

Caregiver burden mediates between caregiver's mental health condition and elder's behavioral problems among Japanese family caregivers

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Running Title: Caregiver burden, poor mental health, and elder's behavioral problems

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Abstract

Objectives: In Japan, the prevalence of depression has been reported to occur among 1 in 4 family caregivers. The purpose of this study was to investigate the self-rated burden associated with mental health conditions among caregivers.

Methods: We studied 95 caregivers aged 38-87 years in a cross-sectional study. The General Health Questionnaire (GHQ-12) score of 4 or more was defined as poor mental health.

Results: The proportion of caregivers with poor mental health was 24%. Caregivers with a high GHQ-12 score had the number of caregiver burdens increased by 2.5-fold compared to those with a low GHQ-12 score ($p = 0.001$). The proportion of caregivers with a high GHQ-12 score was significantly higher with an increasing number of behavioral problems among care recipients ($p = 0.003$). A mediational model was used to identify the underlying mechanism of the relationship between the number of behavioral problems and poor mental health in caregivers. Consequently, we found that mental health conditions in caregivers were associated with both number of caregiver burdens and behavioral problems among care recipients.

Conclusions: It is vital to provide support not only to the caregivers but also to their elderly relatives, paying particular attention to early identification of poor mental health in caregivers so as to administer effective interventions, and to offer useful advice concerning how to deal with behavioral problems.

Key words: caregiver burden, poor mental health, elder's behavioral problems, mediational model

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Introduction

In 2007, throughout Japan, about 60% of family caregivers with a co-resident care recipient reported that they suffered from stress or distress (Japan Ministry of Health, Labor and Welfare, 2009). Additionally, depression has been reported to occur among 1 in 4 family caregivers (Machida & Hosaka, 2006). In particular, caring for elderly people with dementia who have behavioral problems and/or problems with activities of daily living (ADLs) is associated with a high risk of caregiver burden and depression (Georges et al., 2008; S.H. Zarit, Todd, & J.M. Zarit, 1986). However, caregiver burden and feelings of distress are not determined solely by the amount of care required. Feelings of distress or burden are influenced, but not dictated, by characteristics of the elder's disease or disability. Despite considerable research demonstrating the factors associated with depression, it is not apparent whether caregiver burden mediates the association between an elder's behavioral problems and the caregiver's depression.

In the area of psychology, some factors that affect mental health have been analyzed by statistical modeling. The mediational model is one of them. Mediation is the process whereby something causes an event or condition, which in turn causes a third event (Levy, Landerman, & Davis, 2011). For example, objective aspects of caregiver burden may affect the quality of

the caregiver-care recipient relationship, which in turn may influence the caregiver's perception of burden. Möller-Leimkühler and Mädger (2011) used a mediational model to identify the underlying mechanism of the relationship between personality factors and psychological well-being of caregivers. Several studies have reported that self-efficacy is the mediator in the relationship between depression and psychological burden in caregivers (Au et al., 2009; Gallagher et al., 2011; Mackenzie & Peragine, 2003). Many of the prior studies on family caregivers focused mainly on the relationship between cause and effect, the caregiver's health problems such as depression, low self-rated health, and burnout. Therefore, these studies had some limitations in the ability to reveal the effect of complicated factors on caring and health in caregivers. However, a study using a mediational model may be able to demonstrate the specific mechanism by which factors mediate between caregiver burden and depression. The purpose of this study was to investigate the self-rated burden associated with mental health conditions among caregivers using a mediational model.

Methods

Subjects

The study subjects were caregivers of elderly relatives in Aki City in Kochi Prefecture, Japan, from February to May 2007. A self-administered questionnaire was distributed to a total of 168 caregivers, and 138 questionnaires were returned (response rate, 82.1%). One hundred

and two out of 138 caregivers lived with their disabled elderly relatives. After exclusion of questionnaires with missing or blank data for age, gender, or the GHQ-12 scale, a total of 95 caregivers (20 men and 75 women) who lived with elderly relatives were enrolled for the final analysis. All the subjects provided informed consent before the examination. The study was carried out by the authority of the Aki City municipal administration, Kochi Prefecture, Japan.

Measures

Characteristics for care recipients included age and gender. Caregiver demographics included age, gender, duration of caregiving, and self-rated health status.

The following questions were used to assess mental health conditions: care recipient's memory and behavioral problems; caregiver psychological, physical, and financial burdens; and social support.

Mental health conditions (GHQ-12)

The General Health Questionnaire developed by Goldberg was devised as a reliable self-rating scale of the degree of psychiatric morbidity. The 12-item version of the General Health Questionnaire (GHQ-12) is a short version of the original 60-item assessment. A GHQ-12 cut-off score of 3/4 was recommended to distinguish clinically depressed individuals from those classified as non-depressed (Goldberg, Oldehinkel, & Ormel, 1998). The GHQ-12 responses were scored by 0-0-1-1, known as the GHQ scoring approach (Goldberg & William,

1988). Using the GHQ-12 Japanese version, Honda, Shibata, and Nakane (2001) also concluded that the GHQ-12 cut-off score of 3/4 had reasonable sensitivity (78%) and specificity (57%) in screening for individuals with common mental disorders. We used it to assess the mental health condition of people who care for elderly relatives.

Caregiver burden

Caregiver burden was assessed with a total of 10 items. The items were divided into 4 indices: distress related to social support (3 items), physical burden (3 items), psychological burden (3 items), and financial burden (1 item). The distress related to social support includes insufficient information on care services, a place for consulting on caregiving, and presence of an informal supporter. Physical burden assesses physical pain (i.e., back, knee, and shoulder pain), lack of sleep, and fatigue. Psychological burden includes difficulty communicating with the care recipient, lack of free time due to caregiving, and stress.

Behavioral problems

Behavioral problems of the elderly care recipient were assessed with a total of 9 items. The items include eating problems, confabulation/visual hallucinations/auditory hallucinations, night wandering, day/night rhythm disturbances, uncooperative or oppositional behavior, hygiene problems, aggression/violence, talking to oneself, and forgetting to turn off the gas range.

Data analysis

The associations between the frequency of subjects with a high GHQ-12 score and characteristics of caregivers, caregiver burden, and number of care recipient behavioral problems were analyzed. The chi-square test was used for nominal scale data such as caregiver burden and behavioral problems, whereas the Wilcoxon rank-sum test was used for ordinal scale data such as number of caregiver burdens.

Furthermore, the primary research question focused on whether the number of caregiver burdens mediated the relationship between the number of behavioral problems and GHQ-12 score. The 3-step Baron and Kenny framework was used to examine the extent to which the number of caregiver burdens mediated the relationship between the number of behavioral problems and GHQ-12 score (Baron & Kenny, 1986). Step 1 established that the number of behavioral problems was predictive of the GHQ-12 score using a simple regression analysis. Step 2 established that the number of behavioral problems was predictive of the mediator, that is, the number of caregiver burdens, using logistic regression analysis. Finally, step 3 established that the number of caregiver burdens mediated the predictive relationship between the number of behavioral problems and the GHQ-12 score by including the number of caregiver burdens. These associations represent a mediator model with the number of behavioral problems as the independent variable, the number of caregiver burdens as the mediator variable, and the GHQ-12 score as the dependent variable, as shown in Figure 1.

Results

Table 1 presents information on the socio-demographic characteristics of the study subjects. Of the 95 caregivers who participated in this study, 28 were spouses (29.5%) and 40 were adult children (42.1%). In addition, 25 were daughters-in-law (26.3%) and 2 were siblings (2.1%). The mean age of caregivers was 63.8 years ($SD = 10.9$), and the age range was from 38 to 87 years. The mean duration of caregiving was 4.17 years ($SD = 3.75$). In addition, the 95 care recipients had a mean age of 84.1 years ($SD = 7.7$), and their age range was 67 to 103 years. Sixty-three of the care recipients were women (66.3%).

Table 2 shows the association between the GHQ-12 score and the characteristics of caregivers and caregiver burden. The common caregiver burdens were “physical pain” (45.3%) and “difficulty communicating with care recipient” (44.2%). Caregiver reports of stress or psychological burden were significantly associated with a high GHQ-12 score compared to those who did not report these burdens ($p < 0.001$). The reporting of “lack of free time due to caregiving” or “lack of sleep” were also significantly associated with a high GHQ-12 score compared to those who did not report these items ($p = 0.006$ and $p = 0.024$, respectively).

Table 3 summarizes the behavioral problems of the care recipients and the associated GHQ-12 scores among caregivers. There were 29 caregivers who had an elderly relative with

behavioral problems (30.5%). The proportion of high GHQ-12 score was significantly higher in caregivers who had an elderly relative with behavioral problems (45%) than in those who had an elderly relative without behavioral problems (15%) ($p = 0.002$). In this study, the most frequent problems with care recipients were confabulation/visual hallucinations/auditory hallucinations (12.6%), forgetting to turn off the gas range (9.5%), and uncooperative or oppositional behavior (7.4%). In particular, the problem of forgetting to turn off the gas range significantly increased the GHQ-12 score among caregivers ($p < 0.001$).

Table 4 shows the association between GHQ-12 score and the number of behavioral problems among care recipients and number of caregiver burdens. The proportion of caregivers with a high GHQ-12 score significantly increased with increasing number of behavioral problems among care recipients ($p = 0.003$). Similarly, caregivers with a high GHQ-12 score had a significantly greater number of caregiver burdens than those with a lower score ($p = 0.001$), and the number of caregiver burdens was 2.5-fold higher compared to those with a low GHQ-12 score.

Table 5 shows the results of hypothesized mediation model associations with the number of behavioral problems, caregiver burdens, and GHQ-12 as its outcome. The step 1 results show that the number of behavioral problems among the care recipients was significantly associated with the number of caregiver burdens as the mediator variable (regression coefficient = 0.845; $p < 0.001$). The step 2 results show that the number of behavioral problems of the care

recipients was significantly associated with the proportion of caregivers with a high GHQ-12 score as the dependent variable (regression coefficient = 0.60; $p = 0.018$). The step 3 results show that the number of behavioral problems among the care recipients was not significantly associated with the proportion of caregivers with a high GHQ-12 score (regression coefficient = 0.351; $p = 0.201$), whereas the number of caregiver burdens was significantly associated with the proportion of caregivers with a high GHQ-12 score (regression coefficient = 0.363; $p = 0.005$). The Sobel test revealed that the relationship between the number of behavioral problems among the care recipients and the mental health condition of the caregivers was significantly mediated by the number of caregiving-related burdens ($p = 0.026$; data not shown).

Discussion

The purpose of this study was to investigate self-rated burden associated with mental health conditions among caregivers using a mediational model. Of the 95 respondents, 23 (24.2%) reported poor mental health, as defined by a high GHQ-12 score. The present study revealed several risk factors for poor mental health: financial and psychological burdens, insufficient information on care services, lack of free time due to caregiving, lack of sleep, difficulty communicating with the care recipient, and caring for a person with behavioral problems.

Caregiver burden is a complex and multidimensional construct (DiBartolo, 2000; George &

Gwyther, 1986; Pearlin et al., 1990). S.H. Zarit and J.M. Zarit (1982) distinguished between objective burden, or the stress associated with providing physical care, and subjective burden, or the psychological consequences of caregiving. Caregiver burden was defined by S.H. Zarit, Todd, and J.M. Zarit (1986) as the degree to which a caregiver's emotional or physical health, social life, or financial status has suffered as a result of caring for a relative. This study found that caregivers who have psychological burdens were significantly more likely to report poor mental health, although a similar association was not seen with physical burdens. The risk of depression may be increased in caregivers with psychological burden compared with those who report physical burden. Assistance with ADLs in elderly persons has not been found to be related to poor health conditions among caregivers. Rather, care recipients who have frequent behavioral or emotional problems place more stress on caregivers (Pinquart & Sörensen, 2003; Pruchno & Resch, 1989).

Behavioral problems and/or cognitive impairment are widely prevalent among elderly people. In one study, 89% to 96% of caregivers reported that elderly care recipients had behavioral problems and problems with ADLs (Georges et al., 2008). The caregiver burden for a person with dementia has been associated with decreased psychological and physical well-being of the caregiver (Bell, Araki, & Neumann, 2001; George & Gwyther, 1986; Hooker et al., 2002; Shaw et al., 1997). In this study, 30.5% of caregivers reported that the care recipient had behavioral problems. Consistent with prior research findings, the caregivers

of persons with behavioral problems were significantly more likely to report poor mental health than caregivers of persons without behavioral problems ($p = 0.002$). In particular, forgetting to turn off the gas range was the behavioral problem that significantly increased GHQ-12 scores among caregivers ($p < 0.001$). In the case of disabilities involving dementia, the care recipient may require ongoing supervision. Thus, caring for elderly people with behavioral problems means not only assisting with ADLs and/or instrumental activities of daily living (IADLs), but also requires ongoing supervision and safety management of the care recipient. This supervision and safety management may contribute to increasing the caregiver burden and amount of care demands.

Using a mediational model, mental health condition in caregivers was found to be influenced by both the number of caregiver burdens and behavioral problems. Although prior studies have reported that behavioral problems among care recipients have an impact on depression and psychological burden in caregivers, this study suggested that other stressors that may have an impact on psychological burden, such as stress and emotional disturbance, can also contribute to psychological symptoms. The other stressors include strain caused by such things as changes in the caregiver's life due to care tasks and ongoing supervision and/or safety management of the care recipient. Many caregivers are required to meet the needs of elderly people with physical and cognitive limitations. Caregivers who cared for elderly people with dementia and used respite care services for 2 weeks reported a reduction in their

caregiving burden (Salin, Kaunonen, & Astedt-Kurki, 2009). This result may be due to management of supervision and safety by providing care services from formal caregivers instead of family caregivers. We considered that managing supervision and/or safety contributes more to caregiver depression than dealing with behavioral problems among elderly with dementia.

In traditional Japanese culture, relationships within the family are based on Confucianism. Women have been assigned household chores as their core duties in the family (Chan & Chui, 2011). Women who had a family member who became sick and needed daily assistance were expected to leave their job and dedicate themselves to housework and the care of the family member. This is particularly the case for many older Japanese who usually uphold traditional gender role norms. The eldest daughter or the wife of the eldest son was charged with taking responsibility for caring for the elderly parent, based on the patriarchal family system (Hashizume, 1998; Hashizume, 2000). In 2006, throughout Japan, more than 140,000 employees left work to undertake elderly care, of whom 80% were women (Cabinet Office, Government of Japan, 2012). This study reported also that, in addition to the spouse, many caregivers of elderly persons living at home are the care recipient's daughter or daughter-in-law. We considered that caregiving in Japan is defined as predominately a woman's responsibility. This normative role as caregiver may become a burden when caregivers have to endure the hardships of caregiving. Stress and psychological burden in

caregivers are heavily influenced by traditional culture and social practices (Chan & Chui, 2011). Consequently, to approach the reduction of caregiver burden effectively, we should not only examine the care recipient's characteristics, caregiver's mental and physical health, and caregiving-related burdens, but also take into consideration the sociocultural milieu.

Limitations

Our study has several limitations. First, because the design was cross-sectional, the relationships found in the present study cannot be interpreted as causal. Second, because the participants in this study were limited to the caregivers of one city in Kochi Prefecture, Japan, generalization of the findings should be made with caution. In addition, we didn't use any standard scales for caregiver burdens and for behavior problems. Finally, the quality of the relationship between caregiver and care recipient has emerged as an important variable in caregiving research (Oh et al., 2006); however, this was not assessed in the present study. The strengths of this study were that: 1) the response rate was relatively high, at 82.1% (138 of 168); and 2) it is one of the few studies focusing on caregiver burden that examined the mediational association between the behavioral problems of elderly care recipients and the mental health conditions among caregivers.

Conclusion

It is vital to provide support not only to caregivers but also to their elderly relatives, paying particular attention to early identification of mental health conditions in caregivers so as to administer effective interventions and facilitate the provision of advice concerning how to deal with behavioral problems. How informal and formal caregivers interact with one another may be critical in the safety management and control of behavioral problems, and to help reduce caregiver frustration and the amount of caregiving by care services for the elderly.

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Table 1. Characteristics of the study subjects

Characteristics		Care recipient	Caregiver
		(n=95)	(n=95)
		n (%)	n (%)
Sex	Male	32 (33.7)	20 (21.1)
	Female	63 (66.3)	75 (78.9)
Age	Mean age, y (SD)	84.1 (7.7)	63.8 (10.9)
	Age range, y	67-103	38-87
Relationship with caregiver			
	Daughter		26
	Daughter-in-law		25
	Wife		22
	Son		14
	Husband		6
	Sibling		2
Self- rated health			
	Good		11
	Intermediate		50
	Poor		23
	Very poor		11
Duration of caregiving			
	Mean, y (SD)		4.17 (3.75)

Table 2. Association between characteristics of caregivers, caregiver burden, and GHQ-12 score

		GHQ-12 score		Number (%)	P value ^a
		3 or less (n=72) n (%)	4 or more (n=23) n (%)		
<i>Characteristics of caregivers</i>					
Age					
	≤64 years	41 (77.4)	12 (22.6)	53 (55.8)	0.688
	≥65 years	31 (73.8)	11 (26.2)	42 (44.2)	
Sex					
	Male	15 (75)	5 (25)	20 (21.1)	0.926
	Female	57 (76)	18 (24)	75 (78.9)	
<i>Social support</i>					
Informal supporter					
	Yes	63 (75.9)	20 (24.1)	83 (87.4)	0.946
	No	9 (75)	3 (25)	12 (12.6)	
Insufficient information on care services					
	Yes	2 (33.3)	4 (66.7)	6 (6.3)	0.012
	No	70 (78.7)	19 (21.3)	89 (93.7)	
Lack of place for consulting on caregiving					
	Yes	3 (50)	3 (50)	6 (6.3)	0.128
	No	69 (77.5)	20 (22.5)	89 (93.7)	
<i>Psychological burden</i>					
Severe stress and heavy psychological burden					
	Yes	18 (52.9)	16 (47.1)	34 (35.8)	<0.001
	No	54 (88.5)	7 (11.5)	61 (64.2)	
Difficulty communicating with care recipient					
	Yes	28 (66.7)	14 (33.3)	42 (44.2)	0.065
	No	44 (83.0)	9 (7.0)	53 (55.8)	
Lack of free time					
	Yes	16 (57.1)	12 (42.9)	28 (29.5)	0.006
	No	56 (83.6)	11 (16.4)	67 (70.5)	
<i>Physical burden</i>					
Physical pain					
	Yes	31 (72.1)	12 (27.9)	43 (45.3)	0.444
	No	41 (78.8)	11 (21.1)	52 (54.7)	
Lack of sleep					

	Yes	12 (57.1)	9 (42.9)	21 (22.1)	0.024
	No	60 (81.1)	14 (18.9)	74 (77.9)	
Fatigue	Yes	19 (67.9)	9 (32.1)	28 (29.5)	0.243
	No	53 (79.1)	14 (20.9)	67 (70.5)	
<i>Financial burden</i>					
Heavy financial burden	Yes	5 (45.5)	6 (54.5)	11 (11.6)	0.012
	No	67 (79.8)	17 (20.2)	84 (88.4)	

^a Chi-square test

Table 3. Association between behavioral symptoms of care recipients and GHQ-12 score of caregivers

		GHQ-12 score		Number (%)	P value ^a
		3 or less	4 or more		
		(n=72) n (%)	(n=23) n (%)		
<i>Behavioral symptoms</i>					
	Yes	16 (55.2)	13 (44.8)	29 (30.5)	0.002
	No	56 (84.8)	10 (15.2)	66 (69.5)	
<i>Night wandering</i>					
	Yes	3 (60)	2 (40)	5 (5.3)	0.397
	No	69 (76.7)	21 (23.3)	90 (94.7)	
<i>Hygiene problems</i>					
	Yes	3 (50)	3 (50)	6 (6.3)	0.128
	No	69 (77.5)	20 (22.5)	89 (93.7)	
<i>Eating problems</i>					
	Yes	0 (0)	0 (0)	0 (0)	—
	No	72 (75.8)	23 (24.2)	95 (100)	
<i>Uncooperative or oppositional behavior</i>					
	Yes	4 (57.1)	3 (42.9)	7 (7.4)	0.231
	No	68 (77.3)	20 (22.7)	88 (92.6)	
<i>Aggression/violence</i>					
	Yes	4 (80)	1 (20)	5 (5.3)	0.821
	No	68 (75.6)	22 (24.4)	90 (94.7)	
<i>Day/night rhythm disturbances</i>					
	Yes	3 (60)	2 (40)	5 (5.3)	0.397
	No	69 (76.7)	21 (23.3)	90 (94.7)	
<i>Confabulation/visual hallucinations/auditory hallucinations</i>					
	Yes	9 (75)	3 (25)	12 (12.6)	0.946
	No	63 (75.9)	20 (24.1)	83 (87.4)	
<i>Talking to oneself</i>					
	Yes	3 (100)	0 (0)	3 (3.2)	0.320
	No	69 (75)	23 (25)	92 (96.8)	
<i>Forgetting to turn off the gas range</i>					
	Yes	2 (22.2)	7 (77.8)	9 (9.5)	<0.001
	No	70 (81.4)	16 (18.6)	86 (90.5)	

^a Chi-square test

Table 4. Association between GHQ-12 score and number of behavioral problems and caregiver burdens

	GHQ-12 score		P value
	3 or less n=72	4 or more n=23	
Number of behavioral problems			
0	56	10	0.003 ^b
1	8	6	
2	4	6	
3 or more	4	1	
Number of caregiver burdens	2 (0, 4) ^a	5 (2.5, 5.5) ^a	0.001 ^b

^a Median (1st quartile, 3rd quartile), ^bWilcoxon rank-sum test

Table 5. Mediation model with behavioral problems, caregiver burden, and GHQ-12

	Items	Regression coefficient	P value
Step 1			
Independent variable	Behavioral problems		
Mediator variable	Caregiver burden	0.845	<0.001
Step 2			
Dependent variable	GHQ-12		
Independent variable	Behavioral problems	0.60	0.018
Step 3			
Dependent variable	GHQ-12		
Independent variable	Behavioral problems	0.351	0.201
Mediator variable	Caregiver burden	0.363	0.005

Step 2 Regression coefficient 0.60 > Step 3 Regression coefficient 0.35

Step 1: simple regression analysis, Steps 2 and 3: logistic regression analysis

Figure 1. Mediator model with the number of behavioral problems as the independent variable, the number of caregiver burdens as the mediator variable, and the GHQ-12 score as the dependent variable.

