HF-SCAR

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

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Abstract

Title: The association between resilience and self-care in heart failure (HF) patients: a cross-sectional study.

Background: Self-care is the cornerstone of therapy to treat HF and to improve outcomes from HF. Despite the positive health outcomes of self-care, patients have difficulty mastering it. The continuous and complex demands of self-care can be seen as stressful and may require patients to apply resilient behaviours as they battle this disease. Resilience may be a helpful factor in performing self-care.

Aim: To explore the association between resilience and the performance of self-care in HF patients.

Methods: A cross-sectional study was performed in the HF outpatient clinic at an University Medical Centre between January and May 2020. Patients were asked to complete a questionnaire, and multiple regression analysis was performed to determine whether resilience was associated with self-care. Analyses were adjusted for the predetermined confounders: age, gender, marital status, education, and depressive symptoms.

Results: Sixty-five patients were included, and 57 patients completed the questionnaire. Resilience was significantly associated with self-care maintenance (β .27; p <.05) in the univariate analysis. In the multivariate analysis, self-care maintenance (β -.30; p <.05) and monitoring (β -.40; p <.01) were significantly associated with low education. There were no associations between resilience and self-care monitoring and management. Resilience was strongly associated with self-care confidence (β .51; p <.01).

Conclusion and implications: This study demonstrated an association between resilience and self-care maintenance. Associations between resilience, self-care management, and monitoring cannot be confirmed yet. This study contributes to the body of knowledge of influencing factors for self-care. It is recommended to pay attention to the degree of resilience in patients, and to provide tailor-made information about self-care. Further research, such as a longitudinal study, is needed to demonstrate a causation between resilience and self-care.

Keywords: Resilience, Self-care, Patient, Heart Failure

Samenvatting

Titel: De associatie tussen veerkracht en zelfzorg bij hartfalenpatiënten: een cross-sectionele studie.

Achtergrond: Zelfzorg is één van de belangrijkste uitgangspunten voor de behandeling tegen hartfalen en om de gezondheidsuitkomsten van hartfalen te verbeteren. Ondanks de positieve gezondheidsresultaten van zelfzorg bij hartfalen, hebben patiënten moeite met het uitvoeren van adequate zelfzorg. De voortdurende en complexe eisen van zelfzorg kunnen als stressvol worden ervaren en kan betekenen dat patiënten veerkrachtige methoden moeten gebruiken gedurende het ziekteproces. Veerkracht kan een helpende factor zijn bij het uitvoeren van zelfzorg.

Doel: Het onderzoeken van de associatie tussen veerkracht en het uitvoeren van zelfzorg bij hartfalen patiënten.

Methode: Een cross-sectionele studie werd uitgevoerd tussen januari en mei 2020 in de hartfalenpoli van een universitair ziekenhuis. Patiënten werden gevraagd een vragenlijst in te vullen en met multipele regressieanalyse werd bepaald of veerkracht geassocieerd was met zelfzorg. Analyses werden aangepast voor de vooraf bepaalde confounders: leeftijd, geslacht, burgerlijke staat, opleiding, en depressieve symptomen.

Resultaten: Vijfenzestig patiënten werden geïncludeerd en 57 patiënten vulden de vragenlijst in. Veerkracht was significant geassocieerd met zelfzorgbehoud (β .27; $p<.04$) in de univariate analyse. In de multivariate analyse waren zelfzorgbehoud (β -.30; $p<.05$) en monitoring (β -.40; $p<.01$) significant geassocieerd met een laag scholingsniveau. Er waren geen associaties tussen veerkracht en zelfzorgmanagement. Veerkracht was sterk geassocieerd met zelfzorgvertrouwen (β .51; $p<.01$).

Conclusie en implicaties: Deze studie toonde een associatie tussen veerkracht en zelfzorgbehoud. Associaties tussen veerkracht en zelfzorgmanagement en -monitoring kunnen nog niet worden bevestigd. Deze studie draagt bij aan de kennis van beïnvloedende factoren voor zelfzorg. Het wordt aanbevolen om aandacht te besteden aan de mate van veerkracht bij patiënten en om zelfzorginformatie op maat te geven. Vervolgonderzoek, zoals een longitudinale studie, is nodig om een oorzakelijk verband tussen veerkracht en zelfzorg aan te tonen.

Trefwoorden: Veerkracht, Zelfzorg, Patiënten, Hartfalen

Introduction

In Europe, an estimated 15 million people suffer from heart failure (HF).[1] This number is expected to increase due to the aging population and the improvement of a range of successful treatments for cardiovascular diseases.[1–3] Heart failure is a chronic disease, characterised by signs and symptoms such as peripheral oedema, elevated jugular venous pressure, shortness of breath, and fatigue due to functional and/or structural cardiac abnormalities, leading to reduction of cardiac output.[4] Outcomes associated with HF are presented in poor quality of life, emergency department visits, hospitalisations, and early mortality.[5–9] Despite the improvement in treating cardiovascular diseases, the prognosis of HF is poor.[10] After a person is diagnosed with HF, the one-year and five-year survival rates are 80%, and 48%, respectively.[11] In recent years, healthcare has focused on optimisation of self-care to prevent hospitalisation and improve survival and well-being.[12]

The middle-range theory of self-care of chronic illness describes methods of maintaining health through managing illness and health-promoting practices.[13] In the treatment of HF, self-care is considered as an vital element of therapy and is seen as a method to improve outcomes from HF.[5,14] Self-care in HF patients is aimed at three concepts.[5] The first is self-care maintenance, for example, taking medications, adhering to a low-sodium diet, and exercising. The second is symptom monitoring, for example, monitoring weight change and fluid retention. The third is symptom management, for example, increasing the dose of diuretics when fluid retention is detected.[12,15,16] Self-care is a complex behaviour and is affected by various factors such as experience and skills, motivation, cultural beliefs, confidence, cognitive abilities, and social support.[13] Research indicates that HF patients who report inadequate self-care have higher readmission rates and mortality rates than those who report adequate self-care.[12] Despite the importance of self-care in HF, non-adherence to self-care behaviours is common, and patients have difficulties mastering it.[1,7,9,14]

Chronic conditions, such as HF, are associated with long-term deteriorating conditions and therefore require flexible behaviour and constant attention from patients for adequate disease management.[17] Literature indicates that HF patients experience distress due to various factors, including lifestyle changes, the emotional impacts of HF, role changes in their social lives, and interactions with health professionals.[18,19] Furthermore, reactions to stressful situations are the result of a person's judgement of a potential threat in combination with self-assessment of their own capacity to manage the situation.[20] When a person believes that the demands of the situation endanger their well-being and exceed their coping abilities, the situation can be seen as stressful.[18]

Resilience is seen 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.[20–23] The continuous demands, the complexity of self-care, and the constant change of cognitive and behavioural efforts[18] could be stressful events in patients' lives and may require the application of resilient behaviours while battling the disease.[17] Resilience is regulated by internal and external factors.[20] 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.[20] Additionally, studies by Liu et al. demonstrate that negative emotions in patients with acute myocardial infarction and depressive symptoms in HF patients are related to resilience, self-efficacy, and health status.[21,22]

Resilience may be helpful in performing adequate self-care in HF, which is essential for managing HF, and patients' own efforts are of great importance.[14,24,25] However, research into the relationship between resilience and self-care in HF is lacking. The hypothesis is that being resilient is associated with better self-care. The findings of this study could provide more insight in understanding the problems of underperforming self-care in HF.

Aim

The aim of this study is to explore the association between resilience and the performance of self-care in heart failure patients.

Method

Design

To research the association between resilience and self-care, a quantitative, cross-sectional study design was used. This design was selected because outcome and exposure were measured in the study participants at the same time.[26] Patients in this study received a questionnaire once. Inclusion of patients at the outpatient clinic was planned from January till May 2020. However, due to the SARS-CoV-2 pandemic, physical inclusion ended in March 2020. The research team decided to include patients from March till May by telephone.

Population and domain

The study was conducted in the cardiology and HF outpatient clinic of the University Medical Centre Utrecht (UMCU) in the Netherlands. The population base consisted of adult patients with a documented diagnosis of HF. The study population were patients who visit the HF outpatient clinic at the UMCU. To be eligible for inclusion, patients must be 18 years or older, have a documented diagnosis HF more than three months prior to the start of the study, and be included in the New York Heart Association's (NYHA) Class II or III. Participants were excluded if they could not read or speak Dutch, had received a heart transplant, were living in a assisted facility or nursing home, or were found by a cardiologist or HF nurse specialist to be physically or mentally unable to complete the questionnaire.

The common criterion was used to calculate the sample size.[27] The initial required sample size was determined to be 70 patients, based on the following determinants: resilience and self-care, and the predetermined confounders of age, gender, education, marital status, and depressive symptoms.

Procedures

Heart failure nursing specialists in the outpatient clinic cardiology screened the patients for inclusion and exclusion criteria. When a patient was found to be eligible for inclusion, the patient was asked during the consultation if the researcher could approach them about the study. Information about the study was provided verbally, and on paper after the patient's consultation. Most patients signed the informed consent (IC) directly after their appointment. From March through May 2020, the process of including and informing patients about the study was done by telephone. After verbal consent, patients received all study information, IC, questionnaire, and a return envelope at their homes. Each patient could complete the questionnaire at home and send it back (with a signed IC if this had not yet been done) to the UMCU.

Data collection

Each participant received one self-report questionnaire. The Self-Care of Chronic Illness Inventory questionnaire (SC-CII) was used to measure self-care. The SC-CII contains three independent scales measuring self-care maintenance (eight items), self-care monitoring (five items), self-care management (seven items can be filled in by patients who experience symptoms and six items by patients who do not experience symptoms), and self-care confidence (10 items). Self-confidence was included in the questionnaire because it is an essential determinant influencing the effectiveness of self-care. Nevertheless, it is not a part of the self-care process *per se*.[28] Each item, except for items 14 and 20, was scored on a 5-point ordinal scale. Each scale was scored separately and standardized to 0-100, with higher scores reflecting better self-care. Scale scores were not added up because patients who reported that they did not experience symptoms, could not fill in the subscale about self-care management. Reasonably, if patients do not experience symptoms they also cannot report how they manage symptoms. [24] A cut-off point of ≥ 70 was used to determine adequate self-care.[28] Internal coherence for the English version was high and was considered adequate for management and maintenance. The SC-CII was translated into Dutch via the method of forward-backward translation.[24]

Additionally, the nine-item Resilience Evaluation Scale (RES) questionnaire was used to determine to what extent the participants assessed themselves as resilient. The RES contains two constructs of psychological resilience: self-confidence (three items) and self-efficacy (six items). Each item is rated on a 5-point Likert scale, and higher scores

indicate greater psychological resilience. The RES is demonstrated to be of good convergent validity and internal consistency in Dutch and English language groups.[20]

Because depression can affect resilience,[21,22] the two-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 over the past two weeks on a 4-point Likert scale. The total score ranges from 0–6. With a score of 3 or greater, a depressive disorder is likely. Validation of the PHQ-2 revealed that sensitivity and specificity were 86% and 78%, respectively.[29]

Data on age, gender, HF etiology, time with HF since diagnosis, left ventricular ejection fraction (LVEF), NYHA class, and HF medication were retrieved from the patient health records. Data on educational level and marital status were self-reported.

Data analysis

Descriptive statistics were used to illustrate the participants' background and medical characteristics. Categorical data are presented as frequencies and percentages. For continuous variables, mean and standard deviation are reported. Multiple linear regression analysis was performed to examine the associations between resilience and self-care. For the subscale self-care management, multiple linear regression analysis was performed on data of patients who reported to experience symptoms. The regression analyses were adjusted for confounders predetermined within the research team: age, gender, marital status, education, and depressive symptoms. The confounders were added with the enter method in the multiple regression analysis in the order that made biological sense.[30] Gender was coded as 0 = male and 1 = female. Education level was coded as 0 = low education, 1 = medium education, 2 = high education, and 3 = other education. Since education level had more than two categories, dummy variables were used where education level 'medium' was the baseline dummy. Marital status was coded as 0 = married/cohabiting and 1 = divorced/single/widowed. Inference for multiple regression was examined with a histogram, PP-plot, and scatterplot.[31,32]

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 gender. Additionally, in the third model resilience was adjusted and corrected for education level, marital status, and depression. In all regression models, the adjusted R-squared, standardized β, and 95% confidence interval (CI) were used to examine the strength of the independent variables. *P*-values of < 0.05 were considered statistically significant. There was no missing data in the questionnaire that needed to be imputed. Statistical analyses were performed with IBM Statistical Package for Social Sciences (SPSS) software (Version 23).[33]

Ethical issues

      The study was conducted according to the principles of the Declaration of Helsinki (version 59, October 2000). The study was assessed by the Medical Ethical Committee of the UMCU the Netherlands and was issued as being non-medical research. Therefore, no ethical board approval was required, and the regulations of the General Data Protection Regulation were followed. All participants provided written IC. The study burden for participants was considered minimal because of the one-time investment of approximately 25 minutes to complete the questionnaire.

Results

Participants

      Ninety-three patients were found eligible for inclusion. Reasons for not including patients from this sample were not being asked by the nursing specialist or cardiologist ($n = 16$), not wanting to participate after information was provided ($n = 7$), and being mentally unable to complete the questionnaire ($n = 5$). In the final sample, a total of 65 patients were included, of who 43 were included during their consultation in the cardiology outpatient clinic and 22 were included by telephone. Of the included patients, nine patients withdrew from the study by not signing the IC or by not returning the questionnaire. A total of 57 questionnaires were completed and returned to the UMCU.

Demographic data

      Table 1 indicates the characteristics of the study sample. The patient population was predominantly male ($n = 36$; 63.2%), and the mean age was 61 years (± 11.7). Most of the patients ($n = 33$; 57.9%) were medium-educated and were married or cohabiting ($n = 44$; 77.2%). Most patients, 80.7% ($n = 46$), were determined to be in NYHA Class II and the mean LVEF was 30% (± 11.6), 31.6% ($n = 18$) of the patients had HF of ischemic origin, and 59.6% ($n = 34$) of the patients had HF of other origin or multiple origins. Most of the patients ($n = 50$; 87.7%) scored < 3 on the PHQ-2, indicating that possible depressive symptoms among the study population were unlikely.

Table 1: *Patient characteristics of study sample*

      Descriptive statistics of the dependent variable self-care and the independent variable resilience are presented in Table 2. Patients reported adequate levels of self-care on all separate self-care scales (mean scores ≥ 70), except for self-care management in patients experiencing symptoms ($n = 51;$ mean 67.01; ± 12.53) and in patients with no symptoms ($n = 6;$ mean 50; ± 28.01). Overall, patients were quite resilient (mean 27.11; ± 5.40). The subscales of the RES indicated that patients had fair trust in themselves (mean 9.32; ± 1.95) and positive beliefs about coping with stressful situations (mean 17.79; ± 3.80).

Table 2: *Descriptive statistics of main study variables*

Regression analysis

In Table 3-6 multiple regression analysis of the separate SC-CII scales and resilience are presented. In the univariate analysis, model 1, resilience is a significant predictor for self-care maintenance (β = .27; p = 0.04) (Table 3). In model 2, resilience was combined with the variables age and gender; when adjusted for these variables, there was no significant association between resilience and self-care maintenance (β = .25; p = 0.06). In model 3, resilience was further combined with educational levels, marital status, and depressive symptoms. After adjusting for these variables, self-care maintenance decreased significantly more in patients with low education levels compared to those with medium education levels (β = -.30; p = 0.03).

Table 3: *Regression model of resilience and the dependent variable self-care maintenance*

As indicated in Table 4, model 1, no significant results were found for resilience and self-care monitoring (β = .15; p = 0.26). In model 2, resilience was combined with the variables of age and gender. Adjusted for these variables, no association was found between resilience and self-care monitoring (β = .15; p = 0.27). However, in model 3, after combining resilience with other variables and adjusting for these, self-care monitoring decreased significantly in patients with low education levels compared to those with medium education levels (β = -.40; p = 0.01).

Table 4: *Regression model of resilience and the dependent variable self-care monitoring*

As indicated in Table 5, model 1, no significant results were found for resilience and self-care management (β = .17; p = 0.23). In models 2 and 3, resilience was combined with other variables and adjusted for them. Additionally, no significant associations were found (β = .17; p = 0.24 and β = .13; p = 0.79).

Table 5: *Regression model of resilience and the dependent variable self-care management (patients with symptoms)*

In Table 6, regression analysis was performed between resilience and self-care confidence. In model 1, a strong significant association was indicated between resilience and self-care confidence (β = .51; p = 0.00). In model 2, resilience was combined with age and gender. After adjusting for these variables, resilience continued to demonstrate a strong significant association with self-care confidence (β = .52; p = 0.00). In model 3, educational levels, marital status, and depressive symptoms were added into the regression. Resilience remained significantly associated with self-care confidence after adjusting for these variables (β = .48; p = 0.00).

Table 6: *Regression model of resilience and the dependent variable self-care confidence.*

Discussion

This study reveals that resilience is significantly associated with self-care maintenance and confidence in HF patients. Low education level is significantly associated with self-care maintenance and monitoring, resulting in a decrease in self-care. No significant associations were found between resilience and self-care monitoring and management. These findings provide new insights into the complex relationship between resilience and self-care in HF patients.

The current findings partly support the hypothesis that being more resilient is associated with better self-care. The significant association found between resilience and self-care maintenance is in accordance with the research of Chang et al. which demonstrated that the direct effects of depressive symptoms on self-care maintenance were moderated by resilience.[34]

Furthermore, our study revealed a significant association between low education levels and self-care maintenance and monitoring in the multivariate analysis, even though only six participants (11%) had a low education level. This finding is in line with a study of Vellone et al. in which patterns of self-care in HF patients and their sociodemographic variables were analysed.[35] Their results indicated that consistent low adherence and low consulting behaviours were seen in patients (66% male) with lower education levels. However, due to the limited size of the low education level group in our study, we did not performed sub-analyses for gender.

In the subscale self-care management, no association with resilience was found. However, a study of Dickson et al. indicated that self-care management was strongly influenced by attitudes and self-efficacy.[14] Since 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.

The analysis of our study revealed a strong association between resilience and self-care confidence. This is in accordance with the work of Lee et al., where in Thai HF patients, self-care confidence moderated the effect of self-care management, which was strongly correlated with mental health.[36] Furthermore, our findings are comparable with research of Ertekin et al., in which an association was discovered between resilience and self-confidence, which increased problem-solving skills in midwife candidates.[37] The strong association in our study could also be explained because resilience and self-confidence are similar measures, however, both variables were moderately correlated.

The hypothesis of our study was that patients with high resilience perform better self-care, however, it could be demonstrated to be true for only two of the four self-care scales. The study population HF patients was slightly more resilient compared to a healthy Dutch

and English group of patients (27.1 vs 25.6) in the study of van der Meer et al.[20] This may have affected the strength of the associations, as the resilience scale is limited to a maximum score of 36.

Limitations and strengths

The present study has some limitations that need to be considered. Firstly, although the Dutch SC-CII was translated with the forward-backward method, the questionnaire was not validated cross culturally.[38] Therefore, it is not certain whether the items of the questionnaire were correctly interpreted and understood by the patients. However, the SC-CII was tested in a study of de Maria et al. in three other cultural groups.[39] That study revealed that the three patient groups used an identical cognitive framework when responding to the questions and that they were using the Likert scale of the SC-CII in an almost identical way.[39] Therefore, validity of the translated questionnaire is assumed for this study.

Secondly, two different measuring circumstances occurred, namely, questionnaires that were completed before the start of the SARS-COV-2 pandemic and those completed during the pandemic. All outpatient clinic appointments were scaled down to telephonic consultations. Therefore, questions such as 'see your healthcare provider for routine health care', or 'tell your healthcare provider about symptoms at the next office visit', can be answered quite differently. It would be interesting to investigate the effect of the pandemic on the self-care and resilience parameters used in this study.

Thirdly, the desired sample size of 70 participants was not realised. Therefore, it is possible that the researchers were unable to detect an effect between resilience and all self-care activities.[32,40]

Fourthly, although the researchers controlled for several predetermined confounders in this analysis, it is possible that other confounders were not considered in this study.

This present study has the following strengths that are worth mentioning. To the best of our knowledge, this is the first study exploring the association between resilience and self-care in HF patients. Furthermore, the majority of participants in this study were male, which is in line with research of the Nivel Institute indicating that, in 2018, age-specific prevalence rates in general practices in the Netherlands were higher for men than for women for most age classes.[41] Therefore, this study's patient population is representative of the general practice population and can be generalised to a broader population of HF patients.

Implications

For future practice, we recommend that attention be paid to the degree of resilience in HF patients. Furthermore, we demonstrated a negative association with low education levels and self-care. Therefore, when patients are diagnosed with HF and during the HF

disease process, tailor-made information must be provided by the cardiologists and nurses to optimise HF self-care.

In addition, the strong association between resilience and self-care confidence may indicate that certain programs for HF patients, such as cardiac rehabilitation,[4] should be offered more often. By following cardiac rehabilitation programs, HF patients could gain tools to build their resilience and self-care confidence to perform adequate self-care.

Moreover, the association between self-care maintenance and resilience may indicate that efforts to improve self-care maintenance could be made more successful by also targeting resilience.

Conclusion

The results of this study reveal that there are indications for an association between resilience and self-care in HF patients. However, an association on all self-care activities cannot be confirmed. This study contributes to the body of knowledge of the factors that can mediate or moderate self-care.[23] Since this study had an explorational aim, we cannot confirm any causal relationship between resilience and self-care. Therefore, further research to study a cause-effect relationship should be performed in a study with a longitudinal study research design.

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Tables and Figures

Table 1

Patient characteristics of study sample (n =57)

Variables	*n* (%)	Mean (*SD*)
Age, years	-	61.28 (11.73)
Sex		
Male	36 (63.2%)	-
Female	21 (36.8%)	-
Education		
Low	6 (10.5%)	-
Medium	33 (57.9%)	-
High	16 (28.1%)	-
All else	2 (3.5%)	-
Marital Status		
Married/Cohabiting	44 (77.2%)	-
Divorced/Widow/Single	13 (22.8%)	-
Heart failure etiology		
Idiopathic	5 (8.8%)	-
Ischemic	18 (31.6%)	-
Hypertension	3 (5.3%)	-
Other	34 (59.6%)	-
Time with HF, years	-	9 (7.6)
LVEF	-	29.75 (11.61)
NYHA Class		
II	46 (80.7%)	-
III	13 (22.8%)	-
Medication		
ACE-I or ARBs	41 (71.9%)	-
Beta Blocker	47 (82.5%)	-
MRAs	53 (93.0%)	-
Digitalis	2 (3.5%)	-
Diuretics	45 (78.9%)	-
PHQ-2	-	1.04 (1.22)
PHQ-2 score <3	50 (87.7%)	-
PHQ-2 score ≥3	7 (12.3%)	-

Abbreviations: LVEF= Left ventricular ejection fraction; NYHA= New York Heart Association; ACE-i= Angiotensin converting enzyme inhibitor; ARBs= Angiotensin II receptor blockers; MRAs= mineralocorticoid receptor antagonist; PHQ-2= Patient Health Questionnaire-2.

Table 2

Descriptive statistics of main study variables (n= 57)

	Mean (*SD*)	Range	Ref Range
SC-CII			
Self-care maintenance	73.63 (10.86)	43.75 - 96.88	0 - 100
Self-care monitoring	77.02 (18.56)	20 - 100	0 - 100
Self-care management			
With symptoms	67.01 (12.53)	25 - 92.85	0 - 100
No symptoms	50.00 (28.02)	4.17 - 83.34	0 - 100
Self-care confidence	75.83 (13.30)	42.50 - 100	0 - 100
RES	27.11 (5.40)	9 - 36	0 - 36
Self-confidence	9.32 (1.95)	4 - 12	0 - 12
Self-efficacy	17.79 (3.80)	5 - 24	0 - 24

Abbreviations: SC-CII= Self-Care of Chronic Illness Inventory; RES= Resilience Evaluation Scale.

Table 3

Regression model of resilience (RES) and the dependent variable self-care maintenance (n=57)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	$R2^a$	β^b	95% CI	$R2^a$	β^b	95% CI	$R2^a$	β^b	95% CI
Block 1	.06			.09			.14		
RES		.27*	.02 -1.07		.25	-.02 - 1.02		.16	-.24 - .88
Block 2									
Age					-.19	-.42 - .06		-.21	-.45 - .06
Gender					.13	-2.89 - 8.69		.15	-2.49 - 9.14
Block 3									
PHQ-2								-.04	-2.91 - 2.22
Education									
Medium vs Low								-.30*	-19.70 - -1.09
Medium vs high								.09	-4.19 - 8.44
Medium vs all else								-.12	-22.62 - 8.22
Marital status								-.12	-10.11 - 3.78

a: Adjusted R-Squared, b: Standardized coefficients Beta

* $p < 0.05$

Model 1: Basic model: Resilience (RES)

Model 2: RES is adjusted and corrected for the confounders age and gender

Model 3: RES is additionally adjusted for possible depressive symptoms (PHQ-2), education levels (low, medium, high, all else), and marital status

Table 4

Regression model of resilience (RES) and the dependent variable self-care monitoring (n=57)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	$R2^a$	β^b	95% CI	$R2^a$	β^b	95% CI	$R2^a$	β^b	95% CI
Block 1	.01			-.03			.06		
RES		.15	-.40 - 1.44		.15	-.42 - 1.46		.06	-.80 - 1.21
Block 2									
Age					-.02	-.46 - .41		-.04	-.52 - .40
Gender					-.01	-11.03 - 10.02		.02	-9.84 - 10.97
Block 3									
PHQ-2								-.05	-5.29 - 3.87
Education									
Medium vs Low								-.40**	-40.57 - -7.29
Medium vs High								.03	-9.91 - 12.66
Medium vs all else								-.08	-35.22 - 19.94
Marital status								-.07	-15.52 - 9.32

a: Adjusted R-Squared, b: Standardized coefficients Beta

* $p < 0.05$, ** $p < 0.01$

Model 1: Basic model: Resilience (RES).

Model 2: RES is adjusted and corrected for the confounders age and gender

Model 3: RES is additionally adjusted for possible depressive symptoms (PHQ-2), education levels

(low, medium, high, all else), and marital status

Table 5

Regression model of resilience (RES) and the dependent variable self-care management (patients with symptoms) (n=51)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	R2[a]	*β*[b]	*95% CI*	*R2*[a]	*β*[b]	*95% CI*	*R2*[a]	*β*[b]	*95% CI*
Block 1	.01			-.02			-.08		
RES		.17	-.28 - 1.14		.17	-.30 - 1.16		.13	-.51 - 1.16
Block 2									
Age					-.08	-.40 - .23		-.00	-.35 - .34
Gender					.05	-6.23 - 8.61		.06	-6.51 - 9.48
Block 3									
PHQ-2								-.05	-4.37 - 3.32
Education									
Medium vs Low								.04	-13.09 - 16.40
Medium vs High								.08	-6.39 - 10.39
Medium vs all else								-.12	-28.17 - 12.95
Marital status								.18	-4.37 - 15.02

a: Adjusted R-Squared, b: Standardized coefficients Beta

Model 1: Basic model: Resilience (RES)

Model 2: RES is adjusted and corrected for the confounders age and gender

Model 3: RES is additionally adjusted for possible depressive symptoms (PHQ-2), education levels (low, medium, high, all else), and marital status

Table 6

Regression model of resilience (RES) and the dependent variable self-care confidence (n=57)

	Model 1 (Block 1)			Model 2 (Block 1, 2)			Model 3 (Block 1, 2, 3)		
	R2[a]	*β*[b]	95% CI	*R2*[a]	*β*[b]	95% CI	*R2*[a]	*β*[b]	95% CI
Block 1	.25			.26			.26		
RES		.51**	.68 - 1.83		.52**	.71 - 1.86		.48**	.53 - 1.81
Block 2									
Age					.18	-.06 - .47		.18	-.09 - .50
Gender					.11	-3.53 - 9.28		.08	-4.47 - 8.80
Block 3									
PHQ-2								-.07	-3.70 - 2.14
Education									
Medium vs Low								.07	-7.52 - 13.70
Medium vs High								.20	-1.41 - 12.98
Medium vs all else								-.05	-20.81 - 14.34
Marital status								-.14	-12.32 - 3.52

a: Adjusted R-Squared, b: Standardized coefficients Beta

* *p* < 0.05, ** *p* < 0.01

Model 1: Basic model: Resilience (RES)

Model 2: RES is adjusted and corrected for the confounders age and gender

Model 3: RES is additionally adjusted for possible depressive symptoms (PHQ-2), education levels (low, medium, high, all else), and marital status