Association between self-care and resilience: a cross-sectional study in heart failure patients

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Association Between Self-care and Resilience

A Cross-sectional Study in Heart Failure Patients

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Background: Self-care (SC) is a cornerstone in heart failure management and is related to patient outcomes. The continuous and complex demands of SC can be experienced as stressful and may require patients to apply resilient behaviors as they manage their conditions. Resilience may be a helpful factor in performing SC. **Objective:** The aim of this study was to determine the association between resilience and SC in patients with heart failure. **Methods:** A cross-sectional study was performed between January 2020 and January 2021. Participants were asked to complete a questionnaire addressing baseline characteristics, the 2-item Patient Health Questionnaire, the Resilience Evaluation Scale, and the Self-Care of Chronic Illness Inventory, which measures 3 concepts of SC: SC maintenance, SC monitoring, and SC management. Multiple regression analysis was performed to determine whether resilience was associated with SC. **Results:** Eighty-six patients were included, and 74 patients completed the questionnaire. In the univariate analysis, an association was found between resilience and SC maintenance, resulting in an increase in SC for patients with higher resilience (β = 0.24; 95% confidence interval, 0.03–0.96). In the multivariate analysis adjusted and corrected for confounders, no significant associations between resilience and all SC scales were found. **Conclusion:** This study could not demonstrate significant associations between resilience and all SC scales. This study contributes to the body of knowledge on factors that can mediate or moderate SC. Further longitudinal research should be performed to study cause-effect relationships.

KEY WORDS: heart failure, resilience, self-care

Worldwide, an estimated 64.3 million people suffer from heart failure.[1] This number is expected to increase because of the aging population and improvements in a range of successful treatments for cardiovascular diseases.[2–4] In the treatment of heart failure, self-care is considered a vital element of therapy and is regarded as a method to improve heart failure outcomes.[5,6]

The middle-range theory of self-care of chronic illness describes self-care as a "naturalistic decision-making process" with methods of maintaining health by managing illness and health-promoting practices. This theory entails 3 vital concepts for adequate self-care: self-care maintenance, self-care monitoring, and self-care management. These 3 key concepts are interrelated because they reflect processes that are often controlled sequentially. Self-care is carried out by everyone to a greater or lesser extent, both in healthy states and during illness.[7,8] However, when diagnosed with a chronic illness, self-care becomes very important. For patients with heart failure, the first process of self-care, maintenance, involves maintaining stability in daily life by treatment adherence, which includes medication taking, a healthy diet, and healthy behaviors such as exercising. The second self-care process, monitoring, includes detecting, monitoring, and interpreting physical sensations, for example, monitoring weight changes and fluid retention. The third

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self-care process, management, is related to the response to the symptoms noted during the second process, with examples including increasing the dose of diuretics when fluid retention is detected and evaluating the initiated action.[9,10] However, self-care is complex and is affected by various factors, such as experience and skills, motivation, cultural beliefs, confidence, cognitive abilities, and social support.[7] Research indicates that patients with heart failure who report inadequate self-care have higher readmission rates and mortality rates than those who report adequate self-care.[10,11] Despite the importance of self-care in heart failure, nonadherence to self-care is common, and patients have difficulties mastering it.[2,12]

Chronic conditions such as heart failure can be associated with frequent episodes of deterioration and therefore require flexible behavior and constant attention from patients for adequate self-care.[13] Patients with heart failure can experience distress related to lifestyle changes, the emotional impacts of heart failure, role changes in their social lives, and interactions with health professionals.[14,15] The complexity of self-care and changes in cognitive and behavioral efforts[14] can be stressful for patients and may require the application of resilient behaviors while managing the disease.[13] Resilience is viewed as the process or ability to maintain a relatively balanced and healthy level of physical and psychological functioning and to "bounce back" from stress and adversity.[16–19] Resilience is regulated by internal and external factors as stated in the stress-coping model of Lazarus and Folkman.[14,16] Internal factors have been associated with positive outcomes after stressful events, wherein self-confidence or having trust in oneself and self-efficacy or positive beliefs about coping with stressful events are important internal factors.[16] In addition, negative emotions in patients with acute myocardial infarction and depressive symptoms in patients with heart failure are found to be related to resilience, self-efficacy, and health status.[17,18] Although resilience and coping look very similar and are closely related, in terms of their impact on behavioral changes, they are distinct concepts.[20] Resilience is defined as the capacity of good adaption to recover from stressful events in the face of adversity such as health problems, whereas coping involves behavioral and cognitive techniques to deal with and manage stressful situations or negative physical and psychological events.[20,21] Because patients' own efforts are essential in performing adequate self-care, resilience is important.[6,12]

However, research on the relationship between resilience and self-care in heart failure is limited, and more insight into understanding the challenges of performing self-care in patients with heart failure is important. Our hypothesis is that being resilient is associated with better self-care. Therefore, the aim of this study was to explore the association between resilience and self-care in patients with heart failure.

Methods

Study Design, Sample, and Setting

To study the association between resilience and self-care, a cross-sectional study design was used. The study was conducted in an heart failure outpatient clinic of a university medical center in the Netherlands according to the principles of the Declaration of Helsinki (version 59, October 2000). The Medical Research Ethics Committee of the University Medical Centre Utrecht concluded that the Medical Research Involving Human Subjects Act does not apply to this study; therefore, no Medical Research Involving Human Subjects Act approval by the Medical Research Ethics Committee was needed. The Medical Research Ethics Committee ensured that the individuals involved in the study were adequately informed that their data would be used for research purposes.

Patients were included from January 2020 until January 2021. However, because of the SARS-CoV-2 pandemic, physical inclusion ended in March 2020, and from March until January 2021, patients were recruited by telephone. Eligible patients were 18 years or older, had a documented diagnosis of heart failure more than 3 months before the start of the study, and were in New York Heart Association class II or III. Participants were excluded if they could not read or speak Dutch, had received a heart transplant, were living in an assisted facility or nursing home, or were found to be physically or mentally unable to complete a questionnaire by the cardiologist or heart failure clinical nurse. The sample size was determined to be 80 patients based on 10 participants per determinant: resilience and self-care and the predetermined confounders of age, sex, education, marital status, and depressive symptoms.[22]

Procedure

Heart failure nurse specialists screened the patients who were scheduled to visit the outpatient clinic for inclusion and exclusion criteria before the consultation. When a patient was eligible for inclusion, the heart failure nurse specialist or cardiologist asked the patient during the consultation whether the researcher could approach them about the study. Information about the study was provided verbally and on paper. Most patients signed informed consent directly after receiving the information. From March 2020, the process of including and informing patients about the study was carried out by telephone. After verbal consent, patients received all study information, Informed Consent, the questionnaire, and a return envelope at their homes. Each patient could complete the questionnaire at home and return it (with a signed Informed Consent if this had not yet been completed) to the medical center.

Measures

Demographic and Clinical Characteristics

Data on age, sex, heart failure etiology, the time since heart failure diagnosis, left ventricular ejection fraction,

New York Heart Association class, and heart failure medication were retrieved from the patients' medical charts. Data on educational level and marital status were self-reported by the patients. Furthermore, because depression can affect resilience,[17,18] the 2-item Patient Health Questionnaire (PHQ-2) was used to determine levels of depressive symptoms in the study population. The PHQ-2 measures the frequency of depressed mood and anhedonia for the past 2 weeks on a 4-point Likert scale. The total score ranges from 0 to 6; a score of 3 or greater indicates that a depressive disorder is likely. The PHQ-2 had sensitivity and specificity of 83% and 92%, respectively.[23]

Self-care

The Self-Care of Chronic Illness Inventory (SC-CII) questionnaire was used to measure self-care.[12] Although several instruments are available to measure heart failure self-care, the SC-CII was used in this study because of the generic character and possibility to compare data between patients with heart failure and patients with other chronic illnesses in the future. The SC-CII contains 3 independent scales measuring self-care maintenance (8 items), self-care monitoring (5 items), and self-care management (7 items). Although item 14 of the SC-CII theoretically fits in the self-care monitoring scale, this item loaded in the self-care management scale during the development and testing of the SC-CII. Therefore, in this study, we calculated self-care scores with item 14 in the management scale.[12] Each item, except for items 14 and 20, was scored on a 5-point ordinal scale. Each scale was scored separately and standardized to 0 to 100, with higher scores reflecting better self-care.[12] A cutoff point of 70 or greater was used to determine adequate self-care.[24] Internal coherence for the English version was high and was considered adequate for management and maintenance. The SC-CII was translated into Dutch via forward-backward translation.[12] The SC-CII can be used in different chronic conditions and has been validated in patients with heart failure.[25]

Resilience

The 9-item Resilience Evaluation Scale (RES) questionnaire was used to determine the extent to which the participants assessed themselves as resilient. The RES contains 2 constructs of psychological resilience derived from the secondary appraisal concept of the Lazarus and Folkman model: self-confidence (3 items) and self-efficacy (6 items). These 2 constructs reflect internal elements that allow persons to positively assess their ability to deal with adversity. Each item is rated on a 5-point Likert scale, and higher scores indicate greater psychological resilience. The RES has been demonstrated to have good convergent validity and internal consistency in Dutch and English language groups, and an exploratory factor analysis of the RES showed a valid 2-factor structure.[16]

Statistical Analysis

Descriptive statistics were used to illustrate the participants' background and medical characteristics. Categorical data are presented as frequencies and percentages. For continuous variables, the mean and standard deviation are reported. Multiple linear regression analysis was performed to examine the associations between resilience and self-care. For the self-care management scale, multiple linear regression analyses were performed on data from patients who reported experiencing symptoms. The regression analyses were adjusted for confounders predetermined within the research team based on expert knowledge and on literature: age, sex, marital status, education, and depressive symptoms. The confounders were added with the enter method in the multiple regression analyses in the order that made biological sense.[26] Because education level had more than 2 categories, dummy variables were used, where the education level "medium" was the baseline dummy. Inferences for multiple regression were examined with a histogram, P-P plot, and scatterplot.[27,28]

First, a basic model was built with resilience as the independent variable and with each of the separate self-care scales as the dependent variable. In the second model, resilience and the separate self-care scales were combined and corrected for the possible confounders of age and sex (reference: men). In addition, in the third model, resilience was adjusted and corrected for education level, marital status (reference: partner), and depression. In all regression models, the adjusted R^2, standardized β, and 95% confidence interval (CI) were used to examine the strength of the independent variables. P values less than .05 were considered statistically significant. No missing data in the questionnaire needed to be imputed. Because of 2 different measurement circumstances (COVID-19), we used an independent t test to determine whether any differences in resilience and self-care existed between participants who completed the questionnaire before COVID-19 and those who completed the questionnaire during COVID-19. Statistical analyses were performed with IBM SPSS software (version 23).[29]

Results

Participants

One hundred fifteen patients were screened and deemed eligible for inclusion. During the patient's appointment, 10 patients had to be excluded according to the established exclusion criteria: a mental or physical inability to complete a questionnaire (n = 7) or an inability to read or speak the Dutch language (n = 3). Other reasons for not including patients in this sample were unwillingness

to participate after information was provided (n = 7) or no request made during the appointment (n = 12). A total of 86 patients were included in the final sample, 43 of whom were included during their consultation in the heart failure outpatient clinic, whereas 43 were included by telephone. Nine patients did not sign the Informed Consent, 1 patient was excluded following the exclusion criteria of living in an assisted facility, and 2 patients signed the Informed Consent but did not return their questionnaires. A total of 86% of the recruited patients completed the questionnaire.

Study Sample

The patients in the study were predominantly male (n = 46, 62%), and the mean age was 60 years (±12) (Table 1). Most of the patients (n = 42, 57%) had a medium education level and were married or cohabiting (n = 55, 74%). Most patients (n = 57, 77%) were in New York Heart Association class II, and the mean left ventricular ejection fraction was 29% (±11). Heart failure had an ischemic etiology in 28% (n = 21) of the sample, and 57% (n = 42) of the patients had heart failure of other origins or multiple origins. Most of the patients (n = 66, 89%) scored less than 3 on the PHQ-2, indicating that depressive symptoms among the study patients were unlikely.

TABLE 1 Patient Characteristics of Study Sample (N = 74)

Variables	n (%)	Mean (SD)
Age, y		60 (12.4)
Sex		
Male	46 (62)	
Education		
Low	7 (10)	
Medium	42 (57)	
High	23 (31)	
Other	2 (3)	
Marital status		
Married/cohabiting	55 (74)	
Divorced/widow/single	19 (26)	
NYHA Class		
II	57 (77)	
III	19 (26)	
Heart failure etiology		
Idiopathic	10 (14)	
Ischemic	21 (28)	
Hypertension	4 (5)	
Other	42 (57)	
LVEF, %		29.5 (10.8)
Years with HF		9 (7.7)
PHQ-2		.96 (1.2)
PHQ-2 score < 3	66 (89)	
PHQ-2 score ≥ 3	8 (11)	
Medication		
ACE-I or ARB	56 (76)	
ARNI	37 (50)	
β-Blocker	60 (81)	
MRA	69 (93)	
Digitalis	2 (3)	
Diuretics	57 (77)	

Abbreviations: ACE-I, angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker; ARNI, angiotensin receptor neprilysin inhibitor; LVEF, left ventricular ejection fraction; MRA, mineralocorticoid receptor antagonist; NYHA, New York Heart Association; PHQ-2, Patient Health Questionnaire-2.

TABLE 2 Self-care and Resilience of the Sample (N = 74)

	Mean (SD)	Range	Ref Range
Self-Care of Chronic Illness Inventory			
Self-care maintenance	74.3 (10.4)	43.8–96.9	0–100
Self-care monitoring	77.9 (18.5)	20–100	0–100
Self-care management			
With symptoms (N = 64)	68.8 (14)	25–96.4	0–100
No symptoms (N = 10)	60.4 (27.1)	4.2–100	0–100
Resilience Evaluation Scale	27.1 (5.1)	9–36	0–36
Self-confidence	9.4 (1.9)	4–12	0–12
Self-efficacy	17.7 (3.6)	5–24	0–24

Abbreviation: Ref, reference.

Adequate levels of self-care (mean scores ≥ 70) (Table 2) were reported on the maintenance and monitoring scale but not on the self-care management scale by patients experiencing symptoms (n = 64; mean, 68.8 [±14]) and patients with no symptoms (n = 10; mean, 60.4 [±27.1]). Overall, the patients were resilient (mean, 27.1 [±5.1]). The subscales of the RES indicated that the patients had fairly high trust in themselves (mean, 9.4 [±1.9]) and positive beliefs about coping with stressful situations (mean, 17.7 [±3.6]).

Relationship Between Resilience and Self-care

Multiple regression analyses of the separate SC-CII scales and resilience are presented. Table 3 shows the regression analysis between resilience and self-care maintenance. In the univariate analysis with model 1, a significant association between resilience and self-care maintenance was found (β = 0.24; 95% CI, 0.03–0.96), demonstrating increased self-care. The adjusted R^2 (0.05) was low, indicating that resilience can account for 5% of the variation in self-care in the univariate model. In model 2, resilience was combined with the variables of age and sex; when adjusted for these variables, no significant association was found between resilience and self-care maintenance (β = 0.21; 95% CI, –0.04 to 0.88). However, after combining resilience with age and sex and adjusting for these factors, self-care maintenance decreased significantly with age (β = –0.23; 95% CI, –0.38 to 0.00). In the final model (model 3), resilience was further combined with educational level, marital status, and depressive symptoms. After adjusting for these variables, no significant associations were found (β = 0.13; 95% CI, –0.25 to 0.76). The adjusted R^2 (0.11) was low, indicating that resilience

TABLE 3 Regression Model of Resilience (Resilience Evaluation Scale) and Self-care Maintenance (N = 74)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	β[a]	95% CI	R^2 (*P*)	β[a]	95% CI	R^2 (*P*)	β[a]	95% CI	R^2 (*P*)
Block 1			0.05 (.04)			0.10 (.02)			0.11 (.04)
RES	0.24[b]	0.03 to 0.96		0.21	−0.04 to 0.88		0.13	−0.25 to 0.76	
Block 2									
Age				−0.23[b]	−0.38 to 0.00		−0.21	−0.38 to 0.02	
Sex				0.14	−1.81 to 7.73		0.14	−1.83 to 7.92	
Block 3									
PHQ-2							−0.02	−2.38 to 2.01	
Education									
Medium-low							−0.20	−15.38 to 1.13	
Medium-high							0.09	−3.16 to 7.34	
Medium-other							−0.12	−22.30 to 7.12	
Marital status							−0.09	−7.49 to 3.31	

R^2 indicates adjusted R^2. Model 1, basic model: resilience (Resilience Evaluation Scale [RES]). Model 2: RES is adjusted and corrected for the confounders of age and sex. Model 3: RES is additionally adjusted for possible depressive symptoms (2-item Patient Health Questionnaire [PHQ-2]), education levels (low, medium, high, all else), and marital status.
Abbreviation: CI, confidence interval.
[a]Standardized beta coefficient.
[b]Statistically significant at $P < .05$.

can account for 11% of the variation in self-care in the multivariate model.

As illustrated in Table 4 (model 1), no significant results were found for resilience and self-care monitoring (β = 0.09; 95% CI, −0.53 to 1.19). In model 2, resilience was combined with the variables of age and sex. After adjusting for these variables, no association was found between resilience and self-care monitoring (β = 0.09; 95% CI, −0.55 to 1.20). However, in the final model, after combining resilience with other variables and adjusting for these variables, self-care monitoring decreased significantly in patients with low education levels compared with those with medium education levels (β = −0.28; 95% CI, −32.99 to −1.82). The adjusted R^2 (0.02) was very low, indicating that resilience can account for 2% of the variation in self-care in the multivariate model.

As shown in Table 5, with model 1, no significant results were found for resilience and self-care management (β = 0.14; 95% CI, −0.32 to 1.17). In models 2 and 3, resilience was combined with other variables and adjusted for them, and no significant associations were found (β = 0.14; 95% CI, −0.34 to 1.17; and β = 0.13; 95% CI, −0.48 to 1.27).

The level of resilience before COVID-19 (mean [SD], 27.72 [6.35]) and resilience during COVID-19 (mean [SD], 26.6 [3.83]) did not significantly differ ($T = 0.89$, $df = 47.78$, $P = .38$) between participants. Before COVID-19, self-care maintenance (mean [SD], 75.49

TABLE 4 Regression Model of Resilience (Resilience Evaluation Scale) and Self-care Monitoring (N = 74)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	β[a]	95% CI	R^2 (*P*)	β[a]	95% CI	R^2 (*P*)	β[a]	95% CI	R^2 (*P*)
Block 1			−0.01 (.45)			−0.03 (.83)			0.02 (.35)
RES	0.09	−0.53 to 1.19		0.09	−0.55 to 1.20		−0.01	−1 to 0.90	
Block 2									
Age				0.05	−0.29 to 0.43		0.08	−0.26 to 0.50	
Sex				0.06	−6.99 to 11.28		0.08	−6.32 to 12.09	
Block 3									
PHQ-2							−0.07	−5.27 to 3.01	
Education									
Medium-low							−0.28[b]	−33.0 to 1.82	
Medium-high							0.05	−8.07 to 11.75	
Medium-other							−0.08	−36.7 to 18.83	
Marital status							0.11	−5.67 to 14.71	

R^2 indicates adjusted R^2. Model 1, basic model: resilience (Resilience Evaluation Scale [RES]). Model 2: RES is adjusted and corrected for the confounders of age and sex. Model 3: RES is additionally adjusted for possible depressive symptoms (2-item Patient Health Questionnaire [PHQ-2]), education levels (low, medium, high, all else), and marital status.
Abbreviation: CI, confidence interval.
[a]Standardized beta coefficient.
[b]Statistically significant at $P < .05$.

TABLE 5 Regression Model of Resilience (Resilience Evaluation Scale) and Self-care Management (N = 64)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	β[a]	95% CI	R^2 (*P*)	β[a]	95% CI	R^2 (*P*)	β[a]	95% CI	R^2 (*P*)
Block 1			0.01 (.26)			−0.02 (.63)			−0.06 (.79)
RES	0.14	−0.32 to 1.17		0.14	−0.34 to 1.17		0.13	−0.48 to 1.27	
Block 2									
Age				−0.04	−0.33 to 0.25		−0.00	−0.32 to 0.31	
Sex				0.08	−5.25 to 9.55		0.07	−5.79 to 9.78	
Block 3									
PHQ-2							−0.04	−4.36 to 3.26	
Education									
Medium-low							0.15	−6.92 to 22.23	
Medium-high							0.03	−7.39 to 9.18	
Medium-other							−0.11	−31.35 to 13.34	
Marital status							0.13	−4.80 to 13.18	

R^2 indicates adjusted R^2. Model 1, basic model: resilience (Resilience Evaluation Scale [RES]). Model 2: RES is adjusted and corrected for the confounders of age and sex. Model 3: RES is additionally adjusted for possible depressive symptoms (2-item Patient Health Questionnaire [PHQ-2]), education levels (low, medium, high, all else), and marital status.

Abbreviation: CI, confidence interval.

[a]Standardized beta coefficient.

[8.98]), monitoring (mean [SD], 79.3 [18.09]), and management (mean [SD], 70.89 [12.29]) did not significantly differ from self-care during COVID-19 between participants (maintenance [T = 0.85, df = 72, P = .40], monitoring [T = 0.56, df = 72, P = .58], and management [T = 1.05, df = 62, P = .30]).

Discussion

In this study, we were unable to find strong associations between resilience and self-care in patients with heart failure. However, we found small indications that partly support the hypothesis that being more resilient is associated with better self-care.

The significant association found between resilience and self-care maintenance in the univariate model supports previous findings of Chang et al,[30] who demonstrated that the direct effects of depressive symptoms on self-care maintenance were moderated by resilience. Furthermore, our study shows a significant association between older age and lower self-care maintenance in the multivariate model, which is in line with the results of a review showing that age was a statistically significant predictor of self-care maintenance, monitoring, and management in different studies, resulting in a decrease in self-care with increasing age.[31] In addition, we found a significant association between self-care monitoring and low education levels in the multivariate model. In a study in which patterns of self-care in patients with heart failure and their sociodemographic variables were analyzed, low adherence and low consulting behaviors were mostly observed in male patients (66%) with lower education levels.[32] However, because of the limited size of the low education level group in our study, we were not able to perform subanalyses to test whether education level was also associated with sex in our study.

We did not find an association between resilience and self-care management. A study by Dickson et al[6] indicated that self-care management was strongly influenced by attitudes and self-efficacy. Because resilience is determined by the underlying constructs of self-efficacy and self-confidence, the observed discrepancy between both studies may be caused by a difference between attitude and self-confidence in the studied population. Furthermore, the participants in our study were relatively self-confident compared with a healthy Dutch and English group of patients (9.4 vs 8.5) and overall slightly more resilient (27.1 vs 25.6),[16] which may have affected the strength of the associations, because the resilience scale is limited to a maximum score of 36. This ceiling effect can influence the actual relationship because of the small variation. However, high scores can also be the result of normalizing the disease and accommodating disease-associated limitations, implying that patients with heart failure may have been able to integrate their disease into their daily lives, and therefore, these patients could rate themselves as more resilient than healthy people.[33]

Self-confidence was previously described to mediate the relationship between self-care behaviors and simple attention, and confidence seems to have a larger direct effect on self-care behavior.[34] Therefore, the high self-confidence among our population may be a possible explanation for why we did not find associations between resilience and all 3 self-care scales.

In our study, R^2 values were low, indicating that resilience can account for a small part of the variation in self-care in the models, which was not in accordance with our expectations that resilient patients perform better self-care. As a result, we were unable to demonstrate an association as strong as we had expected it would be. Participants in this study scored relatively high on self-care. In previous studies in a Dutch sample of patients

What's New and Important

- It remains unclear how and whether resilience is of influence on self-care in patients with heart failure.
- This study contributes to the body of knowledge on factors that can mediate or moderate self-care in patients with heart failure. Alternative factors must be researched that can influence self-care.

with heart failure, high self-care scores were found, possibly because of the high number of patients receiving care and treatment in an heart failure management program.[35,36] For this study, our selected population might be a limitation; many participants were referred to an heart failure disease management program where patients received education about self-care, which may explain these high self-care results.

Limitations and Strengths

This study has some limitations that must be considered. First, although the Dutch SC-CII was translated with the forward-backward method, the questionnaire was not validated cross-culturally.[37] Therefore, whether the items of the questionnaire were correctly interpreted and understood by the patients is not certain. However, the SC-CII was validated in different populations, cultural settings, and patients with heart failure in the study of De Maria et al.[25] Their study population used an identical cognitive framework when responding to the questions and the Likert scale of the SC-CII in an almost identical manner. Therefore, the validity of the translated questionnaire is assumed for this study. Notably, question 14 from the SC-CII may have been unclear to the patients. For this question, patients needed to answer whether they experienced symptoms. If they reported no symptoms, the questions on the self-care management subscale did not have to be answered because if patients do not experience symptoms, they cannot report how they manage those symptoms.[12] Remarkably, the patients continued to complete the rest of the questionnaire or provided 2 different answers to this particular question. A possible explanation for providing 2 answers to item 14 may be the layout of this item. First, a statement is made about symptoms with a nominal explanation of the answer options, followed by the actual question and a numeric rating scale.

Second, this study had an explorational aim and therefore has some disadvantages. Among other issues, because of the cross-sectional design, the consequences of a certain manipulation cannot be measured; therefore, we cannot confirm any causal relationships because measurements were performed at only 1 point in time.

Third, we unfortunately did not collect data on comorbidities in this study, which could have been a good addition to our patient description as well as a valuable variable to include in the regression analysis as a possible confounder.

This study has the following strengths. To the best of our knowledge, this study is the first to explore the association between resilience and self-care in patients with heart failure . The use of multiple regression analyses is considered a strength because we corrected for possible confounders between resilience and self-care. In addition, the inclusion and exclusion criteria of this study are broadly applicable, which resulted in a heterogeneous group of participants. Last, because patients often have comorbidities in addition to heart failure, the use of the SC-CII instead of the Self-Care of Heart Failure Index 6.2, Dutch version, is a strength because patients cannot always distinguish symptoms from different illnesses. The SC-CII measures the whole self-care construct with the different domains of self-care as described in the middle-range theory of Riegel et al,[7] and the Self-Care of Heart Failure Index Dutch v6.2 focuses more on self-confidence in heart failure.

Conclusion

We were unable to find significant associations between resilience and self-care in patients with heart failure in the multivariate regression analysis and could not support our hypothesis that being more resilient is associated with better self-care. This study contributes to the body of knowledge on factors that can mediate or moderate self-care in patients with heart failure. Further longitudinal research should be performed to study cause-effect relationships.

Implication for Practice

Because the patients in our study had relatively high self-care scores, we still do not know the exact magnitude of resiliency among patients with low self-care. However, according to the middle-range theory, resilience can likely influence self-care,[19] but further research including more factors and participants with low self-care scores is needed. We demonstrated negative associations between age and self-care maintenance and between low education levels and self-care monitoring. Therefore, when a patient has difficulties applying self-care, we recommend focusing not only on improving resilience but also on other aspects that may influence self-care in daily practice. Personalized information must be provided by cardiologists and nurses to optimize heart failure self-care.

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