



Research Paper

Correlation Between Affective Status and Self-care Behaviors in Patients with Heart Failure



Leila Rouhi Balasi¹, Arsalan Salari^{1*}, Asieh Ashouri², Azam Nourisaee³, Zahra Ahmadnia¹, Fatemeh Moaddab¹, Fatemeh ZaerSabet¹

1. Department of Cardiology, Cardiovascular Diseases Research Center, Heshmat Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran.

2. Research Center of Health and Environment, School of Health, Guilan University of Medical Sciences, Rasht, Iran.

3. Department of Psychology, School of Humanities, Rasht Branch, Islamic Azad University, Rasht, Iran.



Citation Rouhi Balasi L, Salari A, Ashouri A, Nourisaee A, Ahmadnia Z, Moaddab F, et al. Correlation between Affective Status and Self-care Behaviors in Patients with Heart Failure. *Caspian Journal of Health Research*. 2022; 7(4):227-234. <https://doi.org/10.32598/CJHR.7.4.352.2>

Running Title Self-care Behaviors in Heart Failure Patients

doi <https://doi.org/10.32598/CJHR.7.4.352.2>



ABSTRACT

Background: Poor self-care in patients with Heart Failure (HF) is directly associated with the patient's general health getting deteriorated and hospitalized.

Objectives: One of the factors influencing compliance with self-care behaviors is mood status. The aim of this study was to determine the relationship between affective status with self-care behaviors in patients with HF.

Materials & Methods: In this analytical cross-sectional study, 372 HF outpatients referring to a specialized heart clinic have been included using convenient sampling method. Study tools had 4 parts including demographic and social factors, the European Heart Failure Self-care Behaviors scale, and positive and negative affect scales. The collected data were analyzed using multivariate linear regression model.

Results: The multivariate model adjusted for patient's education, suffering from chronic obstructive pulmonary disease, and heart failure duration showed that positive affects ($\beta=0.113$, Standard Error (SE) =0.056, $P=0.046$) and negative affect ($\beta=0.341$, SE=0.053, $P<0.001$) were significantly related to self-care behaviors, but anhedonia did not have any significant relation with self-care behaviors ($\beta= -0.105$, SE=0.097, $P=0.280$). The separate models accounted for 8 to 11% of the variance in the self-care behaviors.

Conclusion: The result of current study indicates that patients' mood status including positive and negative affect are significant contributors of self-care behaviors. So, it is recommended that in addition to the patient's physical condition, the rehabilitation program of the heart failure

Article info:

Received: 19 July 2022

Accepted: 12 Sep 2022

Published: 01 Oct 2022

* Corresponding Author:

Arsalan Salari, PhD.

Address: Department of Cardiology, Cardiovascular Diseases Research Center, Heshmat Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran.

Tel: +98 (13) 33618177

E-mail: asalari828@gmail.com

patients should incorporate their psychological and mental status.

Keywords: Heart failure, Self-care, affect, Anhedonia, patients

1. Introduction

Hear Failure (HF) as a chronic disease is one of the most prevalent cardiovascular diseases and a major health problem worldwide [1, 2]. HF remarkably affects physical, physiological and social function and usual life activities of the people and the patients frequently get hospitalized when disease symptoms getting deteriorated [3]. On the other hand, due to frequent hospitalization and incurring high health care costs, it imposes a heavy burden on both the patient and the health care system [4].

Heart failure patients require to compliance with a complicated regime of self-care behaviors [2]. Thus, due to the outcomes of the disease and treatment, they will face change in their self-care needs [5]. It is highly imperative for such patients to observe self-care behaviors and one of the common goals of the medical interventions [6, 7].

Self-care behaviors involves the daily behaviors that individuals adopt to promote or recover their health and being well and help the disease prevention and management [6]. As defined by Orem, self-care is a regulated function learned in human based on the individuals' capability to do their self-care activities [8]. The studies suggest that poor self-care of the patients is of the most important determinant in poor prognosis. So that there is a direction relationship between the patients' general state deterioration and getting hospitalized [3].

Heart failure related self-care behaviors are highly specific and reflect the activities a patient with HF has for surviving, doing healthy performance and having a sense of wellbeing and with the goal to lower the risk of complications, deaths and keeping physiological stability ad covers the activities such as taking the prescribed medications, managing the symptoms, following the prescribed diet, observing liquid limitation, doing daily weighing record and maintaining weight, caring daily urination, avoiding drinking too much liquids and doing regular exercises [6, 9]. Despite the importance of self-care behaviors in such patients, they are challenging with some barriers in doing self-care and according to the results of studies, the majority of such patients have average and poor level of self-care behaviors [3, 5, 10].

Generally, self-care is a complicated behavior that may be affected by a combination of the physical and psychological factors [11]. One of the factors that can be considered as an influencing one in observing self-care behaviors is the role of mood status as the psychological factors.

There is evidence indicating that affections play an important role in association of psychological stress with physical health. Apart from the negative effects such as anger, depression and anxiety, there is a growing interest in the role of positive affect as a potential protective factor in the progression of chronic diseases [12]. Positive affect points to the mood status such as happiness, activity and joy. Positive affect is not merely opposed to negative affect since the individuals can concurrently experience both of them [13]. Positive affect exhibits how much a person is passionate in life and to what extent has a sense of being active and vigilance. High positive affect signals high energy, full concentration and enjoyable employment. While low positive affect indicates sadness and lethargy [14]. Positive affect can create benefits beyond people's sense of wellbeing for the individuals, so that it is associated with a prolonged life expectancy, lowered blood pressure, higher heart rate, and reduced risk of stroke, cardiovascular disease and hypertension [12]. Anhedonia is another factor that might be accompanied with worsened compliance with self-care in the patients with HF over time. Anhedonia, as one of the main characteristics of major depressive disorder, refers to the drop of interest or enjoying [14]. In fact, according to the common-sense model of self-regulation, the patient is an active agent who constantly evaluates internal and external stimuli to adjust their behaviors to achieve better adaptation to the disease and emotion is a part of self-regulation framework [15, 16].

Now regarding this matter that the studies have focused on the relationship between self-care behaviors and negative mood like depression and there is little evidence about the effects of positive affect on self-care behaviors and given the significance of identifying the factors influencing self-care behaviors in such patients, the present study has been conducted to outline the relationship between affective status and self-care behaviors in the patients with heart failure.

2. Materials and Methods

Study type and population

The current research was an analytical cross-sectional study to determine the relationship between positive affect and anhedonia and self-care behaviors in heart failure patients as the outpatients referring to a specialized heart clinic in Rasht, Iran. A total of 372 sample was calculated based on the research by Kessing et al. [14] with confidence interval of 95% and $r=0.17$. The study inclusion criteria were left ventricular ejection fraction ≤ 40 , age younger than 80 yrs., no history of hospitaliza-

tion one month before entering the study, lack of suffering from psychological and mental disorders based on asking the patient about the history of neuropsychiatric medication, and having consent to participate in the study.

Study questionnaire

The research tool comprised of 4 parts including: demographic, social and disease related factors, the European heart failure self-care behaviors scale, positive and negative affect, and anhedonia scale. The first part of the

Table 1. Demographic characteristics and factors related to disease of patients

Characteristics		Mean+SD/ No. (%)
Ejection fraction (%)		25.47+7.43
Heart failure duration (month)		33.50+69.73
Gender	Male	136(36.6)
	Female	236(63.4)
Marital status	Married	322(86.6)
	Single	14(3.8)
	Widow	36(9.7)
Educational level	Illiterate	185(49.7)
	Under the diploma	152(40.9)
	diploma	31(8.3)
Smoking	academia education	3(0.8)
	Yes	68(18.3)
Heart valvular disease	Yes	362(97.3)
History of Hyperlipidemia	Yes	129(34.7)
History of hypertension	Yes	208(55.9)
History of Diabetes Mellitus	Yes	137(36.8)
History of Cerebrovascular accident	Yes	2(0.5)
chronic obstructive pulmonary disease	Yes	53(14.2)
History of kidney disease	Yes	22(5.9)
Heart failure stages	I	98(26)
	II	197(53)
	III	77(21)

research questionnaire was extracted from patient's hospital record data.

The self-care behaviors in the patients with HF was assessed using a 9-point of the European Heart Failure Self-care Behaviors scale (EHFScB-9) was used for. The scoring is based on Likert scale (1 = fully agree to 5 = fully disagree) and the scores range from 9 to 45 and getting lower scores represents better self-care behaviors. The scientific validity of this scale was determined through content validity and polling the experts in cardiovascular nursing field. The reliability was confirmed based on Alpha-Cronbach=0.85 [7, 14].

Positive and Negative Affect Scales (PANAS) containing 20-items in two sub-scale was used to measure mood status. Each sub-scale consists of 10 items. The items have been rated on a 5-point Likert scale (1=very low to 5=very high). The general range of the scores for each subscale is 10-50. For positive affect, getting higher score is desirable and for negative affect, lower score is more desirable. This questionnaire was previously evaluated in terms of validity and reliability by Bakhshipour et al. and the results revealed that it has the required validity in Iranian population [17].

Anhedonia was measured using a subscale of Hospital Anxiety And Depression Scale (HADS) made up of 4 items based on a 4-point Likert scale (0=often to 3=not at all). The score range is 0-12 and acquiring higher score denotes more anhedonia [18]. The psychometric properties of HADS was previously evaluated by Kaviyani et al. in Iranian population [19].

Statistical analysis

The collected data was described using frequency distribution, mean, and Standard Deviation (SD). Student t-test, Analysis of variance, and Spearman correlation test was used for univariate association between variables. The multivariate linear regression model was used to evaluate the adjusted independent association between variables. Collinearity assumption was assessed using variance inflation factor. Data analysis was performed using SPSS v. 21 software.

3. Results

Table 1 shows the demographic, social, and disease related factors of the study participants. The Mean (SD) age of the patients was 61.49(11.12) years old (age range: 28-98). The results suggest that the mean score of the self-care behaviors in the patients with heart failure was

21.86 (SD=3.29), the mean score of positive affects was 17.19 (SD=3.35), the negative affect 15.2 (SD=3.03), and the mean score of anhedonia was 7.2 (SD=1.74).

In the univariate analyses, the Spearman correlation test revealed a strong and direct linear correlation between positive affect and negative affect ($P<0.001$, $r=0.574$), average and direct linear correlation between negative affect and self-care behaviors ($P<0.001$, $r=0.227$), week, inverse but significant correlation between negative affect and anhedonia ($P<0.001$, $r=-0.175$) and week, inverse and linear correlation between anhedonia and self-care behaviors ($P<0.009$, $r=-0.136$). Positive affect had no significant correlation with self-care behaviors ($r=0.080$, $P=0.130$).

Examining the relation between patient's demographic and clinical characteristics and main study variables from the stepwise multivariate regression analyses showed that only the patient's educational level ($P=0.009$), suffering from COPD ($P<0.001$) and the duration of heart failure ($P=0.019$) are independently associated with the patient's self-care behaviors ($R^2=8\%$). The individuals with lower educational level, patents suffering from COPD and the patients with longer duration of suffering heart failure have got higher score of self-care behaviors (Table 2).

Moreover, the patient's educational level ($P<0.001$), suffering COPD ($P<0.001$) and the duration of heart failure ($P=0.019$) are independently associated with positive affect ($R^2=24\%$). So that the individuals with higher educational level, those with COPD and the patients with longer duration of heart failure problem have higher score of positive affects (Table 2).

Only chronic obstructive pulmonary disease ($P<0.001$) and longer duration of heart failure ($P<0.001$) are independently associated with greater negative affect ($R^2=23\%$). Patients' educational attainment ($P<0.001$), lack of chronic obstructive pulmonary disease ($P=0.021$) and higher stages of heart failure ($P=0.028$) were independently associated with higher anhedonia ($R^2=6\%$) (Table 2).

The results of multivariate linear regression models for the relation between each of positive and negative affect and anhedonia with self-care behaviors adjusting for patients' demographic and clinical characteristics are shown in Table 3. Because of collinearity between positive affect, negative affect and anhedonia, these variables were entered into the separate model. The results showed that positive affects ($\beta=0.113$, standard er-

Table 2. Patients demographic and clinical determinants of self-care behaviors, positive and negative affect and anhedonia based on the stepwise multivariate linear regression models

	Variables	Coefficient	Standard Error	Standardized Coefficient (Beta)	t	P	Adjusted R ²
Self-care behaviors*	Constant	25.978	1.060		24.509	<0.001	0.08
	COPD	-1.770	0.495	-0.188	-3.572	<0.001	
	Education	-0.638	0.245	-0.131	-2.608	0.009	
	Heart failure duration	0.006	0.002	0.124	2.361	0.019	
Positive affect*	Constant	19.938	0.984		20.253	<0.001	0.24
	COPD	-2.924	0.460	-0.305	-6.354	<0.001	
	Education	1.533	0.227	0.309	6.746	<0.001	
	Heart failure duration	0.007	0.002	0.145	3.024	0.003	
Negative affect*	Constant	21.139	0.808		26.164	<0.001	0.23
	COPD	-3.353	0.416	-0.386	-8.067	<0.001	
	Heart failure duration	0.009	0.002	0.201	4.202	<0.001	
Anhedonia*	Constant	4.674	0.626		7.468	<0.001	0.06
	Education	0.546	0.130	0.212	4.191	<0.001	
	COPD	0.589	0.255	0.118	2.313	0.021	
	Heart failure class	0.287	0.130	0.113	2.208	0.028	



COPD; Chronic obstructive pulmonary disease, Education variable entered into the model with codes of 1 to 4. * Dependent variable in the regression model.

Table 3. Multiple linear regression models of self-care behaviors based on each positive and negative affects and anhedonia adjusted for patients demographic and clinical characteristics

	Variables	Coefficient	Standard error	Standardized Coefficient (Beta)	t	P	Adjusted R ²
Model 1*	Constant	23.721	1.546		15.346	<0.001	0.08
	Positive affects	0.113	0.056	0.115	2.006	0.046	
	Education	-0.811	0.259	-0.166	-3.127	0.002	
	COPD	-1.439	0.522	-0.153	-2.756	0.006	
	Heart failure duration	0.005	0.003	0.107	2.018	0.044	
Model 2*#	Constant	17.785	0.894		19.883	<0.001	0.11
	Negative affects	0.341	0.053	0.315	6.401	<0.001	
Model 3*	Constant	26.560	1.189		22.345	<0.001	0.08
	Anhedonia	-0.105	0.097	-0.056	-1.081	0.280	
	COPD	-1.722	0.497	-0.183	-3.463	0.001	
	Heart failure duration	0.006	0.002	0.122	2.330	0.020	
	Education	-0.582	0.250	-0.119	-2.329	0.020	



COPD; chronic obstructive pulmonary disease, Education variable entered into the model with codes of 1 to 4, * Model 1, 2 and 3 respectively included positive affect, negative affect and anhedonia, along with patients' demographic and clinical characteristics. # COPD and Heart failure duration variables were not significant and did not remain in the stepwise regression model.

ror (SE) = .056, $P=0.046$) and negative affect ($\beta=0.341$, $SE=0.053$, $P<0.001$) were significantly related with self-care behaviors, but anhedonia did not have any significant relation with self-care behaviors after adjusting for patients' demographic and clinical characteristics ($\beta=-0.105$, $SE=0.097$, $P=0.280$) (Table 3).

4. Discussion

Concerning the variety of the factors influencing compliance with self-care behaviors, especially the psychological factors, studying in this area is highly significant. Recently, some of the researchers have studied the psychological disorders following medical disorders. The current study has addressed the relationship between mood status and self-care behaviors in the patients with heart failure.

In this study, the mean score of self-care behaviors in patients was 21.86, which is lower than the study of Moaddab et al. [20], indicating more desirable self-care behaviors in current study. It seems that the reason for this is the difference in the duration of heart failure in the samples of the two studies. Because according to the results of the current study, the duration of heart failure is one of the predictors of self-care behaviors in heart failure patients.

According to the current study results, the individuals with lower educational level have got higher score of self-care behaviors, while this finding is inconsistent with the results gained by Mansouri et al. [21]. Due to lack of sufficient knowledge about the disease outcome and the manner of self-care, it seems that probably the individuals with lower education are more trusting to the medical staff providing training and so they have more compliance with self-care behaviors. While perhaps, in patients with higher educational level, high self-confidence prevents them from accepting the provided training. On the one hand, it may influence such individuals to receive the relevant training in self-care behaviors [22].

Besides, the present study indicates that the individuals with chronic obstructive pulmonary disease and ventricular disorders and with longer duration of heart failure have got higher mean score of self-care, which is consistent with the results achieved in some studies [3, 5]. Maybe the results in this study can be interpreted that suffering from underlying diseases itself can make the patient feel exposed to higher risk and as a result, they will stick to some tips for keeping healthy to avoid the risk. In fact, the simultaneous diseases' occurrence can lead to

the patient's treatment process getting complicated, the issue which can increase the patient's condition sensitivity and subsequently, change the conditions in favor of better compliance.

As the present study findings indicate, the individuals with higher education, the ones with chronic obstructive pulmonary disease and the patients with longer heart failure problem have got higher score of positive affects. The results are in accord with the results of two studies done by Pelle et al. (2009) and Hu et al. (2008) [23, 24]. It seems that higher education can be effective in developing critical thinking skills and affect, and the ability of the individuals to participate in decision making and health care programs [25].

Finally, the present study results reveal significant relationship between negative affect with self-care behaviors, which is in line with the study by Kessing et al. (2014) [14]. Also in a longitudinal study, Goodman et al., found strong correlation between negative affect and self-care behaviors. So that the individuals with negative affect exhibited lower self-care behaviors [11]. Besides, some studies reported the higher occurrence of anhedonia and depression in the patients with heart failure with negative affect status [26, 27]. This issue can refer to the critical role of mood status in the patients' compliance with the prescribed behaviors. In a review study conducted to investigate anxiety and depression in the patients with heart failure, the results have discovered that probably through both physiological and behavioral mechanism, depression can affect the development of heart failure and accompany with unfavorable outcomes like dropped compliance with the treatment, poor performance, increased hospitalization and high death rate [4]. In fact, reduced depression symptoms can facilitate the achievement of the behavioral interventions goals for long-term disease management [28]. The results of this study recommended that in addition to the patient's physical condition, the rehabilitation program of the heart failure patients, should incorporate their psychological and mental status and psychosocial support has to be included in the therapeutic goals.

One of the most significant uncontrollable limitations of current research is that the participants' response to the scale has been in the form of self-report, there has been the possibility of error in remembering self-care behaviors.

5. Conclusion

The result of current study indicates that patients' mood statue including positive and negative affect are significant contributors of self-care behaviors. It seems that in patients with heart failure, in addition to following the patient's physical condition and compliance with recommended behaviors, their psychological state should be considered in the rehabilitation program and psychosocial support should be considered as an effective step in improving the self-care behaviors.

Ethical Considerations

Compliance with ethical guidelines

The present study is a part of an approved proposal supported by the Ethics Committee of Guilan University of Medical Sciences Research Department (Code: IR.GUMS.REC.1394.495).

Funding

This research was supported as a research project (No. 94120419), Funded by the Research Vice-chancellorship of Guilan University of Medical Sciences, Guilan, Iran.

Authors' contributions

Conceptualization and supervision: Leila Rouhi Balasi and Arsaan Salari; Methodology: Leila Rouhi Balasi, Asieh Ashouri; Investigation, writing – original draft, and writing – review & editing: All authors; Data collection: Zahra Ahmadnia and Azam Nourisaed; Data analysis: Asieh Ashouri; Funding acquisition and resources: Leila Rouhi Balasi and arsalan salari.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgements

All authors would like to sincerely appreciate the honorable Vice-president of the Research and Technology Department of Guilan University of Medical Sciences and the Cardiovascular Diseases Research Center of Guilan University of Medical Sciences and all the patients helping us in this respect.

References

- [1] Davis KK, Mintzer M, Himmelfarb CRD, Hayat MJ, Rotman S, Allen J. Targeted intervention improves knowledge but not self-care or readmissions in heart failure patients with mild cognitive impairment. *Eur J Heart Fail.* 2012; 14(9):1041-9. [DOI:10.1093/eurjhf/hfs096] [PMID]
- [2] Mueller-Tasch T, Loewe B, Lossnitzer N, Frankenstein L, Taeger T, Haass M, et al. Anxiety and self-care behaviour in patients with chronic systolic heart failure: A multivariate model. *EJCN.* 2018; 17(2):170-7. [DOI:10.1177/1474515117722255] [PMID]
- [3] Daryasari GA, Karkezloo NV, Mohammadnejad E, Vosoghi MN, Kagi MA. Study of the self-care agency in patients with heart failure. *Iran J Crit Care Nurs.* 2012; 4(8):203-8. https://jccnursing.com/browse.php?a_id=205&sid=1&slc_lang=fa&fxt=1
- [4] Celano CM, Villegas AC, Albanese AM, Gaggin HK, Huffman JC. Depression and anxiety in heart failure: A Review. *Harv Rev Psychiatry.* 2018; 26(4):175-84. [DOI:10.1097/HRP.000000000000162] [PMID] [PMCID]
- [5] Shojaei F, Asemi S, Yarandi AN, Hosseini F. [Self-care behaviors in patients with heart failure (Persian)]. *Payesh.* 2009; 8(4): 361-9. <http://payeshjournal.ir/article-1-598-en.html>
- [6] Graven LJ, Grant JS. Social support and self-care behaviors in individuals with heart failure: An integrative review. *Int J Nurs Stud.* 2014; 51(2):320-33. [DOI:10.1016/j.ijnurstu.2013.06.013] [PMID]
- [7] Lee CS, Lyons KS, Gelow JM, Mudd JO, Hiatt SO, Nguyen T, et al. Validity and reliability of the European Heart Failure Self-care Behavior Scale among adults from the United States with symptomatic heart failure. *EJCN.* 2013; 12(2):214-8. [DOI:10.1177/1474515112469316] [PMID] [PMCID]
- [8] Shojafard J, Nadrian H, Moghadam MB, Mahmudabad SM, Sanati H, Shahi MA. [Effects of an educational program on self-care behaviors and its perceived benefits and barriers in patients with Heart Failure in Tehran (Persian)]. *Payavard.* 2009; 2(4):43-55. https://payavard.tums.ac.ir/browse.php?a_id=133&sid=1&slc_lang=en
- [9] Jaarsma T, Årestedt KF, Mårtensson J, Dracup K, Strömberg A. The European Heart Failure Self-care Behaviour scale revised into a nine-item scale (EHFScB-9): A reliable and valid international instrument. *Eur J Heart Fail.* 2009; 11(1):99-105. [DOI:10.1093/eurjhf/hfn007] [PMID]
- [10] Momeni M, Khoshtarash M, Ghanbari Khanghah A, Salehzadeh A, Rahmatpour P. [Self-care behaviors and related factors in patients with heart failure referring to medical & educational center of heart in Rasht (Persian)]. *J Holist Nurs Midwifery.* 2013; 23(1):22-9. https://hnmj.gums.ac.ir/browse.php?a_code=A-10-243-13&sid=1&slc_lang=en
- [11] Goodman H, Firouzi A, Banya W, Lau-Walker M, Cowie MR. Illness perception, self-care behaviour and quality of life of heart failure patients: A longitudinal questionnaire survey. *Int J Nurs Stud.* 2013; 50(7):945-53. [DOI:10.1016/j.ijnurstu.2012.11.007] [PMID]
- [12] Brouwers C, Mommersteeg PM, Nyklíček I, Pelle AJ, Westerhuis BL, Szabó BM, et al. Positive affect dimensions and their association with inflammatory biomarkers in patients with chronic heart failure. *Biol Psychol.* 2013; 92(2):220-6. [DOI:10.1016/j.biopsycho.2012.10.002] [PMID]

- [13] Denollet J, Pedersen S, Daemen J, De Jaegere P, Serruys P, Van Domburg R. Reduced positive affect (anhedonia) predicts major clinical events following implantation of coronary-artery stents. *J Intern Med.* 2008; 263(2):203-11. [DOI:10.1111/j.1365-2796.2007.01870.x] [PMID]
- [14] Kessing D, Pelle AJ, Kupper N, Szabó BM, Denollet J. Positive affect, anhedonia, and compliance with self-care in patients with chronic heart failure. *J Psychosom Res.* 2014; 77(4):296-301. [DOI:10.1016/j.jpsychores.2014.08.007] [PMID]
- [15] Karademas EC, Barouxi E, Mavroeides G. Positive and negative affect and well-being in cardiac patients and their spouses: the mediating role of illness representations. *Psychol Health.* 2019; 34(3):289-305. [DOI:10.1080/08870446.2018.1525490] [PMID]
- [16] Benzo RP, Abascal-Bolado B, Dulohery MM. Self-management and quality of life in chronic obstructive pulmonary disease (COPD): The mediating effects of positive affect. *Patient Educ Couns.* 2016; 99(4):617-23. [DOI:10.1016/j.pec.2015.10.031] [PMID] [PMCID]
- [17] Bakhshpor A, Dejkam M. [Confirmatory factor analysis of Positive and Negative Affect scale (Persian)]. *J Psychol.* 2005; 3(9):351-65. <https://www.sid.ir/paper/54494/en>
- [18] Woda A, Belknap RA, Haglund K, Sebern M, Lawrence A. Factors influencing self-care behaviors of African Americans with heart failure: A photovoice project. *J Acute Crit Care.* 2015; 44(1):33-8. [DOI:10.1016/j.hrtlng.2014.09.001] [PMID]
- [19] Kaviani H, Seyfourian H, Sharifi V, Ebrahimkhani N. Reliability and validity of anxiety and depression hospital scales (HADS): Iranian patients with anxiety and depression disorders. *Tehran Univ Med J.* 2009; 67(5):379-85. <https://www.cabdirect.org/cabdirect/abstract/20093298427>
- [20] Moaddab F, Ghanbari A, Taheri-Ezbarami Z, Savar Rakhsh A, Mahdavi Roshan M, Jafari M. [Designing a home care model for patients with heart failure: A mixed method study (Persian)]. *J Maz Univ Med.* 2022; 32(211):49-63. <http://jmums.mazums.ac.ir/article-1-18143-en.html>
- [21] MansouriKh, Hasavari F, Sedghi Sabet M, Kazemnejad-Leili E, Gholipour M. [Self-care status and its related factors in patients with heart failure (Persian)]. *J Health Care Mark.* 2018; 19(4):232-41. <https://www.sid.ir/paper/251994/en>
- [22] Fatemeh M, Atefeh G, Arsalan S, Ehsan K, Mitra SS, Ez-zat P. [Study status of self-care behaviors and gender differences in patients with heart failure (Persian)]. *Payavard Salamat.* 2014; 8(3):220-34. <https://web.p.ebscohost.com/abstract?direct=>
- [23] Hu J, Gruber KJ. Positive and negative affect and health functioning indicators among older adults with chronic illnesses. *Issues Ment Health Nurs.* 2008; 29(8):895-911. [DOI:10.1080/01612840802182938] [PMID]
- [24] Pelle AJ, Pedersen SS, Szabó BM, Denollet J. Beyond Type D personality: reduced positive affect (anhedonia) predicts impaired health status in chronic heart failure. *Qual Life Res.* 2009; 18(6):689-98. [DOI:10.1007/s11136-009-9485-z] [PMID] [PMCID]
- [25] Versteeg H, Pedersen SS, Erdman RA, van Nierop JW, de Jaegere P, van Domburg RT. Negative and positive affect are independently associated with patient-reported health status following percutaneous coronary intervention. *Qual Life Res.* 2009; 18(8):953-60. [DOI:10.1007/s11136-009-9511-1] [PMID] [PMCID]
- [26] Albert NM, Zeller R. Depressed patients understand heart failure prognosis but not how to control it. *Heart Lung.* 2009; 38(5):382-91. [DOI:10.1016/j.hrtlng.2008.10.007] [PMID]
- [27] Hallas CN, Wray J, Andreou P, Banner NR. Depression and perceptions about heart failure predict quality of life in patients with advanced heart failure. *Heart lung.* 2011; 40(2):111-21. [DOI:10.1016/j.hrtlng.2009.12.008] [PMID]
- [28] Shen BJ, Maeda U. Psychosocial predictors of self-reported medical adherence in patients with heart failure over 6 months: an examination of the influences of depression, self-efficacy, social support, and their changes. *Ann Behav Med.* 2018; 52(7):613-9 [DOI:10.1093/abm/kay003] [PMID]