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Does the "widowhood effect" precede spousal bereavement? Results from a Nationally Representative Sample of Older Adults

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Abstract

Objective—Increased mortality risk following spousal bereavement (often called the "widowhood effect") is well documented, but little prior research has evaluated health deteriorations preceding spousal loss.

Design—Data are from the Health and Retirement Study, a nationally representative sample of Americans over 50 years old.

Method—Individuals who were married in 2004 were considered for inclusion. Outcome data from 2006 on mobility (walking, climbing stairs), number of depressive symptoms, and instrumental activities of daily living (IADLs) were used. Exposure was characterized based on marital status at the time of outcome measurement: "recent widows" (N = 396) were bereaved between 2004 and 2006, before outcomes were assessed; "near widows" (N = 380) were bereaved between 2006 and 2008, after outcomes were assessed; "married" individuals (N = 7,330) remained married from 2004 to 2010, the follow-up period for this analysis. Linear regression models predicting standardized mobility, depressive symptoms, and IADLs, were adjusted for age, race, gender, birthplace, socio-economic status, and health at baseline.

Results—Compared to married individuals, recent widows had worse depressive symptoms (β = 0.71, 95% confidence interval (CI): [0.57, 0.85]). Near widows had worse depressive symptoms (β = 0.21, 95% CI: [0.08, 0.34]), mobility (β = 0.14, 95%CI: [0.01, 0.26]), and word recall (β = −0.13, 95%CI: [−0.23, −0.02]) compared to married individuals.

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Conclusions—Health declines before spousal death suggests some portion of the "widowhood effect" may be attributable to experiences that precede widowhood and interventions prior to bereavement might help preserve the health of the surviving spouse.

Keywords

Widowhood; Spousal Loss; Spousal Bereavement; Depression; Cognitive Functioning

Objective

The phenomenon of increased mortality among surviving spouses following spousal bereavement, or the "widowhood effect", has long been recognized (1,2) and is supported by two recent meta-analyses (3,4). Most prior research finds greater mortality risk for bereaved men than women (3–6) and higher relative risk for younger individuals than older (4,5).

Many studies have examined the timing of the "widowhood effect" and note an acute influence of widowhood, such that increased mortality risk is highest within the first six months following spousal loss (2,3,6–9); these results suggest a fast-acting, grief-related mechanism. However, potential mechanisms leading to increased mortality remain poorly understood. Recent evidence suggests that the increased mortality risk for the surviving spouse is not due to incident or worsening chronic health conditions following spousal loss (8). There is some evidence of differential mortality risk by cause of death in the decedent spouse (2,5,10) but others have found a generalized increase in mortality risk for the surviving spouse (11–13) indicating spousal bereavement may result in concurrent changes across multiple biological pathways.

Although the mechanisms through which widowhood is associated with increased mortality risk remain unclear, rigorous studies have argued that the relationship is causal for both genders (6,11,14) while others found a causal effect only among men (13,15). Due to limitations in the available data, most analyses have not accounted for time-varying confounding with the exception of weekly time-updating of the number and severity of comorbid conditions (8,10) and biennial time-updating of number of social contacts (16). Additionally, few studies have examined changes that occur before spousal bereavement, although one previous study found higher levels of depression and anxiety, and worse self-reported health for spouses nearing bereavement (17).

In this study we explore the potential causality of the "widowhood effect" by exploiting the timing of the exposure-outcome relationship. In order for a relationship to be causal, the exposure (widowhood) must precede the outcome (health outcomes) (18). By looking for changes in our outcomes before individuals are "exposed" to widowhood, we are able to assess the plausibility that widowhood per se causes health declines for the surviving spouse; health deteriorations prior to widowhood imply that at least some portion of health disadvantage observed among widows occurs before bereavement. Finding no difference in health between those about to be widowed and married individuals would support the causal importance of widowhood specifically.

We additionally examine a range of outcomes previously associated with widowhood including mental health (19,20), cognitive health (21), and physical health markers, such as mobility and instrumental activities of daily living (22); we examine these outcomes both before and after spousal bereavement to inform several mechanistic pathways simultaneously. Determining the cause and mechanism of the "widowhood effect" is important for the development of interventions to alleviate excess mortality.

Our study advances the literature in two distinct ways: first, by examining associations between widowhood and a number of health outcomes, we elucidate potential mechanistic pathways through which spousal bereavement may result in increased mortality risk. Second, we look for health deteriorations preceding widowhood to test the robustness of the claim that the "widowhood effect" is causal.

Methods

Sample

Data from the Health and Retirement Study (HRS), a longitudinal, nationally representative sample of community-dwelling adults 50 years of age and older, and their spouses, are used in this analysis. Respondents are interviewed biennially and data are collected on a variety of outcomes (23). The 11,091 community-dwelling HRS respondents who were 50 years of age or older, and married, married but spouse absent, or partnered in 2004 were considered for inclusion in this study. Individuals who became divorced/separated (N = 285), or subsequently reported never being married (N = 20) over the follow up period from 2004 to 2010 were excluded. We implemented a complete-case analysis for this study, excluding 658 (5.9%) individuals with missing data on one or more of the outcomes or covariates. An additional 1,620 individuals were removed from the married control group either due to death over the follow up period (N = 820), or for missing data on marital status for one or more waves (N = 800); our final analytic sample included 8,508 continuously married and widowed individuals. The HRS was approved by the University of Michigan Health Sciences Human Subjects Committee and these analyses were determined exempt by Harvard School of Public Health Office of Human Research Administration.

Exposure

Outcome data from 2006 was used in this analysis; individuals widowed between 2004 and 2006 (0 – 2 years before outcome assessment) were classified "recent widows", individuals widowed between 2006 and 2008 (0 – 2 years after outcome assessment) were classified "near widows", and individuals who were married or partnered from 2004 to 2010 were classified "married" (Figure 1). Individuals widowed between 2008 and 2010 were not included in the reference group of continuously married individuals because these "future widows" might already be providing care or anticipating the deaths of their spouses; these individuals were modeled separately using an indicator variable, as this slightly improves statistical power. The final analytical sample contained 7,330 married respondents, 396 recent widows, 380 near widows, and 402 future widows.

Outcomes

We consider four groups of health indicators in this analysis: self-reported functional limitation indices (mobility, large muscle movement, activities of daily living [ADL], fine motor skills, and instrumental activities of daily living [IADL]), a number depressive symptoms scale (modified Center for Epidemiologic Studies Depression Scale [CESD] score), a cognitive health scale (word recall), and grip strength. The functional limitation indices are coded 0 if the respondent reported no difficulty, and 1 if they respondent reported difficulty with the activity; responses are summed across each index to create a total score for each individual. The mobility index asked if respondents had difficulty with the following tasks: walking several blocks, walking one block, walking across the room, climbing several flights of stairs, and climbing one flight of stairs; range [0,5] (24,25). The large muscle index covered sitting for two hours, getting up from a chair, stooping or kneeling or crouching, and pushing or pulling a large object; range [0,4] (24,25). Activities of daily living (ADLs) covered bathing, eating, dressing, walking across a room, and getting in or out of bed; range [0, 5] (24,25). The fine motor skills index included picking up a dime, eating, and dressing; range [0, 3] (24,25). The instrumental activities of daily living index (IADLs) included using a telephone, taking medication, handling money, shopping, and preparing meals; range [0, 5] (24,25). Both the mobility index and ADLs ask about difficulty walking across the room.

Depressive symptoms were assessed with a modified Center for Epidemiologic Studies Depression (CESD) scale summing 6 “negative” indicators minus two “positive” indicators; this scale has been validated among HRS participants (26). The negative indicators included depression, everything is an effort, sleep is restless, felt alone, felt sad, and could not get going, while the positive indicators measured if the respondent felt happy and enjoyed life; higher CESD scores indicated more depressive symptoms; range [0, 8] (24,26). Memory was assessed through immediate and delayed recall of a 10 word list; higher scores indicated better memory; range [0 – 20] (24,27).

Dominant and non-dominant hand grip strength was examined for a randomly selected half of the HRS sample in 2006. Of the randomly selected individuals, 3,384 met our inclusion criteria and had information on both hands. Right and left grip strength was assessed two times per hand, with a Smedly spring-type hand dyanometer (28); values were averaged to get the mean right and left grip strength, and set to the observed value for respondents who had one assessment. The dominant hand was set to mean of left hand grip strength for individuals who reported left hand dominant, and to the mean of right grip strength for individual who reported right hand dominant and individuals who self-reported being ambidextrous. The non-dominant hand was set to the opposite of the dominant-hand.

Covariates

The following confounders of the relationship between widowhood and the outcomes were included: baseline age (linear and quadratic terms), race categorized as Non-Hispanic White, Non-Hispanic Black, Hispanic, or Other, an indicator variable for being female, years of education was modeled as a spline with a knot for high school and a discontinuity at college (29), as well as an indicator variable for having a GED (i.e. passing the general educational

development test). We adjusted for place of birth by including southern birth (30) and foreign birth indicators. Childhood socio-economic status was accounted for though dichotomous indicators for each parent's educational attainment (≥ 8 years); we included missing indicators for parent's education because people who did not report parent's education are thought to have a distinct childhood family structure.

We also adjusted for baseline income, wealth (calculated as total assets minus debts at baseline), and health status as assessed in 2004. Values for income and wealth per capita were adjusted for household size by dividing by the square root of the number of household members, and then divided into quintiles. We adjusted for health status with an index of health problems (a count of self-reported doctor's diagnosis of high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, psychiatric problem, and arthritis), modeled with linear and quadratic terms, and self-rated health (poor, fair, good, very good, excellent), modeled as indicator variables. We adjusted for these variables as assessed in 2004 and did not time-update to avoid adjusting for variables which may be influenced by widowhood.

Analysis

Linear regression was used to estimate the association between widowhood and functional, mental, and cognitive health. Married individuals were defined as the reference group; we also tested for differences between near- and recent-widows by changing the reference group to the near-widows. While there are multiple exposure groups in this analysis, we consider the conventional type I error rate of 5% appropriate because the primary contrast, and innovation in this analysis, is the comparison between married individuals and near widows. As the primary contrast was significant for multiple outcomes, the secondary contrast between married and recently widowed individuals, and the tertiary contrast between near widows and recent widows are also presented; as these are unfolding rather than concurrent tests, we did not adjust the significance threshold for multiple comparisons.

Our analysis includes models pooled for men and women (adjusted for gender), and models stratified by gender as there is substantial prior evidence that the association between spousal bereavement and mortality varies by gender such that widowhood is more toxic for men than women (3,4). To improve interpretability of our results, all outcomes were standardized using a z-transformation; point estimates are interpreted as proportions of a standard deviation.

We present effect estimates, 95% confidence intervals (95% CIs), and p-values for two-tailed t-statistics for all nine outcomes. Results are weighted to reflect the complex, clustered sampling design of HRS, and represent the community-dwelling US population 50 years of age and older in 2006; there are 56 degrees of freedom (df) for most t-statistics due to the number of covariates in the model and the complex HRS sampling design. Analyses were performed using proc surveyreg in SAS, version 9.2, Cary, NC.

Results

On average, married individuals were younger, more likely to be White, and had more education than either the recent widows or near widows (Table 1). In adjusted analysis, near

widows reported worse mobility (mean difference 0.14, 95% CI: [0.01, 0.26], t-value: 2.23, df: 56, p: 0.030), more depressive symptoms (mean difference 0.21, 95% CI: [0.08, 0.34], t-value: 3.14, df: 56, p: 0.003), and worse word recall (mean difference −0.13, 95% CI: [−0.23, −0.02], t-value: −2.4, df: 56, p: 0.020), than continuously married respondents (Table 2). Recently widowed individuals reported elevated depressive symptoms compared to married individuals (mean difference 0.71, 95% CI: [0.57, 0.85], t-value: 10.24, df: 56, p: <0.0001), but reported similar difficulty for the other outcomes. When comparing near widows to recent widows, recent widows had worse CESD scores (t-value: 4.85, df: 56, $p < 0.0001$), and better word recall scores (t-value: 2.68, df: 56, p: 0.0097).

Among females, compared to the married reference group, the near widows reported worse mobility (mean difference 0.18, 95% CI: [0.01, 0.35], t-value: 2.16, df: 56, p: 0.035), more IADLs limitations (mean difference 0.17, 95% CI: [0.02, 0.32], t-value: 2.29, df: 56, p: 0.026), elevated depressive symptoms (mean difference 0.16, 95% CI: [0.01, 0.30], t-value: 2.17, df: 56, p: 0.034), and worse word recall (mean difference −0.16, 95%CI: [−0.32, 0.00], t-value: −2.04, df: 56, p: 0.046) (Table 3). Recently widowed females had elevated depressive symptoms compared to married women (mean difference 0.66, 95% CI: [0.49, 0.82], t-value: 7.83, df: 56, p: < 0.0001). When comparing near widows to recent widows, recent widows had more depressive symptoms (t-value: 4.02, df: 56, p: 0.0002), and better word recall (t-value: 2.71, df: 56, p: 0.009).

Near-widowed men had elevated depressive symptoms (mean difference 0.27, 95% CI: [0.04, 0.49], t-value: 2.35, df: 56, p: 0.023) compared to married men (Table 4). Among recently widowed men, depressive symptoms were elevated above those of married men (mean difference 0.78, 95% CI: [0.48, 1.07], t-value: 5.29, df: 56, p: <0.0001). Compared to near widowed men, recently widowed men had elevated depressive symptoms (t-value: 2.88, df: 56, p: 0.0056) (Table 4).

Conclusions

In this national sample of Americans aged 50+ years, we find widowhood is associated with worse health across multiple outcomes, suggesting that spousal bereavement may impact mental, cognitive, and functional health. Additionally, we find changes in mobility, elevated depressive symptoms, and worse word recall associated with widowhood are evident prior to spousal bereavement, suggesting that at least some portion of the “widowhood effect” is not causally related to widowhood per se. Among those who were recently widowed, we find that depressive symptoms were further elevated, and cognitive functioning was slightly better compared to individuals approaching widowhood. Both genders experienced elevated depressive symptoms before and following widowhood compared to continuously married individuals. However, there were some gender differences in other measures; for example, females approaching widowhood experience worse physical and cognitive health while males approaching widowhood do not.

Though HRS data are uniquely suited to examine the association between widowhood and physical, mental, and cognitive health, some limitations should be considered. First, HRS participants are surveyed every two years. However, prior work suggests that the

"widowhood effect" is strongest in the first 6 months following spousal bereavement (7,8). This means that the recent widows included in this sample must survive the initial exposure to widowhood, potentially biasing the results for recent widows towards the null; this survivor's bias will make the recent widows included in our analysis look healthier than all recent widows, but will not affect the near widows. Second, we included only baseline (2004) values of time-dependent variables to avoid adjusting for variables that may be the consequence of widowhood, which may have resulted in some misclassification of these variables. Third, although we tried to include all appropriate covariates in our models, this is an observational study and it is possible that we omitted important confounders which would lead to residual confounding; the direction of bias caused by omission/misspecification of variables is not clear. Fourth, there is the potential for type I error in this study as there are two "exposure" groups (near and recent widows), and three p-values (near widows vs. married, recent widows vs. married, and near widows vs. recent widows) for each outcome. In addition to the conventional α level of 0.05 used in this study, we note the Bonferroni-corrected p-value of 0.025 for the two exposure groups, and 0.017 for the three p-values in each table; these p-values may be considered more conservative thresholds for statistical significance in this analysis. Finally, small sample sizes in the two widowed groups limited the statistical power to detect differences between groups, potentially leading to type II errors; this is particularly true in the subgroup analyses, where, for example, we needed effect sizes of roughly 0.24 SD (women) or 0.29 SD (men) to have 80% power to detect differences between married versus near-widowed individuals.

Our somewhat surprising results that health declines associated with the "widowhood effect" may precede spousal loss are bolstered by findings from the disease management, caregiving, and anticipatory grief literature. A recent study found that individuals had fewer cardiovascular process of care measures (i.e. blood pressure, and cholesterol measures) and reduced medication refills in the year preceding spousal bereavement compared to matched controls (31); these results suggest diminished doctor and self-management of existing conditions in the year leading up to spousal bereavement and may explain why health deteriorations begin before bereavement. Although formal testing did not find evidence of new or worsening chronic conditions mediating the impact of bereavement on risk of death, it is possible that the health declines occur prior to bereavement (8).

Another explanation for worse health preceding bereavement is caregiving burden. Caregiving is associated with the development of mobility impairments (32), depression, worse physical health (33), as well as incident heart disease, strokes (34), and hypertension (35) among older adults, though the duration of spousal caregiving does not exacerbate the effect of caregiving on depression (36). Additionally, placing the decedent spouse in adult day care is associated with lower levels of a physiologic stress marker in the caregiver (37), and placing the decadent spouse in hospice care is protective against death for the surviving spouse (38). These results suggest that some portion of the "widowhood effect" may be the result of caregiving burden, as opposed to excess mortality due to grief following spousal bereavement.

However, not all literature on caregiving support the theory of caregiving being harmful for health; some researchers have found that caregivers live longer than non-caregivers (39,40),

possibly due to the protective effect of stronger social ties between the caregiver and care recipient. Additionally, the “relief” hypothesis in the caregiving model theorizes that the providing care may be so stressful that health declines experienced by the caregiver may resolve after the death of the care recipient, resulting in better health for the caregiver (41–43). Our findings of worse physical and mental health for individuals approaching widowhood, and no difference for many outcomes after widowhood, is consistent with the relief hypothesis.

A third potential explanation for poorer health prior to spousal loss is the anticipatory grief phenomenon; this phenomenon occurs when individuals experience some, or all, of the phases of grief before the death of a loved one occurs (44). Anticipatory grief may affect mental health and cognitive functioning (17), and therefore may explain our findings of worse mental, cognitive, and IADL outcomes among near widows.

Many researchers have explored the period after bereavement; studies have found that spousal bereavement is associated with declines in mental health (19,20,45–48) but the pattern is inconsistent for cognitive health (19,21,49). Relatively few studies have examined the relationship between widowhood and physical health (22,50), but have noted declines. Our results are consistent with the past literature for mental health, however we found no change in physical or cognitive health amongst the bereaved, though it is possible our results among the recent widows are biased towards the null due to survivor bias.

Our research expands upon prior research by examining multiple physical, cognitive, and mental health outcomes both before and after widowhood. Future research elucidating mechanistic pathways and formal testing of mediation – particularly along modifiable pathways such as disease management and caregiving - is warranted. Additionally, where the data are available, more work should be done to adjust for potential time-varying confounders of the “widowhood effect” to elucidate causality. Further research investigating whether caregiving modifies the relationship between marital status and functional, cognitive, and mental health will aid understanding in the changes that precede widowhood. Our results suggest that interventions aiming to mitigate the “widowhood effect” should begin prior to spousal bereavement.

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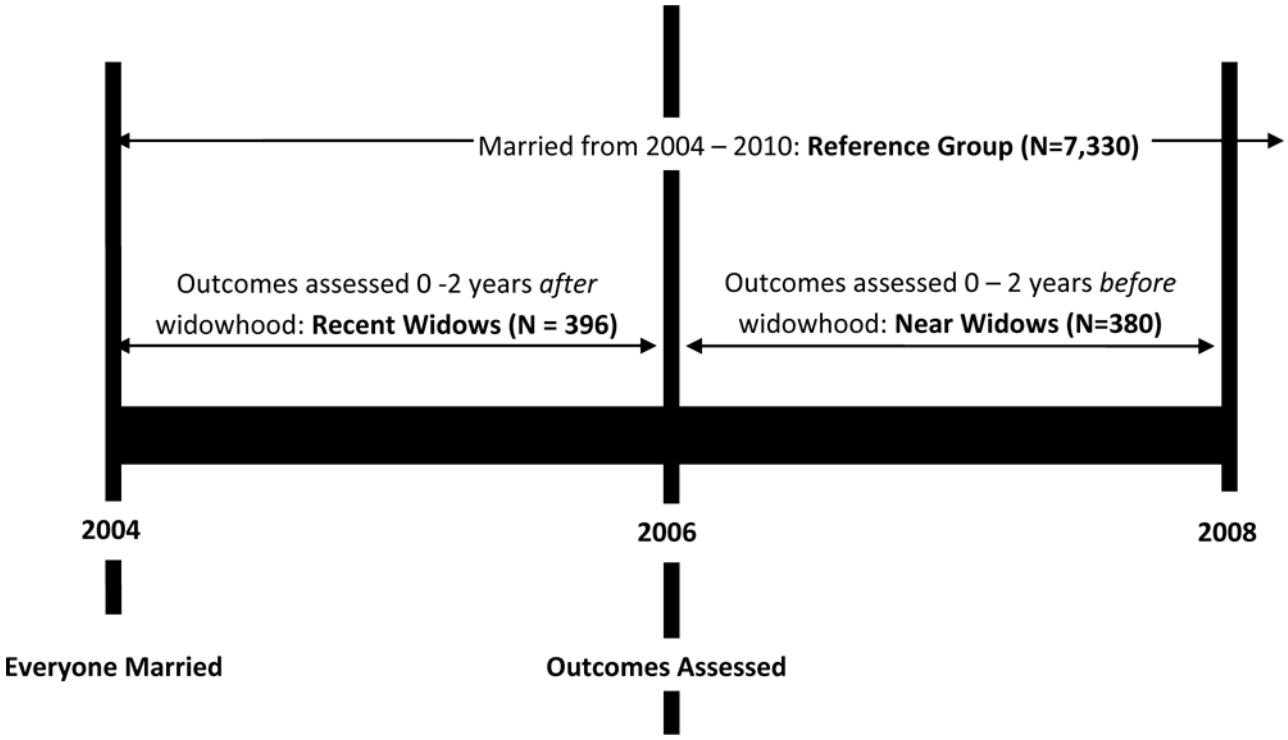

Figure 1. Timeline of Exposure Categories

Individuals continuously married from 2004 to 2010 comprised the reference group for this study. Individuals who had been widowed for 0 – 2 years at the time of outcome assessment were categorized as “recent widows”. Individuals who were widowed in the 0 – 2 years following outcome assessment were considered “near widows”. Of course, many of those categorized as “continuously married” will experience bereavement in the future; to minimize the role of looming bereavement for the continuously married, we defined this group as only those who remained married through 2010. Individuals who are widowed 2008 – 2010 (N = 402) were separately modeled (using an indicator variable) and are not further discussed.

Table 1

Distribution of Covariates

	Married (N = 7,330)		Near Widowed (N = 380)		Recently Widowed (N = 396)	
Covariate	**N/mean**	**%**	**N/mean**	**%**	**N/mean**	**%**
Age (sd)	62.9	(0.17)	70.7	(0.78)	72.3	(0.57)
Female (%)	3598	47.3	261	65.5	283	70.0
Race						
NHW (%)	5924	86.3	296	85.2	291	81.1
NHB (%)	642	5.2	43	6.5	62	9.8
Hispanic (%)	607	6.1	33	5.2	33	6.3
Education						
Years of Education (sd)	13.4	(0.07)	12.2	(0.23)	12.2	(0.17)
High School Grad (%)	5863	84.3	258	70.4	278	74.9
College Grad (%)	1960	31.1	65	18.3	48	14.9
Received GED (%)	332	4.3	16	3.7	22	4.9
Income						
1st quintile (%)	1312	15.1	135	33.6	138	30.1
2nd quintile (%)	1407	15.5	82	19.1	110	27.9
3rd quintile (%)	1485	19.5	71	21.0	70	18.5
4th quintile (%)	1537	23.4	55	16.3	45	11.4
5th quintile (%)	1589	26.4	37	10.0	33	12.1
Wealth						
1st quintile (%)	1360	18.1	102	25.5	125	27.3
2nd quintile (%)	1486	20.3	77	18.9	67	18.4
3rd quintile (%)	1473	19.9	77	20.6	82	21.4
4th quintile (%)	1488	20.8	72	21.3	69	18.7
5th quintile (%)	1523	20.9	52	13.6	53	14.3
Self-rated Health						
Poor (%)	318	4.2	33	7.9	34	8.7
Fair (%)	1068	12.8	79	19.7	99	21.0

	Married (N = 7,330)		Near Widowed (N = 380)		Recently Widowed (N = 396)	
Covariate	**N/mean**	**%**	**N/mean**	**%**	**N/mean**	**%**
Good (%)	2394	30.9	123	34.7	126	32.3
Very Good (%)	2481	35.2	105	26.0	97	26.1
Excellent (%)	1069	17.0	40	11.7	40	11.9
Southern Born (%)	2132	25.9	136	32.9	133	28.2
Foreign Born (%)	728	8.5	39	8.8	41	9.3
Mother's Education ≥ 8 years	5545	80.2	251	67.9	254	64.9
Mother's education missing (%)	521	6.5	45	11.4	48	11.9
Mother's Education ≥ 8 years	4945	71.3	201	52.9	217	57.7
Father's education missing (%)	826	11.2	62	16.9	70	16.7
Number of health conditions (sd)	1.45	(0.02)	1.99	(0.09)	2.05	(0.07)

Abbreviation: sd = standard deviation

All N are for the sample, whereas percentages are weighted to be representative of the U.S. population.

Note: Some column totals do not sum to 100% due to rounding

The proportion of married, near widowed and recently widowed individuals does not total 100% because results for the 402 individuals who were widowed between 2008 and 2010 are not displayed or discussed in this paper; in total, there were 8,508 individuals included in this analysis.

NHW, NHB, and Hispanic do not add up to total because 206 (2.2%) individuals who reported "Other Race" are not presented separately but are included in the total.

Table 2

Average Differences in Health Indicators by Marital Status: Health and Retirement Study, United States (N = 8,508)

	Married (ref)		Near Widowed			Recently widowed			
Outcome	**Mean**	**(95% CI)**	**Mean Difference**	**(95% CI)**	**P**	**Mean Difference**	**(95% CI)**	**p**	**p for Near vs. Recent widows**
Mobility	−0.76	(−0.99, −0.53)	0.14	(0.01, 0.26)	0.030	0.05	(−0.07, 0.16)	0.392	0.2716
Large Muscle	−0.79	(−0.99, −0.58)	−0.01	(−0.12, 0.11)	0.914	0.00	(−0.11, 0.12)	0.983	0.9127
Fine Motor Skills	−0.22	(−0.53, 0.09)	0.01	(−0.13, 0.14)	0.921	−0.04	(−0.16, 0.08)	0.531	0.5888
ADLs	−0.38	(−0.70, −0.06)	0.08	(−0.04, 0.20)	0.192	0.04	(−0.07, 0.15)	0.509	0.5964
IADLs	0.04	(−0.27, 0.35)	0.13	(−0.01, 0.26)	0.072	0.02	(−0.12, 0.16)	0.776	0.2905
CESD	−0.35	(−0.65, −0.05)	0.21	(0.08, 0.34)	0.003¥	0.71	(0.57, 0.85)	<.0001¥	<.0001¥
Word Recall	−0.50	(−0.72, −0.29)	−0.13	(−0.23, −0.02)	0.020*	0.05	(−0.04, 0.15)	0.273	0.0097
Dominant Hand Grip Strength	0.97	(0.67, 1.26)	−0.03	(−0.19, 0.14)	0.764	−0.01	(−0.13, 0.11)	0.883	0.8454
Non-dominant Hand Grip Strength	1.03	(0.73, 1.33)	−0.03	(−0.22, 0.15)	0.726	−0.01	(−0.11, 0.09)	0.828	0.8170

Adjusted for age, race, years of education, mother's education, father's education, education missing indicators for both parents, southern birth, foreign birth, income per capita, wealth per capita, self-rated health, and number of health conditions.

All p-values reflect two-tailed t-statistics from linear regression models with 56 degrees of freedom.

*Indicates a significant difference at the Bonferroni-corrected p-value of 0.05/2 = 0.025

¥Indicates a significant difference at the Bonferroni-corrected p-value of 0.05/3 = 0.017

All outcomes are z-standardized; mean differences are proportions of standard deviations.

Higher values reflect worse health for all outcomes except word recall where higher numbers indicate better memory, and grip strength where higher values indicate more strength.

Table 3

Average Differences in Health Indicators by Marital Status among Females: Health and Retirement Study, United States (N = 4,417)

	Mean for Married (ref)		Near widowed			Recently widowed			
Outcome	**Mean**	**(95% CI)**	**Mean Difference**	**(95% CI)**	**p**	**Mean Difference**	**(95% CI)**	**p**	**p for Near vs. Recent widows**
Mobility	−0.89	(−1.17, −0.62)	0.18	(0.01, 0.35)	0.035	0.08	(−0.05, 0.20)	0.230	0.3146
Large Muscle	−0.57	(−0.85, −0.29)	−0.08	(−0.22, 0.06)	0.263	0.00	(−0.14, 0.15)	0.949	0.3856
Fine Motor Skills	−0.18	(−0.61, 0.25)	0.03	(−0.10, 0.16)	0.639	−0.05	(−0.18, 0.09)	0.470	0.3563
ADLs	−0.43	(−0.87, 0.01)	0.13	(−0.02, 0.28)	0.086	0.04	(−0.11, 0.18)	0.611	0.3757
IADLs	−0.08	(−0.56, 0.40)	0.17	(0.02, 0.32)	0.026	0.06	(−0.11, 0.23)	0.498	0.3507
CESD	−0.27	(−0.68, 0.14)	0.16	(0.01, 0.31)	0.034	0.66	(0.49, 0.82)	<.0001¥	0.0002¥
Word Recall	−0.13	(−0.41, 0.16)	−0.16	(−0.32, 0.00)	0.046	0.09	(−0.03, 0.22)	0.146	0.0090¥
Dominant Hand Grip Strength	−0.75	(−1.01, −0.49)	−0.06	(−0.23, 0.10)	0.442	−0.02	(−0.14, 0.11)	0.759	0.5698
Non-dominant Hand Grip Strength	−0.64	(−0.91, −0.36)	−0.03	(−0.17, 0.11)	0.648	−0.04	(−0.14, 0.06)	0.428	0.9128

Adjusted for age, race, years of education, mother's education, father's education, education missing indicators for both parents, southern birth, foreign birth, income per capita, wealth per capita, self-rated health, and number of health conditions.

P-values reflect two-tailed t-statistics from linear regression models with 56 degrees of freedom; dominant hand and non-dominant hand grip strength p-values reflect two-tailed t-statistics from linear regression models with 55 degrees of freedom due to the smaller sample size for the grip-strength outcomes.

* Indicates a significant difference at the Bonferroni-corrected p-value of 0.05/2 = 0.025

¥ Indicates a significant difference at the Bonferroni-corrected p-value of 0.05/3 = 0.017

All outcomes are z-standardized; mean differences are proportions of standard deviations.

Higher values reflect worse health for all outcomes except word recall summary where higher numbers indicate better memory, and grip strength where higher values indicate more strength.

Table 4

Average Differences in Health Indicators by Marital Status among Males: Health and Retirement Study, United States (N = 4,091)

	Mean for Married (ref)		Near Widowed			Recently Widowed			
Outcome	**Mean**	**(95% CI)**	**Mean Difference**	**(95% CI)**	**p**	**Mean Difference**	**(95% CI)**	**p**	**p for Near vs. Recent widows**
Mobility	−0.42	(−0.79, −0.05)	0.05	(−0.17, 0.28)	0.627	−0.05	(−0.25, 0.16)	0.644	0.5046
Large Muscle	−0.72	(−1.02, −0.42)	0.10	(−0.12, 0.32)	0.372	−0.06	(−0.25, 0.13)	0.538	0.2075
Fine Motor Skills	−0.22	(−0.66, 0.21)	−0.03	(−0.39, 0.33)	0.873	−0.01	(−0.24, 0.21)	0.919	0.9361
ADLs	−0.28	(−0.69, 0.12)	0.00	(−0.22, 0.22)	0.979	0.01	(−0.17, 0.19)	0.890	0.9173
IADLs	0.16	(−0.27, 0.59)	0.03	(−0.19, 0.24)	0.812	−0.10	(−0.32, 0.11)	0.346	0.3897
CESD	−0.29	(−0.63, 0.05)	0.27	(0.04, 0.49)	0.023 *	0.78	(0.48, 1.07)	<.0001 ¥	0.0056 ¥
Word Recall	−0.57	(−0.91, −0.23)	−0.07	(−0.22, 0.07)	0.332	−0.03	(−0.17, 0.12)	0.722	0.6971
Dominant Hand Grip Strength	1.14	(0.67, 1.61)	−0.04	(−0.26, 0.18)	0.707	−0.12	(−0.37, 0.12)	0.321	0.6306
Non–dominant Hand Grip Strength	1.17	0.70 1.63	−0.11	−0.46 0.24	0.535	−0.08	−0.30 0.13	0.439	0.8828

Adjusted for age, race, years of education, mother's education, father's education, education missing indicators for both parents, southern birth, foreign birth, income per capita, wealth per capita, self-rated health, and number of health conditions.

All p-values reflect two-tailed t-statistics from linear regression models with 56 degrees of freedom.

* Indicates a significant difference at the Bonferroni-corrected p-value of 0.05/2 = 0.025

¥ Indicates a significant difference at the Bonferroni-corrected p-value of 0.05/3 = 0.017

All outcomes are z-standardized; mean differences are proportions of standard deviations.

Higher values reflect worse health for all outcomes except word recall summary where higher numbers indicate better memory, and grip strength where higher values indicate more strength.