Factors affecting the quality of life of family caregivers of patients with heart failure
A cross-sectional study

Kyoung-A Kim, PhD, RN\textsuperscript{a}, Jin-Sun Park, MD, PhD\textsuperscript{b}, Kyoung-Woo Seo, MD\textsuperscript{b}, Eui-Young Choi, MD, PhD\textsuperscript{c}, Jeong-Ah Ahn, PhD, RN\textsuperscript{a}\textsuperscript{*} (Correspondence: Jeong-Ah Ahn, College of Nursing and Research Institute of Nursing Science, Ajou University, Worldcup-ro 164, Yeongtong-gu, Suwon 16499, Republic of Korea (e-mail: ahnj@ajou.ac.kr).

Copyright © 2022 the Author(s). Published by Wolters Kluwer Health, Inc.

Funding: This work was supported by the new faculty research fund in 2018 from Ajou University School of Medicine and the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. NRF-2019R1F1A1063148).

Patient consent: This study was approved by the Institutional Review Boards of Ajou University Hospital and Gangnam Severance Hospital, Yonsei University (IRB no. AJIRB-MED-SUR-18-214 & 3-2019-0121), and all patients’ written consent was obtained according to the research ethics. The authors of this work have nothing to disclose.

The data that support the findings of this study are available from the authors upon reasonable request.

\textsuperscript{a} College of Nursing, Gachon University, Incheon, \textsuperscript{b} Department of Cardiology, Ajou University School of Medicine, Suwon, Korea, \textsuperscript{c} Division of Cardiology, Heart Center, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea, \textsuperscript{d} College of Nursing and Research Institute of Nursing Science, Ajou University, Suwon, Korea.

How to cite this article: Kim K-A, Park J-S, Seo K-W, Choi E-Y, Ahn J-A. Factors affecting the quality of life of family caregivers of patients with heart failure: A cross-sectional study. Medicine 2022;101:35(e30042).

Received: 6 August 2021 / Received in final form: 23 February 2022 / Accepted: 2 May 2022

http://dx.doi.org/10.1097/MD.00000000000030042

1. Introduction
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 (β = −0.257, P = .012), caregiver burden (β = −0.408, P = .002) and caregiver depressive symptoms (β = −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.

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 (β = −0.257, P = .012), caregiver burden (β = −0.408, P = .002) and caregiver depressive symptoms (β = −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.\textsuperscript{[1]} Some of the various causes of heart failure include aging, high blood pressure, diabetes, coronary artery disease, dysrhythmia, and cardiomyopathy.\textsuperscript{[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,\textsuperscript{[3]} which was 2.42% in 2012 and is expected to be 2.97% in 2030.\textsuperscript{[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.\textsuperscript{[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.\textsuperscript{[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.\textsuperscript{[6]} However, heart failure patients are primarily older adults who often have difficulties with independent self-management due

Observational Study
Factors affecting the quality of life of family caregivers of patients with heart failure
A cross-sectional study

Kyoung-A Kim, PhD, RN\textsuperscript{a}, Jin-Sun Park, MD, PhD\textsuperscript{b}, Kyoung-Woo Seo, MD\textsuperscript{b}, Eui-Young Choi, MD, PhD\textsuperscript{c}, Jeong-Ah Ahn, PhD, RN\textsuperscript{a}\textsuperscript{*} (Correspondence: Jeong-Ah Ahn, College of Nursing and Research Institute of Nursing Science, Ajou University, Worldcup-ro 164, Yeongtong-gu, Suwon 16499, Republic of Korea (e-mail: ahnj@ajou.ac.kr).

Copyright © 2022 the Author(s). Published by Wolters Kluwer Health, Inc.

Funding: This work was supported by the new faculty research fund in 2018 from Ajou University School of Medicine and the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. NRF-2019R1F1A1063148).

Patient consent: This study was approved by the Institutional Review Boards of Ajou University Hospital and Gangnam Severance Hospital, Yonsei University (IRB no. AJIRB-MED-SUR-18-214 & 3-2019-0121), and all patients’ written consent was obtained according to the research ethics. The authors of this work have nothing to disclose.

The data that support the findings of this study are available from the authors upon reasonable request.

\textsuperscript{a} College of Nursing, Gachon University, Incheon, \textsuperscript{b} Department of Cardiology, Ajou University School of Medicine, Suwon, Korea, \textsuperscript{c} Division of Cardiology, Heart Center, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea, \textsuperscript{d} College of Nursing and Research Institute of Nursing Science, Ajou University, Suwon, Korea.

How to cite this article: Kim K-A, Park J-S, Seo K-W, Choi E-Y, Ahn J-A. Factors affecting the quality of life of family caregivers of patients with heart failure: A cross-sectional study. Medicine 2022;101:35(e30042).

Received: 6 August 2021 / Received in final form: 23 February 2022 / Accepted: 2 May 2022

http://dx.doi.org/10.1097/MD.00000000000030042

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.\textsuperscript{[1]} Some of the various causes of heart failure include aging, high blood pressure, diabetes, coronary artery disease, dysrhythmia, and cardiomyopathy.\textsuperscript{[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,\textsuperscript{[3]} which was 2.42% in 2012 and is expected to be 2.97% in 2030.\textsuperscript{[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.\textsuperscript{[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.\textsuperscript{[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.\textsuperscript{[6]} However, heart failure patients are primarily older adults who often have difficulties with independent self-management due
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 about 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?”. 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, χ² 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 medical 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 57.88 (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
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,
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 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.

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. 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.

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 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. 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, and caregivers’ burden and depressive symptoms are associated with their QoL.

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 3

| 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)                        |

### Table 4

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

| Model | Predictor                  | $B$   | $\beta$ | $t$  | $p$   | 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 | .551 | .551 | .551 |
| 2     | Age                        | $-0.222$ | $-0.257$ | $-2.614$ | .012 | 0.475 | 12.465 | <.001 |
|       | Gender                     | $-1.455$ | $-0.059$ | $-0.600$ | .551 | .551 | .551 | .551 |
|       | Caregiver burden           | $-0.521$ | $-0.408$ | $-3.334$ | .002 | .002 | .002 | .002 |
|       | Caregiver’s depressive symptoms | $-0.841$ | $-0.298$ | $-2.430$ | .018 | .018 | .018 | .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, 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 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.

Also, screening for clinically significant burden or depressive symptoms before the caregiver experiences "burnout" is necessary to provide optimal treatment.

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.

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 outpatient 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 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.

Author contributions

Conceptualization: Jeong-Ah Ahn.
Data curation: Jin-Sun Park, Kyoung-Woo Seo, Eui-Young Choi, Jeong-Ah Ahn.
Formal analysis: Kyoung-A Kim, Jeong-Ah Ahn.
Funding acquisition: Jeong-Ah Ahn.
Methodology: Jeong-Ah Ahn.
Supervision: Jin-Sun Park, Kyoung-Woo Seo, Eui-Young Choi, Jeong-Ah Ahn.
Writing-original draft: Kyoung-A Kim, Jeong-Ah Ahn.
Writing-review & editing: Kyoung-A Kim, Jeong-Ah Ahn.

References

[1] Coronel R, de Groot JR, van Lieshout JJ. Defining heart failure. Cardiaco. 2001;50:419–22.
[2] Roger VL. Epidemiology of heart failure: a contemporary perspective. Circ Rev. 2021;128:1421–34.
[3] Khatriadeh S, Farzadfar F, Oliver J, et al. Worldwide risk factors for heart failure: a systematic review and pooled analysis. Int J Cardiol. 2013;168:1186–94.
[4] Virani SS, Alonso A, Benjamin EJ, et al. Heart disease and stroke statistics-2020 update: a report from the american heart association. Circulation. 2020;141:e139–596.
[5] Cowie MR, Anker SD, Clandaj K, et al. Improving care for patients with acute heart failure: before, during and after hospitalization. ESC Heart Fail. 2014;1:110–45.
[6] Balady GJ, Williams MA, Ades PA, et al. Core components of cardiac rehabilitation/secondary prevention programs: 2007 update: a scientific statement from the american heart association exercise, cardiac rehabilitation, and prevention committee, the council on clinical cardiology; the councils on cardiovascular nursing, epidemiology and prevention, and nutrition, physical activity, and metabolism; and the american association of cardiovascular and pulmonary rehabilitation. Circulation. 2007;115:2675–82.
[7] Pressler SJ, Gradus-Pizlo I, Chubinski SD, et al. Family caregiver outcomes in heart failure. Am J Crit Care. 2009;18:149–59.
[8] Lent J, Enro A, She D, et al. The caregiver stress process and health outcomes. J Aging Health. 2007;19:871–87.
[9] Brostrom A, Stromberg A, Dahlstrom U, et al. Congestive heart failure, spouses’ support and the couple’s sleep situation: a critical incident technique analysis. J Clin Nurs. 2003;12:223–33, 34.
[10] Rivera HR. Depression symptoms in cancer caregivers. Clin J Onco Nurs. 2009;13:195–202.
[11] Adelman RD, Tmanova LL, Delgado D, et al. Caregiver burden: a clinical review. JAMA. 2014;311:1052–60.
[12] Thomson P, Howie K, Leslie SJ, et al. Evaluating emotional distress and health-related quality of life in patients with heart failure and their family caregivers: testing dyadic dynamics using the actor-partner interdependence model. PLoS One. 2020;15:e0227129.e0227129.
[13] Vellone E, Chung ML, Coccieri A, et al. Effects of self-care on quality of life in adults with heart failure and their spousal caregivers: testing dyadic dynamics using the actor-partner interdependence model. J Fam Nurs. 2014;20:120–41.
[14] Pihl E, Jacobsson A, Fridlund B, et al. Depression and health-related quality of life in elderly patients suffering from heart failure and their spouses: a comparative study. Eur J Heart Fail. 2005;7:583–9.
[15] Montgomery RJ, Stull DE, Borgatta EF. Measurement and the analysis of burden. Res Aging. 1985;7:137–52.
[16] Montgomery RJ, Gonyea JG, Hooyman NR. Caregiving and the experience of subjective and objective burden. Fam Relat. 1985;34:19–26.
[17] Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. J Psychiatr Res. 1982;17:37–49.
[18] The WHOQOL Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychol Med. 1998;28:351–8.
[19] World Health Organization. Division of Mental Health. WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment. Geneva, Switzerland: World Health Organization. 1996.
Mårtensson J, Dracup K, Canary C, et al. Living with heart failure: depression and quality of life in patients and spouses. CJ Heart Lung Transplant. 2003;22:460–7.

Chung ML, Moser DK, Lennie TA, et al. The effects of depressive symptoms and anxiety on quality of life in patients with heart failure and their spouses: testing dyadic dynamics using actor-partner interdependence model. J Psychosom Res. 2009;67:29–35.

Neumann R, Strack F. “Mood contagion”: the automatic transfer of mood between persons. J Pers Soc Psychol. 2000;79:211–23.

Hooley PJ, Butler G, Howlett JG. The relationship of quality of life, depression, and caregiver burden in outpatients with congestive heart failure. Congest Heart Fail. 2005;11:303–10.

Chung ML, Lennie TA, Mudd-Martin G, et al. Depressive symptoms in patients with heart failure negatively affect family caregiver outcomes and quality of life. Eur J Cardiovasc Nurs. 2016;15:30–8.

Clyburn LD, Stones MJ, Hadjistavropoulos T, et al. Predicting caregiver burden and depression in Alzheimer’s disease. J Gerontol B Psychol Sci Soc Sci. 2000;55:S2–13.

Reinhard SC, Given B, Petlick NH, et al. Supporting family caregivers in providing care. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville, US: Agency for Healthcare Research and Quality. 2008.

Rha SY, Park Y, Song SK, et al. Caregiving burden and the quality of life of family caregivers of cancer patients: the relationship and correlates. Eur J Oncol Nurs. 2015;19:376–82.

Luttik ML, Blaauwbroek A, Dijker A, et al. Living with heart failure: partner perspectives. J Cardiovasc Nurs. 2007;22:131–7.

Ågren S, Evangelista L, Davidson T, et al. The influence of chronic heart failure in patient-partner dyads-a comparative study addressing issues of health-related quality of life. J Cardiovasc Nurs. 2011;26:65–73.

Chung ML, Pressler SJ, Dunbar SB, et al. Predictors of depressive symptoms in caregivers of patients with heart failure. J Cardiovasc Nurs. 2010;25:411–9.

Lou Q, Liu S, Hoo YR, et al. Comprehensive analysis of patient and caregiver predictors for caregiver burden, anxiety and depression in Alzheimer’s disease. J Clin Nurs. 2015;24:2668–78.