


Factors affecting the quality of life of family caregivers of patients with heart failure

A cross-sectional study

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Abstract

Heart failure is a chronic disease requiring lifetime self-management at home by patients, who often require additional support. However, the long-term nature of this self-management presents great challenges for both heart failure patients and their family caregivers. The role of family caregivers is critical, but little is known about the relationship between the burden, stress, depressive symptoms, and quality of life in the family caregivers of heart failure patients. We aimed to explore caregiver burden, stress, depressive symptoms, and quality of life in both patients with heart failure and their family caregivers and identify the factors associated with family caregivers' quality of life.

The sample included 120 participants (60 heart failure patients and 60 corresponding family caregivers) from cardiovascular outpatient clinics at 2 university-affiliated hospitals in South Korea from September 2018 to July 2019. The mean ages of the heart failure patients and their caregivers were 72.72 ($SD = 12.73$) and 57.03 ($SD = 13.42$) years, respectively. Caregiver burden ($r = -0.601$, $P < .001$) and caregiver depressive symptoms ($r = -0.535$, $P < .001$) were negatively correlated with the caregivers' quality of life. The result of the hierarchical multiple regression analysis identified 3 significant factors related to the family caregivers' quality of life: caregiver's age ($\beta = -0.257$, $P = .012$), caregiver burden ($\beta = -0.408$, $P = .002$) and caregiver depressive symptoms ($\beta = -0.298$, $P = .018$), with overall explanatory power of 47.5%.

It is necessary to develop practical strategies to improve family caregivers' quality of life by alleviating their burden and depressive symptoms. Healthcare providers should be engaged with not only heart failure patients but also their family caregivers during the disease management process to improve patients' outcomes.

Keywords: burden, family caregivers, heart failure, quality of life, stress

1. Introduction

Heart failure is a condition in which the heart is unable to maintain sufficient blood flow throughout the whole body when a patient is stable or exercising.^[1] Some of the various causes of heart failure include aging, high blood pressure, diabetes, coronary artery disease, dysrhythmia, and cardiomyopathy.^[2] In recent years, the rapid increase in the aging population and the rise in the incidence of metabolic diseases such as hypertension, diabetes, and obesity has led to an increase in the prevalence of heart failure,^[3] which was 2.42% in 2012 and is expected to be 2.97% in 2030.^[4] By 2030, the total medical cost for heart

failure management in the US is projected to grow 127%, to \$69.8 billion, reaching \$244 per adult.^[4]

Heart failure presents psychological and socio-economical burdens for the individual heart failure patient, their family, and society due to life-long disease management, hospitalization costs, medication expenditure, and spending on comorbid diseases.^[5] Patients with heart failure require continuous life-long self-management at home, including proper exercise, lifestyle changes (e.g., dietary habits), and symptom monitoring, along with regular hospital visits and medication compliance.^[6] However, heart failure patients are primarily older adults who often have difficulties with independent self-management due

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The authors of this work have nothing to disclose.

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to cognitive or functional decline, leading to their reliance on support from their family caregivers.^[7,8]

Family caregivers of heart failure patients are essential for supporting the patient's daily life, which can substantially affect patients' physical health and psychosocial well-being. However, family caregivers face burdens and stress from their role in providing long-term care since heart failure is one of the chronic diseases. Thus, both patients and the family caregivers need constant and proper support and supervision from healthcare providers and society to address their physical, emotional, and psychosocial needs. However, family caregivers of heart failure patients are known to experience adverse sequelae from their caregiving role, including burden, depressive symptoms, anxiety, and stress,^[9] further impairing their own health and quality of life (QoL).^[10,11]

Despite the importance of the family caregiver's role in supporting heart failure patients, relatively few studies have examined family caregivers' psychosocial well-being and QoL compared to research on these variables in heart failure patients. In addition, several previous studies have compared the QoL of heart failure patients and their family caregivers and reported inconsistent patterns of results across the studies.^[12-14] Therefore, the present study aimed to explore the QoL of heart failure patients and their family caregivers and identify the factors associated with the QoL of family caregivers.

2. Methods

2.1. Study design and participants

The present study used a cross-sectional, correlational design. A total of 120 participants (60 heart failure patients and 60 corresponding family caregivers) were recruited through convenience sampling from cardiovascular outpatient clinics at 2 large tertiary medical centers in South Korea between September 2018 and July 2019. Patients were included if they were adults over 18 years of age, diagnosed with heart failure by a cardiologist, and had regular medical follow-up visits. Family caregivers were eligible to participate if they were adults over 18 years of age and accompanied a patient to the outpatient clinic as a primary family caregiver. All participants needed to be able to communicate and willing to participate in the study.

2.2. Measures

Participants completed a self-report questionnaire surveying their demographic and disease-related characteristics, caregiver burden, depressive symptoms, and QoL. Additionally, an objectively assessed stress measurement was collected.

2.2.1. Caregiver burden. Family caregiver burden was measured using the Montgomery-Borgatta Caregiver Burden Scale developed by Montgomery et al.^[15] that consists of 22 questions using a 5-point Likert scale. This tool measures the caregiver burden by including questions asking objective burden which is perceived disruption of tangible aspects of a caregiver's life and subjective burden which is the emotional impact of caregiving responsibilities on the caregiver.^[15] The higher the score, the higher the caregiver burden. The internal consistency was Cronbach α of 0.81 in a previous study,^[16] and 0.87 in the present study.

2.2.2. Stress. A heart-rate variability measurement tool (UBioClip V 70; Bio Sense Creative, Seoul, Korea) was used to determine the level of participants' objective stress. Stress was measured from 1 to 100, with higher scores indicating higher stress levels.

2.2.3. Depressive symptoms. Depressive symptoms were measured using a tool developed by Yesavage et al.^[17] that

consists of 15 questions using a 6-point Likert scale. This tool asks about depressive symptoms in daily life, and example questions are as follows: "Have you dropped many of your activities and interests?", "Do you feel that your life is empty?", "Do you prefer to stay at home, rather than going out and doing new things?", and "Do you feel that your situation is hopeless?".^[17] The higher the total score, the higher the level of depressive symptoms. Cronbach α was 0.94 in a previous study,^[17] and 0.87 in the present study.

2.2.4. QoL. We used a brief version of the World Health Organization's QoL scale (WHOQOL-BREF)^[18] to assess QoL. It contains 2 items assessing overall QoL and general health and 24 items on 4 QoL domains: physical health, psychological health, social relationships, and environmental health using a 5-point Likert scale. The scores for each domain were transformed to a scale that ranged 4–20 points according to the guideline of the tool,^[19] and higher scores denoted higher QoL.

2.3. Statistical analyses

Data were analyzed using SPSS version 23.0 (IBM Corporation, Armonk, NY, USA). Descriptive statistics were calculated for the demographic and medical characteristics and caregiver burden, stress, depressive symptoms, and participants' QoL. Independent sample *t*-tests, χ^2 tests, Pearson correlations, and hierarchical regression analyses were performed to determine the relationships between the variables and identify factors associated with family caregivers' QoL.

2.4. Ethical considerations

This study was approved by the Institutional Review Boards of Ajou University and Yonsei University (IRB no. AJIRB-MED-SUR-18-214 & 3-2019-0121). All participants provided their written informed consent and were assured that their information would remain confidential. Participant agreement forms were obtained after the researcher explained the purpose of the study and the confidentiality of the data. Anonymity was guaranteed by the suppressed encoding of each participant's name.

3. Results

3.1. Participants' demographic and medial characteristics

The demographic and medical characteristics of the 120 participants (60 heart failure patients and 60 corresponding family caregivers) are presented in Table 1. The mean ages of heart failure patients and their caregivers were 72.72 (*SD* = 12.73) and 57.03 (*SD* = 13.42) years, respectively. In case of heart failure patients, 53.3% (*n* = 32) were men, and the majority of family caregivers were women (*n* = 41, 68.3%).

Patients were diagnosed with heart failure for an average of 5.70 (*SD* = 5.88) years, 61.7% (*n* = 37) of whom reported New York Heart Association (NYHA) functional classes of I or II, and 38.3% (*n* = 23) reported NYHA classes of III or IV. As for the family caregivers, 45.0% (*n* = 27) were the patient's spouse, 25.0% (*n* = 15) were their daughters, and 18.3% (*n* = 11) were their sons. Most families described themselves as having a middle economic status (*n* = 32, 53.3%).

3.2. Caregiver burden, stress, depressive symptoms, and QoL

The means and standard deviations for the study variables of the participants are shown in Table 2. The mean caregiver burden was 57.88 (*SD* = 9.09). The mean stress of the patients and caregivers were 47.58 (*SD* = 20.88) and 52.07 (*SD* = 13.45), respectively. The mean depressive symptoms scores of the

Table 1
Demographic and medical characteristics for heart failure patients and their family caregivers.

Characteristics	Patients (n = 60)		Caregivers (n = 60)		t or χ^2	P
	M (SD) or n (%)		M (SD) or n (%)			
Age (yr)	72.72 (12.73)		57.03 (13.42)		6.568	<.001
Gender	Men	32 (53.3)	19 (31.7)		5.763	.016
	Women	28 (46.7)	41 (68.3)			
Marital state	Married	41 (68.3)	52 (86.7)		22.400	<.001
	Bereaved	16 (26.7)	0 (0.0)			
	Not married	2 (3.3)	5 (8.3)			
	Divorced	1 (1.7)	3 (5.0)			
Educational level	≤ Middle school	37 (61.7)	15 (25.0)		17.029	<.001
	≤ High school	10 (16.7)	15 (25.0)			
	≥ College/university	13 (21.7)	30 (50.0)			
Employed	Yes	14 (23.3)	26 (43.3)		5.400	.020
	No	46 (76.7)	34 (56.7)			
Religion	Christian	15 (25.0)	17 (28.3)		5.067	.281
	Buddhist	10 (16.7)	15 (25.0)			
	Catholic	5 (8.3)	5 (8.3)			
	Others	4 (6.7)	0 (0.0)			
	None	26 (43.3)	23 (38.3)			
Heart failure duration (yr)	5.70 (5.88)		–		–	–
New York Heart Association class	I	12 (20.0)	–		–	–
	II	25 (41.7)	–		–	–
	III	14 (23.3)	–		–	–
	IV	9 (15.0)	–		–	–
Familial economic status	Low	–	14 (23.3)		–	–
	Middle	–	32 (53.3)		–	–
	High	–	14 (23.3)		–	–
Caregiver relationship with patient	Spouse	–	27 (45.0)		–	–
	Daughter	–	15 (25.0)		–	–
	Son	–	11 (18.3)		–	–
	Daughter-in-law	–	5 (8.3)		–	–
	Sibling	–	1 (1.7)		–	–
	Parent	–	1 (1.7)		–	–
Caregiver's disease	Yes	–	33 (55.0)		–	–
	No	–	27 (45.0)		–	–

Table 2
Descriptive statistics for the study variables for heart failure patients and their family caregivers.

Variables	Patients (n = 60)	Caregivers (n = 60)	t	P
	M (SD)			
Caregiver burden	–	57.88 (9.09)	–	–
Stress	47.58 (20.88)	52.07 (13.45)	–1.374	.173
Depressive symptoms	5.58 (4.29)	4.82 (4.11)	0.952	.343
Quality of life (total)	64.77 (12.71)	66.07 (8.55)	–0.620	.537
Overall quality of life	12.16 (3.34)	13.06 (2.36)	–1.372	.174
Physical health	11.78 (3.18)	13.16 (2.03)	–2.635	.010
Psychological health	13.98 (2.91)	13.51 (1.87)	1.065	.290
Social relationships	12.53 (3.09)	12.69 (2.51)	–0.331	.741
Environmental quality of life	14.13 (2.64)	13.62 (2.13)	1.085	.281

patients and caregivers were 5.58 (SD = 4.29) and 4.82 (SD = 4.11), respectively. The mean QoL for the patients and caregivers were 64.77 (SD = 12.71) and 66.07 (SD = 8.55), respectively. There were no significant differences in stress,

Table 3
Correlations between family caregiver's quality of life and other study variables.

Variables	Caregiver's quality of life r (P)
Caregiver burden	-0.601 (<.001)
Patient's stress	-0.128 (.341)
Caregiver's stress	-0.251 (.053)
Patient's depressive symptoms	-0.147 (.308)
Caregiver's depressive symptoms	-0.535 (<.001)
Patient's quality of life	0.052 (.720)

depressive symptoms, and total QoL levels between the patients and their family caregivers.

As for the scores in subcategories of QoL, there was a significant difference in physical health QoL between the patients and family caregivers ($t = -2.635$, $P = .010$), and the mean score of physical health QoL of the patients was significantly lower than that of the family caregivers (11.78 vs 13.16). There were no significant differences in overall QoL, psychological health, social relationships, and environmental QoL between the patients and their family caregivers.

3.3. Relationships between family caregiver's QoL and other study variables

The correlations of family caregiver's QoL and other study variables are presented in Table 3. The QoL of family caregivers had significant negative correlations with caregiver burden ($r = -0.601$, $P < .001$) and caregiver depressive symptoms ($r = -0.535$, $P < .001$). There were no significant correlations between caregiver's QoL and patients' stress, depressive symptoms, and QoL.

3.4. Factors affecting the QoL of family caregivers

A hierarchical multiple regression analysis was performed to explore the factors associated with the QoL of family caregivers (Table 4). In the first step (Model 1), participant's age and gender as demographic variables were entered into the regression. In the second step, caregiver burden and caregiver depressive symptoms, along with demographic variables, were entered into Model 2.

The analysis showed that the prediction model for caregiver QoL was significant ($F = 12.465$, $P < .001$), and the adjusted R^2 of Model 2 was 0.475, which meant the explanatory power of this prediction model for the variance of caregiver QoL was 47.5%. In the model, caregiver age ($\beta = -0.257$, $P = .012$), burden ($\beta = -0.408$, $P = .002$), and depressive symptoms ($\beta = -0.298$, $P = .018$) were significantly associated with the QoL of family

caregivers. As the caregiver's age, burden, and depressive symptoms increased, the caregiver's QoL decreased.

4. Discussion

The present cross-sectional and correlational study explored the factors related to the QoL of family caregivers of heart failure patients. The factors significantly associated with the caregivers' QoL included the caregiver's age, burden, and depressive symptoms.

Heart failure patients and their family caregivers showed significant difference in the physical health domain of QoL; that is, patients reported significantly lower scores on the physical health QoL than their caregivers. However, there were no other significant differences in the QoL domains (e.g., psychological health, social relationships, and environmental QoL) between the patients and caregivers. These results are consistent with previous studies^[14,20] that reported only the physical component of QoL for heart failure patients was lower than that of family caregivers. The physical symptoms experienced by heart failure patients can significantly reduce the related physical aspects of their QoL, but not for caregivers; also, this does not necessarily lead to a significant decrease in the patient's or their caregiver's QoL for the psychological or social domains.^[14,20]

In addition, there were no significant differences in stress and depressive symptoms between heart failure patients and the caregivers, consistent with prior studies reporting similar levels of psychological symptoms in heart failure patients and their caregivers.^[14,21] Prior researchers have posited that when a close interpersonal relationship exists between individuals, especially between patients and their caregivers, emotions can be easily transferred to another person leading to comparable emotional levels in both individuals.^[22]

In this study, caregiver's QoL was inversely correlated with caregiver burden and depressive symptoms—that is, as caregiver's burden and depressive symptoms increased, their QoL decreased. Furthermore, the study's regression model identified caregiver's age, burden, and depressive symptoms as significant predictors of their QoL, explaining 47.5% of the variance. Previous research^[7,21,23,24] demonstrated that caregiver burden and depressive symptoms were related to their own QoL. Increased caregiver burden leads to greater caregiving difficulty, and the complex and demanding responsibilities experienced by caregivers while caring for patients can result in spending more time providing care for patients, which may adversely influence caregivers' well-being.^[24] Heart failure patients' functional limitations and altered self-care increased the necessary activities that must be provided by family caregivers, which have been found to be the cause of increasing caregivers' burden and depressive symptoms,^[25] and caregivers' burden and depressive symptoms are associated with their QoL.^[23]

In this study, as family caregivers' age increased, their QoL decreased. Two-thirds of caregivers were women, and more than half had no job. Thus, the caregivers may have been

Table 4
Hierarchical linear regression of the quality of life predictors for family caregivers.

Model	Predictor	B	β	t	p	adj. R ²	F	P
1	Age	-0.230	-0.266	-2.079	.042	0.075	2.316	.108
	Gender	-2.270	-0.092	-0.179	.475			
2	Age	-0.222	-0.257	-2.614	.012	0.475	12.465	<.001
	Gender	-1.455	-0.059	-0.600	.551			
	Caregiver burden	-0.521	-0.408	-3.334	.002			
	Caregiver's depressive symptoms	-0.841	-0.298	-2.430	.018			

somewhat socially underprivileged, even though they are responsible for caring for heart failure patients. Since the deterioration of the QoL of family caregivers can negatively affect both the relationship between patients and caregivers and the maintenance of their health,^[26,27] healthcare providers need to be aware of family caregivers' QoL and attempt to improve it, considering sociodemographic factors, such as age, gender, and employment.

However, this study found no significant correlations between caregiver's QoL and heart failure patient's stress, depressive symptoms, or QoL. Similarly, a previous study^[21] reported that neither patients' depressive symptoms nor anxiety predicted their family caregivers' QoL; rather, caregivers' high depressive symptoms and anxiety can negatively impact patients' QoL since the patients may be vulnerable to the emotions of their caregivers. Little is known about the relationships between these variables; thus, further research is necessary to demonstrate the causal relationships between these variables in heart failure patients and their caregivers.

A variety of heart failure disease management and cardiac rehabilitation programs exist for heart failure patients, but programs that focus on their caregivers are also necessary. These programs might be used to implement strategies to alleviate caregiver burden and depressive symptoms and improve their QoL. Along with existing heart failure rehabilitation programs, social support, such as encouraging frequent visits by other family members, helping caregivers to accept the situation and finding alternative resources, providing psychological individual and family counseling where appropriate, and improving caregivers' coping skills can help to decrease caregiver burden and depressive symptoms and further improve overall QoL.^[23,24,28,29] Also, screening for clinically significant burden or depressive symptoms before the caregiver experiences "burnout" is necessary to provide optimal treatment.^[30]

As the number of patients with heart failure increases with societal aging, the caregivers' roles in the patients' self-management at home and the improvement of patient outcomes should be emphasized. Therefore, healthcare providers should recognize the importance of QoL and related factors of burden and depressive symptoms not only for patients but also for their caregivers and strive to improve it. It has significant clinical implications for healthcare providers in being able to identify caregivers at risk for burden and depression, and it will allow them in timely consultations to be more specific and effective in reducing caregiver distress.^[31] Further intervention studies are needed in this population that include evaluating both caregivers' and heart failure patients' outcomes.

There are some limitations in this study that need to be acknowledged. First, the small sample size and cross-sectional design limit its ability to determine the causality between the study variables. Second, the sample was selected from the out-patient clinics at 2 medical centers in South Korea using convenience sampling and therefore has poor generalizability. Third, potential confounding factors were not assessed (i.e., caregivers' own health status or specific diseases). It will be valuable to consider these factors in the future study.

5. Conclusion

This study showed that the QoL of family caregivers of heart failure patients was significantly associated with their age, caregiver burden, and caregiver depressive symptoms. Developing effective strategies to mitigate caregiver burden and depressive symptoms and to improve QoL in family caregivers is necessary. Such strategies could further enable family caregivers to participate positively in comprehensive heart failure management for the patients. Healthcare providers should pay attention to both heart failure patients and

their family caregivers to improve patient outcomes, as family caregivers are substantially involved in patients' disease management.

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