Quality of Life and Associated Factors in Older Adults With Heart Failure

Hsiang-Fen YEH¹ • Jung-Hua SHAO²*  

ABSTRACT

Background: Although heart failure (HF) is negatively known to affect older adults physically, psychologically, and socially, only a few studies have explored the predictors of quality of life (QoL) in older adults with HF in Taiwan.

Purpose: This study was designed to determine the relationships among depression, demographic characteristics, clinical characteristics, and QoL in older patients with HF.

Methods: This was a cross-sectional study. From January 2013 to June 2014, convenience sampling was used to collect data from 175 older adults with HF at two hospitals in Northern Taiwan. Participant data were collected from medical records and researcher-administered structured questionnaires in face-to-face interviews.

Results: The QoL of the participants was found to be associated with clinical characteristics, including hospital readmission for >10 days with an increased level of HF-related symptom distress (HFSD) and more-severe depression. Depression was found to have a mediating effect, with the New York Heart Association (NYHA) functional class and HFSD both affecting the QoL of the participants through this intermediary.

Conclusions/Implications for Practice: HF is a chronic and debilitating disease that often reduces QoL in older adults significantly. Interventions designed to improve NYHA functional class and alleviating HFSD are valid treatment options only in cases with depressive symptoms. Nurses treating older adults with HF should consider factors such as NYHA functional class and HFSD to reduce HFSD and readmission rates and to enhance the QoL of these patients. In addition, after both hospital admission and discharge, older adult patients should be assessed regularly to monitor for and quickly address the development of comorbid depression.

Key Words: older adults, heart failure, heart-failure-related symptom distress, depression, quality of life.

Introduction

Heart failure (HF) occurs in the late stage of heart disease and affects more than 23 million people worldwide. The mortality rate for HF accounts for approximately 2% of all deaths worldwide, with 13 million people hospitalized annually for HF at a cost of approximately NT$7.7 billion (approximately US$ 233 million; Celik et al., 2016). In Taiwan, HF negatively affects older adults physically, psychologically, and socially and accounts for 10.6% of all deaths (Department of Statistics, Ministry of Health and Welfare, Taiwan, ROC, 2017). The hospital admission rate for patients with HF who did not comply with the advice of their healthcare professionals was 50%. The increasing readmission rate of patients with HF has become a major health concern (Smit et al., 2016).

Demographic characteristics have been shown to influence quality of life (QoL) in patients with HF significantly. For example, unmarried patients with HF were found to face a higher risk of readmission and death than their married peers (Chung et al., 2009), which is likely because of lack of spousal support. Furthermore, older adults with HF have been shown to have a significantly lower health-related QoL than their healthy older adult peers, mainly because of their relatively more-severe physical and emotional symptoms. HF has been shown to limit patients’ physical activity, cause social and psychological distress, and engender economic hardships, thus affecting patient QoL in several different dimensions. For example, patients with HF experience physiological symptoms such as dyspnea and fatigue that often affect their functional capacity as well as symptoms of discomfort that limit activities, thus influencing both the functional and social aspects of QoL. Riegel et al. (2018) reported HF-related symptom distress (HFSD) to be a key factor affecting QoL in patients with HF. In addition, QoL has been significantly correlated with the New York Heart Association (NYHA) functional classification and left ventricular ejection fraction (Alaloul et al., 2017). Readmission of patients with HF has been reported to be related to disease severity, cognitive, bodily functions, and family relations. Furthermore, the frequency of readmission and the length of rehospitalization stay have been reported to affect the
QoL of patients with HF, predict their prognosis, and increase their medical expenses (Riegel et al., 2018). K. S. Lee et al. (2017) found evidence indicating the likelihood of developing comorbid depression in patients with HF to be 4–5 times higher than that in healthy people. Comorbid depression reduces willingness to visit a doctor and increases the risk of death. Thus, patients with HF and comorbid depression may be readmitted more frequently and have higher mortality rates than patients with HF and without depression. The risk of readmission in patients with HF and comorbid depression is 3 times higher than that in patients with HF but without depression. Furthermore, the mortality rate in patients with HF and comorbid depression is twice as high as in patients with HF and without depression. Therefore, the clinical characteristics of patients with HF and comorbid depression affect their QoL. Identifying and treating comorbid depression have become crucial for the care of these patients.

Although clinical characteristics such as clinical information and HFSD are known to determine the effect of HF on QoL, little evidence has been published in the literature regarding the effect of the comorbid depression on QoL in older adults. In addition, few studies have examined the use of comorbid depression and clinical characteristics in predicting QoL in older adults with HF. Thus, it remains unclear whether clinical characteristics and depression are independent predictors of QoL and whether clinical characteristics or depression mediates the HF–QoL relationship.

The increasing trend in the prevalence of HF in Taiwan is expected to be similar to that in Western countries. However, differences exist in HF care between Taiwan and Western countries, stemming from differences in factors such as medical service systems and culture. For instance, Taiwan’s healthcare system allocates limited time and effort on individualized patient care, which is necessary for comprehensive HF disease management. Furthermore, Taiwanese patients often do not make prescribed changes to their lifestyle or follow long-term medical advice (Liu et al., 2014). These differences may be responsible for the currently high rates of hospitalization and mortality and poor QoL results in Taiwanese patients. Thus, the following hypotheses were formulated: (a) Demographic factors or clinical characteristics of older adults with HF in Taiwan correlate negatively with overall QoL; (b) among older adults with HF in Taiwan, higher levels of HFSD and depression correlate with lower overall QoL; and (c) clinical characteristics affect QoL via comorbid depression. To verify these hypotheses, this study was designed to focus on identifying potential influence of various patient characteristics such as demographic and clinical characteristics (disease severity, HFSD, and depression) on QoL. Thus, further research is required to determine the effects on QoL of different factors in older adults with HF in Taiwan.

This study was developed to explore the correlations between QoL in older adults with HF and selected demographic and clinical characteristics and to examine the nature of the relationships among depression, clinical characteristics, and QoL in patients with HF.

### Methods

#### Sample and Design

This study used a cross-sectional design and used convenience sampling to recruit and enroll 175 patients with a primary or secondary diagnosis of HF from the cardiology outpatient clinics of two of the nine medical centers in northern Taiwan between 2013 and 2014. Eligible participants were at least 60 years old, residing with family, and documented with an NYHA functional classification. Data on participants' demographic and clinical characteristics, depression levels, and QoL were collected between January 1, 2013, and June 30, 2014, using three questionnaires that were administered by the researchers in a structured manner in face-to-face interviews as well as chart reviews in outpatient clinics and participants' homes. The data collection process required approximately 30 minutes for each participant. The required sample size was estimated based on a medium effect size of 0.25, a power of 80%, and an alpha level of .05. Thus, 180 eligible participants were required for this study. Of the 360 patients approached, 172 met the criteria for exclusion and 13 refused to participate because they would not allow home visits, yielding a final sample of 175 participants.

#### Measures

**Demographic characteristics**

Demographic characteristics surveyed were age, gender, marital status, educational level, work status, monthly income, religion, regular exercise frequency and duration, and body mass index (BMI).

**Clinical characteristics**

The following clinical characteristics were surveyed: (a) the time since HF diagnosis, chronic disease history, number of medications, left ventricular ejection fraction (%), NYHA functional class, number of hospital readmissions, and readmission length of stay; (b) HFSD was assessed using the 17-item Heart Failure Symptom Distress Scale, which had preintervention and postintervention reliabilities (Cronbach’s α) of .86 and .92, respectively. On the Heart Failure Symptom Distress Scale, the degree to which each item (HF-related problem or symptom) had bothered or distressed respondents during the month before scale administration is rated on a 4-point Likert-type scale from 0 (not at all) to 4 (extremely). Item scores are summed to yield a total score ranging from 0 to 68, with higher scores indicating greater distress from HF-related symptoms. (c) Depression levels were measured using the 18-item self-report Taiwanese Depression Scale (TDS), which assesses depression in a manner that appropriately considers Chinese cultural characteristics. On the TDS, each item (depressive symptom) is rated for frequency during the past week on a 4-point Likert scale ranging from 0 (never) to 3 (always), and item scores are summed to yield a total score ranging from 0 to 54. The TDS was shown to have good...
specificity (ability to distinguish depressed from nondepressed patients by the area under the receiver operating curve = 92%) and 89% sensitivity. The cutoff score for depression is 19, with severity of depression categorized as no depression (0–18 points), mild depression (19–23 points), moderate depression (24–29 points), and severe depression (> 30 points; Y. Lee et al., 2000)

**Quality of life**
The Chinese version of the Minnesota Living with Heart Failure Questionnaire (MLHFQ) was used in this study. The MLHFQ, which is frequently used to assess the health conditions of patients with chronic HF, is a 21-item disease-specific measure of QoL with two dimensions: physical and emotional. Items are rated on a 6-point Likert scale ranging from 0 (not at all) to 5 (very much), and item scores are summed to yield an overall QoL score, a score for physical health (eight items; score range: 0–40), and a score for emotional health (five items; score range: 0–25). The physical subscale contains items associated with HF-related fatigue and dyspnea. The emotional subscale comprises items such as being worried and feeling depressed. The remaining eight items are used to rate other areas of life affected by HF. Total MLHFQ scores range from 0 to 105, with higher scores signifying poorer QoL. The MLHFQ is a psychometrically sound measure, with good internal consistency as measured by Cronbach’s α scores of .91–.96 for the total scale (Lloyd-Jones et al., 2009; Rector et al., 1987) and .94 and .88 for the physical and emotional dimensions, respectively (Rector, 2005). Moderate to good correlations have been observed between similar dimensions of the MLHFQ and the 36-item Short-Form Health Survey (correlation coefficient = .43 to −.73). The Cronbach’s α was .87 for the Chinese version of the MLHFQ in this study.

**Ethical Considerations**
This study was approved by the research ethics committee (No. 100-4492B). Before the interviews, the participants were informed that all information provided to researchers would remain confidential and that all findings would be reported anonymously. They were assured that participation was voluntary and that they could withdraw from the study at any time.

**Data Analysis**
Data were analyzed using SPSS for Windows 20.0 (IBM Corp., Armonk, NY, USA) at a significance level (p value) of .05. Data represented as continuous values were analyzed descriptively using means (M) and standard deviations (SD), whereas categorical data were described using frequencies and percentages. Differences in relationships between demographic and clinical characteristics, respectively, and outcome variables were analyzed using the independent t test, Kruskal–Wallis test, Pearson’s coefficient, and one-way analysis of variance. Next, stepwise multiple regression was applied to analyze the effects of demographic and clinical characteristics as well as depression levels on QoL. The regression analysis involved inputting all demographic characteristic-related variables (i.e., gender, age, education, work status, BMI, exercise, marital status, income, and religion), clinical characteristics (i.e., diagnosis time, type of medicine, ejection fraction, NYHA class, frequency, readmission length of stay, and symptom distress), and depression variables into the model.

The method of Baron and Kenny (1986) was followed in examining the mediating effects. After controlling for gender, age, marital status, educational level, working status, BMI, and exercise regularity, the mediating effects of both depression and clinical characteristics on QoL were examined using a series of hierarchical regression analyses. The following questions were asked: “Does the independent variable (either clinical characteristics or depression) affect the dependent variable?” (Step 1, Path A; p < .05); “Does the independent variable affect the mediator variable?” (Step 2, Path B; p < .05); and “Does the mediator variable affect the dependent variable?” (Step 3, Path C; p < .05). The mediator effect is supported when a significant relationship between an independent variable and an outcome variable (QoL) becomes less significant or nonsignificant after both the independent variable and mediator are entered into the regression model (Step 4).

**Results**

**Demographic Characteristics**
The 175 participants averaged 74.7 ± 9.1 years old, and most were male (n = 110, 62.9%), married (n = 154, 88.0%), and retired (n = 150, 85.7%). The mean BMI was 24.9 ± 4.2, indicating that most were slightly overweight. A small percentage (4.6%) were underweight (n = 8). Half of the participants exercised regularly (n = 86, 49.1%). The average exercise frequency was 5.9 times/week, and the average exercise duration was 48.1 minutes/week (Table 1).

**Clinical Characteristics**
The largest proportion of the participants (43.2%) had received their HF diagnosis over 5 years ago, and 42 had been diagnosed with one comorbid disease (24.0%). Moreover, 23.2% had a left ventricular ejection fraction of 31%–40%, and most were in NYHA Functional Class II (n = 96, 55.8%). However, 24 participants had been readmitted for > 10 days within the previous 1-year period (14.0%). The average HDPS score was 9.3 (SD = 8.9). The symptom that distressed the participants the most was fatigue (M = 1.1), followed by weakness (M = 0.9) and dyspnea when sitting on a chair (M = 0.9). In terms of depression status, the average TDS score was 23.6 (SD = 10.5), with 37 (21.3%) exhibiting mild depression, 12 (6.9%) exhibiting moderate depression, and 33 (19.0%) exhibiting severe depression (Table 1).
Quality of Life
The average MLHFQ score was 21.7 (SD = 3.0). The average scores for all MLHFQ items were between 0 and 1, indicating that the participants believed that HF symptoms slightly affected their QoL. The aspects of their daily lives that were most affected included walking or climbing stairs (M = 1.5), followed by going outdoors (M = 1.3) and performing housework (M = 1.3; Table 1).

Table 1
Participants’ Demographic and Clinical Characteristics, and MLHFQ (N = 175)

| Demographic characteristic | n   | %   |
|-----------------------------|-----|-----|
| Gender                      |     |     |
| Male                        | 110 | 62.9|
| Female                      | 65  | 37.1|
| Age (years; M and SD)       |     |     |
| ≤ 64                        | 29  | 16.6|
| > 65                        | 146 | 83.4|
| Educational level           |     |     |
| No                          | 51  | 29.1|
| Yes                         | 124 | 70.9|
| Marital status              |     |     |
| Married                     | 154 | 88.0|
| Single/widowed              | 21  | 22.0|
| Work status                 |     |     |
| Retired                     | 150 | 85.7|
| Nonretired                  | 25  | 14.3|
| BMI (kg/m²; M and SD)       |     |     |
| < 18.5                      | 8   | 4.6 |
| 18.5–23.9                   | 64  | 36.6|
| 24.0–26.9                   | 44  | 25.1|
| ≥ 27.0                      | 48  | 27.4|
| Missing data                | 11  | 6.3 |
| Exercises regularly         |     |     |
| No                          | 89  | 50.9|
| Yes                         | 86  | 49.1|
| Frequency (times/week; M and SD) | 5.9 | 2.1 |
| Duration (minute/each time; M and SD) | 48.1 | 3.0 |

| Clinical characteristics | n   | %   |
|--------------------------|-----|-----|
| Time since diagnosis (years) | 102 | 56.8|
| ≥ 5                      | 73  | 43.2|
| Number of chronic diseases |     |     |
| None                     | 87  | 49.7|
| 1                        | 42  | 24.0|
| 2–5                      | 46  | 26.3|
| NYHA class               |     |     |
| I                        | 58  | 33.7|
| II                       | 96  | 55.8|
| III                      | 16  | 9.3 |
| IV                       | 2   | 1.2 |
| Ejection fraction (%)     |     |     |
| ≤ 10                     | 1   | 0.7 |
| 11–20                    | 1   | 0.7 |
| 21–30                    | 18  | 12.7|
| 31–40                    | 33  | 23.2|
| > 40                     | 121 | 62.7|
| Medications              |     |     |
| None                     | 12  | 6.9 |
| 1–5                      | 50  | 28.6|
| > 5                      | 113 | 64.6|
| Readmission length of stay (days) |     |     |
| None                     | 118 | 68.6|

Note. BMI = body mass index; NYHA = New York Heart Association; MLHFQ = Minnesota Living with Heart Failure Questionnaire; HFSD = Heart Failure-Symptom Distress Scale; TDS = Taiwanese Depression Scale.

Quality of Life
The average MLHFQ score was 21.7 (SD = 30.5%). The average scores for all MLHFQ items were between 0 and 1, indicating that the participants believed that HF symptoms slightly affected their QoL. The aspects of their daily lives that were most affected included walking or climbing stairs (M = 1.5), followed by going outdoors (M = 1.3) and performing housework (M = 1.3; Table 1).

Relationship Between Quality of Life and Demographic and Clinical Characteristics
Overall QoL was found to be influenced by employment status and exercise habits. In addition, BMI status was found to have a significant impact on overall QoL (p < .05), with the effect most significant in participants who were underweight (BMI < 18.5) and least significant in participants who were obese (BMI ≥ 27.0). However, these effects did not differ significantly (p > .05) after a post hoc test was conducted. Moreover, the results indicate that the overall QoL of participants in NYHA Classes III and IV was more affected than that of participants in NYHA Classes I and II. By contrast, a lower effect on QoL was reported by nonhospitalized participants compared with their peers who had been readmitted to a hospital > 1 time and for > 10 days. Furthermore, overall QoL was shown to be positively correlated (Pearson’s correlation) with HFSD (r = .57), with overall QoL decreasing as symptom distress level increased. The overall QoL of participants with severe depression was more affected than that of participants with no, mild, or moderate depression (Table 2, only significant variables shown).
Factors Associated With Quality of Life in Older Adults With Heart Failure

In a stepwise multiple regression analysis of demographic characteristics, clinical characteristics, and QoL, overall QoL was found to be more affected in those readmitted for > 10 days than in those who were not hospitalized. Moreover, overall QoL was more affected in participants whose HFSD was more severe. Thus, overall QoL was shown to be substantially affected by high depression levels. (Table 3, only significant variables shown).

Mediating Effect of Depression

The results revealed that the NYHA functional class affected QoL indirectly through depression and that NYHA functional class (Step 1: \( \beta = .23 \)) and depression (Step 3: \( \beta = .40 \)) both had negative effects on QoL. After controlling for demographic variables, NYHA functional class was shown to affect QoL (\( \beta = .23, p < .05 \)) and depression (\( \beta = .16, p < .05 \)), with depression also affecting QoL (\( \beta = .41, p < .05 \)). Thus, the NYHA functional class and depression affected QoL simultaneously. The \( \beta \) coefficient for the NYHA functional class was .173. Compared with the \( \beta \) coefficient in Step 1 (.23), the coefficient for the NYHA functional class was lower, but the effect of the NYHA functional class on QoL was still significant. Therefore, as a mediating variable, depression was determined to affect QoL indirectly (i.e., a partial mediating effect), indicating that NYHA functional class affects QoL via depression (Table 4 and Figure 1-A). The examination of whether the readmission length of stay affected QoL via depression found that both readmission length of stay (Step 1: \( \beta = .30 \)) and depression (Step 3: \( \beta = .40 \)) had negative effects on QoL. After controlling for demographic variables, readmission length of stay was shown to affect QoL (\( \beta = .30, p < .001 \)) but not depression (\( \beta = .10, p > .05 \)). Therefore, depression was not identified in this study as a mediator variable and did not indirectly affect the readmission length of stay or QoL (Table 4 and Figure 1-B).

HFSD affected QoL via depression. In addition, after controlling for demographic variables, both HFSD (Step 1: \( \beta = .56 \)) and depression (Step 3: \( \beta = .40 \)) were found to affect QoL negatively, with HFSD affecting both QoL (\( \beta = .56, p < .001 \)) and depression (\( \beta = .35, p < .001 \)) and depression affecting QoL (\( \beta = .40, p < .001 \)). Thus, HFSD and depression affected QoL simultaneously. In particular, although the

### Table 2

**MLHFQ Analysis Results for the Effect of Different Demographic and Clinical Characteristics (N = 175)**

| Item                                      | \( n \) | Overall QoL | \( \beta \) | \( SE \) | \( p \) |
|-------------------------------------------|---------|-------------|-------------|---------|-------|
| **Exercises regularly** \(^a\)            |         |             |             |         |       |
| No                                        | 89      | 26.13       | 32.86       |         | .048  |
| Yes                                       | 85      | 17.04       | 27.28       |         |       |
| Missing data                              | 1       |             |             |         |       |
| **BMI (kg/m\(^2\))** \(^b\)              |         |             |             |         | .046  |
| Underweight                               | 8       | 52.75       | 44.59       |         |       |
| Normal                                    | 63      | 26.17       | 33.48       |         |       |
| Overweight                                | 44      | 15.41       | 23.12       |         |       |
| Obese                                     | 48      | 14.98       | 26.99       |         |       |
| Missing data                              | 12      |             |             |         |       |
| **NYHA class** \(^c\) \( \leq .001 \)     |         |             |             |         |       |
| I                                         | 58      | 15.93       | 26.95       |         |       |
| II                                        | 95      | 20.09       | 28.90       |         |       |
| III and IV                               | 18      | 46.72       | 34.93       |         |       |
| Missing data                              | 4       |             |             |         |       |
| **Readmissions** \(^c\) \( \leq .001 \) d  |         |             |             |         |       |
| None                                      | 117     | 13.77       | 23.16       |         |       |
| 1                                         | 35      | 36.11       | 33.80       |         |       |
| ≥ 2                                       | 19      | 42.05       | 41.18       |         |       |
| Missing data                              | 4       |             |             |         |       |
| **Readmission length of stay** \(^c\) \( \leq .001 \) d  |         |             |             |         |       |
| None                                      | 117     | 13.77       | 23.16       |         |       |
| ≤ 10 days                                 | 30      | 36.43       | 35.35       |         |       |
| > 10 days                                 | 24      | 40.42       | 38.08       |         |       |
| Missing data                              | 4       |             |             |         |       |
| **HF-related symptom distress** \(^e\) r \( = .57**\)  |         |             |             |         |       |
| Depression \(^c\) \( \leq .001 \) d      |         |             |             |         |       |
| No                                        | 92      | 16.51       | 28.18       |         |       |
| Mild                                      | 37      | 14.13       | 14.81       |         |       |
| Moderate                                  | 12      | 21.50       | 20.16       |         |       |
| Severe                                    | 33      | 47.70       | 8.67        |         |       |
| Missing data                              | 1       |             |             |         |       |

Note. MLHFQ = Minnesota Living with Heart Failure Questionnaire; QoL = quality of life; BMI = body mass index; NYHA = New York Heart Association; HF = heart failure.

\(^a\) Independent \( t \) test; \(^b\) Kruskal–Wallis test (Mann–Whitney \( U \) test with Bonferroni correction); \(^c\) One-way analysis of variance (Scheffe’s post hoc test); \(^d\) Variance unequal (robust analysis of variance with Games–Howell method); \(^e\) Pearson’s correlation.

**p < .01.**

### Table 3

**Stepwise Multiple Regression Analysis of the Effects of Demographic and Clinical Characteristics on Quality of Life (N = 175)**

| Item                                      | \( \beta \) | \( SE \) | \( p \) |
|-------------------------------------------|-------------|---------|-------|
| Readmission length of stay                | 19.04       | 4.92    | < .001 |
| > 10 days/hone readmission                | 17.89       | 5.48    | < .001 |
| Symptom distress                          | 1.71        | 0.22    | < .001 |
| Depression                                | 0.22        | 0.05    | < .001 |

Note. Demographic characteristics included age, gender, marital status, educational level, work status, monthly income, religion, regular exercise frequency and duration, and body mass index. Clinical characteristics included diagnosis time, type of medicine, ejection fraction, New York Heart Association class, frequency, readmission length of stay, and symptom distress. \( R^2 = .41; \) adjusted \( R^2 = .40. \)
β coefficient for HFSD (.48) was lower than the β coefficient in Step 1 (.56), it still affected QoL significantly. Therefore, depression was identified as a mediator variable that indirectly affected QoL (i.e., partial mediating effect), indicating that HFSD affected QoL via depression (Table 4 and Figure 1-C).

### Discussion

The results of this study reveal that the QoL of older adults with HF in Taiwan correlates negatively with their HFSD, length of readmission stay, and depression levels. Therefore, the results mostly support the stated hypotheses. The results indicate that the overall QoL of the participants in this study was less affected than the QoL of other older Taiwanese adults with HF (MLHFQ scores = 38.7 [SD = 19.5]), and Bunyamin et al. (2013) report older German and Austrian adults with HF (MLHFQ scores = 62.0 [SD = 18.6]). The difference between the results of this study and those of previous studies may be attributed to sample differences. The participants in this study were predominantly in NYHA Classes I (33.7%) and II (55.8%) with > 40% left ventricular ejection fraction (62.7%), whereas those in a prior study conducted in Taiwan were predominantly in NYHA Class II (56.7%) with an average ventricular ejection fraction of 41.1% (Liu et al., 2014).

Nearly one in four patients with HF are readmitted within 30 days of their index hospitalization. Furthermore, approximately two thirds of the 2.5 million American patients with HF hospitalized between 2001 and 2005 were readmitted within 1 year of discharge (Curtis et al., 2008). In the sample in this study, 14.0% were readmitted for > 10 days. Readmission frequency and length of rehospitalization stay have been shown to affect QoL in patients with HF, reflecting their prognosis and increasing medical expenses (Albuquerque et al., 2020). Future discharge planning for older adults with HF must be enhanced by tailoring health education to their cultural characteristics and educational levels as well as by devising healthcare plans, including providing homecare guidance for patients with HF, relevant assistance and resources, and follow-up on home care plans, to help ensure patient compliance.

In this study, all of the participants experienced at least one type of HF symptom. Riegel et al. (2018) confirmed that patients with HF often experienced symptom distress, thereby influencing functional status and leading to the presentation

### Table 4

| Step | Predictor | Outcome | Standard β | p   | $R^2$ for Model 1 | $R^2$ for Model 2 |
|------|-----------|---------|------------|-----|-------------------|-------------------|
| 1    | NYHA class| QoL     | .23        | .003| .14*              | .19**             |
| 2    | NYHA class| Depression| .15     | .049| .20**             | .22**             |
| 3    | Depression| QoL     | .40        | < .001| .14*             | .27***            |
| 4    | NYHA class| QoL     | .17        | .019| .14*              | .32***            |
|      | Depression|         | .41        | < .001|                 |                   |

| Step | Predictor | Outcome | Standard β | p   | $R^2$ for Model 1 | $R^2$ for Model 2 |
|------|-----------|---------|------------|-----|-------------------|-------------------|
| 1    | Readmission length of stay | QoL     | .30        | < .001| .14*              | .21**             |
| 2    | Readmission length of stay | Depression| .10   | .240| .20**             | .21**             |
| 3    | Depression| QoL     | .40        | < .001| .14*              | .27***            |
| 4    | Readmission length of stay | QoL     | .26        | < .001| .14*              | .35***            |
|      | Depression|         | .41        | < .001|                 |                   |

| Step | Predictor | Outcome | Standard β | p   | $R^2$ for Model 1 | $R^2$ for Model 2 |
|------|-----------|---------|------------|-----|-------------------|-------------------|
| 1    | HFSD      | QoL     | .56        | < .001| .14*              | .40***            |
| 2    | HFSD      | Depression| .35 | < .001| .19**             | .30***            |
| 3    | Depression| QoL     | .40        | < .001| .14*              | .27***            |
| 4    | HFSD      | QoL     | .48        | < .001| .14*              | .44***            |
|      | Depression|         | .23        | .003|                   |                   |

Note: NYHA = New York Heart Association; HF = heart failure; QoL = quality of life; HFSD = heart-failure-related symptom distress.

*Model 1 includes only control variables (i.e., gender, age, marital status, educational level, working status, BMI, and regular exercise habits). Model 2 includes only control variables (i.e., gender, age, marital status, educational level, working status, BMI, and regular exercise habits) and predictors.

*p < .05. **p < .01. ***p < .001.
of multiple physical symptoms. Various symptoms (dyspnea and fatigue) often negatively affect the QoL of patients with HF. This study revealed that older adults experiencing this HF symptom distress were often unaware of its cause and did not understand the connection between HF and HF symptoms. Moreover, most older adults with HF do not pay attention to the related symptoms after proceeding through the acute phase of HF and their condition becoming stable. Some patients attribute HFSD to aging rather than illness and thus do not continue to receive treatment (Liu et al., 2014; Yeh & Shao, 2018). This issue warrants additional attention in the field of nursing service-related interventions. Massouh et al. (2020) conducted a systematic review to assess the effectiveness of an intervention method for patients with HF, revealing
that the self-management intervention for patients with HF was effective, particularly in diminishing HF symptom distress, mortality, admission rates, and readmission rates and in enhancing QoL.

In this study, depression was found to mediate the relationship between the clinical characteristics of older adults with HF and QoL. Specifically, the NYHA class and HFSD score affected QoL via depression. These findings indicate that NYHA classifications and HF symptom distress must be treated effectively to improve comorbid depression and enhance QoL in older adults with HF. In this study, approximately half of the participants had comorbid depression, with 21.3%, 6.9%, and 19.0% experiencing mild, moderate, and severe depression, respectively. These findings are consistent with those reported by previous studies. For example, Yang and He (2020) reported that 36%–62% of patients with HF had comorbid depression. Depression was found to be significantly and negatively correlated with QoL, increasing risk of morbidity and mortality. Older adults with HF are more likely to have comorbid depression, which reduces QoL. They require substantial attention from clinical and community healthcare professionals. In Taiwan, older adults with HF should be assessed at the initial stage of treatment regarding their comorbid depression status, and their ability to manage HF symptom distress should be enhanced (Liu et al., 2014). Whether older adults with HF and depression take antidepressants according to a doctor’s recommendations should be monitored. In addition, multiple, effective, nondrug intervention approaches (e.g., referral to a psychologist, exercise, behavioral activation, and heart rehabilitation) should be developed (Dickens et al., 2013).

Harris and Heil (2013) found that 11%, 20%, 38%, and 42% of their older adult participants with HF were classified into NYHA Functional Classes I, II, III, and IV, respectively. Moreover, they showed HF classification to be significantly and positively correlated with comorbid depression in patients with HF. Shih et al. (2010) investigated 200 patients with HF and found NYHA functional class to be significantly and positively correlated with comorbid depression in the patients studied. In addition, comorbid depression was found to be significantly and negatively correlated with the QoL of these patients. Their findings are consistent with those of this study. As expected, HF symptom distress was the main factor associated with the occurrence of comorbid depression in older adults with HF. Numerous studies have indicated that symptom distress negatively affects patients with HF in terms of their mental health and physical activities. HF, although controllable, may not currently be cured and is associated with a high rate of mortality. Other factors influencing QoL in patients with HF include HF symptom distress, experiencing repeated relapses and hospitalizations, and showing decreased confidence in self-care (Franzén-Dahlin et al., 2010). This problem is exacerbated by the fact that many older adults with HF lack knowledge regarding how to manage HF-related symptoms and thus often reduce drug dosage or engage in activities harmful to their health when self-managing their illness (Yeh & Shao, 2018). Therefore, we suggest that healthcare professionals develop an evidence-based intervention measure to help patients self-manage their illnesses, particularly HF symptom distress (e.g., follow-up with patients to monitor their heart function, advise patients to adhere to doctor recommendations to relieve HFSD, require older patients with HF to take medicine according to their doctor recommendations, restrict patients’ diet, and educate them on the use of appropriate methods for self-managing symptoms). Moreover, healthcare professionals should regularly follow up on patients with HF to determine whether they have developed comorbid depression. When patients are diagnosed with comorbid depression, procedures must be followed based on a psychiatrist’s advice to prevent the deterioration of depression symptoms and improve QoL.

Limitations

This study was affected by several limitations. (a) A cross-sectional design was used to investigate participants’ QoL during the past 1-month period. Longer-term changes in QoL were not examined. Thus, causal relationships cannot be inferred. Because HF is a chronic disease, longitudinal studies are needed to determine the causal relationships among HF symptoms, cardiac function, depressive level, and QoL in older adults. (b) Purposive sampling from patients at only two hospitals in northern Taiwan was used. Thus, our results may be generalizable to patients with HF in other parts of Taiwan or the world.

Conclusions

In our sample of 60-year-old or older Taiwanese adults with HF, most participants were categorized in NYHA Class II, few experienced symptom distress, and 47.1% exhibited signs of depression. Critical factors found to be associated with QoL included hospital readmission for > 10 days, an increased level of symptom distress, and depression level. Moreover, depression was found to have a mediating effect, and NYHA functional class and HF symptom distress were found to affect QoL via the intermediary effect of depression.

This study provides medical practitioners with insights into the treatment of older adults with HF. Nurses treating older adults with HF should consider factors such as the NYHA functional class and HF symptom distress. To reduce symptom distress, lower the readmission rates, and enhance QoL in patients with HF, providing effective self-management interventions is necessary. In addition, the NYHA classification and HFSD should be improved to improve depression identification and treatment and thus further enhance QoL. Therefore, after both their hospital admission and discharge, older adults with HF should be assessed regularly to determine whether they have developed comorbid depression and be referred to a psychologist if necessary. The results of this study may be used to improve case management for patients with HF, develop effective nondrug interventions to enhance the QoL of older patients with HF, and reduce medical costs related to readmission.
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Author Contributions

Study conception and design: HFY, JHS
Data collection: HFY, JHS
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Drafting of the article: HFY, JHS
Critical revision of the article: HFY, JHS

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*Address correspondence to: Jung-Hua SHAO, No. 259, Wenhua 1st Road, Guishan District, Taoyuan City 33303, Taiwan, ROC.
E-mail: amy@ems.tusct.tw
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