version of the Zarit Burden Interview (J-ZBI); (2) questions regarding their demographic characteristics and that of the disabled elder they cared for; (3) questions about the type and severity of the elder's disabilities; and (4) utilization of public care services.

Caregiver burden

Caregiver Burden was assessed by the Japanese version of the Zarit Burden Interview (J-ZBI), a 22-item self-report inventory that examines the burden associated with functional/behavioral impairments in the home care situation (Arai et al., 1997). The Zarit Burden Interview (ZBI) is one of the most commonly-used scales for assessing the burden of caregiving (Zarit et al., 1980; Zarit and Zarit, 1990).

Demographic variables

Caregivers provided demographic information about themselves and the disabled elderly, including: (1) age and sex: (2) relationship between caregiver and disabled elderly, and (3) number of family members living with them. Caregivers were also asked whether they were receiving any kind of assistance from family members in caring for their disabled elderly.

Disabilities

The elder's disabilities were assessed for problems in Activities of Daily Living (ADL), cognitive impairment and the presence of behavioral disturbances. ADL were measured using the Barthel Index (BI), the widely used ten-item ADL scale, scored from 0–20 (Wade and Collins, 1988; Eto, 2002). Cognitive impairment of the elderly was rated by caregivers using the Short Memory Questionnaire (SMQ). SMQ is a screening test for dementia designed for use in questionnaires by ordinary people. It measures overall cognitive function, with scores ranging from 0–46 (Koss et al., 1993; Maki et al., 1998). The cutoff point for cognitive impairment is less than 40.

In order to determine whether the disabled elderly had behavioral disturbances associated with dementia, we asked the caregivers to fill out the Troublesome Behavior Scale (TBS) (Asada et al., 1994; Asada et al., 1999). The TBS is comprised of 14 questions to assess the types and frequency of behavioral disturbances associated with dementia observed by primary caregivers of the elderly, scored from 0 to 56. Similar in types of behaviors measured to other scales such as the Neuropsychiatric Inventory, the TBS was developed using terminology that could

readily be understood by Japanese respondents. The scores on the TBS in this study were highly skewed with many caregivers reporting no behavior disturbances. As a result, we recoded the TBS as a dichotomous variable, with 0 indicating no behavior disturbances and 1 indicating some disturbances. Caregivers were also asked how many hours they spent in caregiving per day, using a five-point scale ranging from 1 (less than 1 h) to 5 (more than 10 h).

Service utilization

Caregivers were also asked questions about their use of care services, including: (1) the number of care services they had used; and (2) to what extent (the percentage) they used up the amount of services available to them. In Matsuyama Town, the following six public services were available for those in need of care under the LTC insurance scheme: home-help (housekeeping), home nurse visits, overnight respite care, bathing service, adult day services and day care center. Thus, the number of services they had used could range from 0–6. We investigated to what extent the disabled elderly actually used care services against the maximum amount of care services available to them under the LTC insurance; specifically, we used a five-point scale ranging from 1 (less than 30%) to 5 (more than 100%). 'More than 100%' means that they had been using some additional care services at their own expense. Although use of medical services might also contribute to caregivers' outcomes, those services are not covered under the LTC and so that was not included in the study. Given the medical care system in Japan, older patients in need of medical care would likely be receiving it.

ANALYSES

First, demographic variables were explored as possible covariates in the model. Since the sample size was very small, it was necessary to reduce the number of covariates include in the model. To select potential covariates, bivariate correlations were computed between the demographic variables and the other measures in the model. Demographic variables that were significantly correlated with other variables in the model were included in subsequent analyses.

Second, a model was tested to examine if the use of home care services effectively reduces feelings of burden among family caregivers. The model included the following five latent variables: 'ADL deficits'; 'severity of dementia'; 'support from caregiver family members'; 'utilization of care services'; and

'caregiver burden'. 'ADL deficits' was derived from two measured variables, the BI score and hours of caregiving/day. 'Severity of dementia' was derived from two measured variables, the SMQ score and behavioral disturbances. 'Support from caregiver family members' was also derived from two measured variables, the number of family members living with the elderly and their caregiver, and the availability of assistance from the family members. 'Utilization of care services' was derived from two measured variables, the number of services used and the proportion of services utilized in relation to the monthly coverage. 'Caregiver burden' was derived from the J-ZBI score.

Structural equation modeling (SEM) was used to test the model. Maximum likelihood estimation was used to estimate the standardized parameters of the model. The fit of the model to the observed data was assessed with the chi-square statistic, the adjusted goodness of fit index (AGFI) (Arbuckle, 1995), the comparative fit index (CFI) (Bentler, 1990), and the root mean square error of approximation (RMSEA) (Browne and Cudeck, 1993). A chi-square that is not significant ($p > 0.05$) indicates the model does not significantly differ from the data, i.e. a good fit. An AGFI and CFI with a value above 0.90 indicate a very good fit, and an RMSEA of less than 0.05 represents a very good fit.

The Statistical Package for Social Science (SPSS, version 11.5.1, SPSS Inc.) and Amos 5 (SPSS Inc.) were used for the statistical analyses.

RESULTS

Characteristics of subjects

Table 1 shows the characteristics of the disabled elderly. The mean age was 80.2 (SD 8.8) years old, and 73.2% were female. The mean BI score was 9.5

Table 1. Characteristics of the impaired elderly

	Mean	SD
Age	80.2	8.8
BI score	9.5	6.2
SMQ score	18.1	13.5
	n	%
Sex		
Male	22	26.8
Female	60	73.2
Behavioral disturbances		
−	46	56.1
+	36	43.9

BI = Barthel Index; SMQ = Short Memory Questionnaire.

(SD 6.2), and the SMQ mean score was 18.1 (SD 13.5). Seventy-four out of the 82 disabled elderly who scored less than 39 on the SMQ were regarded as having some memory difficulties. Forty-six disabled elderly who scored 0 on the TBS were regarded as having no behavioral disturbance.

Table 2 shows the characteristics of the caregivers. The mean age was 60.5 (SD 13.2) years old, and 76.8% were female. Of the 82 caregivers, 33 were daughters-in-law of the disabled elderly (the normative caregiver in traditional Japanese culture), 16 were wives, and 12 were husbands. The mean number of family members dwelling with subjects was 4.4 (SD 2.0). The mean duration of caregiving was

Table 2. Characteristics of the caregivers

	Mean	SD
Age	60.5	13.2
Number of family members	4.4	2.0
Duration of caregiving (month)	49.7	49.1
J-ZBI score	30.9	17.3
	n	%
Sex:		
Male	19	23.2
Female	63	76.8
Relationship of the caregiver to the impaired elderly		
Wife	16	19.5
Husband	12	14.6
Daughter	9	11.0
Son	6	7.3
Daughter-in-law	33	40.2
Other	6	7.3
Hours of caregiving/day		
1. Less than 1 h	21	25.6
2. 1–3 h	30	36.6
3. 3–6 h	16	19.5
4. 6–9 h	4	4.9
5. More than 10 h	11	13.4
Assistance from the family members		
None	25	30.5
Some	57	69.5
Number of services used		
0	16	19.5
1	31	37.8
2	25	30.5
3	9	11.0
4	1	1.2
Proportion of the utilization of the services to maximum monthly coverage		
1. Less than 30%	48	58.5
2. 30–50%	22	26.8
3. 50–80%	5	6.1
4. 80–100%	4	4.9
5. More than 100%	3	3.7

J-ZBI = Japanese version of the Zarit Burden Interview.

Table 3. Correlations between demographic variables and other variables

	Variable	1	2	3	4	5
1.	Age of the impaired elderly	1				
2.	Sex of the impaired elderly	0.18	1			
3.	Age of the caregivers	−0.03	−0.14	1		
4.	Sex of the caregivers	0.33**	−0.33**	−0.32**	1	
5.	Duration of caregiving (months)	−0.19	−0.05	0.15	0.03	1
6.	Number of family members	0.11	−0.03	−0.15	0.15	−0.10
7.	Assistance from the family members	0.15	0.14	−0.05	−0.05	−0.08
8.	BI score	0.13	0.01	−0.04	0.15	−0.03
9.	SMQ score	−0.03	0.07	0.07	−0.13	−0.16
10.	Behavioral disturbances	0.10	−0.02	−0.21	0.14	0.07
11.	Hours of caregiving/ day	−0.26*	−0.07	−0.04	−0.06	0.15
12.	No. of services used	−0.07	0.09	−0.01	−0.15	0.17
13.	Proportion of the utilization of the services to the monthly coverage	−0.24*	−0.11	0.03	−0.03	0.20
14.	J-ZBI score	−0.13	−0.12	0.07	0.07	−0.01

*Note:*** $p < 0.01$; *: $p < 0.05$; sex: male = 0, female = 1; BI = Barthel Index; SMQ = Short Memory Questionnaire; Behavioral disturbances: none = 0, some = 1; Assistance from the family members: none = 0, some = 1; Proportion of the utilization of the services: less than 30% = 1, 30–50% = 2, 50–80% = 3, 80–100% = 4, more than 100% = 5; and J-ZBI = Japanese version of the Zarit Burden Interview.

49.7 months (SD 49.1). Thirty caregivers (36.6%) spent 1–3 h in caregiving per day. Approximately 70% of the subjects had used 1 or 2 of the public care services. Most subjects (84%) had used less than 50% of the monthly amount of services available to them. The mean score of the J-ZBI was 30.9 (SD 17.3).

Correlational analyses

Table 3 shows the correlation coefficients between the demographic variables and other variables. As noted, demographic variables were explored as possible co-variates for inclusion in the model. Specifically, the age of the disabled elderly was significantly correlated with the sex of caregivers ($r = 0.33$), the hours of caregiving ($r = -0.26$) and the proportion of the services utilized under the monthly coverage ($r = -0.24$). In contrast, the sex of the disabled elderly and the age of the caregivers were significantly correlated only with the sex of the caregivers. Taken together, three demographic variables, the sex of the disabled elderly, and the age and sex of the caregivers, had no relation to the other variables in the model and so were not included in subsequent analyses. Only age of the disabled elderly had a significant relation with the other variables in the model, and so it has been retained.

Structural equation modeling

The results of the structural equation modeling of the model are shown in Figure 1. The model included five latent variables: 'ADL deficits', 'severity of

dementia', 'support from caregiver family members', 'utilization of care services', and 'caregiver burden'. The age of the disabled elderly was treated as a control variable for three exogenous latent variables (support from caregiver family members, ADL deficits of the disabled elderly, cognitive deficits of the disabled elderly). This model showed a good fit with the data: chi-square (df = 26) = 34.46, $p = 0.12$; AGFI = 0.85; CFI = 0.92; RMSEA = 0.06.

First, the direct effects of three latent variables on 'caregiver burden' are shown respectively as a path coefficient from the latent variable to the 'caregiver burden'. A positive value indicates that the latent variable is associated with higher burden. 'ADL deficits' and 'severity of dementia' both had positive relationships with 'caregiver burden', indicating that caregivers of people with greater deficits had higher burden. By contrast, receiving more support from family members was associated with lower burden.

Second, each of these constructs had a similar direct relation with 'utilization of care services.' Caregivers assisting people with greater ADL deficits and greater dementia severity used more care services, while those who received more support from their families used fewer care services.

Third, 'utilization of care services' had a negative relation to 'caregiver burden', indicating that people using more services had lower burden.

DISCUSSION

The present study examined the relationship between the utilization of the care services and caregiver
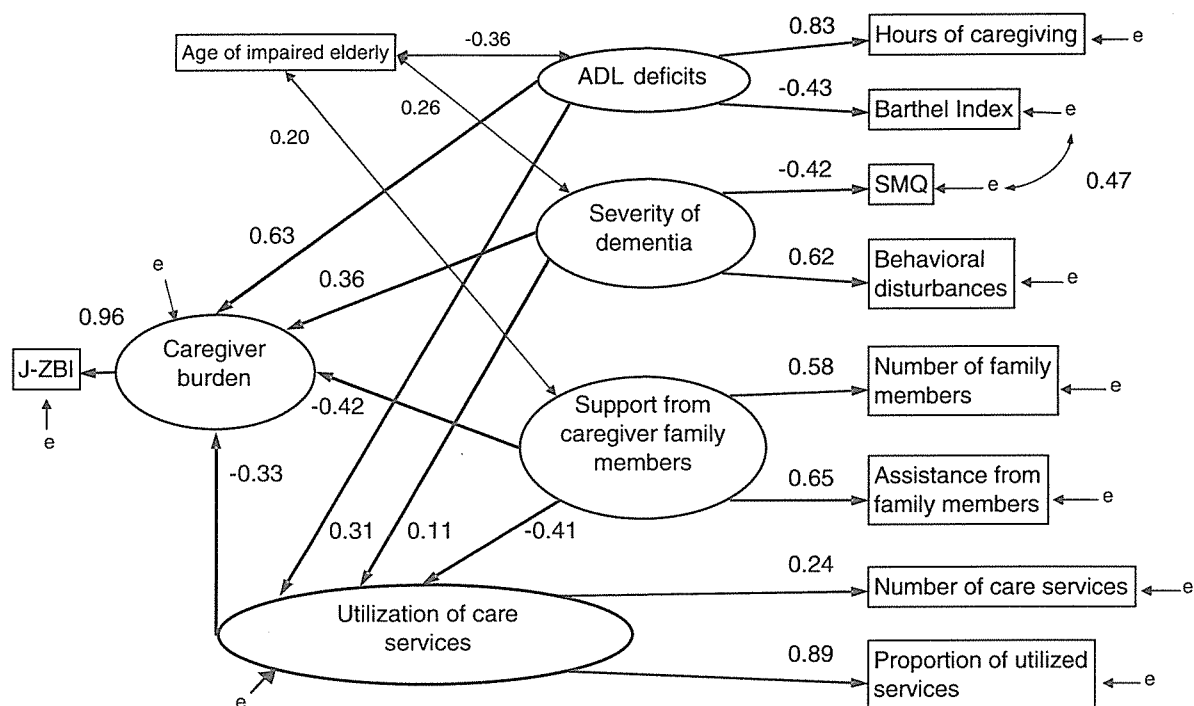
Figure 1. Structural equation model of caregiver burden of family caregivers. J-ZBI = Japanese version of the Zarit Burden Interview. SMQ = Short Memory Questionnaire. Chi-square (df = 26) = 34.46, p = 0.12; AGFI = 0.85; CFI = 0.92; RMSEA = 0.06.

burden under the LTC insurance system in Japan. The results of a structural equation model revealed that the use of home care services is associated with lower feelings of burden among family caregivers.

The model also indicated that ADL deficits and severity of dementia of the disabled elderly are related to higher caregiver burden. This result is consistent with the previous findings that the degree of impairment among the elderly is positively correlated with the feelings of burden among family caregivers (Zarit *et al.*, 1986; Harper and Lund, 1990; Draper *et al.*, 1992; Donaldson *et al.*, 1997; Arai *et al.*, 2000). Also, the present study has shown that the availability of instrumental support from other family members is associated with lower burden among the family caregivers, which is also consistent with previous studies (Pearlin *et al.*, 1995; Miller *et al.*, 2001).

An examination of the model suggests that service use affects the relation of severity to burden and may mediate the impact. The path coefficient from 'ADL deficits' and 'severity of dementia' to 'utilization of care services' is positive, indicating that the severity of ADL deficits and severity of dementia are associated with greater use of care services. Taken together, these findings suggest that caregivers of

people with more severe impairment used more services, which resulted in lower feelings of burden. One of the goals of the LTC insurance system is to reduce caregiver burden (Ministry of Health and Welfare, 1996). The present study has shown that the LTC insurance system in Japan has been fulfilling its objectives; care services provided under the LTC insurance system have been successful in reducing the burden of family caregivers.

On the other hand, the path coefficient from 'support from caregiver family members' to 'utilization of care services' was found to be negative, indicating that the amount of informal support from the co-residing family members was negatively related to the amount of care services used. These results suggest that when caregivers receive more family help, they also receive less formal help and get less benefit from it. Previous studies have shown that family caregivers are hesitant to use public care services (LoGiudice *et al.*, 1995; Caserta *et al.*, 1987; Collins *et al.*, 1991; Office of Management and Coordination Agency, 1997; Watts, 1988; Arai *et al.*, 1998). The present study shows, however, that service use can be effective in helping caregivers with the demands placed on them.

KEY POINTS

- There is a paucity of observational studies of the impact of home care services on burden or other aspects of the caregiver's experience.
- This study examined whether the use of care services was associated with lower feelings of burden among family caregivers in a town in the north in Japan.
- After controlling for the effects of severity of impairments, the use of home care services was associated with lower feelings of burden among family caregivers.
- The findings suggest that home care services have been successfully reducing burden among family caregivers in the study area.

The limitation of the present study is its small sample size, which precluded the use of variables that had been previously reported to be related to caregiver burden, e.g. the kinship of the caregiver (Pinquart and Sörensen, 2003). Given the cross-sectional nature of the data, we also do not know how much of the differences in burden were due to service use or to pre-existing characteristics. Nonetheless, one of the strengths of the present study is that we obtained the sample from the list of people using services, and not from volunteers or clinical populations. In addition, this is the first observational (cross-sectional) study to clearly show the effect of the use of care services on the reduction of caregiver burden in a community setting.

ACKNOWLEDGEMENTS

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DISCOVER SOMETHING GREAT

Factors related to potentially harmful behaviors towards disabled older people by family caregivers in Japan

Megumi Sasaki, Yumiko Arai*, Keigo Kumamoto, Koji Abe, Asuna Arai and Yoko Mizuno

Department of Gerontological Policy, National Institute for Longevity Sciences (NILS), National Center for Geriatrics and Gerontology (NCGG), Obu-shi, Aichi, Japan

SUMMARY

Objective The purpose of the present study was to examine factors related to potentially harmful behaviors (PHB) by family caregivers towards their older family members.

Methods Four hundred and twelve pairs of disabled older adults and their family caregivers participated in the study. All of these disabled older adults were users of visiting nursing services under the public Long-Term Care insurance system, who resided in one of the eight catchment areas of visiting nursing services in Kyoto Prefecture, Japan. The caregivers were asked to complete questionnaires in relation to their PHB towards their older family members, caregiver burden, patient-caregiver kinship, behavioral disturbances of their older adult, age and sex. Visiting nurses obtained the following information regarding the older adults: the severity of dementia; the severity of physical impairment; age and sex.

Results More than 30% of the caregivers admitted PHB towards their older family members. The most frequently reported PHB included verbal aggression (16.8%) and ignoring (13.6%). A logistic regression analysis revealed that adult children (OR = 2.69, 95%CI = 1.23–5.89, $p = 0.013$) and caregivers of disabled older people with behavioral disturbances (OR = 3.61, 95%CI = 1.65–7.90, $p < 0.01$) were more likely to show PHB.

Conclusions In the present study, PHB towards the older people by family caregivers was associated with patients' behavioral disturbances and patient-caregiver kinship, i.e. an adult child as a caregiver. These findings should be taken into account when planning strategies to prevent PHB by family members. Copyright © 2006 John Wiley & Sons, Ltd.

KEY WORDS — potentially harmful behaviors; behavioral disturbances; patient-caregiver kinship; adult child; caregiver burden

INTRODUCTION

Recently, concern about elder abuse or mistreatment by informal family caregivers has been increasing (Lachs *et al.*, 1998; Mosqueda *et al.*, 2004). Lachs and Pillemer (2004) reviewed reports on elder abuse and indicated that it is regularly encountered in daily clinical practice. Moreover, elder mistreatment was found to be associated with shorter survival in the elderly (Lachs *et al.*, 1998). In order to prevent elder abuse, in the United States, provision for prevention of

abuse, neglect and exploitation was established in the amended Older Americans Act in 1992. Also in the United Kingdom, the Protection of Vulnerable Adults scheme, as set out in the Care Standards Act 2000, has been implemented since 2004. Moreover, in Japan, the Protection of Vulnerable Adults Law was passed in the diet and took force in April of 2006. Indeed, the prevention of elder abuse is a world-wide issue.

Various kinds of risk factors have been investigated regarding elder abuse. As for patient factors, Bredthauer *et al.* (2005) showed that patients with low cognitive status, serious mobility impairments, and inability to perform ADL activities were at very high risk of being physically restrained. It was also indicated that greater care recipient ADL/IADL needs were a predictor of potentially harmful behaviors (Beach *et al.*, 2005) and that cognitive impairment

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*Correspondence to: Dr Y. Arai, Departmental Head, Department of Gerontological Policy, National Institute for Longevity Sciences (NILS), National Center for Geriatrics and Gerontology (NCGG), 36-3 Gengo Morioka-cho, Obu-shi, Aichi, 474-8522, Japan.
E-mail: yarai@nils.go.jp

(Lachs et al., 1997) was a predictor of abuse and neglect by family caregivers. From these findings, severity of patient impairment seems to be one of the important risk factors for potentially harmful behaviors, abuse, and neglect by family caregivers. In addition, behavioral disturbance has been found as a predictor of patient insitutionalization (Asada et al., 2000) and elder abuse (Compton et al., 1997; Bredthauer et al., 2005). Coen et al. (1997) and Arai et al. (1999, 2004) also indicated that behavioral disturbance is one of the predictors of caregiver burden. These findings have suggested that behavioral disturbance in disabled older people may be an important risk factor for burden and abuse in caregivers.

As for caregiver factors, Steinmetz (1988) suggested that caregivers with more burden tend to abuse. Moreover, the patient-caregiver kinship was examined as a possible predictor of potentially harmful behaviors. Beach et al. (2005) suggested that spouse caregivers were more prone to conduct potentially harmful behaviors, while Coen et al. (1997) found that daughters were especially prone to burden. On the other hand, Fulmer et al. (2005) showed that patient-caregiver kinship was not associated with elder neglect. Since the above-mentioned findings are inconsistent, it is necessary to examine whether there is a specific patient-caregiver kinship in which elder abuse is likely to occur.

In Japan, the proportion of adult child as caregiver is as high as that of spouse as caregiver and daughter-in-law as caregiver (i.e. approximately 20% according to the Ministry of Health, Labour and Welfare, 2004). Thus, the various kinship relations between patients and their caregivers should be taken into account in investigations on elder abuse in Japan.

In previous studies, diverse terms such as abuse, mistreatment, and potentially harmful behaviors were employed to imply abusive behaviors. Among them, Williamson et al. (2001) and Beach et al. (2005) focused on potentially harmful behaviors by family caregivers, which were defined as behaviors detrimental to the physical and psychological well-being in disabled older people but not necessarily severely abusive. Williamson et al. (2001) included the following five physically-related items of potentially harmful behaviors: withholding food; hitting or slapping; shaking; handling roughly in other ways; and making them afraid of being hit or hurt. The following five items were included as the psychological items: screaming and yelling; threatening with nursing home placement; threatening to use physical force or threatening to abandon; using a harsh tone of voice; insulting; calling names; and swearing at him/her. Beach et al. (2005) regarded potentially harmful behaviors as an 'early warning sign' to full-blown elder abuse and suggested that its assessment may be amenable to preventive intervention efforts. Following Williamson et al. (2001) and Beach et al. (2005), we take the term 'potentially harmful behaviors' to mean potential detrimental behaviors by a family caregiver including physical and psychological components. In a preventive perspective, the detection of potentially harmful behaviors will provide valuable information as a warning sign of more serious elder abuse.

Because of lack of comprehensive investigations on risk factors including patient-caregiver kinship for harmful behaviors, the present study examined the patient factors (e.g. behavioral disturbance and physical or cognitive function), caregiver factors (e.g. caregiver burden), patient-caregiver kinship, and other demographic variables to identify factors related to potentially harmful behaviors on the part of family caregivers.

METHODS

Subjects

The present study was conducted in one of eight catchment areas of visiting nursing services in Kyoto Prefecture, Japan. There are 14 visiting nursing service agencies in this catchment (population, approximately 300,000), which covers Uji City, Jyouyou City, and Kumiyama Town. All of these 14 visiting nursing service agencies agreed to participate in the study and identified all 589 older adults, who used visiting nursing services under the public Long-Term Care insurance system. Subsequently, a principle family caregiver of each older adult was identified. This survey was conducted on these 589 pairs of older adults and his/her caregivers. Among these caregivers, 412 caregivers (70.0%) participated in the study and responded to a set of self-administered questionnaires. The inclusion criteria of the caregivers were: (1) principle caregiver of an older adult; (2) family caregiver of the older adult; and (3) living together with the older adult. Three hundred and ninety-eight pairs of disabled older people and caregivers (67.6%) met these criteria, and data from these pairs were subjected to further analyses. Written informed consent was obtained from all subjects. This study was endorsed by the ethical committee of the National Institute for Longevity Sciences.

Measures

In the present study, the following variables were assessed.

For the older people, the frequency of behavioral disturbances and severity of cognitive impairment were assessed by the caregivers. The frequency of behavioral disturbances observed by the primary caregiver was assessed using the Troublesome Behavior Scale (TBS; Asada et al., 1994, 1999), which is designed to quantify the specific observable behavior usually associated with dementia. This scale consists of 14 items and the scoring range is 0–56 points. Cronbach's α coefficient of the scale in this study was 0.80. Cognitive impairment of the elderly was assessed with the Japanese version of the Short Memory Questionnaire (SMQ; Maki et al., 1998, 2000), which was developed as an objective tool for the assessment of memory difficulties of dementia in a Japanese population. The SMQ consists of 14 items concerning everyday memory problems; the scoring range is 4–46 points. A score of less than 40 is suggestive of dementia. Cronbach's α coefficient of the scale in this study was 0.90.

The severity of dementia, the severity of physical impairment, problems in hearing, and problems in vision of the older people were assessed by the visiting nurses. The severity of dementia was assessed by the nurses using the following criteria developed by the Ministry of Health and Welfare (MHW) (1993); the severity of dementia was rated from I (very mild) to IV (very severe), and M was defined as 'very severe with extremely behavior disturbance'. The MHW suggested that those who were rated I or II were relatively easy to care for at home, albeit having dementia, and hence we used this classification [not severe (I and II) vs severe (III, IV, and M)] for the statistical analyses in the present study. The severity of physical impairment was assessed by the nurses using the following criteria developed by the MHW (1991); rating the severity of physical impairment from J (very mild) to C (very severe). The Ministry criteria suggested that those rated J or A were relatively easy to care for at home, and hence we used this classification [not severe (J and A) vs severe (B and C)] for the statistical analyses. These indexes developed by the MHW are often used by home care professionals in Japan. In addition, the hearing and vision problems of the older people were assessed by the visiting nurses.

For the caregivers, the relationship to the disabled older people was assessed; spouse as caregiver, adult child as caregiver, and daughter-in-law as caregiver.

The Japanese version of the Zarit Burden Interview (J-ZBI; Arai et al., 1997) was also included to assess caregiver burden. This questionnaire is a 22-item self-report inventory that has been widely used in Japan. The original version of the ZBI is one of the most common scales used in North America and European countries for assessing the burden of caregiving (Zarit and Zarit, 1990). A short version of the J-ZBI (J-ZBI_8) has recently been released (Arai et al., 2003; Kumamoto and Arai, 2004; Kumamoto et al., 2004). Conbach's α coefficient of J-ZBI in this study was 0.93.

The potentially harmful behaviors by the family caregivers were assessed using a checklist developed by Ueda (2000). This checklist was similar to the one developed by Williamson and Shaffer (2001). The caregivers' self-report checklist includes nine items; ignoring, leaving alone, verbal aggression, neglecting to care, slapping or pinching, restriction to their bedroom, physical restriction, deprivation of health services, and deprivation of money. Caregivers were asked to indicate how many kinds of behavior listed in the checklist (see Table 2) they had engaged in during the previous six months.

Caregivers were also asked to indicate how many hours per day they provided care for their older family members as well as how many years they had cared for him or her. They were also asked to estimate the number of hours per day they were able to be temporarily relieved of their duties or to leave the side of their older family members to go out.

Analyses

First, pairs of disabled older adults and caregivers were divided into two groups; caregivers who had engaged in at least one of the potentially harmful behaviors and those who had not.

Second, continuous variables except for behavioral disturbance (TBS) and cognitive impairment (SMQ) were dichotomized based on the median. The variable of behavioral disturbance (TBS) was dichotomized based on a score of zero or more than 1, while for cognitive impairment (SMQ), a score of less than 40 was used since it is suggestive of dementia for the dichotomization. The details of the dichotomization for all variables were presented in Table 3. Then, a χ^2 test was conducted to determine differences between the two groups.

Third, Spearman's rank correlation tests were conducted on the variables found to be statistically significant in the univariate analysis.

Finally, a multiple logistic regression analysis was employed to determine which of the explanatory

Table 1. Characteristics of subjects ($n = 398$)

	n (%)	Mean (SD)
Patients		
Sex		
Male	159 (39.9)	
Female	239 (60.1)	
Age		80.5 (9.2)
Behavioral disturbance (TBS) ($n = 327$)		3.2 (5.4)
Severity of dementia ($n = 386$)		
No problem	89 (23.1)	
I	98 (25.4)	
II	94 (24.4)	
III	51 (13.2)	
IV	42 (10.9)	
M	12 (3.1)	
Severity of physical impairment ($n = 387$)		
No problem	4 (1.0)	
J	29 (7.5)	
A	143 (37.0)	
B	118 (30.5)	
C	93 (24.0)	
Cognitive impairment (SMQ) ($n = 261$)		15.06 (13.92)
Hearing problems ($n = 373$)	108 (29.0)	
Vision problems ($n = 371$)	91 (24.5)	
Caregivers		
Sex		
Male	86 (21.6)	
Female	312 (78.4)	
Age ($n = 396$)		63.4 (11.4)
Hours of caregiving/day ($n = 326$)		9.40 (7.69)
Duration of caregiving (year) ($n = 384$)		5.58 (5.54)
Hours caregivers can be relieved/day ($n = 362$)		2.90 (2.90)
Spouse as caregiver	176 (44.2)	
Adult child as caregiver	134 (33.7)	
Daughter-in-law as caregiver	77 (19.3)	
Caregiver burden ($n = 329$)		31.36 (17.03)
Potentially harmful behaviors ($n = 341$)		
Caregivers with at least a kind of potentially harmful behavior	119 (34.9)	
Caregivers with no potentially harmful behavior	222 (65.1)	

variables was significantly related to the caregivers' experience of the potentially harmful behaviors to their older family member. The odds ratio (OR) and the 95% confidence interval (CI) were calculated for each factor.

The criterion for statistical significance was a p-value less than 0.05 for all analyses.

The Statistical Package for Social Science for Windows (version12.0J, SPSS, Inc.) was used for the above analyses.

RESULTS

Characteristics of subjects

Table 1 shows the characteristics of the subjects in the present study. The mean age of the disabled older people was 80.5 (SD 9.2) years, and 60.1% were female. The mean age of the caregivers was 63.4 (SD 11.4) years, and 78.4% were female.

Among caregivers who responded to the question concerning the potentially harmful behaviors, 119 (34.9%) reported that they had engaged in at least one of the potentially harmful behaviors in the checklist. Table 2 presented the percentage of each potentially harmful behavior by family caregivers. The most frequently reported behaviors were verbal aggression (16.8%) and ignoring (13.6%). Of 119 caregivers who reported that they had mistreated the elderly, 81 (68.1%) had engaged in one such behavior, 29 (24.4%) in two behaviors, eight (6.7%) in three behaviors, and one (0.8%) in four behaviors.

Table 3 compares the following two groups regarding the variables concerned; those who had

Table 2. Potentially harmful behavior by family caregivers

	n (%)
Ignoring	54 (13.6)
Leaving alone	13 (3.3)
Verbal aggression	67 (16.8)
Neglecting to care	11 (2.8)
Slapping, pinching, or kicking	18 (4.5)
Restricted to bedroom	2 (0.5)
Physical restriction	0 (0.0)
Deprivation of health services	1 (0.3)
Deprivation of money	1 (0.3)

engaged in at least one type of potentially harmful behavior and those who had not. The following five variables were significantly different between the two groups: the proportion of the disabled older people who had behavioral disturbance; the proportion of those with more severe (level B or C) physical impairment; the proportion of those with hearing problems; the proportion of adult child caregivers; and the proportion of caregivers who felt highly burdened.

Table 4 presents the Spearman's rank correlations between the above four variables. First, the existence of potentially harmful behaviors was correlated with the older people having behavioral disturbances ($\rho = 0.30$, $p < 0.01$), the severity of physical impairment ($\rho = -0.13$, $p < 0.05$), hearing problems ($\rho = 0.12$, $p < 0.05$), adult child as caregiver ($\rho = 0.11$, $p < 0.05$), and caregiver burden ($\rho = 0.20$,

$p < 0.01$). Since the correlation between those with hearing problems and adult child as caregiver was significant but too weak to cause multicollinearity, these variables were also included in the following analysis.

A logistic regression analysis was employed to determine which of the following five variables were significantly related to the potentially harmful behaviors: behavioral disturbance (0 vs 1); severity of physical impairment (no problem, J, A vs B, C); problems in hearing (0 vs 1); adult child as caregiver (no vs yes); and caregiver burden (J-ZBI score 27 and less vs 28 and more). As shown in Table 5, two of these variables proved to be significant factors related to the potentially harmful behaviors: behavioral disturbance and adult child as caregiver. Family caregivers who looked after their older family members with behavioral disturbances were more likely to show potentially harmful behaviors towards them (OR = 3.61, 95% CI = 1.65–7.90, $p < 0.01$). Adult child as caregiver also tended to engage in them (OR = 2.69, 95% CI = 1.23–5.89, $p = 0.013$).

DISCUSSION

The present study showed that 34.9% of the caregivers had engaged in potentially harmful behaviors towards their older family members. Similar results were obtained in the previous studies using the same checklist, 32.4% in Ueda's (2000) study and 34.9% in

Table 3. Comparisons between caregivers with at least one type of potentially harmful behavior and those with none

	Caregivers with no potentially harmful behavior		Caregivers with at least one type of potentially harmful behavior		χ^2	p
Patients						
Sex (Female vs Male)	134 vs 88	n = 222	74 vs 45	n = 119	0.11	0.816
Age (Years) (−80 vs 81+)	112 vs 110	n = 222	54 vs 65	n = 119	0.80	0.426
Behavioral disturbance (0 vs 1+)	127 vs 35	n = 162	27 vs 30	n = 57	19.45	<0.001
Severity of dementia (no problem, I, II vs III, IV, M)	159 vs 60	n = 219	82 vs 29	n = 111	0.06	0.896
Severity of physical impairment (no problem, J, A vs B, C)	89 vs 130	n = 219	61 vs 51	n = 112	5.72	0.020
Cognitive impairment (SMQ) (−39 vs 40+)	130 vs 17	n = 147	78 vs 4	n = 82	2.83	0.101
Hearing problems (0 vs 1)	155 vs 54	n = 209	69 vs 41	n = 110	4.51	0.039
Vision problems (0 vs 1)	161 vs 45	n = 206	81 vs 30	n = 111	1.07	0.333
Caregivers						
Sex (Female vs Male)	174 vs 48	n = 222	92 vs 27	n = 119	0.05	0.891
Age (Years) (−62 vs 63+)	117 vs 104	n = 221	59 vs 60	n = 119	0.35	0.571
Hours of caregiving/day (−5.9 vs 6+)	84 vs 103	n = 187	45 vs 52	n = 97	0.06	0.900
Duration of caregiving /year (−3.9 vs 4+)	110 vs 108	n = 218	59 vs 56	n = 115	0.02	0.909
Hours caregivers can be relieved/day (−1.9 vs 2+)	78 vs 122	n = 200	36 vs 78	n = 114	1.73	0.223
Spouse as caregiver (no vs yes)	126 vs 96	n = 222	71 vs 48	n = 119	0.27	0.646
Adult child as caregiver (no vs yes)	154 vs 68	n = 222	69 vs 50	n = 119	4.44	0.042
Daughter-in-law as caregiver (no vs yes)	171 vs 51	n = 222	101 vs 18	n = 119	2.96	0.091
Caregiver burden (−27 vs 28+)	105 vs 92	n = 197	31 vs 66	n = 97	11.91	0.001

Table 4. Correlations between potentially harmful behaviors, behavioral disturbances, severity of impairment, hearing problems, adult child as caregiver, and caregiver burden

	Potentially harmful behaviors	Behavioral disturbances	Severity of physical impairment	Hearing problems	Adult child as caregiver
Behavioral disturbances	0.30**				
Severity of physical impairment	−0.13*	−0.11			
Hearing problems	0.12*	0.10	−0.07		
Adult child as caregiver	0.11*	0.07	−0.04	0.11*	
Caregiver burden	0.20**	0.10	0.05	0.05	−0.07

$*p < 0.05$.
$**p < 0.01$.

a study conducted by Kumamoto et al. (2004) in Japan. As indicated in Table 2, ignoring and verbal aggression were frequent. It would be difficult for home care professionals to detect the above-mentioned behaviors such as ignoring and verbal aggression on their visits for the following two reasons. First, unlike physical abuse, ignoring and verbal aggression would not leave any traces of abuse on the abused older people. Second, such behavior is often covert. Therefore, self-reports either by the older people or family caregivers may provide more information than observations by home care professionals on their visits. However, self-reports by the older people may not be reliable if they suffer from severe dementia. In the present study, we used self-reports by family caregivers, which may have more reliable and detailed information on potentially harmful behaviors, even if their self-reports may have a response bias regarding more implicit behaviors such as ignoring and verbal aggression. Thus, health professionals should routinely assess potentially harmful behaviors through self-reports by caregivers in order to detect the person and kind of potentially harmful behavior for preventive intervention.

Behavioral disturbance of the older people was identified as a factor related to potentially harmful behaviors. This finding is consistent with a previous study which presented a significant relation between the behavioral disturbance of the older people and abuse by caregivers (Compton et al., 1997). Many

studies revealed that behavioral disturbance correlates to caregiver burden, after other confounding factors are statistically controlled, regardless of the sample characteristics and the place of study (Coen et al., 1997; Arai et al., 1999, 2004). Indeed, coping with behavioral disturbances is one of the most demanding tasks for caregivers, as Coen et al. (1997) and Arai et al. (2004) also suggested. The present study supports the previous findings.

In order to prevent potentially harmful behaviors of caregivers, it is necessary to provide interventions on behavioral disturbances to both older people and caregivers. As pharmacological interventions for older people with behavioral disturbances, typical/atypical antipsychotic medications or antidepressants is often used in clinical settings. However, typical/atypical antipsychotic medications should be provided with caution due to the fact that these would be expected to increase the risk of death in older people (e.g. Wang et al., 2005). Clinicians may also provide pharmacological interventions to caregivers if necessary (e.g. those depressed because of the behavioral disturbances of older people they look after).

Regarding non-pharmacological interventions, Haupt et al. (2000) reported that psychoeducative group intervention with caregivers alleviated agitation and anxiety of demented older people. Moreover, Burgio et al. (2003) indicated that African-American caregivers' appraisal of the behavioral disturbances as bothersome was decreased by cognitive-behavioral

Table 5. Factors related to potentially harmful behaviors by family caregivers

Variables	Odds ratio	95% Confidence intervals	p
Behavioral disturbance (0 vs 1+)	3.61	1.65–7.90	0.001
Severity of physical impairment (no problem, J, A vs B, C)	1.11	0.50–2.46	0.794
Hearing problems (0 vs 1)	1.34	0.58–3.11	0.491
Adult child as caregiver (no vs yes)	2.69	1.23–5.89	0.013
Caregiver burden (−27 vs 28+)	1.67	0.76–3.67	0.205

skills training. They also showed that white caregivers' appraisal of the behavioral disturbances as bothersome was decreased by telephone support. These pharmacological and non-pharmacological interventions for behavioral disturbances may lead to the preventions of potentially harmful behaviors by family caregivers.

Another factor related to potentially harmful caregiver behaviors was patient-caregiver kinship, especially adult child as caregiver. Studies in the USA suggested that spouse caregivers were more likely to engage in potentially harmful caregiver behaviors (Beach *et al.*, 2005) or that the patient-caregiver kinship was not associated with neglect (Fulmer *et al.*, 2005). In the present study on Japanese people, adult child as caregiver was identified as a factor related to potentially harmful behaviors. The process in which being an adult child as a caregiver increases the risk for potentially harmful behaviors is still unclear. Strawbridge *et al.* (1991) indicated that relationship quality with the parent had both a direct effect on caregiver burden and an indirect one through family conflict. It would be useful to include the quality of patient-caregiver relationship as well as in future studies in order to clarify the underlying process of potentially harmful behaviors.

A limitation of our study is that we were unable to confirm whether the two factors identified in the present study actually cause potentially harmful behaviors due to the methodological limitation attached to cross-sectional studies.

Nonetheless, our study has the following strengths. It is one of the few studies conducted in a community setting in Japan in order to investigate factors related to potentially harmful behaviors towards the older people by using a self-report by family caregivers.

Second, we investigated various types of patient-caregiver kinship (i.e. spouse, daughter-in-law, and adult child) in order to identify factors related to potentially harmful behaviors. As mentioned in the Introduction, the proportion of each kind of kinship is almost equal among Japanese people (Ministry of Health, Labour and Welfare, 2004). However, adult child as caregiver was the only kinship which was found to be a factor in Japanese family caregivers. It may be useful to include various types of patient-caregiver kinship in the investigation of risk factors of potentially harmful behaviors.

Lastly, this study can be regarded as a comprehensive investigation of the factors related to potentially harmful behaviors including the demographic data of the older people and caregivers, behavioral disturbances and cognitive impairment in the older people,

caregiver burden in the family caregivers, and patient-caregiver kinship. To our knowledge, such a comprehensive investigation has been rarely undertaken.

In conclusion, our study revealed that behavioral disturbances in disabled older people and adult child as caregiver were significant factors related to potentially harmful behaviors by informal family caregivers. These findings should be taken into account when planning preventive strategies for potential harmful behaviors by family members.

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ORIGINAL ARTICLE

Assessing family caregiver's mental health using a statistically derived cut-off score for the Zarit Burden Interview

A. S. SCHREINER[1], T. MORIMOTO[2], Y. ARAI[3], & S. ZARIT[1]

[1]*The Pennsylvania State University, Pennsylvania, USA,* [2]*Nara Medical University, Japan, and* [3]*National Institute for Longevity Sciences, Japan*

Abstract

Decades of research have confirmed that being a family caregiver is a stressful role. However, the point at which these stressors constitute a real risk for decreased mental health has not been established. The purpose of the present study was to determine a statistically valid cut-off score for the Zarit Burden Interview (ZBI) in order to identify family caregivers at risk for depression and in need of further assessment and intervention. The ZBI and the Geriatric Depression Scale or the CES-D were administered to three different populations of family caregivers of older adults: stroke caregivers ($n = 80$), chronic obstructive pulmonary disease (COPD) caregivers ($n = 48$), and general disability caregivers ($n = 70$). Using three different statistical methods, a ZBI cut-off score was determined. Next, contingency analysis was used to compare depression scale scores and ZBI cut-offs for the three groups of caregivers. Findings suggest that a cut-off score ranging from 24–26 has significant predictive validity for identifying caregivers at risk for depression. A ZBI cut-off of 24 correctly identified 72% of caregivers with probable depression. The validity of ZBI cut-offs scores warrants further confirmation with larger samples. Valid cut-off scores would enable health care providers to assess family caregivers at risk and provide necessary interventions to improve their quality of life in this important role.

Introduction

Decades of international research have served to confirm that being a family caregiver is a stressful role. Family caregivers have been found to have an increased risk of depression, anxiety, and mortality (Bugge, Alexander, & Hagen, 1999; Carod-Artal et al., 1999; Hughes et al., 1999; Ory et al., 1999; Reese et al., 1998; Scholte op Reimer et al., 1998; Schulz & Beach, 1999; Schulz, Tompkins, & Rau, 1998; Vetter et al., 1999; Wu et al., 1999; Zarit, Todd, & Zarit, 1986). However, despite the magnitude of research in this field we remain uncertain as to exactly how much caregiver stress constitutes a real health risk. There are several ways to measure the stressors of care-giving. The oldest and most often used instrument is the Zarit Burden Interview (ZBI; Zarit & Zarit, 1987), which has been translated and validated in several languages allowing for international comparisons. High burden scores on the ZBI have been significantly related to a decrease in mental and physical health, as well as decreased vitality and social functioning.

The purpose of the present study was to determine a statistically valid cut-off score for the Zarit Burden Interview (ZBI) which can be used to

screen caregivers at risk for depression and in need of further assessment and intervention. The need for valid cut-off scores has been advocated by researchers of family caregivers for some time (Bedard et al., 2001; Hebert et al., 2000; Zarit & Zarit, 1987). One advantage of administering the ZBI over standard depression scales is that it enables caregivers to understand the relationship between their care-giving role and their feelings of stress, as well as gain insight into the magnitude of their own stress which is a necessary prelude to any intervention attempt. In addition, while presumably more objective measures of caregiver stress such as hours of direct care or types of care-giving tasks have not been found to relate to negative caregiver outcomes, subjective measures like the ZBI are strongly related to these negative outcomes.

Methods

Subjects

Family caregivers were defined as co-resident family members who assisted with most, if not all, of the

Correspondence: Andrea S. Schreiner, PhD, Department of Health Policy and Administration, College of Health and Human Development, The Pennsylvania State University, 116 Henderson Building, University Park, PA 18602-6500, USA. Tel: +1 (814) 865-1926. E-mail: axs27@psu.edu

patient's daily care needs. Sample inclusion was limited to stroke and chronic obstructive pulmonary disease (COPD) patients and caregivers with no previous psychiatric history. However, it is estimated that 70% of care-recipients in the general disability sample had some form of dementia.

Stroke and COPD caregivers. Following guidelines for ethical use of human subjects, stroke ($n = 80$) and COPD ($n = 48$) family-caregivers were recruited from private hospitals specializing in either neuro-logical or respiratory disorders, in five metropolitan areas in Western Japan. Seven neurological hospitals (54%) were randomly selected from a total of 13 and all facilities agreed to participate in the study (see Schreiner et al., 2003 for more information on stroke caregiver sampling and protocol). The COPD family caregivers were recruited from a convenience sample of five small hospitals that treated COPD patients on home-oxygen therapy. All co-resident family-caregivers of patients were invited to partici-pate in the study and the participation rate at each facility was 100% for the qualifying caregivers, which reflects the high involvement of the physicians.

General disability caregivers. General disability care-givers were recruited as part of the Matsuyama Caregiver Study (see Arai et al., 2000; Arai et al., 2002 for study details). Similar to stroke and COPD caregivers these subjects were the co-residing principal caregivers of older adults who had been registered as disabled elderly ($n = 88$) in a small city (population: 7126) in northern Japan. Disability status was determined on the basis of activities of daily living (ADL) scores and the presence of behavioural disturbances. Seventy surveys were returned for a response rate of 79%. The survey instrument included the ZBI, the Centre for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), and the revised Hasegawa Dementia Rating Scale (HDS-R; scores range from 0–30; scores less than 20 are considered indicative of a possible dementia; Hasegawa et al., 1974; Imai & Hasegawa, 1999), which is the equivalent of the Mini-Mental Exam and widely used in Japan. The mean HDS-R score for care recipients in this sample was 13.8 (SD = 9.2); roughly 70% ($n = 70$) scored as having some form of dementia.

Measures

Caregiver burden, was measured with the Zarit Burden Interview (ZBI; Zarit, Todd, & Zarit, 1986; Japanese version Arai et al., 1997) which consists of 22 items, 21 of which are summed to create a total burden score. Higher scores indicate greater burden. The ZBI measures subjective burden in terms of the degree (from 'never = 0' to 'almost always = 4') to which the caregiver experiences physical,

psychological, emotional, social and financial prob-lems as a result of their care-giving role.

Depressed mood among caregivers was measured with the Geriatric Depression Scale (GDS Short Form; translated by Niino, Imaizumi, & Kawakai, 1991) and the Centre for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), which was translated into Japanese and validated by Shima et al. (1985).

The GDS items were summed; higher scores indicate a greater number of depressive symptoms. A cut-off score of six has been determined for Japanese subjects (Schreiner et al., 2003). Subjects with scores >6 (coded 1) were considered to be symptomatic of depression while scores of <5 (coded 0) were considered 'normal'.

The CES-D is a 20-item self-report scale widely used to identify individuals at risk for depression. Total scores range from 0–60. Individuals scoring 16 or more are generally considered to be at risk for clinical depression and we adopted this cut-off for the present study.

After obtaining informed consent, data from stroke and COPD caregivers was collected by interview which lasted approximately 40–60 minutes per subject. Stroke interviews were conducted in a private room at the rehabilitation clinic where care-recipients were patients. The COPD interviews were conducted at the home of the patient and caregiver. Data from the general disability caregivers was collected via mail survey.

Statistical analysis

The purpose of the statistical analysis was to generate a cut-off score for the ZBI which would have a predictive value for assessing the risk of depression. We compared three different statistical methods to identify a cut-off: (1) Tree-based mod-elling (SAS version 10), which incorporated GDS scores to classify the ZBI; (2) SPSS K-means clustering technique, which looked only at the ZBI scores; and (3) linear regression.

Cut-offs were determined using only stroke and COPD caregivers and excluding the general disabil-ity caregivers so they could later be used as an independent reference sample to validate the ZBI cut-off. Tree-based modelling assigned a basic cut-off score of 24.5 to the data from stroke and COPD caregivers. The K-means clustering determined that the value of 25 was an appropriate cut-off point for high and low burden. The regression model pre-dicted a ZBI score of 25 when the GDS was set at the cut-off value of six ($15.02c + (1.807b \times 6) = 25.86$; see Table I). Thus, three unique methods confirmed a ZBI cut-off around the value of 25.

In order to examine the predictive validity of these cut-offs we grouped samples into high and low depression groups based on their depression scores. Next, 2×2 contingency tables were generated

Table I. Linear regression of burden scores on GDS scores.

| | Unstandardized coefficients | | | |
	B	Std. Error	*t*	Sig.
(Constant)	15.02	2.07	7.2	0
GDS Scores	1.807	0.32	5.6	0

Dependent variable: ZBI total burden scores.
Note: Using the GDS cutoff score of 6 results in a burden score of
25.86 (15.02c + (1.807b × 6)) = 25.86.

comparing high and low depression groups against high and low burden groups for each sample. We used three different burden cut-offs (24, 25, and 26), which centred around the statistically determined cut-off of 25. Next, we tested the overall validity of the cut-offs with the entire sample of caregivers combined. Finally, the specificity and sensitivity of the most significant contingency table for each subject group was analyzed to reveal how well the 'best' ZBI cut-off for that group compared with a gold standard (the GDS or the CES-D) in predicting caregiver depression (Table III). In our study, the calculated sensitivity describes the ZBI cut-off's ability to correctly identify subjects grouped into probable depression by the GDS or CES-D while specificity reports the ability of the ZBI cut-off to correctly identify non-depressed subjects.

Results

Table II contains descriptive data on the entire sample and all study variables. While both stroke and general caregivers were similar in age they were each significantly younger than COPD caregivers. In terms of sex differences, stroke caregivers had a significantly higher percentage of men than did

COPD caregivers. Stroke caregivers also had significantly higher ZBI and GDS scores than did COPD caregivers.

As stated above, based on the statistical analysis we used three different ZBI cut-off scores of 24, 25, and 26 to generate 2 × 2 contingency tables with the GDS or CES-D cut-off scores for each sample of caregivers (Table III). This range of scores was significant in predicting the risk of depression for all caregivers. Specifically, a cut-off of 25 was most accurate for stroke caregivers, while a cut-off of 24 was most accurate for COPD caregivers, and a cut-off of 26 was most accurate for independent reference sample of general disability caregivers. The results indicated that a ZBI cut-off of 25 correctly identified 77% of high burden stroke caregivers as having further need of assessment for depression. In addition, 72% of stroke caregivers with low risk of depression were in the low burden group. However, only 47% of high burden COPD caregivers were in the probable depression group while 79% of COPD caregivers in the low risk for depression group were also in the low burden group. A ZBI cut-off of 26 identified 64% of general disability caregivers with high burden as being in the probable depression (as measured with the CES-D) group while 59% of caregivers in the low burden group had depression scores below the cut-off. The results for the combined sample of all caregivers were significant at all cut-offs but strongest at a cut-off of 24.

Discussion

The findings suggest that a ZBI cut-off score which ranges from 24–26 would be useful in identifying caregivers in need of further assessment and intervention. A cut-off of 24 for our combined sample of three very different types of caregivers, with

Table II. Sample characteristics by caregiver group.

	Stroke	COPD	General disability
Gender			
Male	28.75% (*n* = 23)	8.9% (*n* = 5)	22.86% (*n* = 16)
Female	71.25% (*n* = 57)	91.1% (*n* = 51)	77.14% (*n* = 54)
Chi-square test sig.	0.013 Stroke vs COPD	0.072 COPD vs General	0.26 Stroke vs General
Mean age (sd)	60.15 (14.04)	65.44 (12.79)	60.19 (12.68)
t-test of significance	−2.28	−2.34	−0.016
df	134	124	148
p	0.024 Stroke vs COPD	0.020 COPD vs General	0.987 Stroke vs General
ZBI mean (sd)	28.32 (12.7)	20.35 (13)	30.34 (17.7)
t-test of significance	3.6	−3.6	−0.81
df	135	125	148
p	0.000 Stroke vs. COPD	0.001 COPD vs General	0.42 Stroke vs General
GDS mean (sd)	6.05 (3.2)	4.54 (3.2)	NA
t-test of significance	2.71		
df	135		
p	0.008		
CES-D mean (sd)	NA	NA	15.7 (9.6)

Table III. Contingency analysis of caregivers by high/low depression and burden groups with sensitivity and specificity of burden cutoff scores.

	High GDS	Low GDS	Total *N*	Pearson chi-square	df	Continuity · correction	Likelihood ratio	Exact sig. (1-sided)
Stroke caregivers								
High burden >25	34	10	44	19.6	1	17.65	20.40	0.00
Low burden <=25	10	26	36					
Sensitivity	77%							
Specificity	72%							
COPD caregivers	High GDS	Low GDS	Total	3.80	1	2.66	3.77	0.05
High burden >24	9	6	15					
Low burden <=24	10	23	33					
Sensitivity	47%							
Specificity	79%							
General caregivers	High CES-D	Low CES-D	Total	3.82	1	2.93	3.86	0.04
High burden >26	20	16	36					
Low burden <=26	11	23	44					
Sensitivity	64%							
Specificity	59%							
All caregivers combined	High score 1	Low score	Total	25.44		24.02	26.09	0.00
High burden >24	68	38	106					
Low burden <=24	26	66	92					
Sensitivity	72%							
Specificity	63%							

Note: High score and low score refer to whether the caregiver was above or below the cutoff for either the GDS or the CES-D.

significant differences in age and sex, had a positive predictive value of 64%, which indicated that 64% of caregivers above the ZBI cut-off were also above the depression cut-off. The negative predictive value, the percentage of caregivers who were below the ZBI cut-off and below the depression cut-off, was 72%. Hence, there were 28% false negatives and 36% false positives.

It is important to note that the cut-off determined with the stroke and COPD samples did have validity with the sample of general disability caregivers although the depression scale used with this group was the CES-D and not the GDS. Therefore, despite the use of a different instrument, as well as a different method (i.e., mail survey versus interview), and in addition to significant differences in age and sex, the cut-off score obtained with stroke and COPD caregivers was significant in predicting the risk of depression in other caregivers.

These findings indicate that caregivers at risk for depression could be identified by administering the ZBI alone rather than a battery of other possibly more threatening tests. Since screening as a false negative (i.e., below the burden cut-off but depressed) was seen as a greater problem than screening as a false positive (i.e., above the burden cut-off but not depressed), we chose cut-off scores that increased the level of sensitivity at the expense of specificity.

The cut-off scores in this study warrant further investigation with larger samples and are intended to serve only as a guideline for practitioners to use to assess their family caregivers and encourage the caregivers themselves to seek supportive services. Future studies may also want to look at the relationship between ZBI scores and other negative outcomes of care-giving such as moods of anxiety or anger or physical outcomes such as decreased heath status in order to expand the relevance of cut-off scores for predicting a broader range of caregiver negative outcomes. Again, we did not look at the influence of moderating variables on burden as our purpose was to determine a cut-off score broad enough to identify risk across a variety of different types of different caregivers.

Conclusion

As the average lifespan continues to increase, so do disability rates from chronic illnesses. Persons with disabilities often require caregivers and family members overwhelmingly assume this role. In fact, family caregivers provide care that is estimated to exceed the combined costs of nursing home and paid home health care (Arno, Levine, & Memmott, 1999). The main reason family caregivers relinquish their role and seek institutional care is from feelings of excessive burden or exhaustion (Narayan et al., 2001). These conditions can be ameliorated with current psycho-educational interventions which focus on improving caregivers' coping skills and their sense of mastery or self-efficacy (Bookwala & Schulz, 1998; Hebert et al., 2003; Ostwald et al., 1999; Pearlin et al., 1990; Yates, Tennstedt, & Chang, 1999). Valid cut-off scores for the ZBI would enable health care professionals to identify family caregivers in need of such interventions to improve their ability to provide quality care in this important role.

Acknowledgements

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Factors Related to Institutionalization among the Frail Elderly with Home-Visiting Nursing Service in Japan

Asae Oura[a]   Masakazu Washio[a]   Jyun-ichi Wada[b]   Yumiko Arai[c]
Mitsuru Mori[a]

[a]Department of Public Health, School of Medicine, Sapporo Medical University, Sapporo; [b]Medical Foundation, Tenshindo Geriatric Health Care Facility, Yokoen, and [c]Department of Gerontological Policy (Health Policy for the Aged), National Institute of Longevity Sciences (NILS), Obu, Japan

Abstract

A dramatic increase in the number of elderly people in Japan has led to a concurrent increase in the number of frail elderly in need of care. It is estimated that the number of frail elderly will reach 3.9 million by the year 2010. Family members are often both physically and mentally burdened with caring for the frail elderly. The present study was conducted to identify the risk factors for institutionalization among the frail elderly receiving in-home care in Japan.

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In former days, the frail elderly were cared for in the traditional Japanese family system because most Japanese elderly, over 60% compared with 20% or less in the West, lived with their children [1]. However, the number of children in each family has dramatically decreased, and the nuclear family has now become more common [3]. Therefore, caregivers often have to take care of the frail elderly without any help because other relatives often live too far away to provide assistance. It has been reported that caring for the frail elderly tends to induce depression in the caregivers [4]. Caregivers' depression is a risk factor for caregivers discontinuing their provision of in-home care [5]. Thus, the present study was conducted to identify the risk factors for institutionalization among the frail elderly receiving in-home care in Japan.

Introduction

The dramatic increase in the number of older people in Japan, which is now well documented [1], has led to a concurrent increase in the number of elderly in need of care (frail elderly). It is estimated that the number of frail elderly will reach 3.9 million in 2010 [2]. Family members are often both physically and mentally burdened with caring for the frail elderly [2].

Subjects and Methods

In order to identify the factors related to institutionalization among the frail elderly receiving in-home care, a follow-up study was conducted in Kyushu, south-western Japan, from 1998 to 2003. The participants were 122 pairs of frail elderly and their caregivers. The frail elderly were 52 males and 70 females with a mean age ($\pm$ SD) of 80.7 ($\pm$ 8.5) years at the baseline, while caregivers were 28 males and 94 females with a mean age ($\pm$ SD) of 61.0 ($\pm$ 13.6) years. The kinship status of caregivers were 49 spouses, 51 children,

Asae Oura
Department of Public Health, School of Medicine
Sapporo Medical University, Chuo-ku Minami-1 Nishi-17
Sapporo, Hokkaido 060-8556 (Japan)
Tel. +81 11 6112111, Fax +81 11 6418101, E-Mail aoura@sapmed.ac.jp