Loneliness Among US Adults Aged ≥55 Early in the COVID-19 Pandemic: Findings From the COVID-19 Coping Study

Brendan Q. O'Shea, MPH[1] [ID]; Jessica M. Finlay, PhD[2]; Jasdeep Kler, MPH[1];
Carly A. Joseph, BS[1]; and Lindsay C. Kobayashi, PhD[1]

Abstract

Objectives: Loneliness is associated with increased risks of adverse health outcomes among middle-aged and older adults. We estimated the prevalence of loneliness and identified key sociodemographic, employment, living, and health-related risk factors for loneliness among adults aged ≥55 during the early phase of the COVID-19 pandemic in the United States, when much of the country was under shelter-in-place orders.

Methods: We collected data from online questionnaires in the COVID-19 Coping Study, a national study of 6938 US adults aged ≥55 from April 2 through May 31, 2020. We estimated the population-weighted prevalence of loneliness (scores ≥6 of 9 on the 3-item UCLA Loneliness Scale), overall and by sociodemographic, employment, living, and health-related factors. We used population-weighted modified Poisson regression models to estimate prevalence ratios (PRs) and 95% CIs for the associations between these factors and loneliness, adjusting for age, sex, race, ethnicity, and education level.

Results: Overall, we estimated that 29.5% (95% CI, 27.9%31.3%) of US adults aged ≥55 were considered high in loneliness in April and May 2020. In population-weighted adjusted models, loneliness was the most prevalent among those who reported depression, who were not married or in a relationship, who lived alone, and who were unemployed at the onset of the pandemic.

Conclusions: We identified subpopulations of middle-aged and older adults who were vulnerable to loneliness during a period when COVID-19 shelter-in-place orders were in place across most of the country. These insights may inform the allocation of resources to mitigate an unintended health consequence during times of restricted activity.

Keywords

loneliness, COVID-19, pandemic, isolation, aging

In September 2017, US Surgeon General Vivek H. Murthy referred to loneliness as a "growing health epidemic."[1] He said loneliness was the most common condition he witnessed as surgeon general and attributed some of the leading causes of death in the United States to loneliness.[1,2] Four years later, amid the COVID-19 pandemic, people in the United States have had a dramatic increase in physical isolation. Widespread measures taken by government officials to reduce the spread of SARS-CoV-2, the virus that causes COVID-19, have curtailed in-person socializing and interpersonal engagement. By March 30, 2020, many states had issued statewide shelter-in-place or stay-at-home orders that called for the closure of nonessential businesses, restricted

nonessential travel, and the banning of large gatherings.[3] By the end of April 2020, mitigation efforts included federal quarantine orders for travelers, school closures, and restrictions on visitor access to residential care facilities.[4]

[1] Department of Epidemiology, University of Michigan School of Public Health, Ann Arbor, MI, USA
[2] Social Environment and Health Program, Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI, USA

Corresponding Author:
Brendan Q. O'Shea, MPH, University of Michigan School of Public Health, 1415 Washington Heights, SPH I, Ann Arbor, MI 48109, USA.
Email: broshea@umich.edu

Older age is associated with increased risk for severe COVID-19–related morbidity and mortality, with adults aged ≥65 and adults with comorbid conditions at highest risk for severe health effects from COVID-19.[5,6] In the absence of widespread population immunity, many middle-aged and older adults will likely need to reduce the number of physical contacts to a greater extent than groups that are less vulnerable to COVID-19 to limit their risk of acquiring infection and spreading SARS-CoV-2. Loneliness, the feeling of being lonely independent of one's measurable level of social contact,[7] is associated with an increased risk of adverse health outcomes among middle-aged adults (aged 55-64) and older adults (aged ≥65), including dementia, myocardial infarction, anxiety, depression, and all-cause mortality.[8-18] Extended physical isolation may increase loneliness, which is an unintended health consequence of measures taken to curb the COVID-19 pandemic.[7]

In June 2020, the National Poll on Healthy Aging identified that 41% of adults aged 50-80 felt a lack of companionship, 56% felt isolated from others, and 46% had infrequent social contact.[19] Research conducted before the COVID-19 pandemic identified demographic, social, and health-related risk factors for loneliness, including female sex, increasing age, low education level, low annual household income, being unmarried, living alone, living in a nursing home, poor self-reported health, poor mental health, and high number of chronic illnesses.[20-28] However, key risk factors for loneliness among middle-aged and older adults during the COVID-19 pandemic are unknown. COVID-19–related changes to daily life may influence previously identified associations between loneliness and its risk factors, and populations that were previously at low risk for loneliness may have been at increased risk for loneliness under COVID-19 restrictions. For example, employed people who began working remotely, were placed on leave, or lost their jobs may have had greater shocks to their daily social networks and, therefore, a higher prevalence of loneliness than people who were retired or not employed before the pandemic.[29] People who live alone or in assisted-living institutions may be especially isolated under COVID-19 restrictions, and people with preexisting health conditions may also have a higher prevalence of loneliness than people who are living with others and who have few preexisting health conditions because of their need to physically isolate themselves to avoid COVID-19 exposure.[5] Without evidence on predictors of loneliness during COVID-19, the ability of targeted public health efforts and social policy to mitigate loneliness during times of shelter-in-place orders and social distancing recommendations is limited. The objectives of our study were to (1) estimate the prevalence of loneliness among US adults aged ≥55 during April and May 2020 and (2) identify key sociodemographic, employment, living, and health-related predictors of loneliness during this period. We chose predictors on the basis of prepandemic evidence for their associations with loneliness among middle-aged and older adults and their plausibility for association with loneliness during COVID-19 restrictions.[20-28]

Methods

Study Design and Population

The COVID-19 Coping Study is a national longitudinal cohort study of 6938 US adults aged ≥55 enrolled from April 2 through May 31, 2020, in all 50 states, the District of Columbia, and Puerto Rico.[30] The study design, recruitment methods, and data collection are described elsewhere.[30] In brief, investigators recruited participants through a nonprobability, multiframe sampling strategy, which included snowball sampling through social media platforms and word of mouth and an online research panel with sampling quotas for sociodemographic characteristics of the general US population aged ≥55. Participants completed online questionnaires, administered via the University of Michigan Qualtrics, in English (N = 6886) and Spanish (N = 52).[30] We used data from the baseline of the COVID-19 Coping Study (N = 6938). We excluded 138 participants who were missing data on loneliness, for an analytical sample of 6800 participants. The COVID-19 Coping Study was approved by the Health Sciences and Behavioral Sciences Institutional Review Board at the University of Michigan.

Outcome: Loneliness

We measured loneliness using the 3-item University of California Los Angeles (UCLA) Loneliness Scale.[31] Participants were asked how often they (1) felt they lacked companionship, (2) felt left out, and (3) felt isolated from others during the past week. Response options were "hardly ever," "some of the time," and "often"; each item was scored on a scale of 1-3, with higher scores indicating higher levels of loneliness (total score range, 3-9). Consistent with previous applications of the UCLA Loneliness Scale, scores were dichotomized at the upper quintile of our study population to indicate low or high loneliness, corresponding to total scores of <6 and ≥6.[32] The UCLA Loneliness Scale had good internal consistency, with a Cronbach alpha of 0.77.[30]

Predictors of Loneliness

The COVID-19 pandemic had caused dramatic changes to daily life in the United States at the time this study was conducted. Xenophobic and ageist language used by the media and government officials had created a hostile environment for racial/ethnic minority groups and older adults.[33-36] Many people in the United States had lost work or experienced financial difficulties because of the economic recession caused by the pandemic.[37] Health care workers and adults at risk for severe morbidity and mortality from COVID-19 were self-isolating from their families,[38] and many adults

postponed or went without medical care.[39] Considering the multifaceted impact of the COVID-19 pandemic on daily life, we selected potential predictors of loneliness that were relevant to COVID-19–related life changes and supported by prepandemic evidence for their relationships to loneliness: sociodemographic characteristics, employment characteristics, living circumstances, and health-related factors.[20-28] Specifically, we assessed the prevalence of loneliness in relation to the following characteristics: sex (male, female), age (55-59, 60-64, 65-69, 70-74, 75-79, 80-84, ≥85), race (White, non-White), ethnicity (Hispanic/Latinx, non-Hispanic/ Latinx), highest level of education (<high school diploma, high school diploma/general educational development [GED], some college or 2-year associate degree, 4-year college or university degree, postgraduate or professional degree), pre–COVID-19 employment status (retired, employed, unemployed), COVID-19–related change in employment (employment not affected, lost job/furloughed/ reduced pay or hours/working from home), current relationship status (married or in a relationship, never married, divorced or separated, widowed), living arrangement (living alone, living with others), degree of prepandemic social isolation (low or high; we created a dichotomized composite measure for social isolation by assigning 1 point for less than monthly contact with each of children, other family members, and friends; lacking participation in social organizations; and living alone, dichotomized at the top quartile),[32] type of residence (senior living or nursing home, non–senior living or nursing home), receipt of in-home care assistance before the pandemic (yes or no), depressive symptoms (measured by the 8-item Center for Epidemiologic Studies Depression scale, dichotomized at <3 and ≥3),[40] and number of physician-diagnosed comorbid health conditions such as cancer, heart disease, chronic obstructive pulmonary disorder, asthma, hypertension, and diabetes (0, 1, 2, ≥3).

Statistical Analysis

We generated population weights using data from the 2018 American Community Survey,[41] to ensure that the study population was demographically representative of the general US population aged ≥55, based on age, sex, race, ethnicity, education level, marital status, and US Census region of residence.[30] We described characteristics of the population-weighted sample overall using univariate statistics, and we estimated the unadjusted prevalence and associated 95% CIs for loneliness according to each predictor variable. We used population-weighted Poisson regression models with a log-link function and robust SEs to estimate prevalence ratios (PRs) and 95% CIs for the associations between these factors and loneliness.[42] We modeled each predictor separately to avoid overadjustment, with sex, age, race, ethnicity, and education level included in all models.[43] Because the pandemic caused older adults to often be physically separated from their families, we evaluated a

statistical interaction between relationship status and living arrangement in a model adjusted for age, sex, race, ethnicity, and education level. In addition, age and number of physician-diagnosed comorbid conditions were modeled as continuous variables to test for a linear trend between these factors and loneliness, with $P < .05$ considered significant. We performed all statistical analyses using Stata version 16.0 (StataCorp).

Results

More than half (53.9%) of the study population was female, and the mean age was 67.8 (Table 1). The overall population-weighted prevalence of loneliness was 29.5% (95% CI, 27.9%-31.3%) (Table 2). A higher percentage of women than men reported loneliness (34.4% vs 23.9%), and the adjusted PR (aPR) of loneliness was higher among women than among men (aPR = 1.39; 95% CI, 1.23-1.57; Tables 2 and 3). The prevalence of loneliness steadily decreased with increasing age, from 37.4% among adults aged 55-59 to 22.7% among adults aged ≥85 ($P < .001$).

Pre–COVID-19 employment status and COVID-19–related employment changes affected the prevalence of loneliness (Tables 2 and 3). The prevalence of loneliness was lowest among retired people compared with people who were employed or unemployed pre–COVID-19 (23.7%, 33.8%, and 43.0%, respectively). Compared with people whose employment was unaffected by COVID-19, people who had lost their job, been furloughed or placed on leave of absence, had reduced pay or hours, or began working from home had a higher prevalence of loneliness (35.6% vs 28.2%; aPR = 1.29; 95% CI, 1.04-1.59).

Being married or in a relationship was associated with a lower prevalence of loneliness compared with being never married, divorced or separated, and widowed (Tables 2 and 3). Nearly half of adults aged ≥55 who were divorced or separated reported loneliness (44.9%), and people who were divorced or separated had a higher adjusted prevalence of loneliness than people who were married or in a relationship (aPR = 2.05; 95% CI, 1.79-2.35). A higher percentage of people who lived alone reported loneliness than people who lived with others (41.9% vs 24.8%), and the prevalence of loneliness was higher among people who lived alone than among people who lived with others (aPR = 1.73; 95% CI, 1.54-1.95). More than one-third of adults who reported high levels of prepandemic social isolation reported loneliness (35.9%). Adults who reported high levels of prepandemic social isolation had a higher adjusted prevalence of loneliness than adults who reported low levels of prepandemic social isolation (aPR = 1.48; 95% CI, 1.32-1.66). Adults who were married or in a relationship but living alone had a higher adjusted prevalence of loneliness than adults who were married or in a relationship and living with others (aPR = 2.83; 95% CI, 2.11-3.80; Table 4).

Table 1. Population-weighted characteristics of participants in the COVID-19 Coping Study (N = 6800), United States, April–May 2020[a,b]

Characteristic	% (95% CI)
Sociodemographic characteristics	
Sex (N = 6800)	
Male	46.1 (44.2-48.0)
Female	53.9 (52.0-55.8)
Age, y (N = 6800)	
55-59	22.7 (21.2-24.4)
60-64	21.9 (20.4-23.4)
65-69	18.1 (16.8-19.4)
70-74	14.3 (13.0-15.6)
75-79	9.9 (8.9-11.0)
80-84	6.5 (5.7-7.4)
≥85	6.7 (5.4-8.3)
Race (N = 6800)	
White	80.2 (78.4-81.9)
Non-White	19.8 (18.1-21.6)
Ethnicity (n = 6704)	
Non-Hispanic/Latinx	89.1 (87.5-90.5)
Hispanic/Latinx	10.9 (9.5-12.5)
Highest education level (N = 6800)	
Postgraduate or professional degree	12.1 (11.4-12.8)
4-y college or university degree	16.5 (15.5-17.5)
Some college or 2-y associate degree	27.7 (26.2-29.3)
High school diploma/GED	30.1 (28.4-31.9)
<High school diploma	13.6 (11.7-15.8)
Employment	
Employment status pre–COVID-19 (n = 6795)	
Retired	52.9 (51.0-54.8)
Employed	31.4 (29.8-33.0)
Unemployed	15.7 (14.2-17.3)
COVID-19–related change in employment (n = 2643)	
Employment not affected	25.7 (23.1-28.4)
Employment affected[c]	74.3 (71.6-76.9)
Living circumstances	
Relationship status (n = 6784)	
Married or in a relationship	58.8 (56.8-60.6)
Single, never married	8.3 (7.3-9.3)
Single, divorced or separated	17.8 (16.4-19.4)
Single, widowed	15.1 (13.6-16.8)
Living arrangement (n = 6743)	
Living with others	72.1 (70.3-73.8)
Living alone	27.9 (26.2-29.7)
Degree of prepandemic social isolation (N = 6800)[d]	
Low	57.3 (55.4-59.2)
High	42.7 (40.8-44.6)
Type of residence (n = 6795)[e]	
Non–senior living or nursing home	98.2 (97.5-98.7)
Senior living or nursing home	1.8 (1.3-2.5)

(continued)

Table 1. (continued)

Characteristic	% (95% CI)
Health-related factors	
Receives in-home care assistance (n = 6783)	
No	94.1 (93.0-95.1)
Yes	5.9 (4.9-7.0)
Depressive symptoms (n = 6789)[f]	
No	68.0 (66.2-69.7)
Yes	32.0 (30.3-33.8)
No. of physician-diagnosed comorbid health conditions (N = 6800)[g]	
0	33.4 (31.7-35.1)
1	36.6 (34.8-38.4)
2	19.9 (18.5-21.4)
≥3	10.2 (8.9-11.6)

Abbreviation: GED, general educational development.
[a]Data were from the baseline wave of the COVID-19 Coping Study.[30]
[b]All estimates applied population weights based on 2018 American Community Survey data.[41]
[c]"Employment affected" refers to people who had lost their job, been furloughed or placed on leave of absence, had reduced pay or hours, or began working from home.
[d]Degree of prepandemic social isolation is a dichotomized composite measure created by assigning 1 point for less than monthly contact with each of children, other family members, and friends; lacking participation in social organizations; and living alone, dichotomized at the top quartile of the COVID-19 Coping Study population.[32]
[e]"Senior living" refers to both senior independent living and senior assisted-living facilities.[32]
[f]Measured by the 8-item Center for Epidemiologic Studies Depression Scale, dichotomized at <3 and ≥3.[40]
[g]Physician-diagnosed comorbid conditions were calculated based on the presence of self-reported diagnoses of hypertension, diabetes, heart disease, asthma, chronic obstructive pulmonary disease, and cancer (all yes/no).[41]

Receipt of pre–COVID-19 in-home assistance was associated with a higher prevalence of loneliness than not receiving pre–COVID-19 in-home assistance (38.7% vs 28.8%; Table 2). The adjusted prevalence of loneliness was also higher among adults who received in-home assistance than among adults who did not receive in-home assistance (aPR = 1.43; 95% CI, 1.13-1.80; Table 3). One-third of adults with ≥3 comorbid conditions reported loneliness (36.4%; Table 2), and adults with ≥3 comorbid conditions had a 53% higher adjusted prevalence of loneliness than people with no comorbid conditions (aPR = 1.53; 95% CI, 1.25-1.86; Table 3). We found a graded, dose–response relationship between the number of reported comorbid conditions and prevalence of loneliness in the adjusted model ($P < .001$). Two-thirds of adults who reported depressive symptoms compared with one-third of adults who did not report depressive symptoms reported loneliness (63.7% vs 13.4%). The adjusted prevalence of loneliness was 4.5 times higher among adults who reported depressive symptoms than among adults who did not report depressive symptoms (aPR = 4.52; 95% CI, 3.97-5.14).

Table 2. Population-weighted prevalence of loneliness by sociodemographic, employment, living, and health-related characteristics, COVID-19 Coping Study, United States, April–May 2020[a,b]

Characteristic	Prevalence of loneliness,[c] % (95% CI)
Overall	29.5 (27.9-31.3)
Sociodemographic characteristics	
Sex	
Male	23.9 (21.6-26.4)
Female	34.4 (32.1-36.8)
Age, y	
55-59	37.4 (33.6-41.3)
60-64	33.5 (29.9-37.2)
65-69	29.1 (25.6-32.9)
70-74	25.4 (21.5-29.7)
75-79	20.3 (16.4-24.9)
80-84	19.7 (15.1-25.3)
≥85	22.7 (14.6-33.5)
Race	
White	29.6 (27.8-31.5)
Non-White	29.3 (25.0-34.0)
Ethnicity	
Non-Hispanic/Latinx	29.6 (27.9-31.4)
Hispanic/Latinx	28.9 (23.1-35.6)
Highest education level	
Postgraduate or professional degree	24.9 (22.8-27.2)
4-y college or university degree	29.2 (26.7-31.9)
Some college or 2-y associate degree	33.9 (30.9-37.1)
High school diploma/GED	26.7 (23.8-29.9)
<High school diploma	31.3 (24.0-39.6)
Employment	
Employment status pre–COVID-19	
Retired	23.7 (21.6-26.0)
Employed	33.8 (31.1-36.5)
Unemployed	40.3 (34.9-45.8)
COVID-19–related change in employment	
Employment not affected	28.2 (23.1-33.9)
Employment affected[d]	35.6 (32.5-38.7)
Living circumstances	
Relationship status	
Married or in a relationship	21.1 (19.3-23.0)
Single, never married	39.7 (33.6-46.2)
Single, divorced or separated	44.9 (40.4-49.6)
Single, widowed	38.9 (33.5-44.6)
Living arrangement	
Living with others	24.8 (22.9-26.7)
Living alone	41.9 (38.3-45.6)
Degree of prepandemic social isolation[e]	
Low	24.8 (22.8-26.9)
High	35.9 (33.0-38.9)

(continued)

Table 2. (continued)

Characteristic	Prevalence of loneliness,[c] % (95% CI)
Type of residence[f]	
Non-senior living or nursing home	29.4 (27.7-31.1)
Senior living or nursing home	34.9 (22.7-49.6)
Health-related factors	
Receives in-home care assistance	
No	28.8 (27.1-30.6)
Yes	38.7 (29.8-48.3)
Depressive symptoms[g]	
No	13.4 (12.0-15.1)
Yes	63.7 (60.5-66.7)
No. of physician-diagnosed comorbid health conditions[h]	
0	27.7 (25.1-30.4)
1	29.6 (26.8-32.5)
2	29.1 (25.5-32.9)
≥3	36.4 (29.9-43.4)

Abbreviation: GED, general educational development.
[a]Data were from the baseline wave of the COVID-19 Coping Study.[30]
[b]All estimates applied population weights based on 2018 American Community Survey data.[41]
[c]Loneliness was measured using the 3-item UCLA Loneliness Scale dichotomized at the upper quintile of our study population, corresponding to scores of <6 and ≥6.[31,32]
[d]"Employment affected" refers to people who had lost their job, been furloughed or placed on leave of absence, had reduced pay or hours, or began working from home.
[e]Degree of prepandemic social isolation is a dichotomized composite measure created by assigning 1 point for less than monthly contact with each of children, other family members, and friends; lacking participation in social organizations; and living alone, dichotomized at the top quartile of the COVID-19 Coping Study population.[32]
[f]"Senior living" refers to both senior independent living and senior assisted-living facilities.
[g]Measured by the 8-item Center for Epidemiologic Studies Depression Scale, dichotomized at <3 and ≥3.[40]
[h]Physician-diagnosed comorbid conditions were calculated based on the presence of self-reported diagnoses of hypertension, diabetes, heart disease, asthma, chronic obstructive pulmonary disease, and cancer (all yes/no).

Discussion

During the first wave of the COVID-19 pandemic (April–May 2020), when shelter-in-place orders were in place across much of the United States, approximately one-third of adults aged ≥55 in this sample reported loneliness. Our findings are consistent with prepandemic research on predictors of loneliness and also challenge some beliefs about older adults and loneliness during COVID-19. We identified subgroups of middle-aged and older people in the United States who reported loneliness during the early months of the COVID-19 pandemic, namely, adults who were unemployed, were not married

Table 3. Population-weighted prevalence ratios for loneliness, according to sociodemographic, employment, living, and health-related factors, COVID-19 Coping Study, United States, April–May 2020[a,b,c]

Characteristic	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Sociodemographic characteristics		
Sex[d]		
Male	1 [Reference]	1 [Reference]
Female	1.44 (1.28-1.63)	1.39 (1.23-1.57)
Age, y[d]		
55-59	1 [Reference]	1 [Reference]
60-64	0.90 (0.77-1.04)	0.89 (0.77-1.04)
65-69	0.78 (0.66-0.92)	0.77 (0.66-0.91)
70-74	0.68 (0.56-0.82)	0.70 (0.58-0.84)
75-79	0.54 (0.43-0.69)	0.56 (0.44-0.70)
80-84	0.53 (0.40-0.70)	0.54 (0.41-0.72)
≥85	0.61 (0.40-0.93)	0.63 (0.41-0.95)
P value for trend across age groups[e]	<.001	<.001
Race[d]		
White	1 [Reference]	1 [Reference]
Non-White	0.99 (0.84-1.17)	0.93 (0.79-1.09)
Ethnicity[d]		
Non-Hispanic/Latinx	1 [Reference]	1 [Reference]
Hispanic/Latinx	0.98 (0.78-1.22)	0.95 (0.77-1.19)
Highest education level[d]		
Postgraduate or professional degree	1 [Reference]	1 [Reference]
4-y college or university degree	1.17 (1.04-1.33)	1.18 (1.03-1.34)
Some college or 2-y associate degree	1.36 (1.20-1.55)	1.40 (1.23-1.59)
High school diploma/GED	1.07 (0.93-1.24)	1.11 (0.96-1.28)
<High school diploma	1.26 (0.96-1.64)	1.24 (0.97-1.60)
Employment		
Employment status pre–COVID-19[f]		
Retired	1 [Reference]	1 [Reference]
Employed	1.42 (1.26-1.61)	1.22 (1.05-1.41)
Unemployed	1.70 (1.44-2.00)	1.37 (1.12-1.67)
COVID-19–related change in employment[f]		
Employment not affected	1 [Reference]	1 [Reference]
Employment affected[g]	1.26 (1.02-1.56)	1.29 (1.04-1.59)
Living circumstances		
Relationship status[f]		
Married or in a relationship	1 [Reference]	1 [Reference]
Single, never married	1.88 (1.57-2.26)	1.75 (1.45-2.12)
Single, divorced or separated	2.13 (1.86-2.44)	2.05 (1.79-2.35)
Single, widowed	1.84 (1.56-2.18)	2.15 (1.81-2.55)
Living arrangement[f]		
Living with others	1 [Reference]	1 [Reference]
Living alone	1.69 (1.50-1.90)	1.73 (1.54-1.95)
Degree of prepandemic social isolation[f,h]		
Low	1 [Reference]	1 [Reference]
High	1.45 (1.29,1.63)	1.48 (1.32-1.66)
Type of residence[f,i]		
Non-senior living or nursing home	1 [Reference]	1 [Reference]
Senior living or nursing home	1.19 (0.80-1.76)	1.39 (0.93-2.09)

(continued)

Table 3. (continued)

Characteristic	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Health-related factors		
Daily independence[f]		
No in-home assistance	1 [Reference]	1 [Reference]
Receives in-home assistance	1.34 (1.05-1.72)	1.43 (1.13-1.80)
Depressive symptoms[f,j]		
No	1 [Reference]	1 [Reference]
Yes	4.74 (4.18-5.37)	4.52 (3.97-5.14)
Number of physician-diagnosed comorbid health conditions[f,k]		
0	1 [Reference]	1 [Reference]
1	1.07 (0.93-1.23)	1.19 1.04-1.37)
2	1.05 (0.89-1.23)	1.20 (1.03-1.41)
≥3	1.31 (1.07-1.62)	1.53 (1.25-1.86)
P value for trend[e]	.03	<.001

Abbreviations: GED, general educational development; PR, prevalence ratio.
[a]Data were from the baseline wave of the COVID-19 Coping Study.[30]
[b]All models applied population weights based on 2018 American Community Survey data.[41]
[c]Loneliness was measured using the 3-item UCLA Loneliness Scale dichotomized at the upper quintile of our study population, corresponding to scores of <6 and ≥6.[31,32]
[d]Models adjusted for sex, age group, race, and ethnicity.
[e]Variable was modeled continuously to assess linear trend between the characteristic and loneliness. Significance was based on 2-sided probability, with *P* < .05 considered significant.
[f]Models adjusted for sex, age group, race, ethnicity, and education level.
[g]"Employment affected" refers to people who had lost their job, been furloughed or placed on leave of absence, had reduced pay or hours, or began working from home.
[h]Degree of prepandemic social isolation is a dichotomized composite measure created by assigning 1 point for less than monthly contact with each of children, other family members, and friends; lacking participation in social organizations; and living alone, dichotomized at the top quartile of the COVID-19 Coping Study population.[32]
[i]"Senior living" refers to both senior independent living and senior assisted-living facilities.
[j]Measured by the 8-item Center for Epidemiologic Studies Depression Scale, dichotomized at <3 and ≥3.[40]
[k]Physician-diagnosed comorbid conditions were calculated based on presence of self-reported diagnoses of hypertension, diabetes, heart disease, asthma, chronic obstructive pulmonary disease, and cancer (all yes/no).

or in a relationship, lived alone, and reported depressive symptoms. Our findings may inform public health and social policies to identify and mitigate loneliness among groups most vulnerable to loneliness during periods of shelter-in-place orders and social distancing during a pandemic.

Table 4. Interaction between relationship status and living arrangement as potential predictors of loneliness, COVID-19 Coping Study, United States, April–May 2020[a,b,c]

Relationship status/living arrangement	Adjusted prevalence ratio (95% CI)
Married or in a relationship/living with others	1 [Reference]
Never married/living with others	2.18 (1.63-2.93)
Never married/living alone	1.60 (1.29-1.98)
Divorced or separated/living with others	1.79 (1.45-2.20)
Divorced or separated/living alone	2.29 (1.97-2.65)
Widowed/living with others	2.25 (1.73-2.93)
Widowed/living alone	2.17 (1.77-2.65)
Married or in a relationship/living alone	2.83 (2.11-3.80)

[a]Data were from the baseline wave of the COVID-19 Coping Study.[30]
[b]Model is population weighted based on the 2018 American Community Survey data[41] and adjusted for sex, age, race, ethnicity, and education level.
[c]Loneliness was measured using the 3-item UCLA Loneliness Scale dichotomized at the upper quintile of our study population, corresponding to scores of <6 and ≥6.[31,32]

Despite the potential effect that COVID-19 control measures may have had on loneliness, evidence on loneliness among older adults during the COVID-19 pandemic is sparse and primarily uses nonrepresentative samples and varying measures of loneliness.[19,44,45] We identified 3 studies that estimated the prevalence or predictors of loneliness among people in the United States during the early months of the pandemic.[19,44,45] The National Poll on Healthy Aging, a study of 2074 US adults aged 50-80, observed decreased companionship or increased feelings of isolation (2 items used in the UCLA Loneliness Scale) among women and among adults who lived alone; had low levels of self-reported health; were unemployed, disabled, or not working; and had poor mental health or depression.[19] A longitudinal study of 1545 people in the United States aged 18-98 conducted from January through April 2020 found that older adults aged ≥65 had lower levels of loneliness than middle-aged (ages 40-64) and younger (ages 18-39) adults did, and that levels of loneliness were high among people who lived alone and had chronic conditions.[44] Lastly, in a study of 151 adults aged ≥60 in California, 54% of participants reported worsened levels of COVID-19–related loneliness from March to June 2020. The study also found that loneliness, measured by the UCLA Loneliness Scale, was associated with worsening levels of depression, anxiety, and worries about COVID-19 and general health.[45] Our predictors of loneliness are consistent with predictors of loneliness in these studies, and we identified additional predictors of loneliness among middle-aged and older adults during the first months of the COVID-19 pandemic.

Our findings challenge the narrative propagated by some media and government officials that older adults are incapable, vulnerable, and frail.[35] The oldest adults in our study (aged ≥75) had a lower prevalence of loneliness during COVID-19 than adults aged 55-74 did. We also observed a decrease in the prevalence of loneliness with increasing age, which is consistent with previous research documenting an inverse, nonlinear association between loneliness and age.[26-28] We also found that, regardless of age and other sociodemographic factors, retired people were less likely than people who were employed pre–COVID-19 to be lonely during the early months of the pandemic. The socioemotional selectivity theory suggests that, as people age, they become more motivated to focus on close social connections rather than peripheral relationships.[46,47] Adults who were employed pre–COVID-19 may have been more susceptible to peripheral social network disruptions caused by COVID-19–related workplace changes than retired people, who may have been less reliant on social connections stemming from work. Alternatively, employment disruptions or bleak employment opportunities caused by COVID-19 may have also led to increased loneliness among non–retired people; previous research suggests that negative changes in finances are associated with loneliness.[48] Our results also indicated that adults who were married or in a relationship but separated from family and living alone may be at especially high risk for loneliness during periods of shelter-in-place orders and social distancing recommendations. The effects of family separation on loneliness and health during COVID-19 deserve further investigation.

Limitations

This study had several limitations. First, the use of cross-sectional data did not allow us to assess causal relationships between our predictors and loneliness. However, identifying characteristics that predict loneliness during the early phase of the COVID-19 pandemic may help health care professionals and policy makers identify populations most likely to experience loneliness during periods of extended physical isolation. Second, about 40% (2898 of 6938) of participants in the COVID-19 Coping Study reported hearing about the study through word-of-mouth from friends and family or Facebook.[30] Although the use of snowball sampling granted access to hard-to-reach groups, such as people who are not on social media, word-of-mouth recruitment may have been conditional on people having a social network that enabled them to be referred to the study. Because these people may be more socially connected than the general population, we may have underestimated the population prevalence of loneliness, despite the use of sociodemographic population weights in our estimates. Third, our results may not be generalizable to non-internet users, who may primarily comprise populations that are in poor health, lack internet access, and are homeless or institutionalized.[49] These population groups were particularly vulnerable to loneliness before the COVID-19 pandemic,[23,50,51] suggesting that our estimate of prevalence of loneliness during the study period may be an underestimate.

This study also had several strengths. First, use of the internet as a recruitment strategy enabled us to rapidly enroll a national cohort of middle-aged and older US adults at low cost during the first wave of a major pandemic, when research restrictions on human subjects were in place. Second, we observed 20 significant PRs, 1 of which is expected to be due to chance at the α = .05 level. Third, this study had a large sample size with national coverage, English- and Spanish-language survey modalities, general population weights, rich covariate data, and timeliness in data collection. Lastly, to our knowledge, this study is one of the first population-representative assessments of loneliness and its key risk factors during the first wave of the COVID-19 pandemic in the United States, when many state-mandated shelter-in-place and social distancing measures were in place.

Conclusions

Even with the increased availability of vaccines, epidemiologists and other researchers urge that nonpharmacologic interventions to mitigate the spread of COVID-19, such as

physical distancing, should remain in place.[52,53] Periodic lockdowns may be required if herd immunity is compromised by a short period of immunity from the vaccine, the appearance of new SARS-CoV-2 variants, or changes in human behavior that result in disease outbreaks. Physical distancing measures have been shown to be effective in reducing the spread of COVID-19,[54] but measures should be taken to curb loneliness as a secondary health effect. Despite evidence that loneliness is associated with adverse health outcomes, loneliness is not regularly assessed by health care professionals.[55] Regular screening for and early detection of loneliness by health care professionals is paramount and should be the first step toward minimizing the negative health effects of the pandemic, as prolonged periods of loneliness have been associated with even worse health outcomes than transient loneliness.[56,57] Any intervention to reduce loneliness should include an array of strategies from multiple sectors, given the concerningly high prevalence of loneliness in this population. Results from this study may help guide public health and social policies aimed at mitigating loneliness as an unintended health consequence among middle-aged and older adults who are affected by the COVID-19 pandemic and inform decision makers during future periods of uncontrolled infectious disease transmission.

Acknowledgments

Declaration of Conflicting Interests

Funding

ORCID iD

Brendan Q. O'Shea, MPH https://orcid.org/0000-0002-3216-2536

References

1. Murthy V. Work and the loneliness epidemic. *Harvard Business Review*. September 26, 2017. Accessed September 2, 2020. https://hbr.org/2017/09/work-and-the-loneliness-epidemic

2. Heron M. Deaths: leading causes for 2017. *Natl Vital Stat Rep*. 2019;68(6):1-77.

3. Mervosh S, Lu D, Swales V. See which states and cities have told residents to stay at home. *The New York Times*. April 20, 2020. Accessed July 14, 2020. https://www.nytimes.com/

interactive/2020/us/coronavirus-stay-at-home-order.html?auth=login-email&login=email

4. Schuchat A, CDC COVID-19 Response Team. Public health response to the initiation and spread of pandemic COVID-19 in the United States, February 24–April 21, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(18):551-556. doi:10.15585/mmwr.mm6918e2

5. Wortham JM, Lee JT, Althomsons S, et al. Characteristics of persons who died with COVID-19—United States, February 12–May 18, 2020. 2020;69(28):923-929. doi:10.15585/mmwr.mm6928e1

6. Romero Starke K, Petereit-Haack G, Schubert M, et al. The age-related risk of severe outcomes due to COVID-19 infection: a rapid review, meta-analysis, and meta-regression. *Int J Environ Res Public Health*. 2020;17(16):5974. doi:10.3390/ijerph17165974

7. Centers for Disease Control and Prevention. Loneliness and social isolation linked to serious health conditions. Published May 26, 2020. Accessed July 14, 2020. https://www.cdc.gov/aging/publications/features/lonely-older-adults.html

8. Rico-Uribe LA, Caballero FF, Martín-María N, Cabello M, Ayuso-Mateos JL, Miret M. Association of loneliness with all-cause mortality: a meta-analysis. *PLoS One*. 2018;13(1):e0190033. doi:10.1371/journal.pone.0190033

9. Shankar A, McMunn A, Banks J, Steptoe A. Loneliness, social isolation, and behavioral and biological health indicators in older adults. *Health Psychol*. 2011;30(4):377-385. doi:10.1037/a0022826

10. Stickley A, Koyanagi A, Roberts B, et al. Loneliness: its correlates and association with health behaviours and outcomes in nine countries of the former Soviet Union. *PLoS One*. 2013;8(7):e67978. doi:10.1371/journal.pone.0067978

11. Kuiper JS, Zuidersma M, Voshaar RCO, et al. Social relationships and risk of dementia: a systematic review and meta-analysis of longitudinal cohort studies. *Ageing Res Rev*. 2015;22:39-57. doi:10.1016/j.arr.2015.04.006

12. Shankar A, Hamer M, McMunn A, Steptoe A. Social isolation and loneliness: relationships with cognitive function during 4 years of follow-up in the English Longitudinal Study of Ageing. *Psychosom Med*. 2013;75(2):161-170. doi:10.1097/PSY.0b013e31827f09cd

13. Holwerda TJ, Deeg DJH, Beekman ATF, et al. Feelings of loneliness, but not social isolation, predict dementia onset: results from the Amsterdam Study of the Elderly (AMSTEL). *J Neurol Neurosurg Psychiatry*. 2014;85(2):135-142. doi:10.1136/jnnp-2012-302755

14. Beutel ME, Klein EM, Brähler E, et al. Loneliness in the general population: prevalence, determinants and relations to mental health. *BMC Psychiatry*. 2017;17(1):97. doi:10.1186/s12888-017-1262-x

15. Bekhet AK, Zauszniewski JA. Mental health of elders in retirement communities: is loneliness a key factor? *Arch Psychiatr Nurs*. 2012;26(3):214-224. doi:10.1016/j.apnu.2011.09.007

16. Stickley A, Koyanagi A. Loneliness, common mental disorders and suicidal behavior: findings from a general population survey. *J Affect Disord*. 2016;197:81-87. doi:10.1016/j.jad.2016.02.054

17. Valtorta NK, Kanaan M, Gilbody S, Hanratty B. Loneliness, social isolation and risk of cardiovascular disease in the English Longitudinal Study of Ageing. *Eur J Prev Cardiol*. 2018;25(13):1387-1396. doi:10.1177/2047487318792696

18. Hakulinen C, Pulkki-Råback L, Virtanen M, Jokela M, Kivimäki M, Elovainio M. Social isolation and loneliness as risk factors for myocardial infarction, stroke and mortality: UK Biobank cohort study of 479 054 men and women. *Heart*. 2018;104(18):1536-1542. doi:10.1136/heartjnl-2017-312663

19. National Poll on Healthy Aging. Loneliness among older adults before and during the COVID-19 pandemic. Published September 2020. Accessed October 23, 2020. https://www.healthyagingpoll.org/report/loneliness-among-older-adults-and-during-covid-19-pandemic

20. Anderson GO. *Loneliness Among Older Adults: A National Survey of Adults 45+*. AARP Research; 2010. Accessed May 18, 2021. https://www.aarp.org/research/topics/life/info-2014/loneliness_2010.html

21. Yang K, Victor CR. The prevalence of and risk factors for loneliness among older people in China. *Ageing Soc*. 2008;28(3):305-327. doi:10.1017/S0144686X07006848

22. Vozikaki M, Papadaki A, Linardakis M, Philalithis A. Loneliness among older European adults: results from the Survey of Health, Aging and Retirement in Europe. *J Public Health*. 2018;26(6):613-624. doi:10.1007/s10389-018-0916-6

23. Theeke LA. Predictors of loneliness in U.S. adults over age sixty-five. *Arch Psychiatr Nurs*. 2009;23(5):387-396. doi:10.1016/j.apnu.2008.11.002

24. Pinquart M, Sörensen S. Risk factors for loneliness in adulthood and old age—a meta-analysis. *Adv Psychol Res*. 2003;19:111-143.

25. Cohen-Mansfield J, Hazan H, Lerman Y, Shalom V. Correlates and predictors of loneliness in older adults: a review of quantitative results informed by qualitative insights. *Int Psychogeriatr*. 2016;28(4):557-576. doi:10.1017/S1041610215001532

26. Hawkley LC, Buecker S, Kaiser T, Luhmann M. Loneliness from young adulthood to old age: explaining age differences in loneliness [online ahead of print November 15, 2020]. *Int J Behav Dev*. doi:10.1177/0165025420971048

27. Hawkley LC, Wroblewski K, Kaiser T, Luhmann M, Schumm LP. Are U.S. older adults getting lonelier? Age, period, and cohort differences. *Psychol Aging*. 2019;34(8):1144-1157. doi:10.1037/pag0000365

28. Nguyen TT, Lee EE, Daly RE, et al. Predictors of loneliness by age decade: study of psychological and environmental factors in 2,843 community-dwelling Americans aged 20-69 years. *J Clin Psychiatry*. 2020;81(6):20m13378. doi:10.4088/JCP.20m13378

29. Gallie D, Paugam S, Jacobs S. Unemployment, poverty, and social isolation: is there a vicious circle of social exclusion? *Eur Soc*. 2003;5(1):1-32. doi:10.1080/1461669032000057668

30. Kobayashi LC, O'Shea BQ, Kler JS, et al. Cohort profile: the COVID-19 Coping Study, a longitudinal mixed-methods study of middle-aged and older adults' mental health and well-being during the COVID-19 pandemic in the USA. 2021;11(2):e044965. doi:10.1136/bmjopen-2020-044965

31. Russell DW. UCLA Loneliness Scale (version 3): reliability, validity, and factor structure. *J Pers Assess*. 1996;66(1):20-40. doi:10.1207/s15327752jpa6601_2

32. Steptoe A, Shankar A, Demakakos P, Wardle J. Social isolation, loneliness, and all-cause mortality in older men and women. *Proc Natl Acad Sci U S A*. 2013;110(15):5797-5801. doi:10.1073/pnas.1219686110

33. Reny TT, Barreto MA. Xenophobia in the time of pandemic: othering, anti-Asian attitudes, and COVID-19 [online ahead of print May 28, 2020]. *Politics, Groups, and Identities*. doi:10.1080/21565503.2020.1769693

34. Le TK, Cha L, Han H-R, Tseng W. Anti-Asian xenophobia and Asian American COVID-19 disparities. *Am J Public Health*. 2020;110(9):1371-1373. doi:10.2105/AJPH.2020.305846

35. Ayalon L, Chasteen A, Diehl M, et al. Aging in times of the COVID-19 pandemic: avoiding ageism and fostering intergenerational solidarity. *J Gerontol B Psychol Sci Soc Sci*. 2021;76(2):e49-e52. doi:10.1093/geronb/gbaa051

36. Brooke J, Jackson D. Older people and COVID-19: isolation, risk and ageism. *J Clin Nurs*. 2020;29(13-14):2044-2046. doi:10.1111/jocn.15274

37. Kochhar R. Unemployment rose higher in three months of COVID-19 than it did in two years of the Pew Research Center. June 11, 2020. Accessed September 2, 2020. https://www.pewresearch.org/fact-tank/2020/06/11/unemployment-rose-higher-in-three-months-of-covid-19-than-it-did-in-two-years-of-the-great-recession

38. Lorenzo D, Carrisi C. COVID-19 exposure risk for family members of healthcare workers: an observational study. *Int J Infect Dis*. 2020;98:287-289. doi:10.1016/j.ijid.2020.06.106

39. Czeisler ME, Marynak K, Clarke KEN, et al. Delay or avoidance of medical care because of COVID-19–related concerns—United States, June 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(36):1250-1257. doi:10.15585/mmwr.mm6936a4

40. Lewinsohn PM, Seeley JR, Roberts RE, Allen NB. Center for Epidemiologic Studies Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychol Aging*. 1997;12(2):277-287. doi:10.1037/0882-7974.12.2.277

41. US Census Bureau. 2018 American Community Survey 1-year estimates. Published 2018. Accessed September 16, 2020. https://data.census.gov/cedsci/map?q=Total Population in the United States&g=0100000US.04000.001&tid=ACSDP1Y2018.DP05&vintage=2018&layer=VT_2018_040_00_PP_D1&cid=DP05_0001E

42. Zou G. A modified Poisson regression approach to prospective studies with binary data. *Am J Epidemiol*. 2004;159(7):702-706. doi:10.1093/aje/kwh090

43. VanderWeele TJ. Principles of confounder selection. *Eur J Epidemiol*. 2019;34(3):211-219. doi:10.1007/s10654-019-00494-6

44. Luchetti M, Lee JH, Aschwanden D, et al. The trajectory of loneliness in response to COVID-19. *Am Psychol*. 2020;75(7):897-908. doi:10.1037/amp0000690

45. Kotwal AA, Holt-Lunstad J, Newmark RL, et al. Social isolation and loneliness among San Francisco Bay Area older adults during the COVID-19 shelter-in-place orders. *J Am Geriatr Soc*. 2021;69(1):20-29. doi:10.1111/jgs.16865

46. Carstensen LL. Social and emotional patterns in adulthood: support for socioemotional selectivity theory. *Psychol Aging*. 1992;7(3):331-338. doi:10.1037/0882-7974.7.3.331

47. Bruine de Bruin W, Parker AM, Strough J. Age differences in reported social networks and well-being. *Psychol Aging*. 2020;35(2):159-168. doi:10.1037/pag0000415

48. de Jong Gierveld J, Keating N, Fast JE. Determinants of loneliness among older adults in Canada. *Can J Aging*. 2015;34(2):125-136. doi:10.1017/S0714980815000070

49. Hunsaker A, Hargittai E. A review of internet use among older adults. *New Media & Society*. 2018;20(10):3937-3954. doi:10.1177/1461444818787348

50. Patanwala M, Tieu L, Ponath C, Guzman D, Ritchie CS, Kushel M. Physical, psychological, social, and existential symptoms in older homeless-experienced adults: an observational study of the Hope Home Cohort. *J Gen Intern Med*. 2018;33(5):635-643. doi:10.1007/s11606-017-4229-1

51. Kearns A, Whitley E. Associations of internet access with social integration, wellbeing and physical activity among adults in deprived communities: evidence from a household survey. *BMC Public Health*. 2019;19(1):860. doi:10.1186/s12889-019-7199-x

52. Skegg D, Gluckman P, Boulton G, et al. Future scenarios for the COVID-19 pandemic. *Lancet*. 2021;397(10276):777-778. doi:10.1016/S0140-6736(21)00424-4

53. Healthline. Keep those plans on hold. Social distancing probably won't end for at least a year. October 21, 2020. Accessed March 17, 2021. https://www.healthline.com/health-news/keep-those-plans-on-hold-social-distancing-probably-wont-end-for-at-least-a-year

54. Haug N, Geyrhofer L, Londei A, et al. Ranking the effectiveness of worldwide COVID-19 government interventions. *Nat Hum Behav*. 2020;4(12):1303-1312. doi:10.1038/s41562-020-01009-0

55. Perissinotto CM, Stijacic Cenzer I, Covinsky KE. Loneliness in older persons: a predictor of functional decline and death. *Arch Intern Med*. 2012;172(14):1078-1083. doi:10.1001/archinternmed.2012.1993

56. Martín-María N, Caballero FF, Miret M, et al. Differential impact of transient and chronic loneliness on health status: a longitudinal study. *Psychol Health*. 2020;35(2):177-195. doi:10.1080/08870446.2019.1632312

57. Shiovitz-Ezra S, Ayalon L. Situational versus chronic loneliness as risk factors for all-cause mortality. *Int Psychogeriatr*. 2010;22(3):455-462. doi:10.1017/S1041610209991426