Research Article

Mourning in a Pandemic: The Differential Impact of COVID-19 Widowhood on Mental Health

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Abstract

Objectives: The death of a spouse is an established predictor of mental health decline that foreshadows worsening physical health and elevated mortality. The millions widowed by COVID-19 worldwide may experience even worse health outcomes than comparable pre-pandemic widows given the particularities of dying, mourning, and grieving during a pandemic defined by protracted social isolation, economic precarity, and general uncertainty. If COVID-19 pandemic bereavement is more strongly associated with mental health challenges than pre-pandemic bereavement, the large new cohort of COVID-19 widow(er)s may be at substantial risk of downstream health problems long after the pandemic abates.
Methods: We pooled population-based Survey of Health, Ageing and Retirement in Europe data from 27 countries for two distinct periods: (1) pre-pandemic (Wave 8, fielded October 2019–March 2020; *N* = 46,266) and (2) early pandemic (COVID Supplement, fielded June–August 2020; *N* = 55,796). The analysis used a difference-in-difference design to assess whether a spouse dying from COVID-19 presents unique mental health risks (self-reported depression, loneliness, and trouble sleeping), compared with pre-pandemic recent spousal deaths.
Results: We find strong associations between recent spousal death and poor mental health before and during the pandemic. However, our difference-in-difference estimates indicate those whose spouses died of COVID-19 have higher risks of self-reported depression and loneliness, but not trouble sleeping, than expected based on pre-pandemic associations.
Discussion: These results highlight that the millions of COVID-19 widow(er)s face extreme mental health risks, eclipsing those experienced by surviving spouses pre-pandemic, furthering concerns about the pandemic's lasting impacts on health.

Keywords: Bereavement, COVID-19, Mental health, Widowhood

The COVID-19 pandemic has dramatically increased mortality rates worldwide, leaving tens of millions grieving lost family members (Verdery et al., 2020; Wang et al., 2021). Model-based estimates from the United States suggest that 8.8 million individuals lost close family members to COVID-19 by April 2022 (Verdery et al., 2020). Equally

striking, survey estimates from Europe, focused only on adults ages 50 and older, imply that more than 2.1 million people in those age groups lost close relatives in that continent's first COVID-19 wave (Wang et al., 2021), a number that has grown substantially since its measurement in the summer of 2020. Bereavement is "the situation of

having recently lost a significant person through death" and is a known health risk that contributes to health disparities through biopsychosocial mechanisms (Richardson et al., 2015; Stroebe et al., 2007; Umberson, 2017). Among bereavement types, recent spousal loss and "widowhood effects" present some of the most severe consequences, including mental health problems, physical health declines, and elevated mortality (Domingue et al., 2021; Elwert & Christakis, 2008a, 2008b; Ennis & Majid, 2019; Wörn et al., 2020), which compound other bereavement-related challenges, such as financial insecurity (Umberson, 2017). After disasters, those who experience bereavement report serious mental health problems at high rates (Frankenberg et al., 2008; Kuo et al., 2003; Raker et al., 2020a), and research on COVID-19 finds that those bereaved by this disease are more likely to report depression (Grace, 2021; Wang et al., 2021) and other mental health disorders (Simon et al., 2020; Tang & Xiang, 2021) than nonbereaved peers.

It remains debated, however, whether the indirect health impacts of the COVID-19 crisis, such as bereavement, are worse than similar experiences in pre-pandemic times (Ng et al., 2020; Raker et al., 2020b). There are reasons to suspect as much. A useful concept in the bereavement literature is that of a "bad death" (Carr, 2003), which is "marked by physical discomfort, difficulty breathing, social isolation, psychological distress, lack of preparation, being treated without respect or dignity, and the receipt of unwanted medical interventions" (Carr et al., 2020: 426; Krikorian et al., 2020). Those whose loved ones die "bad deaths" tend to report greater mental distress than those whose loved ones die in different circumstances (Carr, 2003). Widely recognized frameworks of bereavement also identify factors contributing to increased psychological vulnerability following it (Stroebe et al., 2006, 2007). These risk factors include a sudden or traumatic death, stressful circumstances surrounding death and place of death, and lack of interpersonal support and coping resources following death (Stroebe et al., 2007).

Based on these theoretical models, many scholars posit that COVID-19 bereavement is likely to have a "differential impact"—specifically, elevated negative associations between losing a loved one to this disease and subsequent health"—because of unique features of dying, mourning, and grieving those who died of COVID-19 during the pandemic (Carr et al., 2020; Stroebe & Schut, 2021). We would expect those bereaved by this disease to have worse mental health because "COVID-related fatalities embody the attributes of a 'bad death'" (Carr et al., 2020) and bear the hallmarks of bereavement risk factors (Stroebe & Schut, 2021), such as the bereaved being deprived of final moments with loved ones and in-person funeral and memorialization rituals due to the ongoing health emergency. Such expectations may also hold for other deaths that occurred during the pandemic but were not caused by COVID-19. These challenges are likely to be exacerbated by the other stressors associated with the pandemic, with the problems

facing the bereaved "compounded by their own social isolation, lack of practical and emotional support, and high-stress living situations" (Carr et al., 2020). During the pandemic, older adults' vulnerabilities also include their increased risks of financial difficulties (Li & Mutchler, 2020), fear of infection and dying (Ishikawa, 2020), and lower rates of using mental health services for psychological disorders (Seo et al., 2021).

To date, however, the COVID-19 differential impact hypothesis remains untested in population-based data, informed only by theoretical conjectures based on pre-pandemic literature (Carr et al., 2020; Stroebe & Schut, 2021) and small, nonrepresentative studies (Eisma et al., 2021). Even as many expect differential impacts from COVID-19 bereavement, prior work has debated the applicability of such extrapolations to the COVID-19 crisis (Ng et al., 2020; Raker et al., 2020b), and it was not clear a priori whether general resilience or even improvements in older adult mental health during the COVID-19 crisis (Vahia et al., 2020; Van Winkle et al., 2021) would outweigh these theoretical expectations. Testing the differential impact hypothesis in population-based data will help clarify the scope of the pandemic's secondary health ramifications because its empirical confirmation clarifies whether the massive cohort of pandemic widows and widowers—and the COVID-19 bereaved more generally—face worse health risks than the already high rates of health challenges facing recent widows and widowers under pre-pandemic conditions.

Two factors make it challenging to assess the differential impact hypothesis. For one, high-quality, population-based data from the crisis period are only beginning to emerge. It is not yet possible, for instance, to examine whether those bereaved by COVID-19 suffer from elevated mortality compared with pre-pandemic studies of elevated mortality following recent bereavement (Elwert & Christakis, 2008a, 2008b). However, contemporary scholarship on widowhood effects finds that the manifestation of short-term mental health problems following bereavement is highly predictive of subsequent physical health declines and elevated mortality (Domingue et al., 2021). This means that higher rates of mental health challenges following COVID-19 bereavement than pre-pandemic bereavement may function as an early warning sign for larger downstream health risks on the horizon. Second, the data that are available for COVID-19 bereavement are often based on different surveys with different sampling frames than those available pre-pandemic. These differences and secular shifts in health behaviors and attitudes during the pandemic, such as the robustly documented *decline* in depression among older adults (Fancourt et al., 2021; Recchi et al., 2020; Van Winkle et al., 2021), complicate comparisons.

We overcome these challenges and test the differential impact hypothesis using newly available data from two waves of the Survey of Health, Aging, and Retirement in Europe (SHARE; http://www.share-project.org/data-access.html)

and a difference-in-difference design. Specifically, we test whether the death of a spouse from COVID-19 is associated with worse subjective mental health relative to comparable pre-pandemic associations. Our study design leverages comparable data, drawn from two survey administrations on the same sampling frame, to account for confounding from changes in survey mode and secular shifts in rates of mental health challenges. These design features allow us to provide a robust examination of the potential excess mental health burden associated with COVID-19 bereavement compared with comparable pre-pandemic bereavement, which can inform understandings of the extent of the downstream population health challenges that might arise from COVID-19 bereavement. Although we can assess the differential impact hypothesis, the data we use are not well-suited to examine subsidiary hypotheses such as whether bereavement from deaths by causes other than COVID-19 during the pandemic has differential associations with mental health (either compared with pre-pandemic bereavement or to COVID-19 bereavement). Our focal population is older adults, who are at the highest risks of losing a spouse to COVID-19 (Verdery et al., 2020; Wang et al., 2021) and are the population most often studied with respect to widowhood effects (Elwert & Christakis, 2008a, 2008b; Umberson, 2017).

Method

Data

SHARE has interviewed a longitudinal cohort of adults ages 50 and older using cross-nationally harmonized questionnaires in 28 countries since 2004; interwave refreshment and survey weights enable population representative estimates in each cross-section (Börsch-Supan et al., 2013). We leverage a unique feature of SHARE. Wave 8 began in November 2019 but suspended data collection in March 2020 because of COVID-19. At the beginning of March 2020, only 55 cumulative COVID-19 deaths had been recorded in the European Union (Our World in Data, 2021, 2022), meaning it is nearly certain that no sample participants lost a spouse to COVID-19 during this wave of data collection (less than 8% of Wave 8 participants were interviewed in March 2020). Adapting to the crisis, a supplemental questionnaire was then fielded between June and August 2020 (COVID Supplement) to Wave 8 respondents and those sampled but not interviewed in Wave 8 (Scherpenzeel et al., 2020). Given the summer period yielded a lull in European COVID-19 deaths (with 126.5 thousand deaths reported by June 1, 2020 and 139.8 thousand deaths reported by August 31, 2020; Our World in Data, 2021, 2022), this timeline indicates that those surveyed in the supplement who reported losing a spouse would have lost them within approximately the last 3 months. Pooling information from respondents in countries participating in both waves (N = 46,266 in Wave 8

and N = 55,796 in COVID Supplement), we compare the subjective mental health of those whose spouse died from COVID-19 (reported in COVID Supplement) to reports on the same outcomes from those whose spouse recently died from other causes just prior to the first wave of COVID-19 deaths in Europe (reported in Wave 8).

Measures

Mental health
We examine three mental health outcomes that are measured consistently across the two SHARE waves (the only three indicators of mental health available in both waves), including self-reported depression, loneliness, and trouble sleeping. Self-reported depression derives from the question "in the last month, have you been sad or depressed" (1 = *yes* and 0 = *no*). This item appears in the EURO-Depression scale (Guerra et al., 2015) but even as a single item has strong validity and retest reliability (Wang et al., 2021). We create an indicator for loneliness based on responses to the question "How much of the time do you feel lonely?" (1 = *often* and 0 = *some of the time* or *hardly ever or never*; results are robust to alternate coding strategies). This single-item measure has similar validity and retest reliability to validated loneliness scales (Newmyer et al., 2021). Trouble sleeping is measured as responses to the question "Have you had trouble sleeping recently?" (1 = *trouble with sleep or recent change in pattern* and 0 = *no trouble sleeping*).

Recent spousal bereavement
In the COVID Supplement, respondents reported whether anyone close to them died of an infection from SARS-COV2, and if so, if the deceased was their spouse. The timing of COVID-19 death waves in Europe (see above) suggest that those losing spouses to COVID-19 were surveyed an average of 3 months after the death with limited censoring.

We measure pre-pandemic recent widowhood using reports of marital status changes in Wave 8. Because bereavement-related mental health declines can attenuate (Domingue et al., 2021), we create three indicators to capture selectively narrower durations since the time of death: (a) spouse died within 3 years (since 2017, the year of Wave 7 interviews); (b) spouse died within 1 year (since 2019); and (c) for respondents interviewed in 2020, spouse died within 3 months (since 2020). Note that in regular waves, SHARE does not collect month of death data, but only year of death. We examine these three measures to balance making our comparisons as robust (in terms of case counts and measurement certainty, which determine precision of estimated pre-pandemic bereavement associations and tests of differences from those associations) and comparable (in terms of recency) as possible. Measure (a) gives us the most certain, observation-based coverage of the widest pool of pre-pandemic spousal deaths, but it is less recent. Measure (b) gives us good coverage of a smaller number of

pre-pandemic spousal deaths to the extent that respondents report death dates accurately, and it is more recent than the 3-year measure but not perfectly comparable to the recency of COVID-19 deaths. Measure (c) gives us the closest direct comparator to the recency of COVID-19 deaths, at the expense of the number of pre-pandemic comparator deaths and possibly the certainty of their coverage. Owing to these different strengths and limits, we report tests of COVID-19 bereavement against all three measures.

Analytic Strategy

We use a difference-in-difference design, which is a commonly used method for explanatory research (Dimick & Ryan, 2014; Lechner, 2011; Wing et al., 2018). The difference-in-difference method as applied to this case relies on the comparability of the pre-pandemic and pandemic samples (see Table 1) to develop an assumed counterfactual of what the pandemic widow(er)s would look like were they to have lost their spouse pre-pandemic. The validity of the analysis depends on the counterfactual assumption that the relationships between pre-pandemic recent widowhood and the study outcomes are stable between periods such that any trends should have been observed for those whose spouse died of COVID-19. Table 1 presents descriptive results to help assess that assumption. Because most respondents ($N = 36,674$) appear in both waves (which increases the plausibility of the ignorability assumption that the difference owes to the spouse dying of COVID-19 rather than changes in the composition of the population or who dies), we adjust standard errors to account for clustering of panel respondents (see below for alternate approaches). Although we do not have information about those who lost spouses to causes other than COVID-19 during the pandemic, this information is not essential to making inferences about the differential impact hypothesis.

The estimate of the excess impact of losing a spouse to COVID-19 (vs. pre-pandemic associations) on mental health is given by:

$$\hat{\phi} = (\bar{d}_{2W} - \bar{d}_{1W}) - (\bar{d}_{2nW} - \bar{d}_{1nW})$$

where $\bar{d}_{..}$ is the proportion reporting mental health challenges in period 1 or 2 for individuals recently widowed (W) or not recently widowed (nW). In this context, ϕ is most conveniently estimated using a standard linear probability regression model

$$outcome_{it} = \alpha + \beta_1 period_{it} + \beta_2 widowed_{it} + \phi period \times widowed_{it} + \epsilon_{it}$$

where i indexes cases and t indexes time periods; *outcome* is an indicator for reporting being depressed, lonely, or having trouble sleeping; *period* is an indicator for the COVID-19 period; and *widowed* is an indicator for recent widowhood.

We then turn to examining the differential impact hypothesis (Table 2). For each mental health outcome, we consider three models. Given our prior discussion of measurement timing, Models 1, 4, and 7 examine pre-pandemic recent widowhood using the last 3-year definition (Measure a), Models 2, 5, and 8 use the last 1-year definition (Measure b), and Models 3, 6, and 9 use the last 3-month definition (Measure c).

It may be that other factors, such as those that determine who dies of COVID-19, predict both the likelihood of losing a spouse to this disease and respondents' mental health responses to such a loss. For instance, perhaps those in smaller households found COVID-induced self-isolation more difficult and thus were more likely to lose a spouse to COVID-19 and to have less support and therefore respond more negatively to bereavement, and thus this household size confounding is what explains any differential impact

Table 1. Descriptive Characteristics of SHARE Wave 8 and COVID Supplement Samples

	Wave 8		COVID Suppl.			Both waves
	Mean/%	(SE)	Mean/%	(SE)	Difference	Range
Age						
50–59	26.2%		26.1%			0–1
60–69	35.7%		35.8%		—	0–1
70–79	22.1%		22.2%		—	0–1
80+	16.1%		15.9%		—	0–1
Female	54.0%		54.0%		—	0–1
Employed	33.0%		32.9%		—	0–1
Fair/poor health	38.3%		27.3%		—	0–1
Household size	2.11	(0.02)	2.12	(0.03)	—	1–18
Mental health problems						
Depressed or sad	43.4%		28.2%		15.2%	0–1
Often lonely	7.5%		7.3%		0.2%	0–1
Trouble sleeping	36.2%		27.3%		8.9%	0–1
Analytic sample *N*	42,266		55,796			

Notes: Supp. = Supplement survey. Estimates are weighted. Linearized *SE*s adjusting for sample design shown in parentheses. Country proportion estimates are not shown for space and because they have no differences between samples. SE = standard error; SHARE = Survey of Health, Ageing and Retirement in Europe.

Table 2. Difference-in-Difference Model Results of Recent Spousal Death, COVID-19, and Mental Health

	Depressed or sad			Often lonely			Trouble sleeping		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Status									
Not recently widowed	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)
Recently widowed	0.339***	0.421***	0.495***	0.233***	0.235***	0.190	0.210***	0.215***	0.318*
	(0.019)	(0.023)	(0.063)	(0.020)	(0.031)	(0.141)	(0.022)	(0.034)	(0.134)
Time period									
Pre-COVID-19	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)	(Ref)
COVID-19	-0.144***	-0.149***	-0.130***	0.005	0.000	-0.005	-0.084***	-0.088***	-0.075***
	(0.008)	(0.008)	(0.010)	(0.003)	(0.003)	(0.005)	(0.007)	(0.007)	(0.009)
Difference-in-difference									
Recently widowed × COVID-19	0.281***	0.200**	0.126	0.410*	0.408*	0.453*	0.093	0.087	-0.015
	(0.064)	(0.066)	(0.088)	(0.163)	(0.166)	(0.215)	(0.170)	(0.173)	(0.216)
Constant	0.426***	0.431***	0.411***	0.068***	0.072***	0.077***	0.357***	0.360***	0.347***
	(0.008)	(0.008)	(0.010)	(0.003)	(0.003)	(0.005)	(0.008)	(0.008)	(0.009)
Obs.	98,424	98,412	78,420	98,303	98,291	78,319	98,579	98,566	78,554
R^2	.033	.031	.018	.012	.006	.002	.013	.011	.006
Time since spouse's death	3 years or less	1 year or less	3 months or less	3 years or less	1 year or less	3 months or less	3 years or less	1 year or less	3 months or less

Notes: (Ref) indicates reference group. Survey design corrected *SEs* are in parentheses. Time since death includes cases where spouse was measured as dying within indicated amount of time (Wave 8) or reported as dying of COVID-19 (COVID Supplement). Estimates are from weighted linear probability models. Models controlling for age group, gender, household size, self-rated health, employment status, and country are in Supplementary Table 1. Stratified models by gender and age group are in Supplementary Table 2. Models restricted to participants who appear in both Wave 8 and the COVID Supplement are in Supplementary Table 3. Models limited to respondents who were married in Wave 7 and did not divorce in Wave 8 are in Supplementary Table 4. A placebo test using spousal hospitalization instead of spousal death is in Supplementary Table 5. *SE* = standard error.
***$p < .001$, **$p < .01$, *$p < .05$.

rather than the death being due to COVID-19. To assess such circumstances and other issues, we also fit models controlling for respondents' sociodemographic characteristics, including age, gender, employment status, self-rated health, household size, and country (Supplementary Table 1 and Supplementary Figure 1), models that stratify results by gender and age group (Supplementary Table 2); models that restrict the sample to those participating in both waves (Supplementary Table 3); models limited by whether respondents were at risk of widowhood (Supplementary Table 4); and models that conduct a placebo test on whether the spouse was hospitalized but did not die of COVID-19 (Supplementary Table 5). Because results do not meaningfully change between these alternate specifications, we present the most parsimonious models.

Results

Table 1 presents characteristics of respondents in both the Wave 8 and COVID Supplement samples. Older adults in the two samples were similar in terms of age, gender, employment status, and household size. As for mental health, older adults of the Wave 8 sample had similar prevalence of loneliness (7.5% vs. 7.3%) but higher prevalence of depression (43.4% vs. 28.3%) and trouble sleeping (36.2% vs. 27.3%) compared with older adults in the COVID Supplement sample. Self-rated health also appears to have improved between waves.

Table 2 presents results from difference-in-difference models for the associations between recent spousal death and each of the three mental health outcomes in the context of COVID-19. The *Recently widowed* coefficients across all models in Table 2 indicate that associations between recent widowhood and mental health are large and statistically significant when averaging those who became recent widows both before and during the COVID-19 period. Those whose spouses died were more likely to be depressed,

lonely, and have trouble sleeping than those who did not recently experience a spousal death. The bereavement results are consistent across the three durations since spousal death that we consider, though probabilities of depression, and to a lesser extent trouble sleeping, are higher when we consider widows and widowers bereaved more recently.

The COVID-19 coefficients across all models in Table 2 show that mental health indicators are more variable over time. Self-reported depression and trouble sleeping decreased meaningfully from the pre-COVID-19 period to the COVID-19 period, but loneliness remained unchanged. These results highlight that the probability of depression or trouble sleeping declined as the pandemic took hold, with only slight differences consistent with measurement changes when considering across the duration-based models.

The most important estimates in Table 2 are the difference-in-difference coefficients, which allow us to evaluate the differential impact hypothesis. The difference-in-difference coefficients (*Recently Widowed × COVID-19*) indicate that a spouse dying from COVID-19 is associated with greater risk of depression ($B = 0.281$, $SE = 0.064$, $p < .01$ in Model 1; $B = 0.200$, $SE = 0.066$, $p < .01$ in Model 2) and loneliness ($B = 0.410$, $SE = 0.163$, $p < .05$ in Model 4; $B = 0.408$, $SE = 0.166$, $p < .05$ in Model 5; $B = 0.453$, $SE = 0.215$, $p < .05$ in Model 6) than expected based on pre-pandemic associations. We found no differential impact for trouble sleeping, however, where all coefficients and test statistics indicate there were no statistically significant differences. Within each outcome of interest, the difference-in-difference results are broadly consistent across models, indicating that the difference-in-difference results are not explained by measuring the COVID-19 widows and widowers during a more acute phase, sooner after their loss occurred.

Figure 1 presents key results for depression and loneliness, the two outcome variables for which we found substantively meaningful and statistically significant evidence of differential impact (based on Models 3 and 6 in Table 2, the most conservative comparisons of pre-pandemic deaths within the last 3 months). The figure plots pre-pandemic associations between recent widowhood and mental health by highlighting the predicted probabilities of depression (left panel) or loneliness (right panel) for recently widowed and not recently widowed individuals, respectively. It then shows, in the COVID-19 period, the well-documented decline in subjective mental health problems for older adults during the COVID-19 period, a result most clearly illustrated by the non-widowed predicted probability in the COVID-19 period. The figure also displays what the counterfactual predictions would be if the differences between the recently widowed and not widowed were as large as they were in the pre-pandemic period during the COVID-19 period, when all widowhood is COVID-19-related. Note that this counterfactual prediction assumes that the interwave decline in mental health challenges held for the bereaved. In other words, the counterfactuals are what would be
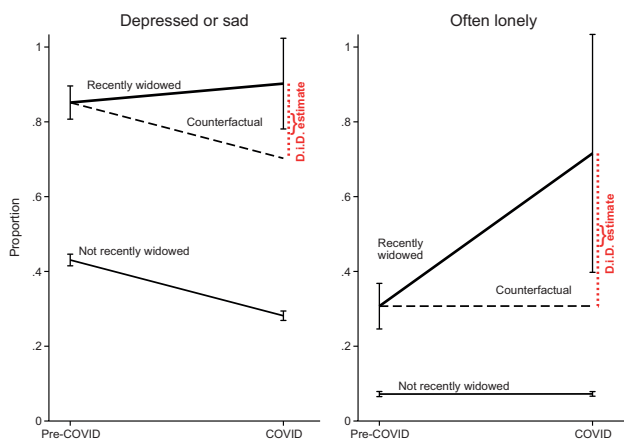

Figure 1. Modeled difference-in-difference estimates illustrating excess mental health challenges associated with a spouse dying of COVID-19 compared with pre-pandemic bereavement. Full color version is available within the online issue.

expected based on interwave changes in mental health for spouses not recently widowed and the pre-pandemic bereavement offset. Finally, the figure shows what the actual change was for those who lost spouses to COVID-19 (the recently widowed probabilities in the COVID-19 period), as well as the difference-in-difference estimates—the mental health burdens associated with losing a spouse to COVID-19 that exceed pre-pandemic expectations—which are marked.

Figure 1 highlights that, for depression (Model 3, left panel), 41.1% of those who were not recently widowed were depressed during the pre-COVID-19 period, whereas 90.6% of those who recently lost a spouse during the pre-COVID-19 period—that is, the pre-pandemic recent widows and widowers—were depressed (difference = 49.5 percentage points). During the COVID-19 period, the percentage of those not recently widowed who were depressed declined to 28.2%. Assuming the pre-pandemic association between recent widowhood and depression was maintained, we would expect that 77.7% of those who lost a spouse to COVID-19 would be depressed in the COVID-19 period based on the decline we observe for those not having recently lost a spouse.

Instead, we see a very different statistic: 90.2% of those who lost a spouse to COVID-19 were depressed in the COVID-19 period (difference = 62.1 percentage points). The difference-in-difference estimate is thus 12.6%, suggesting that there is a larger impact of losing a spouse to COVID-19 than expected based on pre-pandemic associations. As for loneliness (Model 6, right panel), 7.7% of those not recently widowed and 26.8% of those who recently lost a spouse were lonely during the pre-COVID-19 period (difference = 19.0 percentage points). Likewise, during the COVID-19 period, 7.3% of the not recently widowed were lonely, which implies a counterfactual expectation that 26.3% of COVID-19 widows and widowers would be lonely. In actuality, 71.6% of those who lost a spouse to COVID-19 were lonely (difference = 63.3 percentage points), yielding a 45.3% difference-in-difference estimate consistent with a vastly elevated excess burden of loneliness among the COVID-19 widows and widowers compared with what would be expected based on pre-pandemic associations.

In sensitivity analysis, we first examined whether adding controls, such as those that account for factors that could influence both risks of one's spouse dying of COVID-19 and resilience in the face of such loss, like household size, employment, or self-rated health (Supplementary Table 1); these results do not alter our conclusions (Supplementary Figure 1). We also examined whether the excess mental health consequences from COVID-19 spouse bereavement differ by gender and age groups (50–69 vs. 70 and older). These stratified analyses show the same pattern of results as those in the main results—that COVID-19 spousal bereavement had worse associations with mental health compared with pre-pandemic bereavement across these subgroups of older adults, although we cannot distinguish whether these subgroup differences are statistically significant (Supplementary Table 2). In addition, we conducted a similar analysis only with the balanced panel sample (i.e., respondents who participated in both waves) and these results are also consistent with the original reports (Supplementary Table 3). To account for the potential heterogeneity among the not-recently widowed group, we also conducted analysis by restricting the Wave 8 sample to respondents who were married in Wave 7 and did not divorce by Wave 8 and found that the results are substantively the same (Supplementary Table 4). Finally, we conducted a placebo test using spousal hospitalization from COVID-19 in the place of COVID-19 deaths, expecting that positive findings would indicate unmeasured confounding and throw caution to conclusions about differential impact. This yielded no evidence that unmeasured confounding biases our primary estimates (Supplementary Table 5).

Discussion

We provide the first population-based evidence that losing a spouse to COVID-19 is associated with distinctly worse mental health than expected based on comparable pre-pandemic associations between recent spousal death and mental health. These elevated risks apply to millions of COVID-19 widows and widowers worldwide and merit recognition. Taken alongside evidence that those experiencing the highest rates of mental health problems shortly after a spousal death in turn face the largest risks of subsequent physical health decline and elevated mortality (Domingue et al., 2021), these results underscore the potential for substantial downstream health ramifications of COVID-19 deaths (Simon et al., 2020). Results of this study call for urgent policy and clinical attention to those who lost spouses, or potentially a loved one more generally, to COVID-19.

The finding that COVID-19 widowhood has an outsized association with poor mental health outcomes is consistent with theoretical conjecture (Carr et al., 2020; Stroebe & Schut, 2021) and prior disaster studies (Raker, 2020a), but it had not been empirically tested for COVID-19. Although our data allow us to demonstrate the differential impact of mourning spousal deaths due to COVID-19, we anticipate that these findings extend to other pandemic deaths—to mourning in a pandemic more generally. That is, we suspect that bereavement *during* the pandemic, not only directly *from* the pandemic, is excessively harmful for bereaved older adults. Many deaths during the pandemic became "bad deaths" for surviving family members due to the fear of seeking necessary medical care, the triaging of acute health problems, and hospital restrictions on nonpatient access, each of which likely made it difficult for families to process their loved one's death, regardless of its specific cause. Grieving and mourning were also complicated

for all during the pandemic due to social isolation. Other pandemic-induced stressors, such as financial insecurity and lack of practical and emotional support, likely further aggravated the psychological distress for the bereaved during this time.

Our results also add support to the notion that certain types of deaths—"bad deaths" (Carr, 2003)—are especially risky for older adult mental health, even outside of pandemic contexts (Carr et al., 2020). A challenge for prior research on the differential impact of bad deaths has been the question of whether those experiencing bad deaths were more likely to face difficulties even in the absence of bad death circumstances—for instance, if a confounder increases both the risks of one's spouse dying of suicide and the risks of one's own negative mental health. By using a novel difference-in-difference design during a respiratory pandemic that increased the likelihood of people experiencing bad deaths in an acute mortality shock, we were able to rule out the influence of many such confounders and obtain new insights into the challenges associated with bad deaths.

Our results also focus only on one type of bereavement—spousal loss—but an even larger share of the population has experienced other family and nonfamily losses due to COVID-19 (Wang et al., 2021). Prior scholarship has established the extremely negative health ramifications of bereavement during pre-pandemic times. COVID-19 bereavement, and likely all bereavement during the pandemic, has stronger negative associations with mental health than pre-pandemic bereavement, providing a strong rationale for immediate policy and scholarly attention to the issue of bereavement and health.

Future research can take a similar approach to calibrate the consequences of different types of COVID-19 bereavement. In particular, examining whether the many children who lost parents (Kidman et al., 2021) and grandparents (Livings et al., 2022) to COVID-19 face distinct challenges from those who had similar, pre-pandemic losses could clarify the support this cohort needs; any increase in the already stark implications of parental death would mean these children will face especially severe educational attainment, development, and health disadvantage in middle and late life (Ferraro et al., 2016; Patterson et al., 2020; Umberson et al., 2017). Moreover, this study offers a framework for studying the consequences of other types of relationship loss, like divorce, which future work could examine.

Because of the small number of spousal deaths from COVID-19 in Europe's first-wave crisis, this research does not address possible variation in COVID-19 bereavement's worse-than-expected association with mental health by population subgroups. Prior research demonstrates greater depression risk for women than men following COVID-19 bereavement (Wang et al., 2021). Our sensitivity analyses produced results suggestive but not statistically significant evidence of a differential impact of COVID-19 deaths by gender, possibly pointing to the universality of distress following COVID-19 bereavement. Future work can reassess these possibilities with more data and can examine whether the results vary by other stratifying dimensions known to influence mental health in the COVID-19 era, like socioeconomic status (Wright et al., 2021). Recent work has shown COVID-19 bereavement disparities by race in the United States, with Black Americans losing more relatives than their White counterparts (Verdery et al., 2020), part of a broader tendency for U.S. minority groups to experience greater levels of bereavement (Cooper & Williams, 2020; Umberson et al., 2017). It is not clear whether these results generalize to the U.S. context, but COVID-19 bereavement's possible contributions to widening racial disparities deserve investigation (Garcia et al., 2021).

This study has several limitations. First, the SHARE data have only two relevant observation points, one for the pre-pandemic period and one acute pandemic period just after the first wave of Europe's COVID-19 crisis. Much has changed since the data were collected: as elsewhere, Europe's first wave COVID-19 crisis had fewer deaths than seen in subsequent waves (Cacciapaglia et al., 2020). In addition to greater death counts since the data were collected, there have been marked changes in infection and mortality risks driven by mutations in and spread of the SARS-COV-2 virus, the development and deployment of vaccines, antivirals, and new treatment protocols, and changes in national and local public health directives. Given that our results are restricted to the early-pandemic phase in Europe and Israel, they may not generalize to all COVID-19 spousal deaths, either later in the pandemic or in other countries. Moreover, the outcome measures pertain only to self-reports of poor mental health rather than clinical thresholds. Likewise, although they highlight a larger initial mental health toll to spousal death when the spouse dies of COVID-19, our results cannot address whether the outsized associations between COVID-19 bereavement and poor mental health persist longer than about 3 months after the event, nor whether these early mental health challenges lead to physical health declines and subsequent mortality as pre-pandemic models imply (Domingue et al., 2021). Last, as noted, it would be an important extension to compare these results against those estimated for people whose spouses died of causes other than COVID-19 during the pandemic period to confirm that all bereavement during the COVID-19 pandemic has created excess mental health challenges compared with pre-pandemic bereavement. Unfortunately, as clarified above, the data are not yet available for such work, leaving these questions to future research.

The COVID-19 pandemic has killed millions around the world and left an even larger number of individuals grieving the deaths of close family members. Compared with pre-pandemic associations, our study found that those whose spouses died of COVID-19 had worse-than-expected mental health, which suggests that bad deaths and other

bereavement risk factors are highly salient challenges for population health. The unique challenges facing the large cohort bereaved during the COVID-19 pandemic highlight the need to provide therapeutic intervention and support for bereaved older adults.

Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

Author Contributions

H. Wang and A. M. Verdery conceived the study, conducted the analysis, and led the writing. E. Smith-Greenaway contributed to the study design and assisted with the writing. S. Bauldry assisted with the analysis and the writing. R. Margolis assisted with the writing. A. M. Verdery supervised the study. All authors discussed the results and contributed to manuscript writing and revision.

Conflict of Interest

None declared.

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