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## Caregiving Behavior Is Associated With Decreased Mortality Risk

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### Abstract

Traditional investigations of caregiving link it to increased caregiver morbidity and mortality, but do not disentangle the effects of providing care from those of being continuously exposed to an ailing loved one with serious health problems. We explored this possible confound in a national, longitudinal survey of elderly married individuals ( $N = 3,376$ ). Results showed that spending at least 14 hr per week providing care to a spouse predicted decreased mortality for the caregiver, independently of behavioral and cognitive limitations of the care recipient (spouse), and of other demographic and health variables. These findings suggest that it may be premature to conclude that health risks for caregivers are due to providing active help. Indeed, under some circumstances, caregivers may actually benefit from providing care.

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Approximately 21% of the U.S. adult population provides unpaid care to an adult over age 18 (Pandya, 2005, par. 2). There is a growing consensus that caregiving is harmful to physical health, so public-policy researchers have recommended that caregivers receive “relief from the relentless work of family caregiving and its debilitating effects” (Feinberg et al., 2004, Recommendation 3). As reported by Riess-Sherwood, Given, and Given (2002), the physical health consequences of providing care “have been so striking that federal legislation has been enacted to begin granting financial relief to those who provide care in the home in the hopes that this would relieve some of the health effects” (p. 111). These recommendations are based, in part, on evidence that caregivers may experience problems with immune regulation (e.g., see Vitaliano, Zhang, & Scanlan, 2003, for an overview), and

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#### SUPPORTING INFORMATION

Additional Supporting Information may be found in the on-line version of this article:

Table S1

Table S2

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also on evidence of increased mortality among caregivers (Christakis & Allison, 2006; Schulz & Beach, 1999).

However, empirical evidence of worsened physical health among caregivers comes from studies that often equate providing active help with being continuously exposed to an ailing loved one with serious health problems (e.g., Christakis & Allison, 2006; Vitaliano et al., 2003). Christakis and Allison, for example, linked caregiving to increased mortality risk on the basis of increased mortality rates among individuals whose spouse had been hospitalized, as opposed to individuals who provided more hours of care to a spouse. In instances like these, it is impossible to know whether the adverse health consequences are due to stress arising from active helping (e.g., hours of care provided to another person), or to other features of the caregiving context that may be harmful, such as anticipatory bereavement or witnessing the decline of a loved one.

The failure to separate the health consequences of providing active help from those of other sources of stress may be due to an underlying assumption about the strain, stress, and burden that is presumed to accompany providing care to other people. As Given, Given, Kozachik, and Rawl (2003) described, “a relationship between distress and actual care demands has been assumed to exist but has not been systematically examined” (p. 342). Thus, it may be premature to conclude that active help produces harmful levels of stress among caregivers. This caution is underscored by a recent meta-analysis of cross-sectional studies of the subjective health of caregivers (Pinquart & Sorenson, 2007) that yielded no evidence that providing active help has adverse effects on health. On the contrary, some analyses demonstrated that greater amounts of helping were associated with *better* self-rated health for caregivers, a finding that is consistent with data from well-controlled prospective studies of helping in a variety of contexts (see Post, 2007, for an overview). For example, greater helping behavior, as measured by number of volunteer hours or number of volunteer activities, is associated with reduced mortality for volunteers (reviewed in Oman, 2007). And the provision of practical or emotional support to family members and friends predicts reduced morbidity and mortality for the provider (S.L. Brown, Nesse, Vinokur, & Smith, 2003; W.M. Brown, Consedine, & Magai, 2005).

Of course, such findings must be interpreted with caution. Providing support may enhance the provider's health, but the converse is also possible—those individuals who are the healthiest may provide the most support. And generalizations from studies of volunteering and social support to the traditional caregiving context are constrained by the fact that the decision to volunteer or provide social support is often freely made and, in some cases, is of low cost to the helper. Nevertheless, studies of volunteering and social support have yielded evidence that providing help can be associated with health benefits, and these findings contrast sharply with those from traditional studies of caregiving, a paradox that begs for empirical clarification.

Thus, the literatures on caregiving, volunteering, and social support suggest a paradox: Helping other people can be both bad and good for one's health. The present study was designed to identify factors that may be responsible for these seemingly contradictory findings by assessing the relationship between caregiving (hours of care provided to a spouse) and caregiver mortality, independent of exposure to behavioral and cognitive limitations of the care recipient (spousal need).

We examined this question using data from 3,376 participants in the Health and Retirement Study (HRS), a biennial longitudinal survey of a nationally representative cohort of U.S. adults, designed to address a broad range of scientific questions about late-life health and the transition to retirement age (Soldo, Hurd, Rodgers, & Wallace, 1997). Unlike prior studies

of caregiving, which typically compare caregivers (e.g., people with a spouse in poor health) with noncaregivers (e.g., people with a spouse in good health), this study assessed caregiving (hours of care provided to a spouse) for every individual. We examined whether individuals' mortality risk would increase or decrease with the number of hours of care they provided to their spouses.

## Method

### Sample

We used data from the 1993, 1995, 1998, and 2000 surveys of the Asset and Health Dynamics (AHEAD) cohort of the HRS. At the baseline survey in 1993, the AHEAD cohort was a nationally representative sample of community-dwelling individuals age 70 or older. Spouses of individuals in the AHEAD cohort were included in the study, regardless of age. From the 8,222 respondents in the baseline survey, we identified 4,298 married individuals (2,149 couples) who lived in a two-person household. We included a couple in our analyses only if both members of the couple were able to provide their own answers to survey questions ( $n = 3,414$ ).<sup>1</sup> Of these individuals, 38 were excluded from the analysis because of either missing or incomplete data on time of death. The main analyses were performed using the remaining 3,376 individuals. For all 3,376 respondents, we created an active-help (hours of care provided) variable based on the partner's report of hours of care received and a spousal-need variable to characterize the spouse's health. To avoid confusion, we use the term "respondent" to indicate when a person's score on a variable (e.g., care hours) is used to predict his or her own mortality risk. We use the term "spouse" to indicate when an individual's mortality risk is being predicted by variables that characterize the individual's partner.

### Focal Measures

**Time of Death**—Information on time of death was obtained at and between waves from next of kin and the National Death Index (NDI). Vital-statistics information in the NDI was last updated in the year 2000. We computed survival time for respondents from the day of the 1993 interview until death or the date of the last interview.

**Hours of Care Provided to the Spouse**—As in prior research with caregivers in the HRS, hours of care provided by the respondent was calculated at baseline using spousal reports of care received. Each potential care recipient (spouse) was asked to report whether, because of a health problem, the respondent provided him or her with help in at least one activity of daily living (ADL; eating, transferring, toileting, dressing, bathing, walking across a room) or instrumental activity of daily living (IADL; e.g., preparing meals, grocery shopping, managing money; Fonda & Herzog, 2004). After indicating that help was received from a spouse, potential care recipients responded to the following two questions: (a) "How often in the last month did your spouse help you? (every day, several times a week, about once a week, less than once a week, not at all)" and (b) "On the days your spouse helped you, about how many hours per day was that?" Responses to these questions were then used to calculate the number of care hours per week. The resulting variable was nonnormally distributed, so following prior studies using these data (Kim, Kabeto, Wallace, & Langa, 2004), we created a dummy variable to indicate whether the care recipient had received 0, from 1 to 14, or 14 or more hours of care a week from the respondent.<sup>2</sup> Fourteen hours of

<sup>1</sup>An additional 883 individuals had their data provided by someone else in the household.

<sup>2</sup>The distribution for this variable was nonlinear and multimodal, with almost 90% of values at one of three modes: 0 (80.8%), 7 (4.6%), and 14 (2.9%). Thus, we treated this variable as categorical rather than continuous, and defined our categories using these modes.

care per week was the median amount of time spent caregiving for those respondents who provided some care. The details of the methodology used to calculate caregiving hours from the HRS data have been reported previously (Langa, Chernew, Kabeto, & Katz, 2001).

**Spousal Need**—Spousal need was assessed at baseline in three ways: self-reported ADL and IADL limitations and presence of any cognitive impairment (mild, moderate, or severe), as determined by a modified version of the Telephone Interview for Cognitive Status, a validated cognitive screening instrument designed for population studies (Brandt, Spencer, & Folstein, 1988; Plassman, Newman, & Welsh, 1994; Welsh, Breitner, & Magruder-Habib, 1993).

**Health and Demographics**—The following health measures reported by the respondent at baseline were included in the analyses: presence of comorbid conditions, self-rated health, health-related functional status, and depressive symptoms. Respondents indicated whether they had a history of cancer, diabetes, a heart condition, stroke, chronic lung disease, high blood pressure, psychiatric illness, or arthritis. In addition, they rated their own health as excellent (1), very good (2), good (3), or fair or poor (4). Health-related functional status was assessed by the number of ADLs and IADLs in which respondents were limited “because of a health or physical problem.” In the case of IADLs, respondents were asked to identify those that they “never do,” and when an IADL was thus identified, the respondent was asked, “Is that because of a health problem?” (thus, activities, such as grocery shopping and cooking, that were always done by the other spouse were differentiated from activities that the respondent did not do because of a physical problem). Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression (CES-D) Scale (Radloff, 1977). The abbreviated 8-item version of the CES-D Scale used in the HRS has reliability and validity comparable to that of the widely used and validated 20-item CES-D Scale (e.g., Turvey, Wallace, & Herzog, 1999).

The following sociodemographic measures, self-reported by respondents at baseline, were also included in the analysis: age, race (White, Black, other), gender, highest level of education (in years), employment status (working for pay, not working), and net worth (see Cao, 2001, for more details).

### Analytic Framework

Time of death data was assessed at all waves and between waves using NDI data and next-of-kin reports; all other variables were assessed at the 1993 interview. To account for the complex design, we used Cox proportional hazards models and multivariate analyses to calculate the association between each baseline measure and respondents’ survival time. The hazard models considered weights used to represent the national population, including person-level sampling weights (post-stratified at the person level to 1990 totals for census region by race-ethnicity, sex, and age). Detailed information about household- and person-level analysis weights is available on the official HRS (2007) Web site. The confidence intervals were adjusted for the complex design (two levels of strata) using SUDAAN 9.0 software (RTI International, Research Triangle Park, NC). In addition, the Cox proportional hazard models adjusted for clustering at the level of the couple. Couple-level adjustments estimate the standard errors for clustered data using a modified form of the “robust” estimation of variance (Huber, 1967; White, 1980).

Two multivariate Cox models were estimated to determine the simultaneous association of care hours and the spousal-need variables with survival time: Model 1 included only care hours and spousal-need variables; Model 2 also adjusted for the respondent's health and demographics. All models were fitted in advance of examining the data, and list-wise

deletion was used to handle missing data, so Model 2 was based on a final sample size of 3,369.

## Results

### Descriptive Statistics

Table 1 summarizes the characteristics of the study sample. As the table shows, 909 participants (26.9% of the sample) died over the course of the study period. The table also shows that hours of care provided was indeed associated with spousal need, as the majority of spouses who had four to six impairments in ADLs also were receiving some amount of care from their spouse. However, evidence of spousal need was not synonymous with respondents' provision of care. Among individuals with one or more impairments in ADLs ( $n = 673$ ), for example, nearly half ( $n = 333$ ) reported receiving no help from their partner. Table S1 in the supporting information available on-line provides further descriptive information about the study population (see p. XXX).

### Multivariate Analyses

Table 2 presents the hazard ratios and corresponding 95% confidence intervals for our primary analyses, which used the baseline characteristics as predictors of survival time. The test of the unadjusted association of care hours and mortality demonstrated that the highest level of caregiving ( $\geq 14$  hr per week) was associated with a reduced risk of mortality ( $p = .012$ ), but that a lower level of caregiving (1–14 hr per week) was unrelated to mortality risk (n.s.). When hours of care and spousal-need variables were considered simultaneously (Model 1), the hazard ratio for high care hours (i.e.,  $\geq 14$  per week) was significant ( $p < .0001$ ). In addition, the hazard ratio for low care hours (1–14 hr per week) was also significant ( $p = .025$ ). These results indicate that both levels of care hours were associated with reduced mortality risk for the caregiver, relative to providing no hours of care (see Table 2).

Respondents' mortality risk was increased by higher levels of spousal ADLs ( $p = .028$ ) and spousal IADLs ( $p = .018$ ). The presence of cognitive impairment in a spouse, however, was unrelated to mortality risk for the respondent ( $p > .1$ ; see Table 2).

We performed further analyses to examine whether helping behavior predicts longevity independent of its association with better health and health-related functioning. Table 2 shows the separate associations of helping behavior and spousal-need variables after adjusting for the respondents' comorbid conditions, self-rated health, health-related functional status, depressive symptoms, age, gender, race, education, employment status, and net worth (Model 2). The hazard ratio for the caregivers providing 14 or more hours of care remained statistically significant ( $p = .012$ ); however, none of the spousal-need variables were significant after adjusting for the measures of caregiver health and demographics. Note that Table S2 in the supporting information available on-line is an expanded version of Table 2 with the complete results of Model 2 (see p. XXX).

## Discussion

Individuals who provided 14 or more hours of care per week to their spouse had lower rates of mortality than those who did not provide any care to their spouse. Moreover, respondents who were married to someone in poor health had higher rates of mortality than those whose spouse was healthy. When demographics and health status of the respondent were considered (gender, age, race, education, net worth, employment, self-rated health, comorbid conditions, health-related functional limitations, and CES-D depression), a high number of

caregiving hours ( $\geq 14$ ) remained a significant predictor of decreased mortality risk, but spousal-need variables were no longer related to increased mortality risk.

This beneficial association between care hours and mortality replicates findings that link the provision of help to longevity of the helper (e.g., S.L. Brown et al., 2003; Oman, 2007), and extends these findings to the caregiving context. The results of the present study also extend the growing literature on the positive, beneficial effects of caregiving (e.g., Hilgeman, Allen, DeCoster, & Burgio, 2007; Kramer, 1997), which previously had not linked caregiving to physical-health benefits (but see Allman, Rosin, Kumar, & Hasenstaub, 1998, for similar evidence among primates).

The finding that spousal impairments predicted increased mortality risk (in the primary multivariate model) is consistent with previous studies that have linked caregiver strain and hospitalization of the spouse to increased mortality risk (Christakis & Allison, 2006; Schulz & Beach, 1999), and with studies showing that a family member's need can lead to health problems for noncaregivers (Amirkhanyan & Wolf, 2003). Beneficial effects of providing help to another person may have gone undetected in prior work because caregivers experience stress and strain related to anticipatory bereavement. Other researchers have argued that bereavement-related processes underlie harmful physical-health effects of being a caregiver (Schulz, O'Brien, Bookwala, & Fleissner, 1995), and, indeed, bereavement is associated with worsened physical-health problems—including physical illness, problems with immune function, and increased mortality risk—in the surviving spouse (e.g., Irwin, Daniels, & Weiner, 1987; Vitaliano et al., 2003).

A new conceptual model of caregiving underscores the need to differentiate the different psychosocial processes that characterize the caregiving experience (Schulz et al., 2007). Schulz and his colleagues suggested that the perception of the patient's suffering may be harmful, but that the caregiver's compassion (which may lead to greater amounts of care provided) could be beneficial for his or her outcomes. At the very least, our results suggest that it is important to continue to examine the unique influence of the provision of care in a caregiving context in order to determine whether it can be salutary for caregivers.

Our data do not address the mechanism by which caregiving hours may decrease mortality risk, but we hypothesize that stress regulation may play a role. Harmful physical-health effects of being a caregiver are often attributed to exposure to high levels of chronic stress (e.g., Vitaliano et al., 2003), and immune problems among caregivers have been linked to altered stress regulation (e.g., Redwine et al., 2004). More generally, providing help to another person has been hypothesized to promote the physical health of the helper by acting, in part, as a stress buffer. We have shown in our prior work, for example, that increased help given to other people after the loss of a spouse (i.e., providing instrumental support to others) predicts accelerated recovery from depressive symptoms during the 18-month bereavement period among individuals who have had a heightened stress response to the bereavement event (S.L. Brown, House, Brown, & Smith, 2008). Furthermore, hormones that are causally linked to helping behavior, such as oxytocin (S.L. Brown & Brown, 2006), decrease activity of the hypothalamic-pituitary-adrenal (stress) axis (Carter, 1998), and contribute to cellular repair and storage of cell nutrients (see Heaphy & Dutton, 2008, for a review). If future work continues to show help-related health benefits, then it will be important to determine whether these effects can be explained by links with restorative stress regulation. Indeed, a new neural model of caregiving behavior in social mammals links areas of the brain that motivate parental caregiving to the inhibition of competing brain regions that produce an avoidance (stress) response (Numan, 2006).

## Limitations and Directions for Future Research

The present study has clear limitations. First, our analyses were restricted to married individuals who were living at home and healthy enough to respond to survey questions. Thus, these results cannot be generalized to cases in which a care recipient is institutionalized or is in exceptionally poor health. Given that the majority of caregiving studies have been conducted on small samples of individuals with extreme caregiving experiences, such as caring for a person with Alzheimer's disease (Schulz & Beach, 1999), differences between the results of the present study and those of previous caregiving studies could be due to the health or cognitive status of the care recipients. Future research should therefore examine whether the health effects of care hours provided change as a function of the health or cognitive status of the recipient.

Our primary results are also qualified by the fact that the care-hours variable was not obtained via self-report. Conceivably, cognitive limitations in spouses could have undermined the reliability of their reports of care received. However, only 3% of our sample was characterized by cognitive impairment, and controlling for this variable only strengthened the association between care hours and mortality (see Table 2). Furthermore, studies of social support have documented that reports of receiving spousal support are reasonably well correlated with spouses' reports of providing support (e.g., Vinokur, Schul, & Caplan, 1987). Nevertheless, future studies (and the HRS) should include self-reported measures of care hours (and other measures of helping behavior) so that researchers can begin to examine caregiving behavior from the caregiver's perspective—and move toward a better understanding of factors that promote beneficial health effects in a caregiving context.

Our study also relied on correlational (albeit prospective) data. Consequently, we cannot rule out the possibility that our findings are due to unmeasured confounding of care hours with good health. However, the fact that our health and demographic measures (such as age) entirely mediated the effect of spousal impairments in ADLs and IADLs on mortality risk suggests that use of these measures may have been a reasonable way to statistically control for preexisting levels of health and robustness. Finally, even if there is some unmeasured level of health and robustness driving the association of care hours with mortality risk, our results are the first of which we are aware to document a positive association between caregiving (care hours) and longevity, and they suggest that more research is needed before adverse health effects of being a caregiver can be attributed to the provision of help.

Although we found that caregiving for 14 or more hours per week was predictive of longevity, the actual number of hours required for producing beneficial effects is a question that will need to be addressed in future research. There may be some point at which the quantity of caregiving is so high that any benefits disappear, because of physical and perhaps psychological exhaustion.

Finally, we have speculated that harmful effects of caregiving may be due to anticipatory bereavement or witnessing the care recipient's suffering, but we did not assess these constructs directly. Future studies will be needed to isolate which features of the caregiver context are responsible for harmful effects, with the ultimate goal of leveraging this knowledge into successful interventions for caregivers.

## Conclusion

A growing literature attests to the adverse effects of being a caregiver for physical health. But the results of the current study suggest a need for caution before concluding that the negative effects on health are due primarily to providing help to another person. In the absence of an empirical base measuring the distinct, objective physical-health effects of providing help in the caregiving context, recommendations that caregivers be relieved of

their caregiving duties may be premature, and may overlook beneficial aspects of providing help and other critical avenues for intervention. It is crucial that caregiving studies begin to disentangle the presumed stress of providing help from the stress of witnessing a loved one's suffering, across a variety of caregiving experiences and illness populations, so that researchers may further explore the health effects of competing (and perhaps contradictory) influences on mortality risk among caregivers.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**TABLE 1**  
**Characteristics of the Study Population in 1993 (*N* = 3,376)**

Variable	No. of care hours provided per week		
	None ( <i>n</i> = 2,732)	1 to 14 ( <i>n</i> = 306)	14 or more ( <i>n</i> = 338)
Deceased by 2000 interview	756	74	79
Spousal need			
No. impairments in ADLs			
0	2,399	167	137
1–3	312	125	141
4–6	21	14	60
No. impairments in IADLs			
0	2,365	89	107
1–3	358	213	197
4–6	9	4	34
Cognitive impairment (mild, moderate, or severe)	62	21	39

**Note.** Spouses' number of impairments in activities of daily living (ADLs) and instrumental activities of daily living (IADLs) were obtained by spouses' self-report.

**TABLE 2**  
**Mortality Hazard Ratios From Univariate and Multivariate Models Using 1993 Measures of Care Hours and Spousal Need as Predictors**

Variable	Univariate model	Multivariate models	
		Model 1	Model 2
Hours of care provided per week			
0	—	—	—
1 to 14 hr	0.88 (0.66–1.16)	0.71 (0.52–0.96)	0.92 (0.69–1.24)
≥ 14 hr	0.71 (0.55–0.93)	0.47 (0.33–0.67)	0.64 (0.45–0.90)
Spousal need for care			
No. impairments in ADLs		1.09 (1.04–1.86)	0.97 (0.89–1.05)
No. impairments in IADLs		1.17 (1.03–1.33)	1.05 (0.92–1.20)
Cognitive impairment		1.21 (0.82–1.79)	0.95 (0.65–1.39)

**Note.** For all three models,  $N = 3,376$ . The hours of care provided by the respondents and spouses' number of impairments in activities of daily living (ADLs) and instrumental activities of daily living (IADLs) were obtained by spouses' self-report. Couples in which the respondent provided no hours of care were the reference group for analytic comparisons. Model 1 included only care hours and spousal-need variables as predictors; additional significant predictors in Model 2 were gender, age, employment status, self-rated health, functional status (impairments in ADLs and IADLs), and history of lung disease, stroke, a heart condition, diabetes, and cancer.