Perceived Health Status of and Moderating Factors in Elderly People Caring for Their Grandchildren

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Objective Situations in which elderly people are the primary caregivers for their grandchildren are becoming more common. This study aimed to investigate moderating factors of and the association between grandchild care and the grandparents' perceived health. Financial support in return for grandchild care was also investigated as a moderating factor.

Methods Participants included 357 elderly people over the age of 60 years. The assessment to evaluate the perceived health status and social support was performed via a questionnaire. It included questions regarding the care of grandchildren and demographic variables, as well as the Medical Outcome Survey (MOS) 36-item short-form health survey (SF-36), and the MOS Social Support Survey (MOS-SSS).

Results The subscale scores of SF-36 and MOS-SSS did not differ significantly for grandchild-care status. However, the subscale scores of SF-36 were significantly higher in groups that received regular financial support from adult children in return for grandchild care than in groups that did not.

Conclusion Our data suggest that regular financial support in return for grandchild care may be a moderating factor in the association between grandchild care and the perceived health status of elderly people. These findings have important social implications and warrant future study to reveal the psychological mechanism of these associations and enhance the health of elderly individuals.

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Key Words Elderly people, Financial support, Grandchild care, Health status, Social support.

INTRODUCTION

As the life expectancy of humans and the employment of mothers both increase worldwide, more grandparents find themselves caring for their grandchildren. Despite significant variations in the prevalence of grandchild care in different countries with varying maternal employment regimes, a study performed in 10 European countries reported that 58% of grandmothers and 49% of grandfathers cared for their grandchildren under the age of 16 in the past year.¹ In the United States, the prevalence of grandparent-and-grandchild co-residence in-

creased from 3.2% in 1970 to 5.5% in 2003.² In addition, 24% of preschoolers in the United States were regularly cared for by a grandparent.³ A Taiwanese study also reported that the percentage of elders providing care for grandchildren dramatically increased from 9% in 1993 to 21% in 2007.⁴ In Korea, the percentage of children cared for by a grandparent was reported to be as high as 37.2% in 2016.⁵ The rate of grandchild care is reported to be higher in cases of employed mothers (53%) than in cases of unemployed mothers (43%) in USA.³ This is also the case in Korea; the rate of grandchild care is 53.7% in cases of employed mothers and only 25.8% in cases of unemployed mothers.⁵ Further, the younger the child was, the more support was required from the grandparents; 70.7% of children younger than 1 year required grandparent care.⁵

Raising a child is physically and emotionally challenging, but it also provides emotional rewards. As such, research regarding the relationship between grandchild care and the health of the grandparent is inconclusive.⁶ Multiple studies reported positive associations between grandchild care and the health and

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wellbeing of grandparents.⁶⁻¹⁰ For instance, Di Gessa et al.⁷ reported that both intensive and non-intensive experiences with caring for grandchildren provided some health benefits to the grandparents. Ku et al.⁸ also reported that long-term multigenerational caregivers were more likely to report better self-rated health, higher life satisfaction, and fewer depressive symptoms when compared with non-caregivers. Older veterans with a diagnosis of posttraumatic stress disorder (PTSD) reported reduced symptoms after caring for their grandchildren.¹⁰

On the contrary, other studies showed a negative association between grandchild care and the health of the grandparents.¹¹⁻¹⁴ Grandparents caring for grandchildren were more likely to experience depressive and isolated feelings.¹² Custodial grandparents in particular were vulnerable to unfavorable health outcomes such as limited activities of daily living (ADLs) or depressive and isolated feelings.^{11,13}

However, multiple studies reported that the relationship between grandchild care and the health of grandparents is not a positive/negative linear relationship. Rather, there are various moderating factors involved, such as the intensity of caring, the amount of social support, the relationships among family, and the characteristics of the grandparents themselves.¹⁵⁻¹⁸

Coall and Hertwig¹⁶ reported that the relationship between a grandparent's wellbeing and the intensity of care has an inverted u-shape, and very-low and very-high intensity of care can have a negative effect on both a grandparent's wellbeing and the development of grandchildren. Chen and Liu¹⁷ also reported that high intensity care of younger grandchildren accelerated health declines, whereas lighter levels of care had a protective effect.

Social support is another main factor involved in the health of grandparents caring for their grandchildren. In a longitudinal study, Hayslip et al.¹⁹ reported that social support moderated the effects of parental stress on depression. Musil et al.²⁰ also reported that social support moderated the effects of strain and family-life stresses on depressive symptoms in grandparents.

The characters of grandchildren, such as abnormal emotional or hyperactive symptoms, also contribute to higher levels of anxiety and depression in grandparents caring for grandchildren.²¹ In addition, stressors such as depression and anxiety of grandparents may arise from certain grandparent characteristics, such as being female, in poverty, or of ethnic minority.²²

Financial support from grown-up children is a common phenomenon in Asian culture, as it contributes to the fulfillment of the virtue of filial piety.^{23,24} Financial support in return for grandchild care is common in Korea, but not as common in Western countries.²⁵ Cong and Silverstein²³ reported financial support from grown-up children reduced depression of grandparent. The psychological benefits were the most pronounced when financial support was accompanied by full-

time grandchild care. However, studies examining the effect of financial support by grown-up children on grandchild care are limited. Our study investigated the association between and moderating factors of grandchild care and perceived grandparent health. Financial support in return for grandchild care was also investigated as a moderating factor.

METHODS

Participants

Study data were collected from the Suseong Mental Health Care Program for the Elderly, which was performed in Daegu, the fourth largest city in South Korea with a population of 2.5 million, during 2011. The participants included 357 elderly people over the age of 60; the number of male participants was 149 (41.7%). The age of the participants ranged from 60 to 93, with an average age of 72.12. All participants gave written informed consent after being provided with a complete explanation of the project. They were then questioned by the trained interviewer. The study protocol was approved by the Institutional Review Board for Human Subjects of a university hospital in Cheonan, South Korea (2018-12-004).

Assessment

The assessment was performed via a questionnaire on demographic variables and other relevant information about grandchild care. Questions inquired about the grandparent's experience with grandchild care, financial support from children, motivation and reason for grandchild care and intensity of grandchild care, the probability of continued grandchild care, the kind of support needed, and benefits from grandchild care.

The questionnaire also included the Medical Outcome Survey (MOS) 36-item short-form health survey (SF-36) and the MOS Social Support Survey (MOS-SSS). The SF-36 is a multi-item scale that assesses eight health concepts: 1) limitations in physical functioning; 2) limitations in social functioning; 3) limitations to usual roles due to physical problems; 4) limitations to usual roles due to emotional problems; 5) general mental health; 6) vitality; 7) bodily pain; and 8) general health perceptions.²⁶ The MOS-SSS is a scale for the assessment of perceived social support that consists of 19 items and subscales for emotional/informational support, tangible support, positive social interaction, and affection support.²⁷ The scores for subscales of the SF-36 and the MOS-SSS were converted to a range from 0 to 100 using the formula (raw sum - possible minimum score) ÷ (possible maximum score - possible minimum score) × 100.

Statistical analysis

Demographic variables and items related to grandchild care

were analyzed using frequency analysis, chi-squared tests, and analysis of variances (ANOVA). The participants were categorized into three groups: 1) those who were currently caring for their grandchildren (Current group), 2) those who had cared for their grandchildren previously but not currently (Past group), and 3) those who had never cared for their grandchildren (None group). The ANOVA was used to test for any statistically significant differences between these three groups on subscales of the SF-36 and the MOS-SSS.

The grandparents who had experienced grandchild care were further categorized into two groups: 1) those who received regular financial support in return for grandchild care (Pay group) and 2) those who did not receive regular financial support in return for grandchild care (the No pay group). The SF-36 and the MOS-SSS scores between the Pay group and No pay group were compared using three models. Model 1 used multivariate analysis of variance (MANOVA) without considering any covariates. Model 2 used a multivariate analysis of covariance (MANCOVA) with age, sex, educational level, household income level, marital status, and employment status as

covariates. Model 3 included the intensity of grandchild care in addition to model 2.

To examine the association between financial support group (pay group) and the SF-36 subscales, a generalized linear model (GLM) was used, with the covariates of age, sex, educational level, household income level, marital status, employment status, and financial support (model 1). Model 2 included the intensity of grandchild care in addition to model 1. To determine whether there was a correlation between the amount of financial support received and scores on the SF-36 and the MOS-SSS, Pearson's correlation coefficient was used. All data were analyzed using the Statistical Package for the Social Sciences (SPSS) statistical software, version 25.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Demographic characteristics

The demographic characteristics of participants are shown in Table 1. The age, education, and income levels were not sig-

Table 1. Demographic characteristics of the participants

Experience of grandchild care	None group	Current group	Past group	Statistics	p
N (%)	228 (63.9)	55 (15.4)	74 (20.7)		
Mean (SD) years old	72.42 (7.93)	70.45 (5.94)	72.43 (6.98)	1.617	0.200
Sex (%)				10.692	0.005
Male	109 (47.8)	20 (36.4)	20 (27.0)		
Female	119 (52.2)	35 (63.6)	54 (73.0)		
Education, N (%)				9.568	0.144
≤6	97 (42.5)	23 (41.8)	35 (47.3)		
7 to 11	35 (15.4)	16 (29.1)	10 (13.5)		
12	43 (18.9)	8 (14.5)	17 (23.0)		
>12	53 (23.2)	8 (14.5)	12 (16.2)		
Income (thousand KRW per month), N (%)				6.133	0.632
Over 5,000	19 (9.3)	3 (5.7)	5 (6.9)		
3,000 to 5,000	34 (16.6)	8 (15.1)	13 (18.1)		
2,000 to 1,000	43 (21.0)	13 (24.5)	13 (18.1)		
Under 1,000	37 (18.0)	16 (30.2)	16 (22.2)		
None	72 (35.1)	13 (24.5)	25 (34.7)		
Employment, N (%)				10.781	0.005
Not employed	153 (73.9)	44 (83.0)	66 (91.7)		
Employed	54 (26.1)	9 (17.0)	6 (8.3)		
Marriage status, N (%)				7.087	0.131
Married	140 (67.0)	36 (67.9)	52 (72.2)		
Bereavement	58 (27.8)	17 (32.1)	20 (27.8)		
Divorced	11 (5.3)	0 (0.0)	0 (0.0)		

None group: elderly people who never experienced grandchild care, Current group: elderly people who were currently caring their grandchildren, Past group: elderly people who had cared for their grandchildren previously. N: number, SD: standard deviation

nificantly different among the None, the Current, and the Past groups. Elderly females experienced significantly more grandchild care than elderly males, and grandparents who cared for grandchildren were less likely to work.

Characteristics related to grandchild care

Characteristics related to grandchild care are shown in Ta-

ble 2. Among participants who had experienced grandchild care, 48.7% received regular financial support from their grown-up children in return for the care, amounting to approximately 490,000 KRW (approximately 450 USD) per month in average. Results showed that 52.6% of grandparents started caring for their grandchildren on their own will, and 73.8% of grandparents cared for their grandchildren full-time on weekdays. Em-

Table 2. Characteristics related to grandchild care

Grandchild care	Total	Current group	Past group	Statistics	p
Financial support from grown-up children, N (%)				3.336	0.068
No	60 (51.3)	30 (61.2)	30 (44.1)		
Yes	57 (48.7)	19 (38.8)	38 (55.9)		
Amount of financial support, mean (SD) 1,000 KRW per month	490.2 (322.0)	531.3 (394.1)	464.0 (271.8)	0.420	0.521
Duration of grandchild care, mean (SD), month	81.37 (81.87)	92.02 (75.05)	73.53 (86.22)	1.564	0.213
Motivation for grandchild care (%)				0.601	0.740
Grandparent's own will	60 (52.6)	25 (52.1)	35 (53.0)		
By the child's request	32 (28.1)	15 (31.3)	17 (25.8)		
Grandparent's will and child's request	22 (19.3)	8 (16.7)	14 (21.2)		
Intensity of grandchild care, N (%)				3.924	0.416
Daytime during weekday	25 (19.8)	10 (18.5)	15 (20.8)		
Full time during weekday	20 (15.9)	9 (16.7)	11 (15.3)		
Weekend only	3 (2.4)	2 (3.7)	1 (1.4)		
Always	73 (57.9)	29 (53.7)	44 (61.1)		
Etc	5 (4.0)	4 (7.4)	1 (1.4)		
Reason for grandchild care, N (%)				19.022	0.002
Employment of both parents	82 (84.5)	29 (67.4)	53 (98.1)		
Financial difficulties	2 (2.1)	2 (4.7)	0 (0.0)		
Accidents or disease	2 (2.1)	1 (2.3)	1 (1.9)		
Death of children's parents	5 (5.2)	5 (11.6)	0 (0.0)		
Divorce of children's parents	4 (4.1)	4 (9.3)	0 (0.0)		
Missing of children's parents	2 (2.1)	2 (4.7)	0 (0.0)		
Will to continue grandchild care, N (%)				1.404	0.496
Will continue caring	27 (24.8)	13 (26.0)	14 (23.7)		
According to the situation	43 (39.4)	22 (44.0)	21 (35.6)		
Don't want caring grandchildren again	39 (35.8)	15 (30.0)	24 (40.7)		
Kind of support needed, N (%)				6.816	0.078
Financial supports	11 (23.9)	8 (38.1)	3 (12.0)		
Academic supports for grandchildren	3 (6.5)	2 (9.5)	1 (4.0)		
Caring support for grandchildren	29 (63.0)	9 (42.9)	20 (80.0)		
Assistance for housework	3 (6.5)	2 (9.5)	1 (4.0)		
Benefits from the grandchild care, N (%)				0.684	0.408
No	21 (23.2)	7 (18.9)	14 (26.4)		
Yes	69 (76.7)	30 (81.1)	39 (73.6)		

Current group: elderly people who were currently caring for their grandchildren, Past group: elderly people who had cared for their grandchildren previously. N: number, SD: standard deviation

ployment of both parents of the grandchildren was the biggest reason for grandchild care (84.5%). When asked whether they were willing to continue grandchild care, 35.8% responded “No”.

Perceived health status and social support

The perceived health statuses and social support of the None, the Current, and the Past groups are shown in Table 3. None of the groups' subscales of perceived health status and social support differed significantly.

The perceived health statuses and social support of the Pay group and the No pay group are shown in Table 4. Scores on some subscales of the SF-36, including role limitation by physical problem, role limitation by emotional problem, social function, bodily pain, total mental health, and total physical health, were significantly lower in the No pay group than in the Pay group in model 1. In model 2, role limitation by physical problem, role limitation by emotional problem subscales, and social function on the SF-36 were significantly different between the two groups. None of the subscales on the SF-36 were significantly different between the groups in model 3. Although not shown in Table 4, there was no main effect of intensity of grandchild care on any of the subscales on the SF-36 when included as a covariate in model 3.

Also, none of the subscales on the MOS-SSS were significantly different between the two groups in all models.

Associations between regular financial support and scores on the SF-36 and the MOS-SSS subscales

GLM analysis with the covariates of age, sex, education level, household income level, marital status, employment status, and regular financial support from grown-up children in model 1 found that regular financial support was positively associated with scores on the physical role, emotional role, and total mental health subscales of the SF-36 (Table 5). However, this association disappeared when intensity of grandchild care was included as a covariate in model 2 (Table 5, Supplementary Table 1 in the online-only Data Supplement). The amount of financial support received was not significantly correlated with the scores on any of the subscales on the SF-36 or the MOS-SSS (Supplementary Table 2 in the online-only Data Supplement).

DISCUSSION

Our study investigated the factors related to grandchild care and the perceived health status of grandparents. Among all participants, about 36.1% of elderly individuals were found to have experienced grandchild care. This is comparable with the previous study that reported the prevalence of 37.2% in South Korea.⁵ However, there was one study where the prevalence of grandchild care by grandparents had been compared between

Table 3. Differences of perceived health and social support between the groups

Group	None group (N=219)	Current group (N=54)	Past group (N=74)	Statistics	p
SF-36, mean (SD)					
General health	39.61 (22.1)	41.11 (16.95)	41.42 (18.05)	0.272	0.762
Physical function	62.97 (32.15)	66.85 (27.1)	61.01 (28.91)	0.574	0.564
Role limitation, physical	74.23 (29.47)	79.28 (25.26)	75.08 (27.11)	0.688	0.503
Role limitation, emotional	84.28 (24.43)	84.41 (20.8)	85.36 (23.28)	0.058	0.944
Social function	80.88 (25.57)	84.26 (21.88)	82.94 (23.28)	0.504	0.605
Bodily pain	61.74 (23.88)	62.96 (23.68)	63.38 (23.48)	0.159	0.853
Vitality	51.23 (17.93)	50 (16.51)	51.69 (15.67)	0.158	0.854
Mental health	63.58 (19.22)	62.87 (17.82)	68.45 (16.76)	2.159	0.117
Total mental health	66.94 (17.49)	66.88 (14.98)	69.35 (15.62)	0.610	0.544
Total physical health	58.4 (24.37)	61.48 (20.24)	58.85 (20.98)	0.387	0.680
SF-36 total score	62.28 (20.18)	63.86 (16.29)	63.67 (17.05)	0.241	0.786
MOS-SSS, mean (SD)					
Emotional/informational	59.61 (23.54)	64.64 (27.11)	62.2 (27.57)	0.992	0.372
Tangible	69.32 (24.03)	71.93 (27.83)	72 (25.56)	0.450	0.638
Positive	60.14 (26.1)	66.44 (28.82)	67.27 (28.1)	2.532	0.081
Affectionate	62.42 (25.89)	65.43 (30.52)	65.75 (28.95)	0.551	0.577
Overall	62.17 (21.94)	66.56 (25.4)	65.83 (24.52)	1.186	0.307

None group: elderly people who never experienced grandchild care, Current group: elderly people who were currently caring for their grandchildren, Past group: elderly people who had previously cared for their grandchildren. SF-36: the Medical Outcome Survey (MOS) 36-item short-form health survey, MOS-SSS: the Medical Outcome Survey Social Support Survey, N: number, SD: standard deviation

two countries, Chinese (57.6%) and Korea (5.6%) and the number was much lower than in this study.²⁴ The worldwide provision of grandchild care is reportedly increasing despite the wide range in cultures and social systems (i.e., about 50% in Europe and 24% in the United States).^{1,3}

Although 71.9% of grandparents had started caring for

their grandchild part-time or full-time on their own will, about 35.8% of grandparents reported they did not want to continue caring for their grandchildren in the future. This finding implicates that caring for grandchild might be burden for grandparents to keep up with. This burden might be caused by the long periods of time required for grandchild care. Most of the

Table 4. Differences of perceived health and social support between the groups who received financial support from their adult child in return for grandchild care or not

Group	No pay group (N=60)	Pay group (N=57)	Model 1		Model 2		Model 3	
			F	p	F	p	F	p
SF-36, mean (SD)								
General health	39.83 (17.39)	42.72 (18.40)	0.873	0.352	0.103	0.749	0.042	0.837
Physical function	59.5 (30.18)	67.89 (27.16)	2.328	0.130	0.403	0.527	0.021	0.884
Role limatation, physical	69.48 (32.04)	83.99 (18.94)	8.315	0.005*	4.926	0.029*	2.035	0.157
Role limitation, emotional	78.47 (27.24)	91.08 (14.42)	9.247	0.003*	5.895	0.017*	3.089	0.082
Social function	78.54 (28.10)	87.5 (15.13)	5.636	0.019*	3.932	0.050*	1.544	0.217
Bodily pain	58.67 (26.52)	68.07 (19.95)	4.237	0.042*	1.644	0.203	0.289	0.592
Vitality	47.92 (16.94)	52.63 (14.98)	2.422	0.122	1.295	0.258	0.372	0.543
Mental health	64.00 (17.68)	67.54 (17.76)	1.179	0.280	1.329	0.252	0.322	0.572
Total mental health	64.58 (17.27)	71.27 (12.83)	5.536	0.020*	3.881	0.052	1.472	0.228
Total physical health	55.83 (23.14)	64.19 (18.29)	4.454	0.037*	1.630	0.205	0.195	0.660
SF-36 total score	59.85 (18.73)	67.37 (14.23)	5.873	0.017*	2.919	0.091	0.699	0.405
MOS-SSS; mean (SD)								
Emotional/informational	63.18 (30.06)	61.61 (25.36)	0.093	0.761	0.038	0.845	0.259	0.612
Tangible	72.40 (28.61)	70.45 (25.44)	0.109	0.742	0.001	0.974	0.247	0.620
Positive	67.37 (28.05)	64.06 (29.85)	0.415	0.521	0.436	0.510	0.025	0.874
Affectionate	64.17 (30.74)	65.18 (30.07)	0.010	0.919	0.020	0.886	0.026	0.872
Overall	66.08 (26.32)	64.40 (24.57)	0.123	0.726	0.002	0.963	0.115	0.735

* $p < 0.05$. Model 1: crude model without any covariates, Model 2: includes the age, sex, educational level, household income level, and marital and employment status as covariates, Model 3: includes the intensity of caring for grandchildren as a covariate in addition to model 2. No pay group: grandparents who received regular financial support in return for grandchild care, Pay group: grandparents who did not receive regular financial support in return for grandchild care. SF-36: Medical Outcome Survey (MOS) 36-item short-form health survey, MOS-SSS: Medical Outcome Survey Social Support Survey, N: number, SD: standard deviation

Table 5. Generalized linear model for scores on subscales of the SF-36 according to financial support (N=116)

	Model 1			Model 2		
	B	95% CI	p	B	95% CI	p
No Financial support from grown-up children	referent					
Financial support						
Role limitation by physical	11.0	1.9 to 20.1	0.017*	7.38	-1.9 to 16.7	0.119
Role limitation by emotional	10.7	2.7 to 18.8	0.009*	7.8	-0.2 to 15.7	0.054
Social function	8.2	-0.1 to 16.5	0.053	5.1	-3.3 to 13.5	0.233
Bodily pain	5.7	-2.3 to 13.7	0.161	2.6	-5.7 to 10.8	0.540
Total mental health	6.1	0.4 to 11.8	0.036*	3.8	-1.9 to 9.5	0.188
Total physical health	4.7	-2.1 to 11.6	0.177	1.7	-5.3 to 8.6	0.639
SF-36 total score	5.4	-0.4 to 11.2	0.070	2.7	-3.1 to 8.5	0.365

* $p < 0.05$. Model 1: includes the age, sex, educational level, household income level, and marital and employment status as covariates, Model 2: includes the intensity of caring for grandchildren as a covariate in addition to model 1

grandparents (93.7%) spent their time regularly on grandchild caring, longer than daytime on weekdays. Furthermore, 59.7% of the grandparents always cared for their grandchild. These are large burdens compared to the results reported in Western countries. For example, a European study reported that only 32.4% of grandparents caring for a grandchild provided intensive care, which had been defined as “looking after at least one grandchild almost daily or for at least 15 hours a week.”⁶ In this study, grandparents also responded that “caring support for grandchildren” was the most needed form of by their own grown-up children (63.0%). However, despite the burden of parenting, grandparents also did report benefits from caring for their grandchildren (76.7%). This is consistent with the findings of previous studies, which reported positive associations between grandchild care and the wellbeing of grandparents.^{7,8,10}

The fact that there were no significant differences in scores on any of the SF-36 subscales in the None, the Past, and the Current groups suggests that taking care of grandchildren itself did not have significant effect on the perceived health status of grandparents and that there might be other relevant factors. The fact that there were no significant differences in the scores for any of the MOS-SSS subscales in three groups also suggests that raising grandchildren itself did not have direct impact on perceived social support.

Interestingly, role limitation by physical, role limitation by emotional, social function, and bodily pain subscales of the SF-36 were significantly different in the Pay and the No pay groups. This means that regular financial support in return for grandchild care is a mediating factor related to the perceived health status by grandparents.

Despite few studies, financial support from grown-up children in return for grandchild care has been beneficial to the psychological well-being of grandparents, which is consistent with our findings.^{23,28} For instance, Cong and Silverstein²³ reported that financial support from grown-up children reduced depression of grandparents. This could be explained by the financial benefits themselves or by acknowledgement for their role. Although we did not explore the direct reason for the beneficial effect of financial support, 23.9% of the grandparents claimed “financial support” to be the most needed form of support for grandchild care, which indicates a perceived financial burden associated with grandchild care. This suggests that financial support effectively mitigates the financial burden.

However, when asked the reason for grandchild care, 84.5% claimed the employment of both parents, and only 2.1% claimed financial difficulties. In particular, the amount of transferred money was not significantly correlated with the SF-36 subscale scores. This suggests that financial support from grown-up children could have been meant other than the mitigation of

financial burden. Cong and Silverstein²³ reported that financial support promoted psychological benefits when accompanied by full-time grandchild care and argued that intergenerational “time-for-money” reciprocity would be not only a survival strategy to ensure economic prosperity but also contributes positively to the psychological wellbeing of grandparents.

During grandchild care, grandparents might encounter a dilemma between altruism (the pleasure of caring for grandchildren) and exploitation (the sense of being unrecognized and under-valued).²⁹ When a tangible reward is lacking, the grandparents might feel unfairly treated by their grown-up children.³⁰ Meanwhile, financial remittance in return for grandchild care would signify an acknowledgement for their contribution by their own children and serve as psychological reward for grandparents. This acknowledgement may help to preserve grandparents’ self-esteem and self-efficacy.²³

Grandchild care is structurally ambivalent. Although it can be a joyful task to spend time with beloved grandchildren, it can also be perceived as a stressful burden that constrains an individual’s freedom. The feeling that the support from their own children has been “earned” may help mitigate the psychological distress caused by burden of long periods of care and limitation to the grandparents’ freedom. In our study, these are thought to be the reasons that regular financial support in return for grandchild care was positively associated with perceived health status, especially in the sense of role limitation by both physical and emotional problem.

Another interesting finding of our study was that the significance of the association between financial support and subscale scores on the SF-36 disappeared when the intensity of grandchild care was included as a covariate, although the intensity of grandchild care had no independent effect on the scores. This finding suggests that the intensity of grandchild care may be another strong mediating factor for the perceived health status of elderly people caring for a grandchild. This result is consistent with previous studies reporting that the intensity of grandchild care was the critical factor for mental health of grandparents caring for grandchildren.^{16,17}

Our study has some limitations. First, the sample size was small, which limits the generalization of the findings in our study. A study with a larger sample size is needed to confirm our findings. Second, we did not include a qualitative in-depth interview, which limited our investigation of the delicate and complicated feelings that grandparents may have regarding grandchild care and financial remittance. Whether the financial support from their own children had been included in the grandparents’ reported monthly household income or had covered the costs of caring for grandchildren was not known; these factors may also affect grandparents’ satisfaction when they take care of their grandchildren. Future study with an

in-depth interview would help clarify grandparents' feelings and may indicate more useful clinical implication to enhance the health of grandparents.

In conclusion, despite some limitations, our findings indicate that regular financial support to grandparents in return for grandchild care may be positively associated with the perceived health status of grandparents. These findings have important social implications and warrant future study to reveal the psychological mechanism of these associations and enhance the health of elderly individuals.

Supplementary Materials

The online-only Data Supplement is available with this article at <https://doi.org/10.30773/pi.2019.0115>.

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Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Jung Jae Lee. Data curation: Jung Jae Lee, Un Sun Chung. Formal analysis: Jung Jae Lee, Kyung Min Kim. Funding acquisition: Jung Jae Lee, Un Sun Chung. Investigation: Jung Jae Lee, Kyung Min Kim. Methodology: Jung Jae Lee, Un Sun Chung. Project administration: Jung Jae Lee. Resources: Jung Jae Lee, Un Sun Chung. Visualization: Kyung Min Kim, Un Sun Chung. Writing—original draft: Kyung Min Kim, Jung Jae Lee. Writing—review & editing: Un Sun Chung, Kyung Min Kim.

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Supplementary Table 1. Generalized linear model for scores on subscales of the SF-36

	Role limitation, physical				Role limitation, emotional				Social function				Bodily pain				Total mental health				Total physical health			
	B	95% CI		p	B	95% CI		p	B	95% CI		p	B	95% CI		p	B	95% CI		p	B	95% CI		p
		lower	upper			lower	upper			lower	upper			lower	upper			lower	upper			lower	upper	
Age	-1.27	-2.03	-0.51	0.001	-0.457	-1.10	0.19	0.166	-0.371	-1.05	0.31	0.286	-1.291	-1.96	-0.62	0.000	-0.205	-0.67	0.26	0.387	-1.229	-1.80	-0.66	0.000
Sex																								
Male	Referent				Referent				Referent				Referent				Referent				Referent			
Female	-9.66	-22.26	2.95	0.133	-6.089	-16.88	4.70	0.269	-5.810	-17.17	5.55	0.316	-12.430	-23.64	-1.23	.0300	-6.682	-14.43	1.07	0.091	-12.640	-22.10	-3.19	0.009
Educational level																								
≤6	Referent				Referent				Referent				Referent				Referent				Referent			
7 to 11	2.61	-9.33	14.56	0.668	-1.198	-11.42	9.02	0.818	2.040	-8.73	12.81	0.710	2.119	-8.50	12.74	0.696	-2.528	-9.84	4.79	0.498	4.036	-4.92	12.99	0.377
12	10.48	-1.95	22.91	0.099	1.633	-9.01	12.27	0.764	-0.265	-11.47	10.95	0.963	11.195	0.14	22.25	0.047	-1.152	-8.77	6.46	0.767	7.872	-1.46	17.20	0.098
>12	10.19	-5.51	25.90	0.203	-0.884	-14.33	12.56	0.897	-6.530	-20.69	7.63	0.366	4.424	-9.54	18.39	0.535	-3.087	-12.84	6.67	0.535	6.742	-5.04	18.52	0.262
Income																								
Over 5,000	Referent				Referent				Referent				Referent				Referent				Referent			
3,000 to 5,000	-9.15	-28.69	10.39	0.359	-0.152	-16.87	16.57	0.986	-2.612	-20.23	15.00	0.771	0.833	-16.54	18.20	0.925	-1.291	-13.26	10.68	0.833	-2.907	-17.56	11.75	0.697
2,000 to 1,000	3.53	-16.17	23.23	0.726	0.379	-16.48	17.24	0.965	0.179	-17.58	17.94	0.984	10.933	-6.58	28.45	0.221	.479	-11.71	12.67	0.939	3.390	-11.39	18.17	0.653
Under 1,000	0.78	-17.74	19.31	0.934	-7.046	-22.90	8.80	0.384	2.924	-13.77	19.62	0.731	10.929	-5.54	27.39	0.193	-1.772	-13.13	9.58	0.760	5.449	-8.44	19.34	0.442
None	0.35	-18.27	18.97	0.971	-11.462	-27.40	4.47	0.159	-6.881	-23.67	9.91	0.422	11.200	-5.35	27.75	0.185	-7.382	-18.81	4.04	0.205	1.320	-12.65	15.29	0.853
Marriage																								
Married	Referent				Referent				Referent				Referent				Referent				Referent			
Bereavement	0.84	-9.68	11.36	0.875	2.031	-6.97	11.03	0.658	-3.075	-12.56	6.41	0.525	0.900	-8.45	10.25	0.850	1.301	-5.14	7.74	0.692	3.122	-4.77	11.01	0.438
Employment																								
Not employed	Referent				Referent				Referent				Referent				Referent				Referent			
Employed	5.37	-10.00	20.74	0.493	0.260	-12.89	13.41	0.969	3.713	-10.14	17.57	0.599	-1.041	-14.70	12.62	0.881	-1.932	-11.38	7.51	0.688	-0.364	-11.89	11.16	0.951
Intensity of grandchild care																								
Daytime during weekday	Referent				Referent				Referent				Referent				Referent				Referent			
Full time during weekday	11.25	-3.22	25.71	0.128	8.409	-3.97	20.79	0.183	13.082	0.04	26.12	0.049	12.196	-0.66	25.05	0.063	8.627	-0.23	17.49	0.560	13.785	2.94	24.64	0.013
Only weekend	-6.14	-34.65	22.36	0.673	1.132	-23.26	25.53	0.928	6.970	-18.73	32.67	0.595	-7.861	-33.20	17.48	0.543	-1.846	-19.32	15.62	0.836	1.411	-19.97	22.79	0.897
Always	3.88	-7.51	15.26	0.504	1.669	-8.07	11.41	0.737	2.963	-7.30	13.23	0.572	5.399	-4.72	15.52	0.296	1.231	-5.75	8.22	0.730	4.719	-3.82	13.26	0.279
Etc	5.10	-17.99	28.19	0.665	9.881	-9.88	29.64	0.327	6.302	-14.52	27.12	0.553	11.303	-9.23	31.83	0.281	11.342	-2.82	25.51	0.117	9.417	-7.91	26.74	0.287
Financial support																								
No	Referent				Referent				Referent				Referent				Referent				Referent			
Yes	7.38	-1.91	16.66	0.119	7.797	-0.15	15.74	0.054	5.095	-3.28	13.47	0.233	2.582	-5.67	10.84	0.540	3.821	-1.87	9.51	0.188	1.665	-5.30	8.63	0.639

SF-36: the Medical Outcome Survey (MOS) 36-item short-form health survey

Supplementary Table 2. Correlation between the amount of financial support and scores on the SF-36 and the MOS-SSS (N=41)

	Correlation
SF-36, mean (SD)	
General health	-0.100
Physical function	0.180
Role limitation, physical	0.202
Role limitation, emotional	0.060
Social function	0.096
Bodily pain	0.177
Vitality	0.124
Mental health	-0.107
Total mental health	0.015
Total physical health	0.122
SF-36 total score	0.091
MOS-SSS, mean (SD)	
Emotional/informational	-0.046
Tangible	-0.028
Positive	0.034
Affectionate	0.107
Overall	0.009

SF-36: the Medical Outcome Survey (MOS) 36-item short-form health survey, MOS-SSS: the Medical Outcome Survey Social Support Survey