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The Caregiver Stress Process and Health Outcomes

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Objective: The authors examine the impact of two caregiving stressors, care receivers' behavior problems (an objective stressor) and caregivers' feelings of overload (a subjective stressor), on three dimensions of caregiver health.

Method: The participants were 234 primary caregivers of elderly relatives with dementia living in the community who completed a comprehensive interview about their current care situation, including stressors and health. **Results:** Higher levels of both objective and subjective stressors were associated with all three dimensions of caregiver health: poorer self-reported health, more negative health behaviors, and greater use of health care services. The association between objective stressors and health was mediated by caregivers' feelings of overload. **Conclusions:** These findings demonstrate caregivers' vulnerability to the effects of stressors across three dimensions of health and also underscore the importance of subjective appraisals of stress.

Keywords: *caregivers; dementia; stress; health costs*

The stress associated with caring for a disabled elder can adversely affect caregivers' health, particularly when care involves assisting someone with dementia (Alexander & Klein, 2001; Almborg, Grafström, & Winblad,

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1997; Lieberman & Fisher, 1995; Pruchno, Kleban, Michaels, & Dempsey, 1990; Schulz & Beach, 1999; Schulz, O'Brien, Bookwala, & Fleissner, 1995; Vitaliano, Zhang, & Scanlan, 2003). In most prior research, physical health has been measured using a single indicator such as self-reported health. Few studies have used multiple dimensions of health, and still fewer have attempted to link caregiving stressors to these dimensions. Guided by Pearlin's stress process model (Aneshensel, Pearlin, Mullan, Zarit, & Whitlatch, 1995; Pearlin, Mullan, Semple, & Skaff, 1990), in the current study we examined the effects of both objective and subjective caregiving stressors (dementia patients' problem behaviors and caregivers' feelings of overload, respectively) on three dimensions of caregiver health (self-reported health, health behaviors, and health services use).

The chronic stress of caregiving has been found to affect several dimensions of caregiver health, including self-reported health, health symptoms, illness, and medication use (Asada, Kinoshita, & Kakuma, 2000; Cacioppo et al., 1998; Glaser & Kiecolt-Glaser, 1997; Kiecolt-Glaser, Marucha, Malarkey, Mercado, & Glaser, 1995; Schulz & Beach, 1999; Vitaliano et al., 2003; von Kanel et al., 2001; Zhang, Vitaliano, & Lin, 2006). According to Teel and Press (1999), self-reported health was poorer among caregivers of people with dementia than among age-matched peers. Only one half of caregivers reported their health as good or excellent, as opposed to three fourths of elders in general. Shanks-McElroy and Strobino (2001) showed that caregivers experienced a one-third increase in negative health symptoms after assuming caregiving responsibilities. Spouse caregivers reported more days of illness because of infectious disease, primarily upper respiratory tract infections, than noncaregivers (Esterling, Kiecolt-Glaser, & Glaser, 1996). Caregivers also used more prescription medications than noncaregivers (Schulz et al., 1997). Shaw et al. (1997) found that prolonged exposure to the chronic stress of caregiving can lead to changes in sympathetic arousal and cardiovascular reactivity, predisposing caregivers to hypertension and cardiovascular disease. Given these health changes, it is not surprising that caregivers have a greater risk of mortality than noncaregivers. Schulz and Beach (1999) found that people who were providing care for a spouse and experiencing strain had mortality risks that were 63% higher than those whose spouse was not disabled.

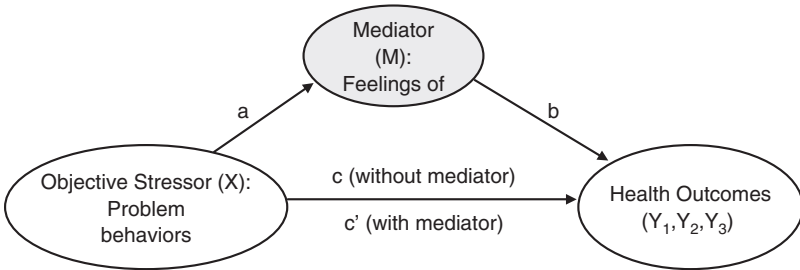
Caregiving stress can result in changes in health behaviors as well. Health behaviors refer to self-care behaviors exercised by caregivers to promote their health and well-being. Providing care to a family member with dementia can be a 24-hour responsibility that requires hands-on assistance and supervision. Given the demands on caregivers' time and energy, they may

neglect their own self-care, for example, sleeping less, eating too much or too little, not exercising, or not managing their own health problems in an optimal way (Gallant & Connell, 1998; Schulz & Beach, 1999; Schulz et al., 1997; Teel & Press, 1999; Vitaliano et al., 2003). Neglect of their own health may worsen preexisting illnesses or increase vulnerabilities to new stress-related problems. Some studies have found that caregivers of people with dementia reported sleeping less and having more sleep problems, lower levels of exercise, and more significant weight gain than did noncaregivers (Schulz et al., 1997).

The health services costs incurred as a result of caregivers' changed health status are hidden burdens on the health care system (Burns, 2000; Johnson, Davis, & Bosanquet, 2000; Moore, Zhu, & Clipp, 2001; Schulz et al., 1997). According to some studies, caregivers of people with dementia use more health services than their noncaregiver counterparts, including an increased number of physician visits, increased prescription drug use, and a higher incidence of inpatient hospitalizations (Ernst & Hay, 1994; Fillit, 2000; Weinberger et al., 1993). Not all studies, however, have found this association (see Vitaliano et al., 2003, for a review). One possibility is that some people are so involved in the caregiving role that they defer obtaining medical care for themselves.

Much of the research on the effects of caregiving stress on health has been guided by stress process models (e.g., Aneshensel et al., 1995; Lazarus & Folkman, 1984; Pearlin et al., 1990). Conceptualizing well-being as the outcome of multidimensional processes, these models differentiate between the objective indicators of stressors and the caregiver's subjective experience of those stressors. Among the objective stressors encountered by caregivers, their care receiver's problem behaviors, such as agitation, hyperactivity, and aggression, are usually regarded to be the most difficult or challenging (Aneshensel et al., 1995; Asada et al., 2000; Jarrott, Zarit, Stephens, Townsend, & Greene, 2000; Pruchno et al., 1990). Nourhashemi et al. (2001) identified behavior problems as the leading reason for emergency hospital admissions of people with dementia. Behavior problems are also a strong predictor of institutionalization (Asada et al., 2000; Monini, Tognetti, Cinque, Di Franco, & Bartorelli, 2001). Ratings of the frequency of occurrence of behavior problems and other objective stressors, however, have been found to have relatively modest associations with well-being (e.g., Aneshensel et al., 1995). From a stress process perspective, objective stressors such as behavior problems pose challenges to caregivers, but the extent to which these stressors affect caregivers' well-being depend in part on their subjective experience of these problems. Indicators of these subjective stressors, such

Figure 1
The Relation of Stressors to Health Outcomes



Note: Y₁ = caregiver self-reported health; Y₂ = caregiver health behaviors; Y₃ = caregiver health services use.

as role overload, have been found in both cross-sectional and longitudinal analyses to have a substantial impact on well-being (Aneshensel et al., 1995).

Much of the prior work on caregiver health has explored the effect of a single type of stressor on a single health measure. In the present study, we examined the relation of two key caregiving stressors, an objective stressor (care receiver's behavior problems) and a subjective stressor (caregiver's feelings of overload) to three dimensions of caregiver health (self-reported health, health behaviors, and health services use). As shown in Figure 1, we proposed that care receivers' higher levels of behavior problems (i.e., an objective stressor) would be directly associated with caregivers' lower ratings of self-reported health, poorer self-care behaviors, and higher use of health care services (Path c). Furthermore, we hypothesized that relationships between the care receiver's behavior problems (i.e., an objective stressor) and the caregiver's health (i.e., outcome) would be mediated by an intervening variable, the caregiver's feelings of overload (i.e., a subjective stressor), as represented by paths a and b in Figure 1.

The mediation model implies that the mediating variable (i.e., feelings of overload) explains the process or mechanism between the independent variable, X (i.e., predictor), and the dependent variable, Y (i.e., outcome). Complete mediation is achieved when variable X no longer has a significant

direct effect on variable Y after mediator M is controlled for, and thus path c' is reduced to zero. A mediation model can be used in caregiving research to explain the pathway through which stressful events (i.e., stressors) affect the caregiver's well-being and health; in this case, the care receiver's behavior problems influence the caregiver's physical health through the mediation of the caregiver's subjective feelings of overload. Specifically, we hypothesized that exposure to the care receiver's behavior problems would result in an increase in the caregiver's feelings of overload, which, in turn, have consequences for the caregiver's self-reported health, health behaviors, and use of health services.

Method

Sample

The current study is part of the Family Caregiving and Respite Evaluation Study (Family CARES), which examines the effects of adult day services on reducing problem behaviors in people with dementia and alleviating their caregivers' stress. The participants in this study were 234 primary caregivers of elderly relatives with dementing illnesses residing in New Jersey and one adjacent county in Pennsylvania. Participants included caregivers enrolling a relative in an adult day services program and a comparison group recruited through a variety of community sources, including in-home respite programs, the Alzheimer's Association, and other community groups. The present study uses baseline data before the use of adult day services. To be eligible for the study, caregivers had to be assisting a family member with dementia and living in the same household as that relative. Dementia was determined on the basis of the caregiver's report of a diagnosis of Alzheimer's disease or another dementia. In a few instances in which there was no formal medical diagnosis, participants were included if their relative had a history of progressive memory impairment and a Mini-Mental State Exam score of 23 or less (Folstein, Folstein, & McHugh, 1975).

Characteristics of caregivers and their relatives are shown in Table 1. The average ages of caregivers and persons with dementia were 62.7 and 80.1, respectively. The majority of caregivers were female (79.5%), and approximately 56% of care receivers were female. The average length of time since the onset of memory problems was 53 months. The average amount of time since the dementia diagnosis was 31 months. Caregivers had been assisting their relative for an average of 33 months.

Table 1
Characteristics of the Sample (N = 234)

Characteristic	Caregiver (CG)	Care Recipient (CR)
Average age (years; <i>M</i> [<i>SD</i>])	62.68 (12.85)	80.10 (7.96)
Gender (female; %)	79.5	56.4
Race (White; %)	86.3	85.9
Education (years; <i>M</i> [<i>SD</i>])	13.54 (2.21)	11.23 (3.25)
Median household income (\$) ^a	30,000-39,000	10,000-19,000
Kin relationship of CG to CR (%)		
Wife	33.2	
Husband	12.9	
Daughter or daughter-in-law	44.0	
Son or son-in-law	6.9	
Other	3.0	
Time since onset of memory problems (months; <i>M</i> [<i>SD</i>])	53.21 (40.80)	
Time since Alzheimer's disease diagnosis (months; <i>M</i> [<i>SD</i>])	31.35 (26.87)	
Time since caregiver began assisting (months; <i>M</i> [<i>SD</i>])	32.70 (31.32)	

^a Values include relatives who are not the caregiver's spouse.

Procedures and Measures

Interviews were conducted by trained interviewers at the caregiver's home. The selection of measures was guided by the caregiving stress process model (Aneshensel et al., 1995; Pearlin et al., 1990) and included sociodemographic characteristics of the care receiver and caregiver, care receiver's behavior problems, caregiver's stress and well-being, caregiver's self-reported health, health behaviors, and use of health care services.

Health measures. The current study used three measures of different aspects of caregiver's health: self-reported health, health behaviors, and health services use.

Self-reported health. The caregiver's perception of his or her health was measured with three items that asked the respondent to rate on a 5-point scale his or her current health, health as compared with health 2 years prior, and health of others of his or her own age. A summary score was created by adding the responses to the three items. Lower scores reflected poorer health status. Alpha for the scale was .68.

Health behaviors. Six items originally developed by Pearlin et al. (1990) were used to measure caregivers' health behaviors. The items assessed the caregiver's monthly frequency in engaging in self-care behaviors such as getting enough sleep, exercise, alcohol consumption, nutrition, and appropriate self-care. Items were scored on a 4-point scale with responses ranging from 0 (*never*) to 3 (*all of the time*) in the past month. A summary score was created by adding the responses to each item. Lower scores reflected poorer self-care health behaviors. Alpha for the scale was .64.

Health services use. To measure health services use, we first asked caregivers about their frequency of use of various health services including physician visits, medical calls, emergency room visits, inpatient hospital use, and prescription medication in the past 3 months. These items were drawn from two large-scale surveys of health care use: the Medicare Current Beneficiary Survey (Health Care Financing Administration, 1992) and the Asset and Health Dynamics Among the Oldest Old Study (Soldo, Hurd, Rodgers, & Wallace, 1997). Given the low frequency of caregivers' use of any particular service, we aggregated use across services by computing a current market estimate of the cost for services used. To do so, we obtained information from public sources (e.g., American Medical Association, 1997–1998; Medical Expenditure Panel Survey, 2000) that provided the average cost of each health service. All costs were estimated for the year 2000, with the cost drawn from prior years adjusted for inflation of medical expenses. Although any individual's actual costs for a particular service might vary, we felt this strategy would capture the average impact on the health care system of a particular pattern of use. The cost of each service for caregivers was calculated by multiplying the frequency of service use by the average cost of specific health services. A summary score indicating total expenditures for health services use was created by adding the cost of the five health services items. The mean costs for each type of medical service and the total cost of all services used in the past 3 months is shown in Table 2. The total score for expenditures for health services use remained highly skewed, however, and so a log transformation was performed before including it in the analysis.

One factor that could affect health care use is the type of health insurance. We examined the types of insurance coverage reported by caregivers. About half of the sample of caregivers (49%) was enrolled in Medicare, and 46% had some type of private insurance. We decided not to examine whether type of insurance was related to use because it would be confounded with caregiver age. In addition, we examined subtypes of coverage within both the Medicare and non-Medicare groups, but the number of people who fell

Table 2
Estimated Mean Cost of Health Care Services for
Caregivers (in Dollars) for the Past 3 Months

Service	<i>M</i>	<i>SD</i>
Physician visits	193.9	291.5
Physician medical calls	13.7	40.1
Emergency room visits	24.2	120.5
Hospital inpatient visits	42.1	352.2
Prescription drugs	131.5	122.0
Total expenditures for use	410.3	586.8

into various categories of coverage (e.g., HMO vs. fee for service or Medicare plus Medicaid) was too small for analysis.

Predictor Variables

Two caregiving stressors were used as predictor variables: behavior problems of the person with dementia and the caregiver's subjective feelings of overload.

Behavior problems. Behavior problems were measured with the Weekly Record of Behavior. The Weekly Record of Behavior was developed for the Family CARES study after a review of existing behavior problem scales to include a broad range of items that provided descriptions of specific behaviors (Fauth, Zarit, Femia, & Hofer, 2006; Femia, Leitsch, Zarit, & Stephens, 2001). The Weekly Record of Behavior assesses 53 common dementia-related behaviors that are grouped into 12 categories: eating, bathing, dressing, toileting, restlessness, mood and anxiety, naps, disruptiveness, memory, sleep, reality problems, and positive behaviors. For the present study, items pertaining to napping and positive behaviors were not included because those items were not usually perceived as stressful. Caregivers were asked whether each problem had occurred in the past week, and if so, how many times the behavior occurred, how long the average duration of the behavior was, and how stressful the event was to the caregiver. For the present analysis, a summary score was created by counting the number of behavior problems exhibited by the care receiver with dementia. A higher score reflected more behavior problems among care receivers. Prior work with the Weekly Record of Behavior indicates that it has high short-term stability and acceptable reliability across settings (e.g., from home to adult day care; Fauth et al., 2006).

Table 3
Correlations of Caregivers' Health, Stressor, and
Demographic Variables (N = 234)

Variable	1	2	3	4	5	6	7	8
1. Self reported health	—	.35**	-.27**	-.13*	-.24**	-.07	-.17**	.19**
2. Health behavior		—	-.06	-.16*	-.40**	.27**	-.21**	.02
3. Expenditures for health services use			—	.11	.16*	.33**	-.05	.07
4. Behavior problems				—	.34**	-.10	.09	.13
5. Overload					—	-.08	.28**	-.07
6. CG age						—	-.19**	-.19**
7. CG gender							—	-.03
8. CG education								—

Note: CG = caregiver.

* $p < .05$. ** $p < .01$.

Overload. Overload represents a caregiver's appraisal of the immediate impact of care-related stress on his or her time and energy (Pearlin et al., 1990; Zarit, Stephens, Townsend, & Greene, 1998). We used the three-item overload scale developed by Pearlin et al. (1990). Items asked whether the caregiver was able to relax, could count on having a block of time to use as he or she liked, and had time just for him- or herself. Caregivers rated each item on a 4-point scale ranging from 0 (*never*) to 3 (*all of the time*). A summary score was created by adding the three items. A higher score reflected greater overload among caregivers. Alpha for the scale was .76. Table 3 shows the correlations among the variables used in the study.

Analysis

The current study used the standard approach developed by Judd and Kenny (1981) for evaluating mediation. This approach involves the use of three regressions to assess the relation of predictors, mediators, and outcomes. In the first step, we examined the relation of the objective stressor, i.e., the care receiver's problem behaviors, to each of the caregiver's health outcomes. In the second step, we assessed the relation between problem behaviors with the mediating variable, caregiver's feelings of overload. In the final step, we regressed the three dimensions of health to both the care receiver's problem behaviors and the caregiver's feelings of overload. Full mediation is found when the resulting association between problem behaviors and outcome equals 0.00 after including the mediator. Partial mediation is indicated when

adding the mediating variable results in a reduction in the association between the objective stressor and the outcomes. Using the approach developed by Mackinnon and Dwyer (1993), we also computed the percentage of the total effect of the predictor on the outcome variable that was accounted for by the mediator. In each step, sociodemographic variables, including caregiver's age, gender, education, and relationship to the care receiver were considered possible covariates if the bivariate relation to the outcome variables was significant. This initial screening prevents the introduction of spurious effects because of the inclusion of covariates that are unrelated to the dependent measures (Rovine, von Eye, & Wood, 1988).

Results

Table 4 shows the results of the regression models. Model 1 describes the outcome variable of self-reported health, Model 2 shows health behaviors, and Model 3 describes expenditures for health services use. For Model 1, the regression analysis for self-reported health was significant ($R^2 = .11$), $F(4, 228) = 6.95, p < .01$. Step 1 shows that caring for someone with more behavior problems ($\beta = -.15, p < .05$) was significantly associated with poorer self-reported health among caregivers. Step 2 shows a significant positive relation ($\beta = .33, p < .01$) between behavior problems and the mediator, overload, meaning that more behavior problems among care receivers are related to greater overload among caregivers. In Step 3, the addition of caregiver's feelings of overload to the regression for self-reported health reduced the relation of behavior problems to self-reported health ($\beta = -.09$), providing evidence of partial mediation. Using the Mackinnon and Dwyer (1993) formula, 37% of the effect of behavior problems on self-reported health was mediated by overload.

The overall model for caregiver's health behaviors was also significant ($R^2 = .23$), $F(4, 224) = 16.63, p < .01$. Step 1 shows that the care receiver's behavior problems ($\beta = -.13, p < .05$) were significantly associated with the caregiver's health behaviors. That is, caregivers whose relatives have more behavior problems take poorer care of themselves. Step 2 again showed a significant relation ($\beta = .31, p < .01$) between behavior problems and the mediator, overload. In Step 3, the relationship between the care receiver's behavior problems and the caregiver's health behaviors was reduced from significant to nearly zero ($\beta = -.01$) when caregiver's feelings of overload was added into the analysis, providing evidence for full mediation. The mediator accounted for 92% of the effect of behavior problems on health behaviors.

Table 4
Summary of Regression Analyses Predicting Caregiver Self-Reported Health, Caregiver Health Behaviors, and Caregiver Health Service Use

Variable	Model 1: Caregiver Self-Reported Health (N = 233)			Model 2: Caregiver Health Behaviors (N = 229)			Model 3: Caregiver Expenditures for Health Service Use (N = 226)											
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3									
	Self-Reported Health	Overload	Self-Reported Health	Health Behaviors	Overload	Health Behaviors	Service Use	Overload	Service Use									
	β	SE	β	SE	β	SE	β	SE	β	SE								
CG age	—	—	—	.23**	.02	-.00	.01	.22**	.01	.37**	.01	-.07	.01	.38**	.01			
CG gender	-.15*	.35	.25**	.26	-.11	.36	-.15*	.48	.26**	.27	-.06	.46	—	—	—			
CG education	.21**	.21	-.11	.15	.19**	.20	—	—	—	—	—	—	.13*	.20	-.11	.16	.15*	.19
Behavior problems	-.15*	.02	.33**	.02	-.09	.02	-.13*	.03	.31**	.02	-.01	.03	.13*	.02	.34**	.02	.07	.02
Overload	—	—	—	-.16**	.09	—	—	—	—	-.38**	.11	—	—	—	—	—	-.17**	.08
	$R^2 = .11, F(4, 229) = 6.95^{***}$			$R^2 = .23, F(4, 225) = 16.63^{***}$			$R^2 = .17, F(4, 222) = 7.60^{***}$											

Note: CG = caregiver.
 * $p < .05$. ** $p < .01$.

The third model that tested expenditures for health care use was also significant ($R^2 = .17$), $F(4, 221) = 7.60$, $p < .01$. Step 1 shows that the care receiver's behavior problems ($\beta = .13$, $p < .05$) were significantly associated with expenditures for health services use. That is, caregivers assisting someone with more behavior problems have higher total health care use. Step 2 again shows a significant relation ($\beta = .34$, $p < .01$) between behavior problems and the mediator, overload. In Step 3, the relationship between the care receiver's problem behaviors and caregiver's expenditures for the health services use was reduced from significant to nonsignificant ($\beta = .07$) when caregiver's feelings of overload were included in the analysis, providing evidence for partial mediation. The mediator accounted for 45% of the effect of behavior problems on health services use.

Discussion

Prior research has emphasized the central role of behavior problems in caregiving stress (Jarrott et al., 2000; Nourhashemi et al., 2001). Behavior problems represent an aspect of dementia that is often unpredictable and difficult to control and have frequently been reported to be associated with higher levels of subjective stress and depressive symptoms (e.g., Aneshensel et al., 1995; Asada et al., 2000; Pruchno & Resch, 1989). The results of the current study suggest that behavior problems are also associated with dimensions of caregiver's health. Caregivers of people with greater numbers of behavior problems rate their health more poorly, take poorer care of themselves, and spend more money on their health care.

The current study also found evidence that subjective appraisals of stress, in this case, caregivers' feelings of overload, mediated the relation between stressors and health. When behavior problems result in greater feelings of overload, caregivers may have less time and energy to take care of their own health (Schulz & Beach, 1999; Shaw et al., 1997). Feeling more tired and depleted, they evaluate themselves as less healthy, engage in fewer health-promoting behaviors, and use more health services. Previous research by Aneshensel et al. (1995) found a similar mediating effect of overload in the relationship between care receivers' behavior problems and caregivers' psychological well-being.

Prior research on health services use has found contradictory results, suggesting sometimes that caregivers use more services than noncaregivers and sometimes that caregivers use fewer (see Vitaliano et al., 2003). One possibility is that at least some caregivers may not take the time to go for medical care because of their other responsibilities. In contrast to this prior

research, the present study demonstrated a relation between higher stress and greater health services use. Thus, although some caregivers may defer using health services, increasing levels of stress are associated with higher rates of use. This increased use of medical services represents another hidden cost of caregiving stress (Moore et al., 2001).

There is often a tendency in caregiving research to view objective measures of stressors such as behavior problems as the primary determinants of negative caregiving consequences. Considerable individual variability in caregiving outcomes, however, may be accounted for by subjective appraisals of care-related stress (e.g., Aneshensel et al., 1995; Haley et al., 1996; Zarit, Reever, & Bach-Peterson, 1980). Classical stress theory (e.g., Lazarus & Folkman, 1984; Pearlin et al., 1990) suggests that the subjective meaning that caregivers give to stressors has a critical role in the relation of stressors and outcomes. In their landmark study, Schulz and Beach (1999) reported an association of caregiving and subsequent risk of mortality only for those caregivers experiencing subjective strain. The findings of the current study also show the important association between caregivers' subjective appraisal of overload and various dimensions of health.

Another implication of the findings is the need to use multiple dimensions of health. The three measures used in the present study had only modest associations with one another. Other important dimensions of health, such as specific health conditions, were not included in the study. Caregivers with disorders such as hypertension or diabetes may be particularly vulnerable to the effects of care-related stress, and this may result in caregivers reducing attention to their own care.

A limitation of the present study is that data were collected at one point in time. The possibility needs to be considered that the causal and mediational pathways might go in opposite directions or that there might be reciprocal relations among stressors, mediators, and outcomes. Measures of appraisal that involve rating the severity or impact of the stressor may be particularly likely to have reciprocal effects, that is, caregivers who believe the stressor to be more difficult or challenging may also report that it occurs more often. The type of appraisal used in the present study, overload, is not tied to the occurrence of specific stressors such as behavior problems, and so the potential for reciprocity is reduced, although not eliminated. Another limitation is the health services use measure. Given the low frequency of use of many services and the relatively small sample, it was not possible to look at the frequency of use of any particular service, such as hospitalizations or doctor's visits. We computed cost estimates for the services that caregivers reported using as a strategy for aggregating use across different types of services.

These estimates, however, should not be taken as an indication of actual cost to consumers or the health care system. Depending on the health insurance they have, caregivers may have varying degrees of out-of-pocket costs and incentives or disincentives to use particular services. Similarly, the cost to any particular provider, such as an HMO or Medicare, would vary depending on the costs they allow for a service, copayments, deductibles, and so on. We should also note that we relied on retrospective reports, and so it is possible that more highly burdened caregivers may have overestimated past health care use. One other potential source of confound is caregivers' premorbid health status. It is possible that caregivers reporting higher levels of stress might have had more health problems before the onset of caregiving.

In conclusion, the current study suggests that appraisals of stress mediate the relationship between objective stressors (care receivers' problem behaviors) and caregivers' health outcomes. These results have implications for intervention programming for dementia patients and their caregivers. When programs try to help caregivers who face serious challenges and threats to their health, they need to understand that subjective appraisals of caregiving responsibilities are as important a factor as objective stressors in influencing their well-being and health. Modifying subjective perceptions of stressors may require a different intervention approach, for example, by providing counseling and emotional support (Mittelman, Roth, Haley, & Zarit, 2004; Schulz et al., 2003). Although many programs have been designed to improve caregivers' mental health, these interventions could be expanded to minimize negative impacts on caregivers' physical health as well by addressing the specific pathways by which stressors and appraisals lead to poorer health.

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