

Predictors of Decreased Self-Care Among Spouse Caregivers of Older Adults With Dementing Illnesses

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This study describes the health behaviors (alcohol consumption, exercise, sleep patterns, smoking, and weight maintenance) of a sample of older adult spouse caregivers ($N = 233$) and investigates the predictors of decreased self-care since caregiving began. Multiple regression results indicate that caregivers who experience greater developmental burden, report a greater number of depressive symptoms, perform a greater number of activities of daily living (ADL) tasks in caregiving and spend more hours in a day providing care, and who have lower self-efficacy for both self-care and spouse care are at greater risk for negative health behavior change. Results have implications for the identification of caregivers who may be particularly vulnerable to the negative health impact of caregiving.

Caring for a relative with a disabling illness is an increasingly common experience, one that is associated with a variety of physical,

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emotional, social, and financial burdens (Biegel, Sales, & Schulz, 1991; Haley et al., 1995). Dementia caregiving is especially stressful; Alzheimer's disease and related disorders (ADRD) pose the greatest challenge for caregivers due to their combination of progressive physical and cognitive impairments, disruptive behaviors, emotional outbursts, and personality deterioration (Haley, Levine, Brown, Berry, & Hughes, 1987).

The adverse consequences of caregiving, especially dementia caregiving, on the caregiver's mental and physical health are well documented (see Schulz, O'Brien, Bookwala, & Fleissner, 1995; Schulz, Visintainer, & Williamson, 1990; and Wright, Clipp, & George, 1993 for reviews). Psychological distress is especially common. Caregivers consistently report more symptoms of depression and anxiety, and demonstrate increased rates of depression and anxiety, as compared to the general population (Schulz et al., 1995). Negative physical health effects of caregiving have also been documented, although the findings are inconsistent, perhaps because of the reliance on self-report measures and caregivers' great variability in health status (Haley et al., 1995). Caregivers' self-ratings of health are consistently lower than population norms, and caregivers generally perceive their health to be worse than their age-peers (Schulz et al., 1995). In addition, some studies demonstrate greater medication use, more frequent physician visits, longer illness episodes, more physical symptoms, poorer cardiovascular health, and lower immune functioning among caregivers (Schulz et al., 1990; Schulz et al., 1995). Spouse caregivers are the most susceptible to these adverse outcomes. For example, spouses are more likely than other family caregivers to rate their health poorly, to exhibit emotional distress and psychiatric morbidity, and to demonstrate poorer physical health (Schulz et al., 1995; Wright et al., 1993). About one half of primary caregivers and one third of all family caregivers are spouses, and of these, 80% are older than 65 years of age (Stone, Cafferata, & Sangl, 1987). Thus, older adult spouse caregivers constitute an especially important and vulnerable subpopulation of caregivers.

Greater levels of impairment in the care recipient do not directly translate into greater negative outcomes for caregivers. Instead, there is great variability in how caregivers adapt to similar caregiving

demands. The work of Lazarus and Folkman (1984) provides a useful conceptual guide for understanding the caregiver stress process and, in fact, has been used in many empirical investigations of the adaptational outcomes of caregiving (e.g., Haley, Levine, Brown, & Bartolucci, 1987; Lawton, Moss, Kleban, Glicksman, & Rovine, 1991; Miller, McFall, & Montgomery, 1991). Briefly, this framework suggests that stress is the result of a particular relationship between a person and the environment. Environmental demands are appraised within the context of personal characteristics and beliefs (such as beliefs about personal control), and resources (such as social support). The appraisal of a situation as threatening effects behavioral, physiological, and psychological responses, which may in turn influence health outcomes.

Within the caregiving context, this model implies that a caregiver's age, gender, and health background, as well as his or her feelings of control over the situation and level of supportive resources, influence how he or she appraises the demands made by the patient's impairment and the nature of the required caregiving tasks. A situation judged to be threatening results in high levels of perceived burden, which is how appraised stress has been operationalized in the caregiving literature. Feelings of burden, in turn, can lead to psychological distress, behavioral responses, and physiological outcomes.

Changes in health behaviors, a behavioral response, may represent one mechanism by which the stress of caregiving leads to adverse health outcomes. For example, caregivers may not have enough time to include self-care activities, like exercise or the preparation of nutritious meals, in their daily routine; alternatively, the unique demands posed by dementia caregiving may make some positive health behaviors impossible, such as getting a good night's sleep or getting out of the house to exercise (Connell, 1994). In addition, health behaviors such as smoking, drinking, and overeating might be used as coping strategies for caregivers (Connell, 1994; Nowack, 1989).

The breakdown of the usual marital relationship among caregiving dyads may lead to the loss of the regulatory function of social support that spouses provide (Rook, Thuras, & Lewis, 1990), and health behaviors may suffer as caregivers' support networks erode. For example, a caregiver may lose her walking partner when her spouse

becomes homebound or may lose the motivation to prepare nutritious meals when she no longer has the responsibility of cooking for two on a regular basis.

The assertion that health behaviors serve a mediating role between caregiving stress and health outcomes is bolstered by two bodies of empirical evidence: one that links stress to health behaviors and a second that links health behaviors to long-term health outcomes. Stress, operationalized in various ways, has been associated with increased smoking (Cohen, Schwartz, Bromet, & Parkinson, 1991), increased alcohol consumption (Finney & Moos, 1984), substance abuse (Brown, 1989), increased calorie and fat intake (McCann, Warnick, & Knopp, 1990), and increased body mass index (Rookus, Burema, & Frijters, 1988). Empirical evidence also supports a significant negative effect of stressful life events on a composite index of five health behaviors (smoking, exercising, alcohol use, weight maintenance, and sleep) (Gottlieb & Green, 1984).

The association between health behaviors and long-term health outcomes is relatively well documented, largely by the 20-year longitudinal study that linked a variety of health behaviors and habits to long-term morbidity and mortality among a sample of almost 7,000 adults in Alameda County, California (Belloc & Breslow, 1972; Berkman & Breslow, 1983). Among the general population, both physical health status and mortality have been shown to be related to exercise and physical activity, sleep patterns, maintaining a regular meal schedule, proper nutrition, eating breakfast, cigarette smoking, alcohol consumption, and maintaining appropriate body weight (Belloc & Breslow, 1972; Berkman & Breslow, 1983; McIntosh, Shifflett, & Picou, 1989). In addition, the effects of these health behaviors appear to be additive, such that a greater number of positive health practices is related to better physical health status (Belloc & Breslow, 1972). This relationship between health practices and health status exists among older adults as well. Poor health practices are linked with increased disability and mortality over a 10-year period (Breslow & Breslow, 1993), exercise and good nutrition are related to older adults' functional health (Duffy & MacDonald, 1990), and impaired functioning in older women has been linked to obesity, smoking, abstaining from alcohol, and physical inactivity (Ensrud et al., 1994).

Empirical evidence also suggests that health behaviors are associated with several other constructs important to the stress process. For example, health behaviors have been shown to be related to social support (Gottlieb & Green, 1984; McIntosh et al., 1989) and to self-efficacy among the general population and among older adults (Grembowski et al., 1993; Holden, 1991). In addition, positive relationships have been demonstrated between health locus of control and exercise, cigarette smoking, and alcohol (Wallhagen, Strawbridge, Kaplan, & Cohen, 1994).

The few studies that have examined the health behavior patterns of caregivers suggest that this is a potentially fruitful area for further research. In a pilot study of 44 spouse caregivers (Connell, 1994), 39% reported eating less nutritiously, 33% of exercisers reported lower levels of activity, and half of smokers reported increased smoking since caregiving began. Exercise, food, sleep, medications, and alcohol were identified as coping strategies by 80%, 64%, 52%, 34%, and 34%, respectively. In addition, self-care was significantly negatively correlated with perceived burden, on-duty hours, and depression and significantly positively correlated with self-rated physical health and overall spirits. In a study that compared 52 male spouse caregivers of Alzheimer's disease patients with a demographically matched comparison group of noncaregivers, the caregivers reported significantly more difficulty in getting adequate sleep and maintaining regular exercise (Fuller-Jonap & Haley, 1995).

The present study investigated the relationship between the demands of providing care to a spouse with dementia and caregiver health behaviors, specifically alcohol consumption, exercise, sleep patterns, smoking, and weight maintenance. The study goals were (a) to describe the health behavior patterns of male and female caregivers and the change in these patterns since caregiving began and (b) to develop a predictive profile of the caregiver at risk for decreased self-care.¹ The choice of potential predictors was guided by the conceptual stress and coping framework highlighted previously and included characteristics of the caregiving situation, personal characteristics, beliefs about personal control, social support, perceived burden, and depression.

Understanding the relationship between caregiver stress and health behaviors has both personal significance for caregivers and broader

scientific significance. An important concern of spouse caregivers is their continuing ability to provide adequate care (Doty, 1986). Given the links between positive health habits and future morbidity, disability, and functional health, the health behavior patterns of spouse caregivers may play an important role in their ability to maintain their own health and continue in their role. Knowing the characteristics of caregivers that are associated with declining health behaviors will allow for the identification of especially vulnerable caregivers and the development of interventions that help caregivers address their own self-care needs.

Method

PARTICIPANTS

Data were obtained from a mailed survey of spouse caregivers of dementia patients followed by the Michigan Alzheimer's Disease Research Center (MADRC). Potential study participants were identified from the MADRC patient database and included all codwelling spouses of noninstitutionalized patients with a diagnosis of dementia who had previously indicated an interest in participating in research. Of 355 caregivers who qualified for the study, completed questionnaires were received from 233, yielding a response rate of 66%.

The final sample consisted of 233 spouse caregivers, 109 males (47%) and 124 females (53%). Mean age was 70 years for males and 66 years for females ($p < .05$). About half of the respondents fell within the range of 65 to 74 years of age, although the sample ranged in age from 30 years to 92 years.² The majority of the respondents were White (91%), retired (84%), and had been married more than 30 years (86%). Approximately 90% of the sample had at least a high school diploma, and one third had a college degree. Level of education was significantly higher for men than for women.

MEASURES

Demographics. Gender was measured as a dichotomous variable (0 or 1) with 0 assigned to women. Race was measured by asking

respondents to indicate their ethnic origin or race with one of six response categories (African American, Asian/Pacific Islander, Hispanic, Native American, White, or Other). Age, in years, was computed from the respondent's birth date. Education was determined by asking respondents to indicate the highest degree they obtained. Response choices included less than a high school diploma, high school diploma or general education diploma (GED), associate arts degree, bachelor's degree, or graduate degree.

Health background variables. Self-rated physical health was assessed by asking respondents to characterize their health as poor, fair, good, very good, or excellent. Respondents were also asked to indicate whether they currently have diabetes, high blood pressure, heart trouble, and arthritis. These four illnesses were included because of their high prevalence among older adults. These items were coded dichotomously and summed to obtain a measure of each respondent's number of chronic conditions with a potential range of 0 to 4.

Caregiving situation. Two questionnaire items tapped the objective characteristics of the caregiver's situation. Caregivers were asked to report the year when they first started providing care to their spouse. The duration of the caregiving role, in years, was computed from this item. Due to extreme skewness in this variable, duration was recoded into five categories (0-1 years, 2-3 years, 4-5 years, 6-9 years, 10+ years) in an attempt to normalize its distribution. A second item assessed on-duty hours by asking, "During the past month, how many hours a day have you felt 'on duty' in taking care of your spouse?"

An indication of the nature and degree of patient impairment was assessed with a modified version of the basic activities of daily living (ADL) subscale of the Caregiving Hassles Scale (Kinney & Stephens, 1989).³ The ADL subscale, which is composed of nine items such as "I assist my spouse with walking," "I help my spouse eat," and "I bathe my spouse," was chosen as an indication of the intensity of care provided, which was assumed to be a reflection of the patient's physical impairment. For the present research, respondents were asked to check all items that applied to them. Scores were determined by assigning each checked item a score of 1. The individual scores were then summed to give a total ADL task score, ranging from 0 to 8. The

Cronbach's alpha reliability for this subscale was .80, which compares favorably with the alpha reliability of .79 demonstrated in previous research (Kinney & Stephens, 1989).

Personal control beliefs. Two self-efficacy items were developed specifically for this study. Self-efficacy for self-care was measured with a single item asking "How confident do you feel in being able to take care of yourself?" Self-efficacy for caregiving was assessed with the item "How confident do you feel in being able to take care of your spouse?" Response choices for both items ranged from *not confident at all* to *very confident* on a 5-point Likert-type scale.

Health locus of control was measured with the internal subscale of the Multidimensional Health Locus of Control Scale (MHLC) (Wallston, Wallston, & DeVellis, 1978). The internal health locus of control (IHLC) subscale assesses the degree to which individuals believe they are in control of their health. Sample items include "If I get sick, my own behavior determines how soon I will get well again" and "If I take care of myself, I can avoid illness." This subscale has six items, and individual items are summed to obtain a subscale score. The items have a 5-point, *strongly disagree* to *strongly agree*, Likert-type response scale.⁴ Cronbach's alpha reliability was .82 for this subscale, as compared to values ranging from .61 to .80 in previous research (Lefcourt, 1991).

Social support. Social support was measured with five items from the Interpersonal Support Evaluation List (ISEL) that have been used previously in caregiver research; Cohen, Mermelstein, Kamarck, & Hoberman, 1985; Schulz, Williamson, Morycz, & Biegel, 1992). Rated on a Likert-type scale of 0 = *definitely true* to 3 = *definitely false*, the items measure perceived appraisal support and a sense of belonging (each with two items) and perceived tangible support (with one item). Sample items include (a) "If I were sick, I could easily find someone to help me with my daily chores" (tangible); (b) "There is at least one person I know whose advice I really trust" (appraisal); and (c) "When I feel lonely, there are several people I can talk to" (belonging). Higher scores indicate lower levels of perceived social support. Cronbach's alpha was .84 for this scale.

Perceived burden. Perceived burden was measured with four subscales of the Caregiver Burden Inventory (CBI) (Novak & Guest, 1989). These five-item subscales have responses of *strongly disagree* to *strongly agree* on a 5-point Likert-type scale and assess four dimensions of caregiver burden: (a) time dependence burden, or burden due to restrictions on caregiver time; (b) developmental burden, or feelings of being off time in development with respect to peers; (c) social burden, representing role conflict; and (d) emotional burden, or negative feelings toward the care receiver. Sample items include “My spouse needs my help to perform many daily tasks” (time dependence), “I expected that things would be different at this point in my life” (developmental), “I don’t get along with other family members as well as I used to” (social), and “I feel ashamed of my spouse” (emotional).⁵ The individual factors have previously demonstrated high internal consistency reliability, with a Cronbach’s alpha range of .77 to .86 (Novak & Guest, 1989). Cronbach’s alpha reliability values for this sample ranged from .81 to .88.

Depression. Depressive symptoms were measured with the Iowa form of the Center for Epidemiologic Studies Depression Scale (CES-D) (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993; Radloff, 1977). The Iowa form is an 11-item version of the CES-D that taps the same underlying dimensions as the original 20-item scale (depressed affect, positive affect, somatic complaints, and interpersonal problems). Items ask how often respondents experienced each depressive symptom during the past week. Response choices include hardly ever or never, some of the time, and much or most of the time.⁶ Previous research indicates an alpha reliability of .76 for this short version, which is comparable with the original scale ($\alpha = .80$). In the present study, Cronbach’s alpha was .68.

Health behaviors. Five health behaviors—alcohol consumption, exercise, sleep patterns, smoking, and weight maintenance—were measured with items adapted from the Alameda County Study (Berkman & Breslow, 1983). Item wording (and response choices) for these five items are as follows: “How many hours of sleep do you usually get at night?” (less than 7, 7 or 8, more than 8); “How often do you drink four or more beers, glasses of wine, or shots of liquor in a row?” (never,

only occasionally, at least once a month, once a week, daily); "How often do you do active things in your free time like swimming, taking long walks, doing physical exercises, or working in the garden?" (less than once a week, once a week, two or three times a week, almost every day, every day); "Do you smoke?" (yes, no); for smokers: "How much do you smoke now?" (open-ended); "How much do you weigh?" (open-ended); and "How tall are you?" (open-ended).⁷

In addition to the items assessing health behaviors, corresponding items asked how each of these behaviors had changed since the caregiver first noticed problems with their spouse's memory or behavior. Response choices for each of these change items included increased, stayed the same, or decreased. For example, the change in physical activity item was worded "How has your physical activity changed since you first noticed problems with your spouse's memory or behavior?" and response choices included "I am more physically active now," "I am as physically active now as I used to be," and "I am less physically active now."

A health behavior change index was created by summing the five health behavior change items after recoding each into a dichotomy in which 0 was assigned to a response of no change or a change in the positive direction, and 1 was assigned to a response indicating an undesirable change in the behavior. These dichotomies were constructed as follows: sleeping the same amount versus sleeping less or more, exercising the same amount or more versus exercising less, drinking the same amount of alcohol or less versus drinking more, smoking the same amount or less versus smoking more, and maintaining one's weight versus losing or gaining weight. Weight gain was defined as an increase in body mass index of at least 5 kg/m², or about a 20% increase for most people, whereas weight loss was defined as a loss of body weight of 5% or more.⁸ This summary index has a possible range of 0 to 5; higher scores indicate greater negative health behavior change.

DATA ANALYSIS

Hierarchical multiple regression analysis was used to predict negative health behavior change, using the health behavior change index

as the dependent variable. Independent variables were entered in blocks, according to the causal order implied by the conceptual stress framework, to assess the influence of each set of predictors over and above the influence of predictors that act earlier in the process. Thus, caregiver background characteristics (age, gender, education, number of chronic illnesses) were entered first, followed by caregiving situation variables (duration, number of ADL tasks, on-duty hours), beliefs about personal control (self-efficacy for self-care, self-efficacy for spouse care, health locus of control), social support, caregiver burden (time dependence burden, developmental burden, social burden, emotional burden), and depressive symptoms. Mean substitution was used to impute values for missing data.⁹ The 95% significance level was used as a cutoff for statistically significant results.

Results

HEALTH BACKGROUND

Approximately 24% of the sample rated their health as fair or poor, 46% as good, 24% as very good and 6% as excellent. Twenty-seven percent reported no chronic conditions, whereas a third of the sample reported one and a quarter reported two. Compared to national samples of older adults, the present sample exhibits similar levels of high blood pressure and heart trouble, lower levels of diabetes, and higher levels of arthritis (National Center for Health Statistics, 1990).

Approximately 30% of caregivers in the present sample scored above the cutoff score of 16 for depressive symptoms, indicating that they are at risk for clinical depression. This percentage greatly exceeds the national prevalence estimates for adults in this age group, although it is comparable to that reported in other caregiver samples (Schulz et al., 1995). Males were somewhat more likely to rate their health as excellent, whereas females were more likely to rate their health as fair or poor ($p < .10$). Mean depression scores also differed by gender, with females reporting higher levels of depressive symptoms (11.6 for males vs. 14.3 for females; $p < .01$).

HEALTH BEHAVIORS

Tables 1 and 2 present the percentage distributions, for the total sample as well as by gender, for individual health behaviors and health behavior changes since caregiving began. As Table 1 illustrates, the majority of the sample does not drink heavily, although male caregivers are more likely to drink alcohol more frequently and in larger quantities. Women are significantly less active than men. Half of the caregivers sleep less than 7 hours per night, almost 90% are nonsmokers, and 70% have a body mass index that is in the ideal range for their age and gender.

As Table 2 shows, very few caregivers report drinking more since caregiving began, although nearly half say they are less active. A majority of caregivers report sleeping less since caregiving began and report gaining or losing weight. Women are significantly more likely than men to report sleeping less and smoking more. In addition, there is a significant gender difference in weight change. Almost half of the females report gaining weight since caregiving began, compared to only 13% of the males, and only half as many females remained the same weight.

Change in individual health behaviors was also examined within age subgroups. For drinking, smoking, sleep, and exercise, there was no difference in self-reported change between caregivers 65 years of age and younger ($n = 78$) and those older than 65 years of age ($n = 154$). However, younger caregivers were significantly more likely to report weight gain, whereas older caregivers were significantly more likely to report weight loss or no change in weight ($p < .001$).

BIVARIATE CORRELATIONS

Bivariate correlations revealed that negative health behavior change is significantly associated with lower levels of self-efficacy for both self and spouse care ($r = -.32$ and $-.25$, respectively). In addition, negative health behavior change is associated with longer duration of caregiving ($r = .18$), more on-duty hours ($r = .33$), and a greater number of ADL tasks ($r = .27$). Finally, negative health behavior change is also associated with less social support ($r = -.18$), higher

Table 1
Caregiver Self-Reported Health Behaviors

	<i>Percentage Distribution</i>			<i>p Value</i> ^a
	<i>Total</i> (<i>N</i> = 233)	<i>Male</i> (<i>n</i> = 109)	<i>Female</i> (<i>n</i> = 124)	
Drink beer, wine or other liquor				
Never	36.5	27.5	44.4	.00
Only occasionally/once a month	37.3	31.2	42.7	
Once a week	10.3	14.7	6.5	
Daily	15.9	26.6	6.5	
Drink four or more drinks in a row				.04
Never	85.3	78.9	91.1	
Only occasionally/once a month	10.4	12.8	8.1	
Once a week	2.6	4.6	0.8	
Daily	1.7	3.7	0.0	
Do active things in your free time ^b				.01
Less than once a week	38.9	28.3	48.0	
Once a week	10.9	14.2	8.1	
Two or three times a week	27.5	29.2	26.0	
Almost every day/every day	22.7	28.3	17.9	
Hours of sleep				.06
Less than 7	53.2	45.9	59.7	
7 or 8	39.1	43.1	35.5	
More than 8	7.7	11.0	4.8	
Smoking (quantity)				.29
Nonsmoker	88.9	91.2	87.0	
Less than one pack/day	4.0	2.0	5.7	
One to two packs/day	6.6	5.9	7.3	
More than two packs/day	0.4	1.0	0.0	
Weight maintenance ^c				.17
Category 1	70.7	70.4	70.9	
Category 2	10.2	13.9	6.8	
Category 3	9.8	6.5	12.8	
Category 4	9.3	9.3	9.4	

a. Statistical significance of gender differences was determined with chi-square tests.

b. Examples of "active things" included in the question were swimming, taking long walks, doing physical exercises, and working in the garden.

c. Body mass index (BMI) is defined as weight (in kg)/height (in meters)². Having a BMI between the 15th and 85th percentiles for one's age and gender represents the lowest risk. Risk increases as one's BMI falls into the extremes of the distribution. Categories represent percentiles of BMI as follows. Category 1: 15th < BMI < 85th percentile; Category 2: 10th < BMI ≤ 15th or 85th ≤ BMI < 90th percentile; Category 3: 5th < BMI ≤ 10th or 90th ≤ BMI < 95th percentile; Category 4: BMI ≤ 5th or BMI ≥ 95th percentile.

Table 2
Caregiver Self-Reported Change in Health Behaviors Since Caregiving Began

	Percentage Distribution			p Value ^a
	Total (N = 233)	Male (n = 109)	Female (n = 124)	
Change in drinking behavior ^{b,c}				.08
Drink less alcohol now	23.6	22.4	24.6	
Drink same amount	37.6	45.8	30.3	
Drink more alcohol now	3.5	3.7	3.3	
Change in physical activity				.30
More active now	9.2	6.5	11.6	
No change	41.5	45.4	38.0	
Less active now	49.3	48.1	50.4	
Change in sleep				.03
Sleep more now	3.0	4.6	1.6	
Sleep same amount	37.5	44.4	31.5	
Sleep less now	59.5	50.9	66.9	
Change in smoking ^c				.00
Smoke less now	3.9	2.8	0.8	
Smoke same amount	7.8	11.2	4.9	
Smoke more now	1.7	0.0	7.3	
Change in weight				.00
Gained weight	30.0	13.1	44.7	
Stayed the same weight	45.2	57.9	34.1	
Lost weight	22.2	27.1	17.9	
Health behavior change index				.60
0	23.6	25.7	21.8	
1	30.0	33.0	27.4	
2	32.2	28.4	35.5	
3	13.3	12.8	13.7	
4	0.4	0.0	0.8	
5	0.4	0.0	0.8	

a. Statistical significance of gender differences was determined with chi-square tests.

b. The change items asked caregivers how that behavior had changed "since you first noticed problems with your spouse's memory or behavior."

c. Percentages do not total 100 because they do not include respondents who do not drink (for change in drinking behavior item) or who do not smoke (for change in smoking item).

levels of all burden dimensions ($r = .33, .42, .23,$ and $.24$ for time, developmental, social, and emotional burden, respectively), and higher levels of depression ($r = .40$).

MULTIPLE REGRESSION

Hierarchical multiple regression results are presented in Table 3. Caregiver background characteristics explained virtually no variance in health behavior change, but the addition of Block 2 indicates that as both the number of on-duty hours and ADL tasks increase, negative health behavior change increases as well. Entering subsequent blocks of variables into the model indicates that self-efficacy for self-care, self-efficacy for spouse care, social support, developmental burden, and depression have significant effects on negative health behavior change. Overall, the final regression model including all variables explains 31% of the variance in negative health behavior change. As the last column in Table 4 indicates, each step of the analysis, aside from the first, significantly increases the proportion of explained variance.

Due to the high correlations among some of the independent variables—particularly between time burden and developmental burden and between time burden and ADL tasks—as well as the conceptual overlap between the time burden subscale and the measures of the caregiving situation, further analyses were undertaken to determine the amount of multicollinearity among the independent variables. According to the procedure recommended by Lewis-Beck (1990), each independent variable was regressed on all other independent variables. The largest coefficient of multiple determination was for time burden ($R^2 = .68$), indicating that there was a substantial amount of overlap between time burden and other independent variables. Consequently, the hierarchical regression analysis was repeated after omitting time burden. The regression results, however, did not change substantially and therefore are not reported.

Discussion

The adverse health outcomes of caregiving may be partly attributable to declines in health behavior practices. This study was conducted to understand older adult spouse caregivers' practice of five health behaviors, how the practice of these health behaviors changed

Table 3
Hierarchical Multiple Regression Analysis Predicting Negative Health Behavior Change

<i>Block</i>	<i>Variable</i>	β	<i>B (SE)</i>	<i>Cumulative R² (adjusted R²)</i>	<i>R² Change</i>
1	Age	-.06	-.01 (.01)		
	Gender	-.06	-.13 (.14)		
	Education	-.05	-.04 (.06)		
	Number of chronic illnesses	.10	.10 (.07)	.02 (.004)	.02
2	On-duty hours	.24***	.03 (.01)***		
	Duration	.10	.09 (.06)		
3	ADL tasks	.19**	.07 (.03)**	.07*** (.14)	.15***
	Self-efficacy: self-care	-.16*	-.19 (.08)*		
	Self-efficacy: spouse care	-.15*	-.17 (.07)*		
4	Health locus of control	.06	.01 (.01)	.25*** (.21)	.08***
	Social support	-.15*	-.04 (.02)*	.27*** (.23)	.02*
5	Social burden	-.06	-.02 (.03)		
	Developmental burden	.26**	.06 (.02)**		
	Emotional burden	.01	.00 (.02)		
6	Time burden	-.07	-.01 (.02)	.30*** (.25)	.03*
	Depression	.15*	.05 (.02)*	.31*** (.26)	.01*

Note. β (standardized) and *B* (unstandardized) regression coefficients are those at entry. ADL = activities of daily living.

* $p < .05$. ** $p < .01$. *** $p < .001$.

since caregiving began, and which caregiver characteristics predict declines in these behaviors.

Particularly troublesome is that both weight gain and weight loss since caregiving began is more common in the present sample, as compared to large representative samples of older adults followed over time (Coroni-Huntley, Brock, Ostfeld, Taylor, & Wallace, 1986). Female caregivers seem especially susceptible to weight gain; almost half reported a gain of at least 20% since they first noticed problems with their spouse's memory or behavior. This may be related to overeating in response to stress or to limitations in physical activity. Weight gain was more common in younger caregivers, whereas weight loss was more common among older caregivers. This suggests that younger caregivers are more likely to overeat in response to stress, whereas older caregivers are at risk of neglecting their nutritional needs; therefore, weight maintenance interventions may need to be designed differently for older and younger caregivers.

Also troublesome is that about half of the sample participates in active pursuits only once a week or less and reports a decrease in physical activity since caregiving began. Although this may simply reflect a decrease in free time, it indicates that caregivers are at risk for declines in physical activity. Given the links between physical activity and physical functioning among older adults (Ensrud et al., 1994), exercise among caregivers deserves further research attention.

Sleep declines are no doubt partly due to the unpredictable sleeping schedules and nighttime agitation common to dementia (Rabins, 1989). But regardless of the cause, decreased and interrupted sleep could contribute to the physical and mental health symptoms that caregivers experience (Berkman & Breslow, 1983). Interestingly, women were significantly more likely to report a decrease in sleep. Whether this is due to a higher prevalence of nighttime problem behaviors among male dementia patients or to women's greater susceptibility for sleep disruption is a question for future research.

Alcohol consumption and smoking prevalence in the present sample are relatively low and comparable to that of large representative samples of older adults (Comoni-Huntley et al., 1986). Very few caregivers report an increase in drinking or smoking, suggesting that caregivers do not disproportionately rely on these activities as stress-reduction strategies (also reported by Fuller-Jonap & Haley, 1995). In fact, almost a quarter of the sample reports a decrease in alcohol consumption, possibly reflecting decreased participation in social activities.

Although a majority of caregivers are at risk for some health behavior change, caregivers who experience greater developmental burden report more depressive symptoms, perform a greater number of ADL tasks and spend more hours on-duty, perceive less social support, and have lower self-efficacy for self-care and spouse care are at greater risk for decreased self-care. Thus, environmental demands, personal characteristics and beliefs, and personal resources all influence caregiver health behaviors, and the utility of Lazarus and Folkman's (1984) conceptual framework for investigating caregiver stress outcomes is further supported by this research.

That more ADL tasks and on-duty hours predict health behavior declines implies that as the patient's impairment worsens, so does

caregiver's self-care. Although no previous studies have specifically predicted caregiver health behavior, these results support research in which patient's ADL limitations, patient's functional status, and caregiving tasks have been predictive of other mental or physical health outcomes (Wright, Clipp, & George, 1993).

Psychosocial factors also have an important influence on caregiver health behavior. The significance of perceived social support echoes previous literature that has linked performance of health behaviors to the amount of and satisfaction with social support (McIntosh et al., 1989). One's support network, which normally includes one's spouse, may directly influence health behavior patterns and may provide indirect influence via behavioral norms.

Depressed caregivers may be less motivated to attend to their own self-care needs. In fact, the relationship between negative health behaviors and adverse mental health outcomes may be reciprocal, as decreases in self-care may add to psychological distress. For example, overeating and gaining weight may compound feelings of depression.

Caregivers who feel more confident about their ability to take care of themselves and their spouse are less likely to report negative health behavior change, supporting the importance of self-efficacy as a psychosocial predictor of caregiver outcomes (Miller et al., 1991). In addition, the significance of developmental burden suggests that incongruence between a caregiver's current situation and previous expectations about that stage of life may also be an important aspect of the emotional stress of caregiving.

A few study limitations must be highlighted. First, the self-report nature of the dependent variable assumes accurate assessment by caregivers of how their present behavior compares to past behavior. Emotional states could influence the responses to these items, as, for example, a depressed caregiver may be more likely to report decreases in sleep and physical activity. In addition, conclusions about causal relationships cannot be made with cross-sectional data. Future research is needed in which health behavior change is assessed longitudinally.

Unfortunately, characteristics of the nonrespondents are not available, and the possibility that survey respondents differ from nonrespondents must be considered. For example, if caregivers with greater

health behavior change were more likely to respond because of the survey's focus, then the amount of behavior change documented here may be overstated. In addition, without a comparison group of non-caregivers, one cannot conclude whether the amount of behavior change reported here is typical of all older adults over time. Also, given the lack of racial and ethnic minority representation in this sample, these findings can only be generalized to White (and primarily upper middle-class) caregivers. As there may be cultural differences in both the caregiving experience and in the determinants of health behaviors, research that investigates these health behaviors among racial and ethnic minority groups is warranted.

In summary, the present findings suggest that caregiver health behaviors are susceptible to decline over the course of caregiving. Given the links between these behaviors and long-term health outcomes among the general population, the prevalence of health behavior change among these caregivers supports the development of caregiver interventions that target these behaviors. In a situation characterized by lack of control, given the unpredictable but progressive nature of dementia, intervention strategies that target caregiver health behavior may have the added benefit of enhancing caregivers' perceived control over some life domains (e.g., body weight regulation) and may ultimately have a positive impact on caregiver outcomes (Connell, 1994). Because spouse caregivers, especially women, may be particularly vulnerable to problems with exercise and weight control, future research should examine these behaviors individually and in more detail.

The importance of these findings is underscored by the fact that because most spouse caregivers are older adults, many have, or are at risk for, at least one chronic illness that requires a behavioral regimen. Thus, these core health behaviors are important to all caregivers, whether they are managing an extant health problem or preventing a future one. From a broader perspective, because caregivers play an invaluable role in the informal health care system, an investment in caregiver health and well-being has beneficial societal consequences as well. The identification of specific targets for intervention, including health behaviors, can facilitate this investment.

NOTES

1. A related study examined gender differences in a structural equation model of caregiving stress and health behaviors (Gallant, Connell, & Schulenberg, 1996).

2. Although the age range is 30 years to 92 years, 80% of the respondents were 60 years of age or older, and two thirds of the sample was at least 65 years of age. Primarily, the spouses of the younger caregivers included in the sample had Huntington's disease, which is frequently diagnosed at earlier ages than other dementing illnesses.

3. The Caregiving Hassles Scale is a 42-item measure that measures the daily hassles, or minor irritations, of caring for a family member with Alzheimer's disease. Hassles related to assistance with basic activities of daily living (ADL), assistance with instrumental ADL, patient's cognitive status, patient's behavior, and caregiver's support network are assessed. In the original version of the scale, respondents are asked to indicate caregiving events that happen for them and are then asked to rate each event's degree of hassle.

4. Although the original measure used a six-point response scale, a five-point scale was used for this study to give respondents a neutral choice.

5. A fifth subscale assesses physical burden, but because of the substantive overlap between subscale items (e.g., "I'm not getting enough sleep") and the measure of health behaviors, it was not used in this study. Additionally, for this study, the social burden subscale was amended from the original version by the elimination of two items ("I've had problems with my marriage because of caregiving" and "I don't do as good a job around the house as I used to"). Factor analysis indicated that these two items did not load on the social burden factor. Because the Caregiver Burden Inventory (CBI) was originally developed for use with caregiver samples composed of both spouses and adult children, it is understandable that the item asking about marital problems behaved differently with this sample. Also, the item "I don't do as good a job around the house as I used to" was reworded from the original, which read "I don't do as good a job at work as I used to," to increase the applicability to spouse caregivers, most of whom do not work outside the home. This change in wording, and ultimately in meaning, may account for the different factor loading of this item.

6. Scores can be made comparable to the original Center for Epidemiologic Studies Depression Scale (CES-D) with the use of published regression equations, developed by regressing original CES-D scores on simulated short-form scores in a large probability sample (Kohout et al., 1993).

7. To obtain a measure of ideal weight for height, body mass index (BMI) ($\text{weight}/\text{height}^2$) was computed from the two open-ended weight and height items. Because ideal BMI varies according to age and gender, the continuous BMI measure was converted to a four-point scale representing percentiles of BMI, with higher scores indicating a BMI closer to the ideal. Percentiles were defined according to data from the Second National Health and Nutrition Examination Survey (NHANES II) (National Center for Health Statistics, 1987). BMI was categorized as follows: less than the 5th percentile or greater than the 95th percentile for age and gender, between the 5th and 10th percentiles or between the 90th and 95th percentiles, between the 10th and 15th percentiles or between the 85th and 90th percentiles, and between the 15th and 85th percentiles. These categories were chosen based on the evidence that suggests an increased mortality risk for individuals with BMIs that fall above the 85th or below the 15th percentile for age and gender (Cornoni-Huntley et al., 1991).

8. The weight gain cutoff (20%) is thought to be high enough to account for the fact that currently accepted weight standards may be too low for older adults and a small weight gain in

later life may be beneficial for subsequent longevity (Williamson, Kahn, Ramington, & Anda, 1990). A 5% weight loss has been linked to an increased risk of disability, morbidity, and mortality among middle-aged and older adults (Pamuk, Williamson, Serdula, Madans, & Byers, 1993).

9. The treatment of missing data largely affected only two variables—duration and on-duty hours, which had 8% and 9% missing data, respectively. No other variable had more than 2% missing data.

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