

## LEAD ARTICLE

# Preventive Health Behaviors among Spousal Caregivers<sup>1</sup>

LYNDA C. BURTON, SC.D.,<sup>\*,2</sup> JASON T. NEWSOM, PH.D.,<sup>†</sup> RICHARD SCHULZ, PH.D.,<sup>‡</sup> CALVIN H. HIRSCH, M.D.,<sup>§</sup> AND PEARL S. GERMAN, SC.D.<sup>\*</sup>

*\*Health Services Research and Development Center, Johns Hopkins University, School of Hygiene and Public Health, 624 North Broadway, Baltimore, Maryland 21205; †Regional Research Institute, Portland, Oregon 97207; ‡University Center for Social and Urban Research, University of Pittsburgh, Pittsburgh, Pennsylvania 15260; and §Division of General Internal Medicine, University of California, Davis Medical Center, Davis, California 95616*

**Background.** The physical and emotional burden of caring for a functionally impaired spouse may adversely affect the preventive health behavior of the caregiver. This study explores the relationship between caregiving and lifestyle health behaviors and use of preventive services.

**Methods.** The Caregiver Health Effects Study identified spousal caregivers among a sample of more than 3,000 married, community-dwelling older persons, from four counties in the United States, who were enrollees in the Cardiovascular Health Study. High-level caregivers were defined as having a spouse with an ADL impairment ( $n = 212$ ) and moderate-level caregivers, a spouse with one or more IADL impairments ( $n = 222$ ). For each caregiver, a control, matched for age and gender, was selected ( $n = 385$ ). Structured interviews were conducted in the home, following enrollment.

**Results.** Being a high-level caregiver significantly increased the odds of not getting enough rest, not having enough time to exercise, not having time to rest to recuperate from illness, and forgetting to take prescription medications, compared with noncaregivers. These findings did not hold for moderate-level caregivers. The odds were not significantly different for either level of caregiver compared with noncaregivers for missing meals, missing doctor appointments, missing flu shots, and not refilling medications. Larger proportions of caregivers with a strong sense of control had good preventive health behaviors, compared with caregivers with a weak sense of control. © 1997 Academic Press

**Key words:** caregivers; aged; preventive health services; health behaviors; sense of control.

## INTRODUCTION

Caring for an older person who has lost the ability to perform the basic activities of daily living is both psychologically and physically demanding [1]. Moreover, the burden of caregiving may adversely affect the preventive health behavior of the caregiver. This study explores the relationship between caregiving and lifestyle health behaviors and preventive service utilization, using cross-sectional data from the first wave of the Caregiver Health Effects Study (CHES) [2]. CHES identified over 400 spousal caregivers among a sample of more than 3,000 married, community-dwelling older persons to examine the health and mental health effects of caregiving, with the intent of extending, with a generalizable population, knowledge that has been gained from specific, primarily clinic-based populations [1]. The objectives of this paper are: (1) to identify associations between providing care for a spouse and preventive health behaviors practiced by the caregiver, by level of caregiving; (2) to determine whether the sense of control over life events felt by the caregiver is associated with caregiving; and (3) to investigate whether sense of control moderates the hypothesized association between caregiving and preventive health behaviors. These associations have not been addressed previously in the literature and will provide important new information to persons designing interventions to sustain spousal caregivers.

The burden of caregiving has been described in terms of actual physical effort expended at provision of personal care [1,3,4], and the physiological impact [5,6] and the psychological impact or stress on the caregiver [4,7–9]. The actual and/or perceived burden on caregivers [3,10–13] leaves little time for attention to one's own physical well-being. One study found that 80% of caregivers of persons with major caregiving needs were unable to leave the care recipient alone [3] and had to organize their time around the care recipient's daily activity. These burdens may impact on the caregiver's preventive health behaviors and use of preventive services.

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<sup>2</sup> To whom reprint requests should be addressed. Fax: (410) 955-0470.

The benefits of good health behaviors and use of preventive services are well established among general populations of older persons [14]. Benefits of positive health behaviors among older adults have been documented for adequate physical exercise [15,16], smoking cessation [17], adequate nutrition [18], and rest and adequate sleep [19]. Yet little is known about caregivers' engagement in preventive activities, such as visiting a health provider for screening exams or obtaining recommended immunizations for influenza, pneumonia, or tetanus. Lifestyle behaviors, such as smoking, alcohol use, and physical exercise also have not been studied rigorously among caregivers, particularly in a community-based sample of caregivers. This study is the first to report on preventive health service use and lifestyle health behaviors of caregivers which uses a large, community-based population of older individuals, with the opportunity to compare these behaviors between caregiving and noncaregiving spouses.

Psychosocial factors may be a moderating factor in the association of caregiving and the caregiver's preventive behavior. Self-efficacy appears to be associated with motivating health behaviors associated with management of chronic disease [20,21] and weight management [22]. A reduced feeling of burden associated with caregiving has been shown among persons reporting greater use of self-control skills [23], when self-control skillfulness is defined as learned resourcefulness [24] and may be related to preventive health behaviors. The extent to which people see themselves as being in control of the forces that importantly affect their lives, defined as "mastery" by Pearlin et al. [25] and referred to as sense of control in this paper, may also be related to the preventive health behaviors of caregivers. With these studies of psychosocial factors associated with health behaviors as background, this study contributes to the knowledge of preventive health of caregivers by investigating the moderating effect of a strong sense of control on the preventive health behaviors of caregivers.

A strong social support system has been shown to incur health benefits in general populations [11,26] and also to predict use of a preventive visit [27]. These positive effects of social support may extend to use of specific preventive services as well as to practice of positive health behavior among caregivers.

Maintaining the health and well-being of caregivers for frail older persons is a major public health policy concern primarily because informal caregivers provide the great majority of care for incapacitated persons [28], avoiding the need for publicly funded formal care. The inability to continue providing care because of physical health decline of caregivers or heavy caregiver burden may lead to institutionalization of the care recipient [29–35]. A variety of interventions have been tested to avert this incapacitation [36–38], with mixed results, heightening the need to understand what fac-

tors are associated with the physical decline of caregivers. Knowledge about preventive health practices of caregivers may suggest new strategies for interventions. Given the importance of maintaining caregivers' health and the acknowledged benefits of preventive health behaviors, this investigation presents important descriptive information on the relationship between caregiving and preventive health behaviors.

## METHODS

### *Population*

The population are enrollees in the Caregiver Health Effects Study which is designed: (1) to assess the physical and psychiatric health effects of caregiving in a representative sample of persons age 65 and over and (2) to provide details of physical and mental health status, physical function, and health care utilization of the caregiver. This community-based population was drawn from the Cardiovascular Health Study (CHS), a prospective epidemiologic study designed to investigate the incidence of and risk factors for coronary artery disease and stroke among 5,888 persons age 65 and over, drawn from four counties in the United States [39]. Persons eligible to participate were noninstitutionalized and were expected to remain in the area for the next 3 years, were able to give informed consent, and did not require a proxy.

At baseline, the mean age of the CHS population was 72.8, 57% were female, 95% were Caucasian, 72% were high school graduates, 76% described their health as good, very good, or excellent. Fried and colleagues have described the CHS population at baseline in detail [40]. During the 1992–1993 CHS telephone and clinic visit follow-ups, persons whose spouse had activities of daily living (ADL) and/or instrumental activities of daily living (IADL) limitations were identified as eligible for the caregiver study. Following identification of a caregiver, the next subject contacted who matched for age and gender and whose spouse was free of ADL and IADL impairment was eligible to be a control. This ensured that the groups were generally equal as to age and gender. In 50 cases, the response to the screening questions did not agree with the ascertainment of caregiver, due to actual change in the person's caregiving status between the screening and the interview. In these cases, the person was reassigned to the appropriate group.

From the CHS population available at the onset of the caregiver study ( $n = 5,538$ ), 3,185 were married. Of these, 1,105 were contacted consecutively at the time of their CHS follow-up and 619 were identified as caregivers. Of these, 70% ( $n = 434$ ) enrolled; 81% ( $n = 385$ ) of non-caregivers contacted were enrolled.

### *Hypotheses*

This study sought to test three hypotheses. First, moderate- and high-level spousal caregivers, compared

with noncaregivers, will be significantly less likely to engage in preventive health behaviors and use of preventive services. (These preventive behaviors include good eating habits, exercise, obtaining adequate rest, reduced smoking, reduced consumption of alcohol, keeping doctor appointments, finding time to go to the doctor, getting flu shots, refilling prescription medications, and remembering to take prescription medications.) Second, spousal caregivers with a strong compared with a weak sense of control will be significantly more likely to engage in preventive health behaviors and use of preventive services. Third, a strong sense of control in a caregiver will moderate the risk of a caregiver disregarding preventive health behaviors.

### *Sources of Data and Measurement*

Following enrollment in the caregiver study, research assistants carried out structured interviews with caregivers and controls in their homes. The designation of caregiving level was determined as part of the baseline interview, at which time the level of ADL and IADL impairment of the spouse was ascertained. Respondents were asked about their preventive health behaviors and use of preventive services and numerous self-reported measures of physical and mental health.

*Predictor variable: Level of caregiving.* A person was classified as a caregiver if he or she answered affirmatively one or more of the following: "Does your spouse have difficulty in any of the following areas: eating, dressing, bathing, transferring from bed to chair, grooming, using the toilet, using the telephone, preparing meals, doing light housekeeping, shopping, taking medications, handling personal finances, or driving a car." Caregiving was categorized in three levels: no need (no ADL or IADL impairment of spouse), moderate level of need (one or more IADL but no ADL impairment of spouse), and high level of need (at least one ADL impairment of spouse). There was a strong association between the number of extra hours of help given to a spouse due to disability and the level of caregiving (ANOVA,  $P < 0.0001$ ), validating the use of the functional impairment level of the care recipient as an indicator of the level of caregiving. This association between functional impairment of the spouse and intensity of care provided to the spouse has been described by Schulz et al. [2].

*Outcome variables.* The major outcome variables were indicators of behavioral health risks: eating less than three meals a day; not having enough time to get as much exercise as respondent would like; smoking more than usual; drinking alcoholic beverages more than usual; not getting enough rest; when sick, not being able to slow down and get the rest needed; forgetting to take medications; delaying a doctor visit if a health problem was suspected; missing one or more doctor's appointments; missing a flu shot; and running out of medications.

*Moderating variable.* A person's sense of control over life events was operationalized using the self-mastery scale developed and validated by Pearlin et al. [25]. This is a 7-item scale in which the respondent is asked for his/her level of agreement with each of these statements: "There is really no way I can solve some of the problems I have," "Sometimes I feel that I am being pushed around in life," "I have little control over the things that happen to me," "I can do just about anything I really set my mind to do," "I often feel helpless in dealing with the problems of life," "What happens to me in the future mostly depends on me," and "There is little I can do to change many of the important things in my life." There are five possible responses for each statement, from "strongly agree" to "strongly disagree." Responses were coded so that positive answers had higher scores, and were summed for the seven questions. The measurement of self-mastery produced a range of scores from 8 to 35, with the median 25. High scores represent a stronger sense of control. For the bivariate analyses, a weak sense of control was designated less than 25 and high sense of control 25 or more. For regressions, the continuous score was used. Reliability of the scale in this population was  $\alpha = 0.75$ .

*Control variables.* Age, gender, race, education, self-reported health status, and social support were controlled for in all regression analyses. Age was entered as a continuous variable. Other control variables were entered as dichotomies: gender (female = 0; male = 1), race (white = 0; nonwhite = 1), education (no high school diploma = 0; high school diploma = 1), and self-reported health (excellent, very good, good = 0; fair, poor = 1). Perceived social support was measured using a 6-item version of the Interpersonal Support Evaluation List (ISEL), developed by Cohen et al. [41], adapted by Schulz and Williamson [42], and used by Newsom and Schulz with the CHS population [43]. The adapted ISEL version was designed to measure four functions of perceived support: tangible, belonging, self-esteem, and appraisal support. These items were summed and had a possible range from 6 to 24. Higher scores denote a higher level of perceived social support. Reliability of the scale was  $\alpha = 0.68$ .

### *Analysis*

To test for association between caregiving and the dependent variables, contingency tables were run for each outcome variable by the three caregiving levels, using the  $\chi^2$  test for goodness of fit of differences. The association between social support and caregiving was tested with an analysis of variance on the mean score on the ISEL. The three-way goodness of fit between a sense of control and the behavioral health risks, by the level of caregiving, was tested with  $\chi^2$ , with the Mantel-Haenszel statistic for each subtable and the Cochran-Mantel-Haenszel for the overall association.

Logistic regression models were estimated for each of the dependent variables, entering all variables simul-

taneously. Odds ratios with 95% confidence intervals were computed for each outcome variable, with moderate-level and high-level caregiving entered separately, with the no-caregiving controls designated the reference group. For the regressions, the scores on self-mastery, social support, and age were entered as continuous variables.

## RESULTS

Slightly over half of those who enrolled who met the study's definition of caregiving had spouses with deficits in IADL assistance only ( $n = 222$ , 51.2%), while the remainder had spouses with ADL impairment and in most cases IADL impairment also ( $n = 212$ , 48.8%) (Table 1). The sociodemographics and self-rated health status of the population by the level of caregiving are shown in Table 2. There was a significant linear relationship between level of caregiving and age, self-reported health of the caregiver, and perceived social support of the caregiver.

Lifestyle health behaviors and preventive health seeking are shown by caregiving level in Figs. 1 and 2. There were significant associations between caregiving level and inadequate exercise, inadequate rest, ability to slow down and get rest when sick, forgetting to take medications, and not finding time for doctor appointments. The remaining health behaviors (missed meals, more smoking, missed doctor appointments, missed flu shots, no time to refill medications) occurred more frequently for high-level caregivers, but did not achieve statistical significance. Only one behavior, increased use of alcohol, was present less frequently among high-level caregivers.

The relationship between a sense of control and preventive behavior is shown in Table 3, stratified by level

**TABLE 1**

Level of Caregiving: Based on Functional Impairment of Spouse

	Level of caregiving		
	None ( $n = 385$ )	Moderate ( $n = 222$ )	High ( $n = 212$ )
Functional level of care recipient			
IADL dependencies			
0	100%	0	4%
1-3	0	86%	35%
4-9	0	14%	61%
ADL dependencies			
0	100%	100%	0
1-2	0	0	64%
3-6	0	0	36%
Extra hours spent helping spouse because of his/her disability (mean hours)	0.93	1.6	3.0

Note. All three analyses were significant at the  $P < 0.0001$  level.

**TABLE 2**

Sociodemographic Characteristics of the Caregivers by Level of Caregiving

	Level of caregiving			
	Total $n = 819$	None $n = 385$	Moderate $n = 222$	High $n = 212$
Age				
65-74	43.8	50.6	39.5	35.9
75-84	50.4	47.2	55.1	51.3
85+	5.8	2.2	5.4	12.8
Race				
White	90.0	90.4	89.6	89.6
Gender				
Female	51.3	54.0	46.8	50.9
Education				
Grade 0-8	10.6	9.3	11.7	11.8
Grade 9-12	37.4	33.6	40.5	41.0
Grade >12	52.0	57.1	47.8	47.2
No high school diploma				
Self-reported health				
Fair/poor	16.7	10.4	17.8	27.0
Social support <sup>a</sup>	21.6	22.1	21.3	20.9

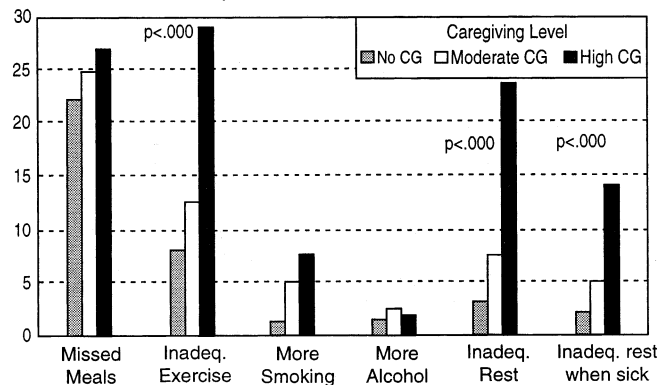
<sup>a</sup> Unadjusted mean score on ISEL. Possible range of 6 to 24.

\*  $P < 0.001$ .

\*\*  $P < 0.0001$ .

of caregiving. With minor exceptions, at each level of caregiving a higher percentage of persons with weak sense of control had negative health behaviors compared with persons with strong sense of control. For example, among high-level caregivers a greater percentage of those with weak sense of control reported not getting enough rest (29.0%) compared with caregivers with strong sense of control (12.5%). Four outcome variables were significantly related to sense of control and level of caregiving: not getting enough rest, not enough time to rest when sick, not having enough time to exercise, and forgetting to take medications. These

Percent with Unhealthy Behavior



**FIG. 1.** Health behaviors, by caregiving level.

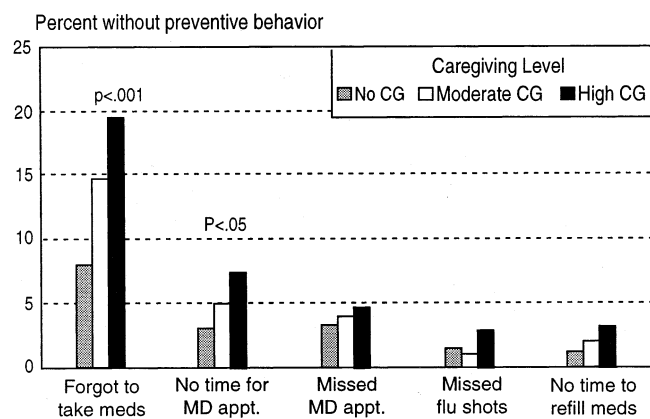


FIG. 2. Preventive behaviors, by caregiving level.

results indicate that, for these outcomes, caregiving was more strongly associated with poor health behaviors if caregivers had a weak sense of control.

The odds of having adverse lifestyle health behaviors are shown in Table 4 for moderate- and high-level caregivers, with noncaregivers as the reference group. Covariates included sense of control, social support, age, race, gender, education, and self-reported health. The odds ratios are significantly higher for high-level caregivers, compared with noncaregivers, for four prevention-related behaviors: not getting enough rest (OR = 2.38), not having enough time to exercise (OR = 2.33), not having time to rest to recuperate from illness (OR = 2.30), and forgetting to take prescription medications (OR = 1.59). The odds for having these behaviors were not significant for moderate-level caregivers.

In these logistic regressions, many of the covariates had significant associations with preventive behaviors. For example, a stronger sense of control was associated with lower odds of not getting enough rest (OR = 0.32). Greater perceived social support also was associated with lower odds of not getting enough rest (OR = 0.54) and not getting time to rest to recuperate (OR = 0.43). Race of the caregiver had an impact on one behavior: non-whites were more likely to skip a meal (OR = 5.80). Gender had a significant association with four behaviors: males were less likely not to have time to exercise (OR = 0.39), not to have enough time to rest when sick (OR = 0.31), or to delay a doctor visit (OR = 0.37), but more likely to skip meals (OR = 1.55). Persons having a high school diploma had higher odds of not finding time to exercise (OR = 1.76) but lower odds of skipping meals (OR = 0.65). Persons with self-reported poor health had increased odds of not getting enough rest (OR = 3.16), not having time to rest to recuperate (OR = 2.72), and skipping meals (OR = 1.92).

### SUMMARY AND IMPLICATIONS

Having a spouse with an ADL impairment predicted poor preventive health behaviors on the part of the

TABLE 3

The Relationship between Preventive Health Behaviors and Sense of Control,<sup>a</sup> by Level of Spousal Caregiving<sup>b</sup>

Preventive event	Sense of control		
	Weak	Strong	Association <sup>c</sup>
Not enough rest.			
Level of caregiving			
High	29.0	12.5	
Moderate	13.7	2.6	
None	6.0	1.7	
	$P < 0.0001$	$P < 0.0001^d$	$P < 0.0001$
Not enough rest to recuperate.			
Level of caregiving			
High	18.3	5.1	
Moderate	8.1	2.7	
None	3.5	1.3	
	$P < 0.0001$	$P < 0.082^d$	$P < 0.001$
Not enough time to exercise.			
Level of caregiving			
High	32.2	21.9	
Moderate	13.7	11.3	
None	10.7	6.5	
	$P < 0.0001$	$P < 0.0001$	$P < 0.0001$
Forgot to take medicines.			
Level of caregiving			
High	20.3	18.5	
Moderate	13.6	14.4	
None	8.2	8.0	
	$P = 0.005$	$P = 0.016$	$P = 0.001$
Not enough time to make M.D. appointment.			
Level of caregiving			
High	9.6	3.1	
Moderate	7.8	2.6	
None	2.0	3.5	
	$P = 0.007$	$P = 0.791^d$	$P = 0.102$
Less than 3 meals a day.			
Level of caregiving			
High	30.1	20.3	
Moderate	23.5	25.9	
None	21.3	22.4	
	$P = 0.082$	$P = 0.967$	$P = 0.429$
Missed >1 M.D. appointment.			
Level of caregiving			
High	4.8	4.7	
Moderate	6.9	1.7	
None	4.7	2.6	
	$P = 0.945$	$P = 0.542^d$	$P = 0.916$
Missed flu shot.			
Level of caregiving			
High	2.6	3.5	
Moderate	1.2	1.1	
None	2.6	0.6	
	$P = 0.992^d$	$P = 0.103^d$	$P = 0.489$
Too busy to refill medicines.			
Level of caregiving			
High	3.9	1.8	
Moderate	3.3	1.0	
None	0.8	1.5	
	$P = 0.109^d$	$P = 0.981^d$	$P = 0.397$

<sup>a</sup> Sense of control was measured using Pearlin's self-mastery scale [25]. The measurement of self-mastery produced a range of scores from 8 to 35, median at 25. High scores represent greater sense of control. Low scores <25, high  $\geq 25$ .

<sup>b</sup> High caregiving was defined as having a spouse with an ADL impairment; moderate caregiving, a spouse with an IADL impairment.

<sup>c</sup> Mantel-Haenszel statistic was used for the  $2 \times 3$  tables and the Cochran-Mantel-Haenszel statistic for overall association.

<sup>d</sup> Cells had expected counts less than 5; therefore, the statistic should be interpreted with caution.

TABLE 4

Odds Ratios for Having Adverse Preventive Behavior by Level of Caregiving (with 95% CI)

Predictor variables	Not enough rest	Not enough time to exercise	Not enough rest to recuperate	Forgot to take medications	Skipped meals	Delay M.D. visit
Caregiving (moderate) <sup>a</sup>	0.86 (1.31, 0.56)	0.85 (0.62, 1.18)	0.96 (0.57, 1.59)	1.07 (0.77, 1.49)	0.97 (0.75, 1.26)	1.02 (0.61, 1.71)
Caregiving (high) <sup>b</sup>	<b>2.38 (1.67, 3.40)</b>	<b>2.33 (1.73, 3.13)</b>	<b>2.30 (1.46, 3.61)</b>	<b>1.59 (1.15, 2.21)</b>	1.08 (0.82, 1.42)	1.40 (0.85, 2.28)
Sense of control <sup>c</sup>	<b>0.32 (0.19, 0.55)</b>	0.95 (0.63, 1.43)	0.70 (0.37, 1.33)	0.80 (0.51, 1.26)	0.92 (0.65, 1.29)	0.91 (0.46, 1.78)
Social support <sup>d</sup>	<b>0.54 (0.32, 0.91)</b>	0.65 (0.42, 1.02)	<b>0.43 (0.23, 0.80)</b>	1.13 (0.66, 1.93)	0.71 (0.47, 1.07)	0.57 (0.29, 1.10)
Age <sup>e</sup>	0.99 (0.94, 1.05)	0.98 (0.94, 1.03)	0.98 (0.91, 1.06)	0.98 (0.94, 1.03)	0.96 (0.93, 1.00)	1.03 (0.95, 1.10)
Race <sup>f</sup>	0.72 (0.28, 1.84)	1.15 (0.58, 2.28)	0.96 (0.33, 2.79)	1.33 (0.64, 2.74)	<b>5.80 (3.48, 9.66)</b>	1.19 (0.39, 3.64)
Gender <sup>g</sup>	0.67 (0.38, 1.16)	<b>0.39 (0.25, 0.62)</b>	<b>0.31 (0.15, 0.65)</b>	1.14 (0.71, 1.81)	<b>1.55 (1.08, 2.22)</b>	<b>0.37 (0.17, 0.81)</b>
Education <sup>h</sup>	0.94 (0.55, 1.61)	<b>1.76 (1.14, 2.71)</b>	1.25 (0.65, 2.43)	1.02 (0.64, 1.61)	<b>0.65 (0.45, 0.92)</b>	0.83 (0.41, 1.67)
Health <sup>i</sup>	<b>3.16 (1.80, 5.55)</b>	1.22 (0.71, 2.09)	<b>2.72 (1.35, 5.45)</b>	1.25 (0.71, 2.19)	<b>1.92 (1.23, 3.00)</b>	1.64 (0.73, 3.65)

<sup>a</sup> Providing care for a spouse with IADL impairment only.<sup>b</sup> Providing care for a spouse with ADL impairment.<sup>c</sup> Measured by the score on 7-item self-mastery index [25]. Higher score denotes stronger self-mastery or sense of control over life events.<sup>d</sup> Score on 6 items from interpersonal support evaluation list [41]. Higher score denotes higher level of perceived social support.<sup>e</sup> Continuous variable.<sup>f</sup> White = 0; nonwhite = 1.<sup>g</sup> Female = 0; male = 1.<sup>h</sup> No high school diploma = 0; high school diploma = 1.<sup>i</sup> General health, by self-report. Excellent, very good, good = 0; fair, poor = 1.

caregiver: not finding time for exercise, inadequate rest, not enough time to rest when sick, and forgetting to take medications. This was true when controlling for demographics, self-reported health, perceived social support, and sense of control. However, caregiving for a spouse with an IADL impairment did not have significant relationships with adverse preventive behaviors, even though most of these behaviors occurred with more frequency than among noncaregivers. This dose-response relationship, in which higher levels of caregiving have stronger association with poor preventive health behaviors, points to the need to calibrate the level of caregiving more precisely when designing interventions to attempt to overcome these negative effects.

Our finding that living with a spouse with ADL impairment had a negative effect on preventive health behaviors is not unexpected, particularly because of the extra hours reportedly spent helping the spouse because of the impairment. Others have shown the intense time commitment of caregiving [12,13] and we have shown how this time commitment may be related to some preventive behaviors.

Spousal caregiving, at either a moderate or a high level, did not appear to be associated, however, with use of the preventive services studied: making and keeping doctor appointments, getting flu immunizations, and refilling prescriptions. Forgetting to take medications, which in this study was categorized as a preventive service, could also be described as a preventive health behavior. The conclusion from these find-

ings is that interventions need to focus on changes in health behaviors, which appear to be at risk among caregivers. The lack of effect of caregiving on preventive service utilization shown here may not extend to other important preventive services not studied, such as use of mammography, and should not be interpreted as justification for reducing efforts to increase preventive services use of caregivers.

The relationship between sense of control and level of caregiving was demonstrated, although the direction of this relationship cannot be determined by these data. It is more probable that caregiving acts to lower a person's sense of control rather than the sense of control acts as a causal agent in level of caregiving. An analysis of longitudinal data that will become available in this study may elucidate the direction of this relationship. Having shown that there is a relationship between sense of control and caregiving, the major focus here was to determine if a strong sense of control moderated the association between level of caregiving and positive preventive health behaviors. The hypothesized moderating effect of sense of control of caregivers on their preventive health behaviors was limited to getting enough rest. Caregivers with a strong sense of control may act on their need to get rest to maintain their ability to provide care, more so than the caregiver overwhelmed by the tasks, who perceives he/she has little ability to control events. The apparent moderating effect of sense of control and three other health behaviors seen at the bivariate level (getting enough rest to recuperate, having enough time to exercise, and

not forgetting to take medications) did not remain when control variables were added. Further understanding of the complex relationships of sense of control, with other aspects of self concept such as self esteem, on the stress of caregiving is necessary before it is clear how this finding might be used in interventions to relieve caregivers.

A perception of strong social support among caregivers increased the odds of their getting enough rest and, when sick, getting enough rest to recuperate. Although the mean score differences suggest little clinical difference, social support stood in multivariate analysis as a positive predictor of two aspects of preventive health behavior, both dealing with getting enough rest. Caregivers with a good perception of social support may in fact be receiving tangible help in their caregiving tasks. Encouragement from a friend or person in whom one confides, rather than or in addition to tangible support, may also be causal. There is evidence in the literature that having a confidant is positively associated with use of preventive services. In a randomized trial of the acceptance by older community-dwelling individuals of preventive visits and the benefits from such visits, German et al. [27] found that having a confidant raised the odds of a woman accepting the offer of a free preventive visit to her primary care physician.

Because CHES is a longitudinal study, it will be possible to investigate further the impact of caregiving on preventive behaviors over time. Additionally, it will be important to look at the caregiving tasks performed and their relationship to preventive health behaviors. Further work will be done to understand the direction of effect of sense of control on caregivers.

The ability to identify predictors of health risks to which caregivers are most susceptible offers opportunities for remediation of adverse effects of caregiving on preventive health behaviors. Our findings of the adverse health behaviors that are associated with caregiving may relate to having more time to rest, exercise, recuperate. To the extent that this is true, many of the interventions that aim at reducing the amount of time the caregiver is "on duty" achieve their benefit as preventive health measures. To date, various means of alleviating the burden of caregiving have been tested [36–38], with respite interventions moderately effective, as are some psychosocial programs to relieve distress of the caregiver. A complementary effort may be to promote more strongly traditional preventive health behaviors in this highly vulnerable population.

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