

Associations Between Self-Care, Caregiver Contribution to Self-Care, and Depressive Symptoms in Patients With Heart Failure: A cross-sectional and correlational study

Işıl Şen Kibar

isil5534@gmail.com

Marmara University

Gizem Şahin Bayındır

Istanbul University-Cerrahpaşa

Research Article

Keywords: Heart failure, Self-care, Caregivers, Depression, Nursing care

Posted Date: October 5th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11021449/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Self-care in heart failure is a multidimensional process that may involve both patients and their informal caregivers. Although caregiver contribution to self-care has been increasingly recognised, the extent to which specific domains of caregiver involvement are associated with depressive symptoms in patients and caregivers remains unclear. This study aimed to examine the associations between patient self-care, caregiver contribution to self-care, and depressive symptoms among patients with heart failure and their informal caregivers.

Methods

This cross-sectional and correlational study included 200 patient-caregiver dyads comprising patients hospitalised with heart failure and their primary caregivers. Data were collected separately from patients in their hospital rooms and from caregivers in a private education room within the clinical unit. Data were collected using the Heart Failure Self-Care Index, the Caregiver Contribution to Self-Care of Heart Failure Index, and the Beck Depression Inventory. Multiple linear regression analyses were conducted to examine the associations between self-care domains and depressive symptoms in patients and caregivers.

Results

Patient symptom perception was inversely associated with patient depressive symptoms ($\beta = -0.213$, $p = .011$), and the model explained 4.7% of the variance in patient depressive symptoms ($R^2 = .047$). Total patient self-care was also inversely associated with patient depressive symptoms ($\beta = -0.177$, $p = .012$; $R^2 = .031$). Among caregiver contribution domains, caregiver contribution to symptom perception was inversely associated with patient depressive symptoms ($\beta = -0.193$, $p = .027$; $R^2 = .036$), whereas caregiver contribution to self-care maintenance and self-care management were not significantly associated with patient depressive symptoms. Neither total patient self-care nor caregiver contribution to self-care was significantly associated with caregiver depressive symptoms.

Conclusions

Patient symptom perception and caregiver contribution to symptom perception were associated with lower depressive symptom severity among patients with heart failure, whereas no significant associations were observed with caregiver depressive symptoms. These findings suggest that specific domains of caregiver involvement, particularly symptom perception, may warrant greater attention in dyad-sensitive heart failure nursing care. Further longitudinal and intervention studies are needed to clarify the direction and mechanisms of these associations.

Trial Registration:

Not applicable

Background

Heart failure is a chronic and progressive condition affecting approximately 64 million people worldwide and is associated with substantial morbidity and mortality [1]. Despite advances in treatment and care, heart failure remains a major global health burden due to impaired quality of life, recurrent hospitalisations, increased healthcare utilisation, and premature mortality [2]. Given the progressive nature of the disease and its substantial symptom burden, which can significantly affect daily functioning and patients' responsibilities for disease management, maintaining effective self-care behaviours is a fundamental component of long-term heart failure management.

Self-care in heart failure is a disease-specific process involving behaviours undertaken to maintain health, monitor disease-related symptoms, and respond appropriately when symptoms occur. This process comprises interrelated components, including self-care maintenance, symptom perception, and self-care management [3]. Self-care behaviours are influenced not only by patients' knowledge and skills but also by a range of demographic, clinical, psychosocial, informational, and socioeconomic factors [4]. In particular, reduced physical capacity, symptom burden, and inadequate social support may make it more difficult for patients to maintain self-care behaviours [5]. Inadequate self-care has been associated with rehospitalisation and adverse clinical outcomes, particularly among individuals with a recent history of hospitalisation or more advanced clinical characteristics of heart failure [6, 7]. In addition, depressive symptoms and insufficient psychosocial support are important factors that may hinder the maintenance of self-care behaviours [8].

However, conceptualising self-care in heart failure solely as an individual patient responsibility may not adequately reflect the social and relational dimensions through which disease management occurs in everyday life. Informal caregivers are spouses, family members, relatives, or friends who have a personal relationship with the patient and typically provide unpaid and non-professional support across a range of activities, from daily living to disease management [9–11]. The progressive and functionally limiting nature of heart failure may make it difficult for some patients to manage self-care responsibilities independently, thereby increasing the importance of caregiver involvement in disease management [12, 13]. Caregivers may contribute to self-care by supporting medication adherence, monitoring dietary and fluid intake, facilitating access to healthcare services and appointments, monitoring symptoms, and communicating with healthcare professionals when necessary [14]. Therefore, self-care in heart failure may be better understood not simply as a set of behaviours performed by the patient alone, but as a relational process shaped by the patient's capacity and the caregiver's contribution [13, 15].

This interdependence between patients and caregivers highlights the importance of considering the patient–caregiver dyad in heart failure management. Previous studies indicate that patients' self-care behaviours should be considered in the context of caregiver involvement, reciprocal interactions, and jointly developed disease-management behaviours [12, 16]. Caregiver contribution to patient self-care extends beyond providing direct assistance and may also include supporting patients in recognising and interpreting symptoms and initiating and maintaining appropriate self-care behaviours [15, 17]. Accordingly, examining caregiver contribution not only at the global level but also across specific components of self-care, such as symptom perception and self-care management, may provide a more detailed understanding of disease-management processes within the patient–caregiver dyad. However, previous studies have reported inconsistent findings regarding the level and determinants of caregiver contribution to self-care [12, 18, 19]. These differences suggest that the caregiver's role may vary according to the patient's clinical condition, care needs, and broader social and cultural context.

Heart failure has not only physical but also substantial psychosocial consequences. In addition to fatigue, dyspnoea, chest pain, oedema, and sleep disturbances, patients frequently experience psychological difficulties, including anxiety and depressive symptoms [18]. Depressive symptoms are common among individuals with heart failure and may become more pronounced with increasing disease severity [20]. A high prevalence of depressive symptoms has also been reported among individuals with heart failure and coexisting chronic conditions, with such symptoms being associated with adverse outcomes related to disease course and quality of life [21]. Through inflammatory and neurohormonal mechanisms as well as behavioural pathways, depressive symptoms may complicate disease management, reduce treatment adherence, and be associated with adverse outcomes such as hospitalisation, mortality, and impaired quality of life [22]. Early recognition and management of depressive symptoms are therefore important components of comprehensive heart failure care.

Depressive symptoms may affect not only individuals with heart failure but also caregivers who actively participate in disease management. Meeting the daily care needs of a person with heart failure, monitoring symptoms, and sustaining disease-management activities may impose substantial physical and psychosocial demands on caregivers. These demands have been associated with adverse outcomes, including disruption of daily life and social relationships, caregiver burden, social isolation, stress, anxiety, and depressive symptoms [13, 23–25]. Therefore, the psychological well-being of patients and caregivers should not be considered entirely independent processes. Previous studies of patient-caregiver dyads have indicated that caregivers' depressive symptoms may be associated with patients' self-care behaviors, and that dyadic interactions may influence psychosocial outcomes [12, 16]. In addition, depressive symptoms and self-care behaviours may be interrelated, suggesting that these relationships should be considered within the behavioural processes through which patients and caregivers may influence one another [8, 26].

The relationship between self-care and depressive symptoms may be understood as a potentially bidirectional process. On the one hand, depressive symptoms may impair motivation, energy, cognitive functioning, and the capacity to cope with illness, thereby making it more difficult to initiate and maintain self-care behaviours. On the other hand, inadequate self-care and a reduced sense of control over the illness may adversely affect psychological well-being [8, 26]. Comorbid conditions such as depression and cognitive impairment have also been reported to hinder the initiation and maintenance of self-care behaviours [27]. Within this context, caregiver involvement in patient self-care may support the maintenance of self-care behaviours by reducing some of the burden associated with disease management. In particular, caregivers' support in recognising and interpreting patients' symptoms and developing appropriate responses may help reduce uncertainty and perceived loss of control related to the illness [15, 17]. Previous studies have likewise suggested associations between caregiver involvement in self-care and psychological outcomes in both patients and caregivers [8, 16].

Taken together, these findings indicate that self-care, caregiver contribution to self-care, and depressive symptoms in heart failure should not be considered as entirely independent variables but rather examined within the context of interactions between patients and caregivers. Nevertheless, existing literature has often examined different dimensions of these variables in separate models, and the relationship between caregivers' contribution to specific components of self-care and patients' depressive symptoms remains insufficiently understood. Although previous studies have examined caregiver contribution to self-care, concepts such as mutuality and dyadic engagement, or psychological outcomes in patients and caregivers [8, 12, 15, 16, 18], further evidence is needed regarding how caregiver contribution specifically to symptom perception and self-care management relates to depressive symptoms in both patients and caregivers. Addressing this knowledge gap is clinically relevant for nurses developing self-care education, symptom-management strategies, and psychosocial support interventions that target not only patients but also the patient-caregiver dyad.

Accordingly, this study aimed to examine the associations between self-care among patients with heart failure, caregiver contribution to patient self-care, and depressive symptoms in patients and caregivers considering the patient-caregiver dyad. A cross-sectional and correlational design was used to investigate these relationships. By examining patients and their caregivers within matched dyads, this approach may contribute to a more comprehensive understanding of self-care behaviours and psychosocial outcomes in heart failure management.

Methods

Study design and participants

The population of this cross-sectional correlational study comprised patients diagnosed with heart failure who were receiving care at a cardiac hospital in Istanbul, Türkiye, and their caregivers. The study sample consisted of patient-caregiver dyads who met the eligibility criteria and were recruited using a convenience sampling method. For dyadic studies, a minimum sample size of 200 individuals per group has been recommended [28]. Accordingly, 200 patients with heart failure and their 200 caregivers were included in the study. The inclusion and exclusion criteria for patients with heart failure and caregivers are presented in Table 1.

Table 1
Inclusion and exclusion criteria for study participants

Inclusion criteria for patients with heart failure	Inclusion criteria for caregivers of patients with heart failure
Aged ≥ 18 years	Aged ≥ 18 years
Willingness to participate in the study	Willingness to participate in the study
Diagnosed with heart failure for at least 1 year	Being responsible for providing care to the patient
Caregiver willing to participate in the study	Patient receiving care willing to participate in the study
New York Heart Association functional class II to IV	
Moderate or greater depressive symptoms	
No neurological disease affecting the central nervous system	
No hearing or speech impairment	
Exclusion criteria	
Diagnosed psychiatric disorder	Diagnosed psychiatric disorder
Terminal-stage disease	

Data collection tools

The following data collection instruments were used: the Patient Information Form, the Caregiver Information Form, the Heart Failure Self-Care Index, the Caregiver Contribution to Self-Care of Heart Failure Index, and the Beck Depression Inventory.

Patient Information Form

This form was developed by the researchers based on the relevant literature and consisted of 15 questions assessing participants' sociodemographic and clinical characteristics [29–31].

Caregiver Information Form

This form was developed by the researchers based on the relevant literature and consisted of 16 questions assessing caregivers' sociodemographic characteristics and information related to the caregiving process [24, 32, 33].

Heart Failure Self-Care Index: It was developed by Riegel et al. [34], and its Turkish validity and reliability were established by Afşar et al. [35]. The instrument consists of three subscales: self-care maintenance, symptom perception, and self-care management. Responses to all items are summed and standardised to yield scores ranging from 0 to 100, with higher scores indicating better self-care. A score of 70 or higher indicates adequate heart failure self-care. The original Turkish validation study reported a Cronbach's alpha of 0.96 [36]. In the present study, Cronbach's alpha for the scale was 0.85.

Caregiver Contribution to Self-Care of Heart Failure Index: It was developed by Vellone et al. [17], and its Turkish validity and reliability were established by Afşar et al. [36]. The instrument consists of three subscales: caregiver contribution to self-care maintenance, caregiver contribution to symptom perception, and caregiver contribution to self-care management. Scores of 70 or higher indicate adequate caregiver contribution to heart failure self-care. The original Turkish validation study reported a Cronbach's alpha of 0.95 [36]. In the present study, Cronbach's alpha was 0.84.

Beck Depression Inventory

It was developed by Beck et al. [37], and its Turkish validity and reliability were established by Hisli [38]. The Beck Depression Inventory consists of 21 items, with each item scored from 0 to 3. Higher total scores indicate greater severity of depressive symptoms [38]. The Turkish validation study reported a Cronbach's alpha of 0.80 [38]. In the present study, Cronbach's alpha was 0.81 among patients with heart failure and 0.83 among caregivers.

Data collection process

Data were collected between 1 November 2024 and 30 June 2025 at a cardiac hospital in Istanbul, Türkiye. Data from patients who were hospitalised with a diagnosis of heart failure were collected in their hospital rooms, whereas caregiver data were collected in the education room of the clinical unit. Patients with heart failure completed the Patient Information Form, the Heart Failure Self-Care Index, and the Beck Depression Inventory. Caregivers completed the Caregiver Information Form, the Caregiver Contribution to Self-Care of Heart Failure Index, and the Beck Depression Inventory. Because the study used paired patient–caregiver data, the data collection instruments completed by each patient and their corresponding caregiver were assigned the same identification number to facilitate dyad-level matching while maintaining data linkage.

Data analysis

Data were analysed using DataBeeg 1.0 and SmartPLS 4. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise participant characteristics and study variables. The normality of the data was assessed using skewness and kurtosis values, and the variables were considered to have an approximately normal distribution [39]. Multiple linear regression analyses were conducted to examine the associations between patient self-care, caregiver contribution to self-care, and depressive symptoms in patients and caregivers. Statistical significance was set at $p < .05$, with a 95% confidence level.

Ethical considerations

Ethical approval was obtained from the Kartal Koşuyolu Specialized Training and Research Hospital Clinical Research Ethics Committee on 1 October 2024 (Decision No. 2024/17/930). Institutional permission to conduct the study was obtained from the study hospital on 16 October 2024 (Permission No. 256828943). Written informed consent was obtained from all participating patients with heart failure and caregivers before data collection. All participants were entitled to withdraw from the study at any time. The study adhered to the principles of the Declaration of Helsinki and the ethical standards of the National Research Committee.

Use of Artificial Intelligence

Since the authors are non-native English speakers, they used DeepL to check the grammar and spelling. Other than that, no artificial intelligence was used to generate the content.

Results

Characteristics of participants

As shown in Table 2, the mean age of the patients with heart failure was 59.80 ± 13.86 years; 75.0% ($n = 150$) were male, 79.0% ($n = 158$) were married, 46.5% ($n = 93$) had completed primary school, 54.0% ($n = 108$) were retired, 47.5% ($n = 95$) reported that their income was lower than their expenses, and 85.5% ($n = 171$) lived with their family. Regarding clinical characteristics, the mean duration since heart failure diagnosis was 5.25 ± 6.98 years, and the mean body mass index (BMI) was 28.02 ± 5.63 kg/m². Half of the patients (50.0%, $n = 100$) were classified as “New York Heart Association” (NYHA) functional class IV. In addition, 43.0% ($n = 86$) were former smokers, 83.5% ($n = 167$) reported no alcohol use, 86.5% ($n = 173$) had a history of coronary artery bypass grafting (CABG) or angioplasty, 61.5% ($n = 123$) had hypertension, 48.5% ($n = 97$) had a history of myocardial infarction, 46.5% ($n = 93$) had diabetes, 19.5% ($n = 39$) had an implantable cardioverter-defibrillator (ICD) or cardiac resynchronization therapy (CRT) device, 15.0% ($n = 30$) had atrial fibrillation, 13.0% ($n = 26$) had chronic kidney disease, and 9.0% ($n = 18$) had chronic obstructive pulmonary disease (COPD) (Table 2).

Table 2
Sociodemographic and clinical characteristics of patients with heart failure

Variables			n	%
Sex		Female	50	25.0
		Male	150	75.0
Marital status		Married	158	79.0
		Single	42	21.0
Educational level		Literate	14	7
		Primary school	93	46.5
		Middle school	29	14.5
		High school	36	18.0
		Bachelor's degree or higher	28	14.0
Employment status		Self-employed	28	14.0
		Worker	12	6.0
		Civil servant	3	1.5
		Retired	108	54.0
		Unemployed	49	24.5
Income status		Income less than expenses	95	47.5
		Income equal to expenses	93	46.5
		Income higher than expenses	12	6.0
Living arrangement		Living alone	29	14.5
		Living with family	171	85.5
New York Heart Association functional class		II	16	8.0
		III	84	42.0
		IV	100	50.0
Smoking status		Current smoker	46	23.0
		Former smoker	86	43.0
		Never smoker	68	34.0
Alcohol use		Current alcohol use	13	6.5
		Former alcohol use	20	10.0
		No alcohol use	167	83.5
Clinical characteristics and comorbidities	History of coronary artery bypass grafting or angioplasty	Yes	173	86.5
		No	27	13.5
	Hypertension	Yes	123	61.5
		No	77	38.5

Variables			n	%
	History of myocardial infarction	Yes	97	48.5
		No	103	51.5
	Diabetes	Yes	93	46.5
		No	107	53.5
	Use of an implantable cardioverter-defibrillator or cardiac resynchronization therapy	Yes	39	19.5
		No	161	80.5
	Atrial fibrillation	Yes	30	15.0
		No	170	85.0
	Chronic kidney disease	Yes	26	13.0
		No	174	87.0
	Chronic obstructive pulmonary disease	Yes	18	9.0
		No	182	91.0

As shown in Table 3, the mean age of caregivers was 47.36 ± 14.00 years; 74.5% (n = 149) were female and married, 29.0% (n = 58) had completed high school, 60.5% (n = 121) were nonsmokers, and 91.5% (n = 183) reported no alcohol use. In addition, 42.0% (n = 84) were not employed, 49.0% (n = 98) were spouses of the patients with heart failure, and 64.5% (n = 129) lived with the patient. Among the caregivers, 14.5% (n = 29) had left their job because of their relative's illness, 36.5% (n = 73) had at least one comorbid chronic condition, and 53.5% (n = 107) had no previous experience providing care for another individual. Furthermore, 59.0% (n = 118) reported having another person available to provide support during the caregiving process. The mean duration of caregiving was 3.11 ± 4.14 years, and the mean daily caregiving time was 15.73 ± 8.43 hours (Table 3).

Table 3
Sociodemographic and caregiving characteristics of caregivers

Variables		n	%
Sex	Female	149	74.5
	Male	51	25.5
Marital status	Married	149	74.5
	Single	51	25.5
Educational level	Literate	18	9
	Primary school	55	27.5
	Middle school	26	13.0
	High school	58	29.0
	Bachelor's degree or higher	43	21.5
Employment status	Self-employed	39	19.5
	Worker	35	17.5
	Civil servant	11	5.5
	Retired	31	15.5
	Unemployed	84	42.0
Left employment because of the relative's illness	Yes	29	14.5
	No	171	85.5
Relationship to patient	Spouse	98	49.0
	Child	66	33.0
	Sibling	16	8.0
	Other relative	20	10.0
Living with the patient	Yes	129	64.5
	No	71	35.5
Presence of comorbid chronic conditions	Yes	73	36.5
	No	127	63.5
Previous caregiving experience	Yes	93	46.5
	No	107	53.5
Availability of another person for caregiving support	Yes	118	59.0
	No	82	41.0
Smoking status	Current smoker	67	33.5
	Former smoker	12	6.0
	Never smoker	121	60.5
Alcohol use	Current alcohol use	17	8.5
	No alcohol use	183	91.5
<i>SD = standard deviation.</i>			

Variables	n	%		
Variables	Min	Max	Mean	SD
Age (years)	18.00	81.00	47.36	14.00
Duration of caregiving (years)	1.00	25.00	3.11	4.14
Daily caregiving time (hours)	1.00	24.00	15.73	8.43
SD = standard deviation.				

Self-care, caregiver contribution, and depressive symptoms

The mean total self-care score of patients with heart failure was 69.43 ± 10.37 , while the mean total caregiver contribution to self-care score was 72.77 ± 11.65 . Patients had higher mean depressive symptom scores than caregivers (45.49 ± 8.87 and 10.84 ± 7.45 , respectively). Descriptive statistics for the total scale scores and subdimensions are presented in Table 4.

Table 4
Mean scores for the scales and subscales of patients with heart failure and their caregivers

Scales and subscales	Minimum	Maximum	Mean	SD
Heart Failure Self-Care Index	40.51	96.92	69.43	10.37
• Self-care maintenance	32.00	98.00	63.65	13.43
• Symptom perception	25.45	100.00	64.35	14.99
• Self-care management	40.00	100.00	75.74	11.32
• Beck Depression Inventory – Patient	24.00	63.00	45.49	8.87
Caregiver Contribution to Self-Care of Heart Failure Index	37.93	95.86	72.77	11.65
• Caregiver contribution to self-care maintenance	20.00	100.00	68.37	14.96
• Caregiver contribution to symptom perception	29.09	100.00	74.59	15.27
• Caregiver contribution to self-care management	37.50	100.00	75.75	12.58
• Beck Depression Inventory – Caregiver	0.00	36.00	10.84	7.45
SD = standard deviation.				

Associations between patient self-care and patient depressive symptoms

Multiple linear regression analysis was conducted to examine the associations between patient self-care subdimensions and patient depressive symptoms. The overall regression model was statistically significant ($F = 3.239$, $p = .023$, $R^2 = .047$). Among the self-care subdimensions, symptom perception was the only variable significantly and inversely associated with patient depressive symptoms ($\beta = -0.213$, $p = .011$). The other self-care subdimensions were not significantly associated with patient depressive symptoms ($p > .05$).

In a separate regression model, total patient self-care was significantly and inversely associated with patient depressive symptoms ($\beta = -0.177$, $p = .012$). The overall model was statistically significant ($F = 6.415$, $p = .012$) and explained 3.1% of the variance in patient depressive symptoms ($R^2 = .031$) (Table 5).

Table 5. Regression analysis of the associations between self-care, caregiver contribution to self-care, and depressive symptoms

Model	Dependent variable	Independent variables	B	SE	β	t	p	F	p	R ²	Durbin Watson
1	Beck Depression Inventory - Patient	Constant	54.038	4.360		12.394	<0.001*	3.239	0.023*	0.047	1.869
		Self-care maintenance	-0.006	0.053	-0.009	-0.116	0.908				
		Symptom perception	-0.126	0.049	-0.213	-2.565	0.011*				
		Self-care management	-0.001	0.068	-0.001	-0.009	0.993				
2	Beck Depression Inventory - Caregiver	Constant	14.920	3.705		4.026	<0.001*	1.715	0.165	0.026	2.075
		Self-care maintenance	0.068	0.045	-0.123	-1.518	0.131				
		Symptom perception	-0.069	0.042	0.139	1.651	0.100				
		Self-care management	0.055	0.057	-0.084	-0.963	0.337				
3	Beck Depression Inventory - Patient	Constant	41.606	4.201		9.904	<0.001*	2.465	0.044*	0.036	1.886
		Caregiver contribution to self-care maintenance	0.065	0.050	0.109	1.280	0.202				
		Caregiver contribution to symptom perception	-0.112	0.050	-0.193	-2.226	0.027*				
		Caregiver contribution to self-care management	0.103	0.056	0.146	1.837	0.068				
4	Beck Depression Inventory - Caregiver	Constant	15.874	3.564		4.454	<0.001*	1.196	0.312	0.018	2.080
		Caregiver contribution to self-care maintenance	-0.030	0.043	0.061	0.708	0.480				
		Caregiver contribution to symptom perception	0.013	0.043	-0.026	-0.293	0.770				
		Caregiver contribution to self-care management	0.082	0.048	-0.138	-1.712	0.088				
5	Beck Depression Inventory - Patient	Constant	56.006	4.198		13.341	<0.001*	6.415	0.012*	0.031	1.888
		Heart Failure Self-Care Index	-0.151	0.060	-0.177	-2.533	0.012*				

6	Beck Depression Inventory - Caregiver	Constant	13.351			3.729	<0.001*	0.503	0.479	0.003	2.078
		Heart Failure Self-Care Index	0.036	0.051	-0.050	-0.709	0.479				
7	Beck Depression Inventory - Patient	Constant	44.112	3.984		11.072	<0.001*	0.123	0.727	0.001	1.867
		Caregiver Contribution to Self-Care of Heart Failure Index	0.019	0.054	0.025	0.350	0.727				
8	Beck Depression Inventory - Caregiver	Constant	13.929	3.342		4.168	<0.001*	0.876	0.350	0.004	2.074
		Caregiver Contribution to Self-Care of Heart Failure Index	0.042	0.045	-0.066	-0.936	0.350				

*B = unstandardized regression coefficient; SE = standard error; β = standardized regression coefficient; R^2 = coefficient of determination. * $p < 0.05$*

Associations between caregiver contribution to self-care and patient depressive symptoms

Multiple linear regression analysis was also conducted to examine the associations between caregiver contribution to self-care subdimensions and patient depressive symptoms. The overall regression model was statistically significant ($F = 2.465$, $p = .044$, $R^2 = .036$). Caregiver contribution to symptom perception was significantly and inversely associated with patient depressive symptoms ($\beta = -0.193$, $p = .027$). In contrast, caregiver contribution to self-care maintenance and caregiver contribution to self-care management were not significantly associated with patient depressive symptoms ($p > .05$). Total caregiver contribution to self-care was not significantly associated with patient depressive symptoms ($\beta = 0.025$, $p = .727$; $R^2 = .001$) (Table 5).

Associations with caregiver depressive symptoms

Total patient self-care was not significantly associated with caregiver depressive symptoms ($\beta = -0.050$, $p = .479$; $R^2 = .003$). Similarly, total caregiver contribution to self-care was not significantly associated with caregiver depressive symptoms. None of the caregiver contribution subdimensions showed a statistically significant association with caregiver depressive symptoms (all $p > .05$) (Table 5).

Overall, these findings indicate that patient self-care and caregiver contribution were associated with patient depressive symptoms only in specific domains, particularly symptom perception and caregiver contribution to symptom perception, whereas no statistically significant associations were observed with caregiver depressive symptoms (Table 5).

Discussion

The findings of this study suggest that depressive symptoms in patients with heart failure may be more closely related to specific components of self-care than to self-care as a global construct. Patient symptom perception and caregiver contribution to symptom perception were both inversely associated with patient depressive symptoms, whereas total caregiver contribution to self-care was not. In contrast, neither patient self-care nor caregiver contribution to self-care was significantly associated with caregiver depressive symptoms. These findings highlight symptom perception as a potentially important component of self-care within the patient–caregiver dyad and suggest that specific domains of caregiver involvement may be more relevant to patient psychological well-being than the overall level of caregiver contribution.

Patients in this study demonstrated a mean self-care score just below the established adequacy threshold, whereas caregivers reported a relatively high level of contribution to patient self-care. This finding is consistent with previous evidence showing that

informal caregivers commonly participate in medication management, dietary behaviours, symptom monitoring, and healthcare utilisation in heart failure [12–14]. The relatively high caregiver contribution may also reflect the role of family members in chronic illness management in Türkiye, although cultural patterns of caregiving were not directly assessed. Family involvement can facilitate disease management and provide practical and emotional support [40]. However, greater caregiver involvement may also reflect greater patient dependency or disease burden. Thus, the level of caregiver contribution alone may be less informative than the specific aspects of self-care that caregivers support and how this involvement is experienced within the dyad.

One of the most clinically relevant findings was the inverse association between patient symptom perception and depressive symptoms. According to the situation-specific theory of heart failure self-care, symptom perception is central to self-care because patients must recognise and interpret changes in symptoms before initiating an appropriate response [3]. Patients who can more effectively identify and interpret changes in dyspnoea, fatigue, oedema, or other heart failure-related symptoms may experience greater confidence and control in managing fluctuations in their condition. Conversely, difficulty recognising or interpreting symptoms may increase uncertainty and perceived loss of control, potentially contributing to psychological distress. Previous studies have similarly linked depressive symptoms with poorer self-care and difficulties in initiating and maintaining appropriate self-care behaviours [8, 26]. However, given the cross-sectional design, the direction of this association cannot be established. Depressive symptoms may impair attention, motivation, and interpretation of bodily sensations, while impaired symptom perception may also contribute to uncertainty and distress. The observed relationship may therefore reflect a potentially bidirectional association rather than a unidirectional effect.

The inverse association between caregiver contribution to symptom perception and patient depressive symptoms is particularly noteworthy. Caregivers may provide an additional perspective on changes in the patient's physical condition and may identify subtle changes that patients do not recognise or interpret differently. In heart failure, fluctuating symptoms such as fatigue, dyspnoea, oedema, and reduced functional capacity may be difficult to distinguish from normal variations in daily functioning or symptoms associated with comorbidities. Caregiver involvement in noticing, discussing, and interpreting such changes may therefore facilitate symptom recognition and appropriate self-care responses [15, 17]. Beyond practical assistance, caregiver contribution to symptom perception may represent a relational process through which patients receive additional information and reassurance regarding changes in their condition.

This finding is consistent with the broader literature on dyadic illness management, which emphasizes patient–caregiver interactions, mutuality, communication, and shared disease-management behaviours in heart failure [12, 16]. Importantly, the absence of an association between total caregiver contribution and patient depressive symptoms, together with the specific association observed for caregiver contribution to symptom perception, suggests that specific domains of caregiver involvement may be more relevant to patient psychological well-being than overall caregiver contribution. This finding extends previous work on caregiver contribution and dyadic engagement by indicating that symptom-focused involvement may warrant particular attention in psychosocial care for patients with heart failure [8, 15, 18].

Several mechanisms may potentially help explain this association. Caregiver participation in symptom perception may increase patients' awareness of changes in their condition, reduce uncertainty, and facilitate timely responses. It may also provide emotional reassurance and strengthen patients' sense of support and shared responsibility. These mechanisms are consistent with the dyadic illness-management perspective, in which disease management is understood as a relational rather than solely individual process [41]. Nevertheless, these mechanisms were not directly assessed in the present study and should therefore be regarded as hypotheses for future research rather than established causal pathways.

The inverse association between total patient self-care and depressive symptoms is also consistent with previous evidence linking psychological well-being with self-care in heart failure. Depressive symptoms may impair motivation, energy, concentration, and perceived self-efficacy, making regular self-care more difficult [26, 27]. Conversely, difficulties in managing a chronic and progressive illness may contribute to psychological distress. The relationship between self-care and depressive symptoms should therefore be interpreted as potentially reciprocal. These findings support the importance of considering psychological well-being when assessing self-care rather than viewing self-care deficits solely as problems of knowledge, motivation, or adherence [8].

Although several associations were statistically significant, the explained variance of the regression models was modest. The models involving patient symptom perception, caregiver contribution to symptom perception, and total patient self-care explained

approximately 3–5% of the observed variability in patient depressive symptoms. Thus, these variables account for only a small proportion of the factors associated with patients' psychological well-being. Depressive symptoms in heart failure are likely influenced by multiple interacting biological, clinical, behavioural, and psychosocial factors, including disease severity, comorbidity burden, functional limitations, previous psychological difficulties, social support, and treatment burden [20, 22]. Accordingly, the findings should not be interpreted as suggesting that improving self-care or caregiver contribution alone would substantially reduce depressive symptoms. Rather, symptom perception and caregiver involvement may represent potentially modifiable components within a broader multidimensional approach to psychological and self-care support.

The absence of significant associations between patient self-care or caregiver contribution and caregiver depressive symptoms also warrants consideration. One possible explanation is that caregiver involvement may be experienced differently across caregiving contexts and relationships. Active involvement may be experienced as supportive or manageable in some circumstances but may be associated with greater burden or distress in others. Caregiver psychological well-being may also depend on factors not examined in this study, including perceived caregiver burden, social support, financial strain, relationship quality, caregiving duration, and patient functional dependency. Previous studies have shown that caregiving in heart failure may be associated with psychological distress, anxiety, depression, and social disruption, but these outcomes are not necessarily determined by caregiver participation in self-care alone [13, 23–25]. The present findings therefore suggest that caregiver depressive symptoms may require direct assessment of caregiver burden and psychosocial context rather than being inferred from the level of contribution to patient self-care.

These findings have several implications for nursing practice. Assessment of self-care in patients with heart failure should extend beyond whether recommended behaviours are performed and should include how patients recognise and interpret symptom changes. Nurses may assess not only the presence of dyspnoea, fatigue, or oedema but also how patients recognise changes, what those changes mean to them, and how they respond. Caregivers may be incorporated into symptom-monitoring and self-care education when they are closely involved in daily disease management. Education should address recognition of clinically relevant symptom changes, when and how to seek professional assistance, and communication strategies that support rather than replace patient autonomy. Given the potential bidirectional relationship between depressive symptoms and self-care, psychosocial assessment should also be integrated into heart failure nursing care. Importantly, interventions should remain dyad-sensitive and should promote collaborative self-care without assuming that greater caregiver involvement is universally beneficial or increasing caregiver burden.

The findings may also inform the design of future interventions. Current heart failure care emphasizes patient education, self-care support, and appropriate caregiver involvement in disease management. The present findings suggest that these approaches may be strengthened by giving greater attention to caregiver involvement in symptom perception and interpretation. Rather than focusing primarily on the quantity of caregiver involvement, nursing interventions could target specific behaviours that facilitate accurate symptom recognition, communication, and timely decision-making, particularly for patients experiencing self-care difficulties or depressive symptoms. Such an approach could complement dyadic interventions aimed at improving communication, mutuality, and shared illness management [15, 41].

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish temporal or causal relationships between self-care, caregiver contribution, symptom perception, and depressive symptoms. The observed associations may be bidirectional, and longitudinal studies are needed to clarify whether changes in symptom perception or caregiver involvement precede changes in depressive symptoms or whether psychological well-being subsequently influences self-care and caregiver behaviours.

Second, although patients and caregivers were recruited as matched dyads, the statistical analyses did not formally account for the interdependence between dyad members using an actor–partner framework. Therefore, the findings should be interpreted as associations examined from a patient–caregiver dyad perspective rather than as evidence of formal dyadic effects. Future studies using the Actor–Partner Interdependence Model or related dyadic approaches could provide a more comprehensive understanding of how patient and caregiver characteristics influence both their own outcomes and those of their dyad partner.

Third, the regression models explained only a modest proportion of the variance in depressive symptoms. Although several associations were statistically significant, self-care and caregiver contribution accounted for only a small proportion of the variability in patient depressive symptoms. This suggests that important biological, clinical, behavioural, and psychosocial determinants of depressive symptoms were not captured in the present models. Future research should consider additional factors such as disease severity, symptom burden, functional status, caregiver burden, relationship quality, social support, previous psychological difficulties, and treatment burden.

Fourth, depressive symptoms were assessed using a self-report measure rather than a structured diagnostic interview. Therefore, the findings reflect the severity of depressive symptoms rather than clinically diagnosed depressive disorders. Future studies could combine validated symptom scales with clinical diagnostic assessments to provide a more comprehensive evaluation of psychological health.

Finally, the study was conducted within a specific healthcare and sociocultural context. The relatively high level of caregiver contribution observed in this sample may partly reflect family involvement in chronic illness management in Türkiye; however, cultural and relational characteristics were not directly assessed. Therefore, the generalisability of the findings to other populations and healthcare systems should be considered cautiously. Multicentre and cross-cultural studies are warranted to determine whether the observed relationships are consistent across different caregiving and healthcare contexts.

Conclusions

This study highlights the importance of considering self-care and psychological well-being within the context of the patient–caregiver relationship in heart failure. Patient symptom perception was inversely associated with patient depressive symptoms, and caregiver contribution to symptom perception was also inversely associated with patient depressive symptoms. Neither total patient self-care nor total caregiver contribution to self-care was significantly associated with caregiver depressive symptoms.

These findings suggest that specific domains of caregiver involvement, particularly symptom perception, may be relevant to patients' psychological well-being beyond the overall level of caregiver contribution. In particular, caregiver participation in recognising and interpreting heart failure symptoms may warrant particular attention in dyad-sensitive heart failure care. However, given the cross-sectional design and modest explained variance, these findings should be interpreted as associations rather than causal effects.

For clinical nursing practice, the findings support a dyad-sensitive approach in which patients and caregivers are assessed and supported together, while maintaining patient autonomy. Nurses may consider incorporating symptom-perception assessment, caregiver involvement in symptom monitoring, and routine screening for depressive symptoms into comprehensive heart failure care. Future longitudinal and formally dyadic studies are needed to determine the temporal and interpersonal mechanisms underlying these associations and to evaluate whether interventions targeting shared symptom perception and caregiver involvement can improve psychological and self-care outcomes for both patients and caregivers.

Declarations

Ethical approval and consent to participate: Ethical approval was obtained from the Kartal Koşuyolu Specialized Training and Research Hospital Clinical Research Ethics Committee on 1 October 2024 (Decision No. 2024/17/930). Institutional permission to conduct the study was obtained from the study hospital on 16 October 2024 (Permission No. 256828943). Written informed consent was obtained from all participating patients with heart failure and caregivers before data collection. The study adhered to the principles of the Declaration of Helsinki and the ethical standards of the National Research Committee.

Consent for publication: Not applicable.

Data availability statement: All data used in this study are available from the first and responsible author upon request.

Competing interests: The authors declare no competing interests.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author contributions Study design: İŞK, GŞB; Data collection: İŞK, GŞB; Data analysis: İŞK, GŞB; Study supervision: GŞB; Manuscript writing: İŞK, GŞB. Both authors read and approved the final manuscript.

Acknowledgements: We would like to thank all patients and caregivers who participated in this study.

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