

# Factors Affecting Family Caregivers' Burden and Depression in Home-based Long-Term Care Service under the Long-Term Care Insurance System

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**Purpose:** This study tried to identify changes in family burden after the introduction of the long-term care insurance and to examine the factors influencing subjective and objective caring burden and depression of family caregivers of elders receiving home-based long-term care. **Methods:** Data were collected from 203 family caregivers of elders from August 1 to 31, 2015 using questionnaires. They were analyzed in descriptive statistics, t test, ANOVA test, and multiple regression analysis. **Results:** The mean score of depression was 7.24, which suggested mild depression level. The subjective family burden was 2.71 and the objective burden 3.04. The factors affecting depression included subjective burden ( $t=5.08, p<.001$ ), objective burden ( $t=2.80, p=.006$ ), time of elderly care per day ( $t=-3.61, p<.001$ ), caregiving duration ( $t=3.33, p=.001$ ), age ( $t=3.13, p=.002$ ), family relationship ( $t=2.48, p=.014$ ), and economic status ( $t=1.99, p=.047$ ). **Conclusion:** The family burden was most important influencing factor on caregiver's depression. Therefore, services and supports to alleviate caregivers' burden in the home-based care should be added to long-term care.

**Key Words:** Depression; Long-term care; Aged; Caregivers

## INTRODUCTION

In South Korea, the long-term care insurance system introduced in July 2008. It is a social insurance system introduced to reduce the burden on the family by providing long-term care service to the elderly who are unable to carry out daily living alone due to aging or geriatric illness and to cope with increasing caring and medical expense of the elderly, as society progresses rapidly into an aging society. When the long-term care insurance introduced, the government provided financial support for establish long-term care facilities because there were few service facilities at the time. Now, however, long-term care facilities such as nursing home and home-based long-term care center had been supplied more than demand [1]. Since then, the rate of long-term care beneficiaries has sharply increased from 4.2% (around 214 thousand elders) of old people in 2008 to 7.5% (around 519 thousand elders) in 2016[2]. It is time to check and improve the quality of sys-

tem rather than quantitative aspects of this system.

Reducing the caregiver's burden is one of the important goals of the Korean long-term care insurance system. The government expected that the home-based long-term care service can allow elders to live with their families and reduce the burden and stress felt by families at home [3]. Elders who need long-term care impose strain on family members who mainly take care them. In traditional Korean culture, people prefer home-based care rather than nursing home [4]. Koreans try effort to take care of their elderly parents at home, even though long-term care insurance system may allow and support institutional service. However, in home care, the family is responsible for a part of the caring, so they are inevitably burdened. As the family system becomes a nuclear family and more women go to work in Korea, there is a few supports of family members to take care of the elderly at home. The family burden is much higher in home-based care services than in institutional service because the home-based care services

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Received: Oct 16, 2017 / Revised: Nov 27, 2018 / Accepted: Nov 28, 2018

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requires the involvement of family members as the main caregivers [5].

Several researchers reported that caregivers of elderly have mental and physical problems such as depression, and lowered immune function [6-8]. In addition, families experience a steep decline in the quality of their daily live and may experience intra-family conflicts when elders' conditions are more serious [9-11]. If the caring period for elder is prolonged, the family may become exhausted and depressed [12]. Family burden and depression may lead to serious outcomes such as insomnia and feelings of powerlessness [13,14]. In such cases, families tend to choose a nursing home care rather than a home-based long-term care. Therefore, it is needed to focus our attention on the burden of the elderly family receiving home-based care services to delay the institutionalization to nursing home.

Even though beneficiaries are receiving care services from the government, caregivers experience huge burden because elders have considerable cognitive and behavioral problems in their daily lives [4]. Therefore, the long-term care insurance system for elders should reduce caregiver burden by supporting not only elders, but also their family members. There were few studies on family burden after the long-term care system enforced. Therefore, this study was conducted for providing the basic data of families' caregiver burden under Korean long-term care service and how much it influences on their depression. It may help to understand what is needed to reduce caregiver's burden.

The purposes of this study are (a) to identify caregiver's burden and depression under the home-based care service, (b) to determine whether the need of the long-term care of the elderly affects caregiver's burden and depression, (c) and finally to find factors influencing caregiver's depression.

## METHODS

This study was a cross-sectional study to identify the caregiver's burden and depression, and to identify the factors influencing on caregiver's depression under the home-based long-term care service.

### 1. Settings and Participants

Participants in this study were 203 caregivers who were taking care of the elderly registered in the long-term care insurance, and these elders were beneficiaries of home-based care service. The elders received home-based care service from the 11 long-term care centers located at C city in South Korea. We conducted a survey to the caregivers

who had spent the most time looking after the elders. According to the G\*Power program (significance level: .01, effect size: .25, and power of the test: .95), a sufficient sample size was 187; thus, the sample size of this research was adequate.

### 2. Measures

The questionnaire consisted of the 65 questions including requesting caregivers' sociodemographic characteristics, caregiver's burden and depression.

**Caregiver burden:** Caregiver burden was assessed by the Subjective Family Burden Interview and Objective Family Burden Interview developed by Montgomery et al. [15], and used in Lee's study [3]. Subjective burden was assessed by 13 items on emotions and attitudes such as those relating to worries and depression while caring for elders. A 5-point Likert-type scale ("most of the time"=5 points and "rarely or never"=1 point) was used in the research questionnaire, and higher scores were equivalent to heavier subjective burden. Reliability of this measurement was Cronbach's  $\alpha = .86$  in Montgomery et al. [15]. Cronbach's  $\alpha$  was .79 in Lee's research [3], and Cronbach's  $\alpha$  was .82 in this study.

**Objective burden** was assessed by a questionnaire that consisted of nine items. It included financial burden and externally personal limitations like burden on personal time, personal freedom, social participation, and physical health. The 5-pointing Likert-type scale ("strongly agree"=5 points and "strongly disagree"=1 point) was used in the research questionnaire, and higher scores indicated heavier objective burden. The reliability of this measurement was Cronbach's  $\alpha$  was .85 in the Montgomery et al. [20], Cronbach's  $\alpha$  was .82 in Lee's research [15], and Cronbach's  $\alpha$  was .86 in this study.

**Depression:** Geriatric Depression Scale Short Form (GDS-SF) was used to assess caregiver's depression. The GDS-SF was devised by Yesavage and Sheikh [16] and translated by Jang et al. [17]. The GDS-SF contained 15 items. The total score of every item for each participant ranged from 0 to 15. Higher total scores indicated higher levels of depression. Scores for a normal level ranged from 0 to 4; for mild depression, 5 to 9; and for severe depression, greater than 9. Cronbach's  $\alpha$  for this instrument was .83 in Jang et al. [17], whereas Cronbach's  $\alpha$  was .86 in this study.

**Sociodemographic characteristics:** Multiple questions were used to measure sociodemographic characteristics including age, gender, marital status, religion, education, employment, subjective economic status, relationship with elders, grading of long-term care, hours of caregiving per

day, and caregiving duration of elders. The grading of long-term care is the numerical value of the level of need for long-term care regarding the mental and physical function and condition from 1 to 5. The judgement committee of grading of long-term care evaluate the elders' ability of daily life, cognitive function, behavioral problem, nursing care needs, and rehabilitation needs. The first grade means the highest level of need for long-term care for elder.

### 3. Data Collection

Data were collected from August 1 through 31, 2015. The researchers and assistants visited the 11 home care service centers in C city and explained the purpose of this study. After getting permission from them, we implemented the survey, visiting each participant's household. We explained the purpose and content of the research to the caregivers and asked the questions with participants who submitted written informed consent. Participants completed the questionnaires. They had sufficient time to answer questions that concerned caregiver burden under the home-based long-term care service. For questions that addressed caregiver burden after the implementation of long-term care insurance, participants were asked to consider the burden they experience presently while caring for elders. The questionnaires were collected after completed, and 203 faithfully answered questionnaires were analyzed in this study.

### 4. Ethical Consideration

The study was approved by the Institutional Review Board of the researcher's institution (IRB; SM-201412-036-1, Korea), and performed in accordance with the Declaration of Helsinki. To protect participants' human rights, the researchers received the permission from the director of the home care service center and got a written agreement from participants before data collection. Before the survey was administered, the purpose and process of the study, a guarantee of confidentiality, voluntary participation, anonymity of data, and the right to withdraw participation at any time during the process were explained to potential participants. The researchers and assistants visited participants' homes and explained participation details and survey questionnaires to participants who decided to join in the survey and complete a written consent form. For the protection of participants' personal information, the survey did not ask for information on personal identity, and collected data were discarded after the study was finished.

## 5. Data Analysis

The collected data were analyzed using the SPSS/WIN 20.0 program. Sociodemographic variables were examined by frequency and percentage. Scores of caregiver's burden and depression were calculated as means and standard deviations, and differences in caregiver's burden according to sociodemographic variables were analyzed by t-test, one-way ANOVA, and Bonferoni post hoc test. Influence of variables on caregiver's burden and depression was examined by multiple regression analysis.

## RESULTS

### 1. Sociodemographic Characteristics of Participants

The mean age of participants was  $60.2 \pm 10.9$  years (Table 1). About 78% were women and 86.7% had spouses. Only 13.3% of participants lived alone. Approximately half (54.2%) had completed middle-high school, and a quarter graduated college or above. About half of caregivers (50.2%) had occupations. About 23% reported that their economic status was low. With respect to caregivers' relationship with the elders, 39.4% were the elders' son or daughter, 21.7% were their spouse, and 20.2% were their daughter-in-law. About 22% had cared for the elders less than 2 years and 44.3% had cared them for more than 5 years. Of the participants, 36.5% took care of the elderly more than 8 hours a day.

### 2. Caregiver's Burden and Depression

Caregiver's burden and depression are shown in Table 2. The score for the subjective burden was 2.71, and the score for objective burden was 3.04 out of a possible range of 1~5. Thus, the objective burden was greater than the subjective burden. Among sub-items of subjective burden, the highest score was "I feel afraid for what the future holds for the elder" (3.66), followed by "I feel it is painful to watch the elder" (3.29). Among the sub-items of objective burden, the highest score was "I cannot take vacation activities and trips" (3.64), followed by "I cannot have a lot more time for myself" (3.43). Depression score was 7.24 out of a possible range from 0 to 15.

### 3. Difference of Caregiver's Burden and Depression by Sociodemographic Characteristics

Table 3 shows the results. Subjective burden signifi-

**Table 1.** Sociodemographic Characteristics of Participants (N=203)

Characteristics	Categories	n (%) or M±SD
Age (year)		60.2±10.9
	< 60	110 (54.2)
	60~69	57 (28.1)
	70~79	21 (10.3)
	≥80	15 (7.4)
Gender	Male	45 (22.2)
	Female	158 (77.8)
Marital status	Single (widow, divorced)	27 (13.3)
	Married	176 (86.7)
Religion	No	69 (34.0)
	Yes	134 (66.0)
Level of education	≤ Elementary school	42 (20.7)
	Middle~High school	110 (54.2)
	≥ College	51 (25.1)
Employment status	Unemployed	42 (20.7)
	Employed	102 (50.2)
	Housewife	59 (29.1)
Economic status	Low	46 (22.7)
	Middle	148 (72.9)
	High	9 (4.4)
Relationship with the elder	Spouse	44 (21.7)
	Adult children	80 (39.4)
	Daughter in law	41 (20.2)
	Others	38 (18.7)
Long-term care approval grade		7.34±6.73
	Grade 1	13 (6.4)
	Grade 2	26 (12.8)
	Grade 3	96 (47.3)
	Grade 4	49 (24.1)
Time of elderly care (hour/day)		7.34±6.73
	< 4	65 (32.0)
	4~< 8	64 (31.5)
Duration of elderly care (month)		68.04±58.67
	< 24	45 (22.2)
	24~< 60	68 (33.5)
Disease (multiple response)		68.04±58.67
	≥ 60	90 (44.3)
	Dementia	101 (49.8)
	Hypertension	95 (46.8)
	Stroke	81 (39.9)
	Depression	62 (30.5)
	Diabetes	56 (27.6)
	Cardiovascular disease	31 (15.3)
	Spinal injury	29 (14.3)
	Chronic respiratory disease	16 (7.9)
	Parkinson's disease	9 (4.4)
	Multiple sclerosis	8 (3.9)
	Cancer	6 (3.0)
Other disease	36 (17.7)	

cantly differed by the caregiver's economic status, family relationship with the elder, long term care service grade of the elder, and duration of caregiving ( $p < .05$ ). Objective burden significantly differed by caregivers' economic status, family relationship, long term care service grade of the elder, and time of elderly care per day ( $p < .05$ ). The significant differences in participants' depression were influenced by caregivers' age, marital condition, religion, education, job, economic status, family relationship with the elder, time of elderly care per day, and caregiving duration ( $p < .05$ ).

#### 4. Factors Influencing Caregiver's Burden and Depression

To identify influencing factors on caregiver's burden, respectively, sociodemographic characteristics that showed statistical significance with caregiver's subjective and objective burden were included as independent variables. To identify influencing factors on caregiver's depression, respectively, subjective and objective burden and socio-economic characteristics that showed statistical significance with caregiver's depression were included as independent variables. After identifying multicollinearity and residual and singular values to test the hypothesis of regression analysis on the independent variables, the correlations among the independent variables were .04~.48, which verified the independence of the predictors because no explanatory variable emerged over .80. In addition, we examined tolerance and the variance inflation factor to identify multicollinearity. Values of tolerance were .55~.89, under 1.0 and over 0.1, and variance inflation factor values were 1.09~1.79, which did not exceed 10. Therefore, no further investigation was necessary. Residuals for normality and homoscedasticity were in a homoscedastic linear model with normally distributed errors. In short, the results of regression analysis were reliable because no statistically problem was founded.

In multiple regression analysis, factors influencing subjective burden were spouse of the elder ( $t=2.34, p=.020$ ), low economic status ( $t=2.26, p=.025$ ), and duration of caregiving ( $t=2.24, p=.026$ ). Factors affecting objective burden were the spouse of the elder ( $t=2.67, p=.008$ ), low economic status ( $t=4.03, p<.001$ ), and the amount of time of elderly care per day ( $t=2.51, p=.013$ ). Significant predictors for caregiver's depression were age ( $t=3.13, p=.002$ ), spouse ( $t=2.48, p=.014$ ), economic status ( $t=1.99, p=.047$ ), time of caregiving per day ( $t=-3.61, p<.00$ ), duration of caregiving ( $t=-3.33, p=.001$ ), subjective burden ( $t=5.08, p<.001$ ), and objective burden ( $t=2.80, p=.006$ ) (Table 4).

**Table 2.** Caregiver's Subjective and Objective Caring Burden, and Depression (N=203)

Variables	n (%)	M±SD
Subjective burden		2.71±0.61
I feel it is painful to watch the elder.		3.29±1.02
I feel useful in my relationship with the elder. <sup>†</sup>		1.68±0.82
I feel afraid for what the future holds for the elder.		3.66±1.08
I feel suppressed during caregiving of the elder.		3.24±1.07
I feel that I am contributing to the well-being of the elder. <sup>†</sup>		1.98±1.01
I feel that the elder tries to manipulate me.		2.56±1.16
I feel strained and depressed about my relationship with the elder.		2.92±1.11
I feel that the elder makes requests which are over and above what he/she needs.		2.67±1.14
I feel that I don't do as much for the elder as I should.		2.89±1.03
I feel that the elder seems to expect me to take care of him/her as if I were the only one he/she depends on. <sup>†</sup>		2.48±1.09
I feel that the elder doesn't appreciate what I do for him/her as I would like.		2.43±1.16
I feel guilty over my relationship with the elder.		2.68±1.11
I feel pleased with my relationship with elder. <sup>†</sup>		2.81±1.13
Objective burden		3.04±0.75
I cannot have a lot more time for myself.		3.43±1.22
I cannot have a lot more money I have available to meet expenses.		2.68±1.15
I have a lot more privacy. <sup>†</sup>		3.17±1.05
I cannot have a lot more relationships with other family members.		2.47±1.11
I can spend a lot more time in recreational and/or social activities. <sup>†</sup>		2.98±1.20
I can take vacation activities and trips. <sup>†</sup>		3.64±1.20
I have a lot more personal freedom. <sup>†</sup>		3.20±1.14
I am healthy. <sup>†</sup>		2.87±1.05
I have a lot more energy. <sup>†</sup>		2.95±1.04
Depression		7.24±4.26
Normal	66 (32.5)	
Mild	63 (31.0)	
Severe	74 (36.5)	

<sup>†</sup>This item was analyzed conversely. Calculated by mean (standard deviation).

## DISCUSSION

The score of subjective burden of our participants was lower when compare to other previous studies [3,18]. Lee [3] reported subjective burden by using the same measuring tool at 2.93 points, and Bang and Jang [18] also presented 2.95 points of emotional burden for those family caregivers who taking care of elders with chronic diseases before implementing the long-term care service. The score of emotional burden in You's research [19], which focused only on old people with dementia, was higher than the scores of caregivers in this research. High subjective burden can be explained by dementia in elders in You's research [19]. The score for objective burden in this study was 3.04, a result lower than ones in other previous studies [18,19] which performed before the long-term care insurance. These results can be inferred that long-term care service reduces subjective and objective burden. However, reducing subjective burden of family members caring for elders with dementia is harder than caring for those with other diseases.

In this study, the objective burden of our participants was higher than subjective burden of our participants. This result is consisted with the findings in previous studies [3,20]. The highest item among objective burden is "have a time to travel", followed by "not enough time for myself" and "not have a lot more personal freedom". Comparing with previous studies [3], the objective burden of economic burden and fatigue has been reduced after the introduction of long-term care insurance. However, the objective burden on individual's privacy and leisure has become relatively larger. The goal of the long-term care insurance system is not only to contribute to the improvement of the quality of life but also to alleviate the burden on the family. This initial goal is somewhat achieved, but this suggests that the further support for improving the quality of life in the family is still needed. More support is needed to maintain the quality of life of caregiver.

The highest item among subjective burden is "afraid of future", followed by "feel painful" and "feel suppressed during caregiving". Comparing with previous studies [3], the subjective burden of "should be doing more" seems to

**Table 3.** The Differences of Depression, Subjective and Objective Caring Burden by Socio-demographic Characteristics (N=203)

Variables	Categories	Subjective burden		Objective burden		Depression	
		M±SD	t or F (p)	M±SD	t or F (p)	M±SD	t or F (p)
Age (year)	< 60 <sup>a</sup>	2.65±0.62	1.16	2.97±0.75	2.41	6.14±3.80	7.52
	60~69 <sup>b</sup>	2.75±0.59	(.324)	2.98±0.71	(.068)	7.84±4.52	(< .001)
	70~79 <sup>c</sup>	2.77±0.53		3.21±0.82		9.23±4.44	a < c, d
	≥ 80 <sup>d</sup>	2.93±0.63		3.47±0.72		10.26±3.51	
Gender	Male	2.75±0.60	0.47	3.12±0.74	0.86	8.24±4.31	1.79
	Female	2.70±0.61	(.639)	3.01±0.75	(.387)	6.96±4.21	(.075)
Marital status	Single <sup>†</sup>	2.69±0.57	-0.14	3.04±0.74	-0.01	9.14±4.21	2.52
	Married	2.71±0.61	(.882)	3.04±0.76	(.994)	6.95±4.20	(.012)
Religion	No	2.79±0.56	1.27	3.15±0.70	1.59	8.30±4.36	2.57
	Yes	2.67±0.63	(.204)	2.98±0.77	(.113)	6.70±4.11	(.011)
Level of education	≤ Elementary school <sup>a</sup>	2.76±0.56	.148	3.11±0.79	.294	9.28±4.25	6.96
	Middle-high school <sup>b</sup>	2.74±0.61	(.862)	3.04±0.71	(.746)	6.94±4.11	(.001)
	≥ College <sup>c</sup>	0.69±0.66		2.99±0.83		6.21±4.10	a > c
Employment status	Unemployed <sup>a</sup>	2.82±0.51	1.84	3.19±0.78	1.66	10.95±3.27	25.26
	Employed <sup>b</sup>	2.73±0.68	(.161)	3.04±0.74	(.191)	6.49±4.12	(< .001)
	Housewife <sup>c</sup>	2.59±0.53		2.92±0.75		5.91±3.64	a > b, c
Economic status	Low <sup>a</sup>	2.91±0.61	3.15	3.43±0.73	9.02	9.21±3.52	7.16
	Middle <sup>b</sup>	2.65±0.56	(.045)	2.93±0.69	(< .001)	6.59±4.25	(.001)
	High <sup>c</sup>	2.66±1.06	a > b, c	2.79±1.19	a > b, c	7.88±4.98	a > b
Relationship with the elderly	Spouse <sup>a</sup>	2.94±0.54	8.38	3.33±0.69	10.67	9.65±3.91	9.00
	Adult children <sup>b</sup>	2.73±0.56	(< .001)	3.09±0.68	(< .001)	7.30±4.50	(< .001)
	Daughter in law <sup>c</sup>	2.78±0.55	a > b, c	3.13±0.64	a > b, c	6.41±2.64	a > b, c, d
	Others <sup>d</sup>	2.17±0.63		3.03±0.69		5.23±4.30	
Long-term care approval grade of elder	Grade 1 <sup>a</sup>	2.89±0.38	3.71	3.28±0.70	3.72	6.15±4.94	0.78
	Grade 2 <sup>b</sup>	2.77±0.63	(.006)	3.17±0.66	(.006)	8.07±4.26	(.538)
	Grade 3 <sup>c</sup>	2.65±0.58	a < b, c	2.75±0.81	d < b, c	6.88±3.85	
	Grade 4 <sup>d</sup>	2.65±0.63		2.80±0.93		7.61±4.92	
	Grade 5 <sup>e</sup>	2.65±0.52		2.92±0.76		7.73±4.01	
Time of elderly care	< 4 hours/day <sup>a</sup>	2.73±0.71	0.49	2.91±0.76	4.66	8.43±4.30	3.88
	4~< 8 hours/day <sup>b</sup>	2.74±0.58	(.610)	3.25±0.70	(.011)	6.84±4.05	(.022)
	≥ 8 hours/day <sup>c</sup>				c > a, b	6.55±4.23	a > c
Duration of elderly care	< 24 months <sup>a</sup>	2.47±0.62	5.85	2.96±0.86	0.79	6.62±4.48	4.14
	24~< 60 months <sup>b</sup>	2.70±0.57	(.003)	2.99±0.69	(.452)	8.44±4.39	(.017)
	≥ 60 months <sup>c</sup>	2.84±0.59	a < b	3.11±0.74		6.65±3.88	b > c
Dementia	No	2.65±0.63	-1.45	2.92±0.79	-2.33	7.51±4.57	.886
	Yes	2.78±0.59	(.148)	3.17±0.70	(.021)	6.98±3.93	(.377)
Total		2.71±0.61		3.04±0.75		7.24±4.26	

<sup>†</sup> Single includes widowed and divorced, Calculated by t-test or ANOVA test with Bonferoni.

have decreased, but caregiver still appeal to fear, painful, and suppressed about caring for the elderly. Several studies reported that the subjective burden is not likely to be reduced though intervention measures since it is related to characteristics of the caregiver that cannot be easily altered [15]. Therefore, counselling service for caregiver should also be included in long-term care service.

The relationship with the elder and subjective economic state were influencing factors the objective and subjective burden, whereas grading of long-term care was not. Inter-

estingly, the subjective burden was influenced by the caregiving duration of the elderly while the objective burden was influenced by the time of care for elderly per day. The elderly who have a spouse as a caregiver used home care service more than nursing home [21]. In this study, spouse felt more burden to take care of their elders than other caregivers did. Spouse of the elderly may be getting older with their partner. So, it raises that possibility that the caregivers may experience deteriorating health themselves while they are caring for older adults or they may worry

**Table 4.** Factors influencing Caregiver's Burden and Depression

(N=203)

Dependent variables	Independent variables	B	SE	$\beta$	t	p
Subjective burden	(Constant)	27.52	5.02		5.48	< .001
	Age	0.04	0.05	0.05	0.76	.445
	Family relationship (spouse) <sup>†</sup>	3.47	1.48	0.18	2.34	.020
	Economic status (low) <sup>†</sup>	2.86	1.26	0.15	2.26	.025
	Grade of long-term care	0.35	0.66	0.04	0.53	.592
	Time of elderly care per day	0.09	0.08	0.07	1.12	.263
	Duration of elderly care	0.01	0.01	0.15	2.24	.026
$R^2=0.16$ , Adjusted $R^2=0.12$ ; $F=3.97$ , $p < .001$						
Objective burden	(Constant)	20.40	4.06		5.02	< .001
	Age	0.03	0.04	0.05	0.76	.446
	Family relationship (spouse) <sup>†</sup>	3.20	1.20	0.19	2.67	.008
	Economic status (low) <sup>†</sup>	4.14	1.02	0.25	4.03	< .001
	Grade of long-term care	-0.72	0.54	-0.10	-1.33	.184
	Time of elderly care per day	0.16	0.06	0.16	2.51	.013
	Duration of elderly care	0.00	0.00	0.04	0.63	.524
$R^2=0.25$ , Adjusted $R^2=0.21$ ; $F=6.93$ , $p < .001$						
Depression	(Constant)	-10.10	2.39		-4.22	< .001
	Age	0.07	0.02	0.19	3.13	.002
	Family relationship (spouse) <sup>†</sup>	1.63	0.66	0.15	2.48	.014
	Economic status (low) <sup>†</sup>	1.15	0.57	0.11	1.99	.047
	Long-term care approval grade of elder	0.54	0.29	0.12	1.85	.065
	Time of elderly care per day	-0.13	0.03	-0.20	-3.61	< .001
	Duration of elderly care	-0.01	0.00	-0.19	-3.33	.001
	Subjective burden	0.18	0.03	0.35	5.08	< .001
	Objective burden	0.12	0.04	0.20	2.80	.006
$R^2=0.44$ , Adjusted $R^2=0.41$ ; $F=13.91$ , $p < .001$						

<sup>†</sup>Dummy variables; adult children (0), high economic status (0).

about the future. It is also possible that the spouse may care the elderly because she/he is the only person who should take care the elderly, and there is no alternative. In order to reduce the care burden of spouse and to be able to use the support system from the beginning, it is necessary to provide sufficient information and to provide practical resources to them [22,23].

The subjective economic level is a factor affecting the burden of care, which is consistent with previous research results. In particular, since the women are economically dependent on the men, the economic burden can be felt more if the social support is not sufficient in the elderly caregiving situation. There is also a need for attention to the social system that supports women as caregivers, and the generation of children who provide economic support to parents.

Therefore, a support system that considers the physical and mental health of caregiver is required so that they may continue care their elderly at home. Services to support health conditions should also be provided. In this study, the caregiving duration of the elderly had a strong influence on the subjective burden. Caregiving duration was an influential factor in You's research [19] and Lee's study

[24], too. You [19] and Lee [24] conducted studies before the long-term care service system was in place. We are concerned that the long-term care system did not alter the caregiver's subjective burden. Considering this, the government will have to establish for additional aspects that can reduce the family burden that comes from the long period of care for elder.

Participants in this study showed a mild level (7.24) of depression and 36.5% of participant have severe depressive symptoms. The influencing factors of depression were subjective burden, objective burden, the age, the hour of caring in a day, duration of caregiving, relationship with elder, and economic status. Toyosima et al. [25] found that the caregivers who care for disabled elders have a greater likelihood of suffering from depression due to longer caregiving period, spouses of the elderly, and the time of caring in a day. In the Sink et al. study [13], researchers used same GDS-SF measurement and 32% of families caring for elders with dementia scored higher than 6.0 in level of depressed symptoms. Washio et al. [26] reported that 43.3% of families of elders who receive home based long-term care services were depressed. In this study, grading of long-term care needs did not influence depression of care-

givers. Therefore, it can be said that the most important factor affecting the caregiver's depression is the caregiver's burden rather than the grade indicating the difficulty of care for the elderly. The longer time to care the elderly a day and the longer duration of the caregiving, the more burdensome and depressed the caregiver. The elderly's health status and grading of long-term care needs was not important after introduction of long-term care insurance. Therefore, regardless of grading of the long-term care needs of the elderly, it is necessary to have a program to help and support the caregiver who is taking care of the elderly for a long period.

In summary, this study demonstrated that the caregivers have a burden and depression to care of elder, and caregiver's burden had a great effect on depression. Long-term care services reduced the burden on caregivers, but we found that the subjective and objective burden remained. To let elder receive consistent care in their home, it is necessary to establish home-based long-term care insurance system with family support. In order to reduce the burden on the family, it is necessary to consider various types of long-term care services to improve their quality of life. There is also a need to diversify support programs for family caregivers to reduce subjective burden of long period caring.

Since enforcing long-term care insurance in Japan, Japan government has reduced caregiver burden experienced by families, particularly by care management system that provides necessary information for family and support to them [27-29]. Korean government had to consider the care manager to support family caregivers.

The limitations of this study were that the participants were recruited from one city and caregivers who cares for the elderly receiving only home care. Additional studies should be performed to representative participants. Further studies should also take into account regional characteristics such as rural areas to enable more specific results.

## CONCLUSION

This research provided basic data to construct family support programs aimed at reducing caregiver burden by understanding the factors influencing depression and burden of caregiver in South Korea. We also identified the level of depression and burden of caregivers under home based long-term care service. Long-term care system has greatly reduced the family burden, but the objective burden has been consistently greater than the subjective burden. This study showed that factors influencing family burden were economic status, family relationship with

elderly, grading of long-term care needs, duration of caregiving, and hours of caring a day, and factors affecting caregiver depression included family burden and age, but grading of long-term care needs was excluded. Despite providing nationwide long-term care services that began in 2008, it did not completely alleviate the burden felt by family members when taking care of elderly.

Considering the results of this research, it is needed to seek strategies to reduce caregivers' burden in the long-term care system and to establish the support program for family caregivers. Therefore, we suggest the following. First, the government should reduce the financial burden of caregivers in long-term care service. Paying personal copayment to long-term care beneficiaries could add to the financial challenges experienced by people in low-income groups.

Second, it is necessary to establish a care-management system to operate the long-term care service efficiently. The care manager can provide a systematic service necessary for elders while abating caregiver burden considerably, and avoiding overlapping services. Care managers could provide services that span areas of management, information, and counseling, and this multifaceted service can play an important role in reducing caregiver burden. It establishes more effective long-term care service plan. The care managers not only provide care plans for the elderly, but can also take care of the elderly's family caregivers.

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