (131)

Note. Table 2 examines loneliness and risk factors for social isolation as a function of age, race, ethnicity, and sex. *P* values were derived using t-tests to compare continuous variables and Chi square tests to compare categorical variables

Table 3 Overlap between loneliness and social isolation risk factors

Living Alone and Loneliness				
	Overall (*n* = 2,022)	Living Alone (*n* = 597)	Not Living Alone (*n* = 1,425)	*p*-value
Living Alone, % (*n*)	29.5 (597)	-	-	-
Loneliness, % (*n*)	11.6 (229)	18.6 (110)	8.6 (119)	< 0.001
Marital Status and Loneliness				
	Overall (*n* = 2,026)	Married (*n* = 679)	Not Married (*n* = 1,347)	*p*-value
Married, % (*n*)	33.5 (679)	-	-	-
Loneliness, % (*n*)	11.6 (229)	7.9 (52)	13.4 (177)	< 0.001

Note. *P* values were derived using Chi square tests to compare categorical variables

being lonely, more likely to be English speaking, and more likely to be referred to social work. There were also differences between those who lived alone by self-reported race. Those who lived alone were less likely to require assistance with ambulation or grooming. Participants who lived alone had better cognitive function compared to those who did not live alone and were more likely to report difficulty with adherence to medical instructions, including medications, diet, or exercise in the past 3 months.

Differences in loneliness and social isolation by age, gender, race, and ethnicity

We assessed the data for differences in living alone, marital status, and loneliness by age, gender, race, and ethnicity (Table 2). Women were significantly more likely to live alone compared to men (69.0% vs. 30.1%; $p < 0.001$) and significantly less likely to be married 41.6% vs. 58.4%; $p < 0.001$). The difference in loneliness in men compared to women (60.3% vs. 39.7%) was not statistically significant. There were also no statistically significant differences in living alone status or loneliness between adults in the 65–79 years age group compared to those in the 80 and older age group however, the younger group was significantly more likely to be married compared to the older group (36.7% vs. 31.1%; $p = 0.02$). There were significant differences in loneliness, living alone, and marital status by racial groups. Racial groups were collapsed into 3 discrete categories– Black/African American, White/Caucasian, and Asian– as these were the predominant racial groups in the sample and all others were included in the "Other" group. Those who identified as Black/African American were significantly more likely to live alone (32.5%; $p = 0.004$) compared to White/Caucasians (16.4%) or Asians (1.01%). Those who identified as Black/African American were significantly more likely to be married (31.9%, $p < 0.001$) compared to White/Caucasians (15.9%) or Asian (5.3%). Those who identified as Black/African American were more likely to be lonely (32.3%; $p = 0.005$) compared to White/Caucasian (22.7%) or Asian (3.49%). Those who identified as Hispanic/Latino were less likely to identify as lonely (39.7%) compared to Non-Hispanic/Latino (57.2%) however, this was not statistically significant.

Loneliness and social isolation risk factors and level of overlap

Associations between marital and living alone status and participant-reported loneliness are displayed in Table 3. Of the 597 individuals who lived alone, 18.6% were

lonely compared to 8.6% of those who did not live alone ($p < 0.001$). Married individuals were significantly less likely to be lonely compared to unmarried individuals (7.9% vs. 13.4%; $p < 0.001$).

Correlates of loneliness, living alone, and marital status

We ran separate logistic regression models for loneliness, living alone, and marital status to identify and compare correlates of each (Table 4).

Loneliness

Those who lived alone were 3.22 times more likely to be lonely ($p < 0.001$, CI 2.23, 4.64) compared to those who did not live alone. Those who identified as Black/African American had 63% lower odds of being lonely ($p < 0.001$, CI 0.23, 0.59) compared to those who identified as White/Caucasian. Those with positive depressive symptoms were more than 10.5 times as likely to be lonely compared to those without depressive symptoms ($p < 0.001$, CI 7.14, 15.5). Each point increase in cognitive function was associated with 3% lower odds of being lonely ($p = 0.03$, CI 0.95, 0.99). Loneliness was associated with ADL disability, such that those who required assistance with grooming and bathing had 4 times greater odds of being lonely ($p < 0.001$, CI 2.59, 7.47; $p = 0.005$, CI 1.58, 13.8 respectively), and those who needed assistance with toileting were 89% less likely to be lonely ($p = 0.02$, CI 0.02, 0.70). Each point increase in comorbidities was associated with 12% greater odds of being lonely ($p = 0.01$, CI 1.03, 1.23). There was no significant difference in loneliness between younger and older age groups, sex, marital status, ethnicity, sensory impairment, and ADLs such as ambulation and transferring.

Living alone

Those who were married were 87% less likely to be living alone ($p < 0.001$, CI 0.09, 0.18) and those who lived alone were 3 times more likely to be lonely ($p < 0.001$, CI 2.07, 4.17). Those who identified as Asian were 72% less likely to be living alone compared to White/Caucasians ($p = 0.01$, CI 0.10, 0.78). Those with depressive symptoms had 32% lower odds of living alone ($p = 0.04$, CI 0.48, 0.98) and those who needed assistance with grooming were 42% less likely to be living alone. There were no significant differences in living alone status in terms of age, sex, ethnicity, visual impairment, cognitive function, ADLs other than grooming, and comorbidities.

Marital status

Individuals in the aged 80 and over age group were 23% less likely to be married ($p = 0.04$, CI 0.61, 0.98) and women were 72% less likely to be married compared to men ($p < 0.001$, CI 0.22, 0.35). Married individuals were 87% less likely to be living alone compared to those who were unmarried ($p < 0.001$, CI 0.09, 0.18) and 36% less likely to be lonely ($p = 0.03$, CI 0.43, 0.96). There were no significant differences in marital status in terms of race, ethnicity, health or functional status.

Discussion

The current study described the prevalence of social isolation and loneliness in 2,026 diverse adults aged 65 and over, discharged from an acute care facility with HHS. We showed that social isolation and loneliness are prevalent in community-dwelling older adults receiving HHS and that those who are socially isolated are more likely to be lonely. We also showed that correlates of loneliness, and social isolation measures of living alone and marital status differ, highlighting social isolation and loneliness as discrete constructs and the need to target discrete risk factors when designing and delivering social connection interventions.

The prevalence of marital and living alone status in our sample which we operationalized as proxies of social isolation in our sample was higher compared to estimates from US Census Bureau data from 2022. Population survey reports from 2022 showed amongst adults aged 65–74, 21% of men and 27% of women lived alone. In adults aged 75 and over, 24% of men and 43% of women lived alone [28]. Comparatively, in the current sample, 36.5% of 80 and over older adults and 63.5% of adults aged 65–79 lived alone. Differences in living alone and marital status prevalence might be explained by the study sample. Our sample was more diverse than nationally representative samples (e.g., 81% White, 11% Black, 6% Hispanic in the abovementioned study [3]). US Census Data of population level statistics report 13.6% of the US population identifies as Black/African American, 19.1% Hispanic/Latino, and 75.5% White/Caucasian [29]. The current sample was majority Black/African American, Hispanic/Latino– which is representative of the population served by the health system [22]. The data for the current study was drawn from a health system that serves patients in Bronx County, NY– the poorest congressional district in the United States where 26.4% of the population live in poverty [22]. While social disconnection is prevalent across demographic, socioeconomic, and cultural boundaries, lower income, underrepresented (e.g., race/ethnicity, sex) older adults– such as a majority of this sample - and those who experience discrimination or marginalization are more likely to be disconnected [11, 15] and social isolation varies across racial/ethnic groups [16]. These data indicate minority and socioeconomically disadvantaged groups as particularly vulnerable to social disconnection and associated poor health outcomes and highlight the imperative to intervene in these populations.

Table 4 Logistic regression of loneliness and socially isolation correlates in Community-dwelling older adults receiving home health services ($n = 1,777$)*

Variable	Lonely ($n = 229$)			Living Alone ($n = 597$)			Married ($n = 1,329$)		
	OR (SE)	95% CI	*p*-value	OR (SE)	95% CI	*p*-value	OR (SE)	95% CI	*p*-value
Age									
≤ 80	1			1			1		
> 80	0.98 (0.17)	0.7, 1.37	0.9	0.98 (0.12)	0.78, 1.24	0.89	1.29 (0.16)	1.02, 1.65	0.04
Sex									
Male	1			1			1		
Female	0.74 (0.13)	0.53, 1.05	0.09	1.07 (0.13)	0.84, 1.37	0.57	3.59 (0.41)	2.87, 4.49	< 0.001
Marital status									
Unmarried	1								
Married	1.49 (0.31)	0.99, 2.23	0.06	7.69 (1.28)	5.55, 10.66	< 0.001	------	------	------
Living arrangements									
Not alone	1						1		
Alone	3.22 (0.6)	2.23, 4.64	< 0.001	------	------	------	7.74 (1.29)	5.58, 10.73	< 0.001
Lonely									
No				1			1		
Yes	------	------	------	2.93 (0.53)	2.07, 4.17	< 0.001	1.55	1.04, 2.32	0.03
Race									
Caucasian	1			1			1		
Black/African American	0.37 (0.09)	0.23, 0.59	< 0.001	0.93 (0.17)	0.66, 1.32	0.7	1.40 (0.25)	0.99, 1.98	0.06
Asian	1.1 (0.52)	0.44, 2.76	0.84	0.28 (0.15)	0.10, 0.78	0.01	0.8 (0.27)	0.41, 1.57	0.51
Other	0.43 (0.13)	0.24, 0.76	0.004	0.91 (0.20)	0.60, 1.40	0.68	1.0 (0.19)	0.67, 1.51	0.99
Ethnicity									
Hispanic/Latino	1			1			1		
Non-Hispanic/Latino	1.1 (0.31)	0.63, 1.92	0.74	0.89 (0.18)	0.60, 1.32	0.57	0.76 (0.15)	0.52, 1.11	0.16
Hearing impairment									
No	1			1			1		
Yes	1.50 (0.28)	1.0, 2.13	0.05	0.96 (0.15)	0.71, 1.30	0.8	0.90 (0.14)	0.66, 1.22	0.5
Vision Impairment									
No	1						1		
Yes	0.95 (0.18)	0.66, 1.39	0.81	1.32 (0.18)	1.01, 1.72	0.04	1.10 (0.15)	0.83, 1.44	0.51
Depressive symptoms									
No	1			1			1		
Yes	10.5 (2.07)	7.14, 15.5	< 0.001	0.68 (0.12)	0.48, 0.98	0.04	0.76 (0.13)	0.54, 1.07	0.12
Cognitive function	0.97 (0.01)	0.95, 0.99	0.03	1.0 (0.005)	0.99, 1.01	0.59	1.0 (0.005)	0.99, 1.01	0.98
Ambulating									
No	1			1			1		
Yes	2.09 (1.31)	0.61, 7.12	0.24	0.65 (0.16)	0.40, 1.06	0.08	0.82 (0.22)	0.48, 1.39	0.46
Transferring									
No	1			1			1		
Yes	0.52 (0.66)	0.04, 6.35	0.61	0.8 (0.58)	0.20, 3.27	0.76	2.11 (1.61)	0.47, 9.38	0.33
Toileting									
No	1			1			1		
Yes	0.11 (0.10)	0.02, 0.70	0.02	1.56 (0.80)	0.57, 4.27	0.59	0.69 (0.4)	0.22, 2.13	0.52
Grooming									
No	1						1		
Yes	4.39 (1.19)	2.59, 7.47	< 0.001	0.58 (0.08)	0.45, 0.76	< 0.001	1.1 (0.15)	0.83, 1.45	0.5
Bathing									
No	1			1			1		
Yes	4.67 (2.58)	1.58, 13.8	0.005	0.93 (0.18)	0.57, 4.27	0.69	0.98 (0.19)	0.67, 1.44	0.94
Comorbidities	1.12 (0.05)	1.03, 1.23	0.01	1.03 (0.03)	0.97, 1.10	0.33	1.02 (0.03)	0.96, 1.09	0.45

Note. *Stata utilizes listwise deletion for all regression models as regression analyses require complete data for all variables included in the model to calculate coefficients thus, 1,777 observations were included in the regression models. OR = odds ratio; SE = standard error; CI = confidence interval

Unexpectedly, prevalence of loneliness in our sample was lower than data reported from other national samples of older adults in the United States (11.6% compared to 43%) [3]. The reported loneliness prevalence in this sample may be an underestimation. National data estimates loneliness prevalence to be up to 43% [3] and our sample was majority Black/African American– a group that may be more vulnerable to loneliness [11, 15]. The current study includes a population of older adults at high risk for both social isolation and loneliness related to recent hospitalization, ADL disability, cognitive function, and overall morbidity. One reason for the discrepancy in loneliness prevalence estimates may be related to heterogeneity in assessment measures e.g., a one-item loneliness question such as the one used in the current study compared to validated assessment measures such as the UCLA Loneliness Scale [30]. Additionally, the use of the term "lonely" in the one-item screen may be stigmatizing and may result in under-reporting of loneliness.

These data reflect the benefits and drawbacks of EHR data. EHR data is both - a rich data source for both health and (increasingly) social information in one dataset but also prone to subjectivity, incompleteness, and human error. Additionally, the OASIS-E manual, which is the basis from where the current data was derived is a 396-page manual (including instructions and appendices) that includes mandated data to be collected at each patient intake visit for HHS. It is possible that data that is necessary for referral to discrete services, such as physical therapy or occupational therapy, is collected more meticulously compared to loneliness data, for which there is no defined referral or intervention. Besides the burden related to the number of questions or assessments, discomfort with asking about loneliness or a lack of knowledge regarding the physiologic impact of loneliness may be other potential explanations for under-reported loneliness on the part of staff. There is also the potential for discomfort or stigma related to questions about loneliness on the part of the patient. Self-reported loneliness may therefore be under-reported however, the single-item loneliness question was found to identify individuals who are lonely similarly to other screens that do not use the term lonely or loneliness [24]. These findings may point to the utility of using validated loneliness assessment tools in vulnerable populations and suggest the one-item screen might be suited as a preliminary or complementary screen to identify those who would benefit from more comprehensive assessment. The findings also point to an area of opportunity for future research regarding barriers and facilitators of loneliness screening in home health care.

The demographic differences in loneliness and social isolation in our sample are largely supported by findings from empirical research. Our findings that loneliness did not significantly differ among those under 80 years of age and those over 80 years of age or by gender are similar to findings from other studies that show loneliness does not increase with age and there are no significant gender differences in loneliness [6, 14, 17]. That being married is protective against loneliness is also in line with extant studies that report being married was associated with greater odds of recovering from loneliness [31]. In the current sample, being married was associated with lower odds of living alone and living alone was associated with higher odds of being lonely. Other studies of population data suggested living alone was not necessarily associated with higher odds of loneliness and that functional factors such as level of social engagement and support buffered against effects of living alone [24]. Given the nature of our data, we were limited by lack of social support and engagement measures that may shed further light on these findings.

Our findings that Black/African American older adults were more likely to report being lonely and living alone are supported by reports that underrepresented groups are more likely to be lonely and socially isolated [11, 32]. On the other hand, Taylor et al. (2020) [32] offered that social support for basic needs (e.g., help with groceries, transportation) may take priority in socioeconomically disadvantaged populations, and perceptions of loneliness would not take precedence in this population based on Maslow's hierarchy of needs. Our findings suggest that Black/African Americans may represent a high-risk group for loneliness and social isolation.

Our findings additionally showed associations of social connection and health status. Similarly to prior studies [1, 3, 31], we found multi-morbidity, cognition, and functional status were associated with loneliness. Furthermore, requiring assistance with ambulation and transferring were not associated with loneliness, while requiring assistance with grooming and bathing were. It is possible that disability in the above ADLs reflects a greater need for assistance with what are normally private, basic needs. This may result in changes in both the individual's own role functions (e.g., as a partner, parent, friend) as well as their relationship with their loved ones who become their primary caregivers, possibly resulting in greater loneliness. Additionally, the decline in function may result in greater loneliness due to changes in the individual's ability to travel inside and outside the home or may be limited in their ability to participate in different social activities. This is also in line with our findings that requiring assistance with grooming was associated with lower likelihood of living alone as individuals whose functional capacities are declined such that they require assistance with grooming makes it less possible to live independently. Loneliness was also associated with functional decline over time [3]. The direction of

the relationship between loneliness and function cannot be parsed in this sample given the nature of our data, however, the current study supports prior findings on loneliness and functional status [3, 33]. Prior studies [34, 35] support our findings that depressive symptoms were associated with higher odds of loneliness. While loneliness and depressive symptoms may overlap they are established as discrete constructs [36]. Our cross-sectional findings between loneliness and depression are extended by longitudinal studies that showed loneliness was associated with increased depressive symptoms over time however, depressive symptoms were not associated with increased loneliness over time [5]. Taken together, our findings add to prior literature on social connection and health outcomes and highlight the imperative for social connection interventions.

The post-acute period (immediately following hospitalization) presents a unique opportunity for social connection screening and intervention, particularly in homebound populations who may otherwise be out of reach. This period can be leveraged to connect vulnerable older adults to resources and services that may not otherwise be as readily available outside of the home health care setting (e.g., social work teams). Additionally, individuals tend to follow closely with home health care for several weeks which allows for robust follow up to ensure acceptability and sustainability of referrals/interventions. Currently there are no best practice recommendations for how to intervene on social isolation and loneliness and research on interventions is evolving. Several interventions for social connection were previously investigated ranging from one-on-one, group, and technologically delivered or virtual interventions [37–39]. Current evidence suggests there is no one-size-fits all intervention and that interventions should be tailored according to individual needs [37]. Social community infrastructure may also be leveraged to improve social connection in older adults [38] however, the evidence is still in its infancy and there is great variation in availability and accessibility of these resources. Prevalence of social isolation and loneliness in older adults emphasize the health policy imperative of improving availability and access of social connection interventions to promote health aging. Low-income geographic areas are more likely to be poorly resourced in terms of civil and social infrastructure and availability and access to technology, transportation, and community spaces can be challenging, especially for home-bound older adults with functional disability. Thus, policy initiatives should focus on equitable resource access and delivery across communities to ensure the most vulnerable older adults are reached.

Strengths and limitations

The dataset was limited to older adults aged 65 and older discharged home from one of 3 Montefiore hospitals in Bronx, NY with HHS provided by the system's home health agency. Patients discharged home with other HHS were not included in this dataset. Patients discharged without HHS, those discharged to inpatient rehabilitation facilities, sub-acute rehabilitation facilities, or long-term care were not included. Additionally, it is possible demographic data in the EHR does not reflect transitions that may be important to these analyses such as marital transitions or transitions in living arrangements. The BIMS is only assessed on individuals who can respond to the survey thus, those who are more impaired may not be captured here. Additionally, the data is limited by lack of data regarding level of education which may confound associations between loneliness and cognition. Additionally, the falls assessment inquiring about 2 or more falls over the last 12 months may not capture the true number of falls in this population (e.g., less than 2) and the question is limited by recall bias. This may explain why the number of falls is lower than expected given the level of functional disability in the sample. EHR data presents both opportunities and challenges. While the dataset potentially represents a rich source of health-related data, it is not built for research and may be error prone due to the volume of information in the record, the number of individuals providing input, and the subjectivity inherent in medical care and diagnoses. Despite these shortcomings, we felt the opportunity to describe the problem in a majority diverse, low resource population of older adults was an important contribution to the literature to highlight the needs of this vulnerable population and to provide areas of opportunity for future research. Much of the data assessed in the OASIS manual is via self-report which may be underreported due to stigma (e.g., self-reported loneliness) or social desirability bias (e.g., adherence to medication regimen). Additionally, while the one-item loneliness question was found to be reliable compared to validated loneliness assessment tools [24], the one-item loneliness assessment is not as robust as multi-item loneliness measures that capture the multi-dimensionality of loneliness (e.g., emotional or social loneliness) [30, 40]. The dataset al.so does not include other measures of social isolation (e.g., social network size, social engagement) thus, our findings are limited to living arrangements and marital status. Marital and living status may instead be utilized as markers for individuals at risk who may benefit from screening for social isolation using validated metrics. We additionally did not have data on marital/relationship quality measures which also limited the extrapolation of our findings. Furthermore, our data is cross-sectional; we therefore cannot draw conclusions regarding directionality or

causality. Finally, we cannot rule out that missing data is not missing at random in this vulnerable population where the sickest individuals may be most likely to have missing data due to difficulty or inability to respond to a lengthy survey and our results should thus be interpreted in this context. We believe our reports on social connection in a large, unique population of diverse older adults drawn from a resource limited county is a significant strength of this study and a valuable contribution to the literature on social connection in community dwelling older adults. Our findings additionally point to areas of opportunity for future study as well as opportunities for leveraging existing EHR data to report on health and social measures simultaneously.

Conclusion

Social isolation risk factors are highly prevalent amongst diverse older adults admitted to HHS following hospital discharge and older adults who are unmarried and living alone are more likely to be lonely. The EHR represents a potentially valuable source of data that can be leveraged to identify older adults at risk for loneliness and social isolation which are important contributors to costly forms of health care utilization and poor health outcomes. The current work highlights the value of additional, brief indicators of social connection into the EHR to facilitate identification and stratification of individuals at risk. Further study is needed in this high-risk population to broadly describe prevalence and correlates of loneliness, marital status, and living alone to understand policy implications for resource allocation and intervention to promote health and prevent associated poor health outcomes.

Abbreviations

ADL	Activities of daily living
EHR	Electronic health record
HHS	Home health service
OASIS	Outcome and Assessment Information Set OASIS-E Manual

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12877-025-05947-0.

Supplementary Material 1

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Author contributions

CP: conceptualization, writing first draft, conducted all analyses. YP: prepared Tables 1 and 3 and contributed to the analyses and editing the first draft. AE: conceptualization, data access, funding, and content expertise. JV: content expertise. HB: conceptualization, data access, funding, content expertise, and supervision. All authors reviewed the final manuscript.

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Data availability

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This research was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained via the Albert Einstein College of Medicine Institutional Review Board. As a retrospective analysis of de-identified data, no consent to participate was required. Individuals provided consent for clinical care at the time of service.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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