Predictive influence of disease knowledge and hope on self-care behavior among adults with heart failure

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Abstract:

BACKGROUND: Self-care, disease knowledge, and hope are critical concepts in health-related studies. Therefore, all three are considered solutions for controlling heart failure (HF) and reducing its complications. This study aimed to identify the predictive influence of disease knowledge and hope on self-care behavior among adults with HF.

MATERIALS AND METHODS: This descriptive-analytical and cross-sectional study examined the data of 113 HF patients referred to the Imam Reza Clinic in Shiraz, Iran, in 2021. This study used HF patients' self-care instruments based on Orem's self-care theory, the HF Knowledge Scale-Persian version, and the Heart Hope Index-Persian version. The data were analyzed using the general linear model (GLM) and Pearson's correlation coefficients.

RESULTS: Of the 113 HF patients, 54.90% ($n = 62$) were male, and 45.10% ($n = 51$) were female. The analysis of the Pearson correlation coefficient indicated the presence of a positive and significant correlation between "self-care and hope" ($r = 0.532$, $P = 0.0001$), "HF knowledge and hope" ($r = 0.432$, $P = 0.0001$), and "self-care and HF knowledge" ($r = 0.410$, $P = 0.0001$). GLM showed that HF knowledge symptoms ($P = 0.0001$), hope ($P = 0.0001$), unemployed patients ($P = 0.042$), and housewife patients ($P = 0.0001$) predicted self-care behavior of HF patients.

CONCLUSION: Considering the positive and significant correlation between "self-care and HF knowledge," "self-care and hope," and "HF knowledge and hope," it seems necessary for doctors and nurses should pay attention to providing educational programs to increase HF knowledge to improve self-care and hope in HF patients.

Keywords:
Heart failure, hope, knowledge, self-care

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Introduction

Heart failure (HF), which is associated with increasing mortality and morbidity rates among patients, has been recognized as a global health priority.[1] It affects over 26 million people worldwide[2] and studies predict that the number of HF patients will increase by 46% from 2012 to 2030, affecting an additional 8 million people.[3]

HF patients experience various complications, including fatigue, shortness of breath, swelling in legs and ankles, challenges with walking and climbing, difficulty sleeping, dietary changes, decreased social interactions, anxiety, depression, sadness, and fear of mortality.[4] Cardiovascular disease (CVD) has placed a significant financial burden on the healthcare system.[5] The economic healthcare costs for HF patients in the United States are estimated to be around $31 billion. As a result, reducing readmissions has been

a priority over the past decade. However, only a few interventions have made significant progress toward achieving this objective.[6] A study showed a negative and significant relationship between readmission and self-care.[7] The results of the systematic review indicate that HF patients have inadequate self-care.[8]

Self-care is crucial for controlling HF,[9] and includes monitoring fluid and salt intake, following a diet and medication, daily weighing, checking ankle swelling and physical activity, and using the system for medicines remembering.[10] Healthy food patterns, as one of the self-care behaviors, lead to providing care for CVD.[11] Factors like marital status, education level, and monthly income were found to be effective in promoting self-care, whereas age was identified as a factor that negatively impacted self-care.[9] Healthy behaviors in CVD can improve outcomes in patients.[12] Increasing self-care leads to long-term disease management, improving the quality of life, and reducing readmission and mortality rates.[13] Poor self-care practices can lead to physical symptoms exacerbation such as dyspnea.[14]

Orem's self-care model suggests that individuals act as their self-care agents through knowledge, attitude, and skills expressed in their actions. A healthy individual maintains a balance between self-care and self-care agents, while an imbalance requires dependent care.[15] Studies have shown the effectiveness of this model in managing disease-related symptoms and complications,[16,17] and patient education considered as a component of management programs for self-care improves outcomes in HF patients.[18] Training patients in this field is effective in reducing readmission and mortality.[9] Providing accurate information to HF patients is crucial and educational interventions can effectively fulfill this role.[19]

Healthcare providers consider various factors, including maintaining hope, which is useful for treating heart patients.[20] Hope as a positive feeling predicts the future,[21] which leads to a person's adaptation to disease.[22] Hope plays an essential role in adaptation to manage stress and control heart disease.[21] As a therapeutic variable, hope improves safety, general well-being, and quality of life.[23] A study found that the frequency of feeling hopeful was associated with mortality rates in homebound elders.[24] Factors such as educational level, marital status, socioeconomic status, and spiritual well-being are significantly related to hope.[25]

Paying attention to chronic diseases is of great importance and will significantly impact reducing health costs and improving the health of society. Considering the importance of self-care, HF knowledge, and hope in HF

patients simultaneously, as well as nurses with a holistic view of patients, it is important to examine self-care, understanding of disease, and hope in these patients, and nurses' awareness of their correlations. Based on the available literature, no study has investigated the correlations between these three variables. If every variable of self-care, HF knowledge, and hope has been investigated in separate studies, the relationship between these variables has not been investigated, and validated tools specific to patients with HF have not been used in Iranian society. This study aimed to examine the effective factors such as disease knowledge and hope on self-care behavior among HF patients by using psychometric tools for self-care, disease knowledge, and hope in HF patients according to the culture of Iranian society.

Materials and Methods

Study design and setting
This descriptive-analytical and cross-sectional study aimed to explore the effective factors on self-care behavior in HF patients referred to the Imam Reza Clinic in Shiraz, Iran, in 2021. The clinic is known for having experienced and internationally renowned professors from the Shiraz University of Medical Sciences and serves around 600,000 patients from all over the country, making it unique in southern Iran.

Study participants and sampling
In 2021, all HF patients referred to the Imam Reza Clinic in Shiraz were included in the study population. The sample size was determined as 113 individuals based on a similar study with $\alpha = 0.05$, $\beta = 0.1$, and $r = 0.3$, and the study samples consisted of HF patients referred to the same clinic.[9]

$$n \geq \left[\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{\frac{1}{2} log \delta \frac{1+r}{1-r}} \right]^2 + 3$$

The study included patients who were diagnosed with HF by a cardiologist, receiving treatment and having medical records at the Imam Reza Clinic, having a conscious willingness to participate, and not having any known psychological disorders. Exiting the study was based on an unwillingness to continue at any study stage.

Data collection and tools
The researcher obtained the necessary permits for sampling from the Vice Chancellor for Research and Technology. Nonprobability available sampling method was used to select participants who met the study criteria and consented to participate. Patients completed questionnaires both physically and

electronically. Electronic questionnaires were used due to COVID-19 and some patients' reluctance to use physical forms. Avalform software was used to create online questionnaires that patients could answer through a shared link. The researcher obtained patients' phone numbers and sent the questionnaire links via SMS to eligible participants or their family members if illiterate.

In this study, three questionnaires were utilized for data collection:

Heart failure patients' self-care instrument based on Orem's self-care theory

This instrument was introduced in Iran in 2016. The scoring scale was based on a five-point Likert scale ranging from one (never) to five (always). The overall level of self-care was classified as 55-110 (poor self-care), 111-165 (moderate self-care), 166-220 (good self-care), and 221-275 (very good self-care).[26] The questionnaire has good content and face validity. The construct validity is also confirmed with $X2 = 0.000$, RMSEA = 0.000, CFI = 1, and TFI = 1. The reliability is supported by a high Cronbach's alpha coefficient of 0.953 and a correlation coefficient of 0.976.[26]

Heart failure knowledge scale-Persian version

This questionnaire was developed based on the Dutch HF Knowledge Scale and psychometrically evaluated by Van Der Wal *et al*. It consists of three dimensions with 15 questions. HF knowledge symptoms (questions 1, 2, 5, 8, and 14), general HF knowledge (questions 6, 7, 9, and 11), and HF knowledge treatment (questions 3, 4, 10, 12, 13, and 15). Each question has three scores ranging from 0 (no knowledge) to 15 (desirable knowledge). The overall score is obtained by summing up all the questions.[27] The validation confirmed content and face validity, and significant differences ($t = -7.14$, *P* = 0.0001) were observed between two groups of HF patients who obtained different scores for construct validity. Cronbach's alpha coefficient was reported at 0.62 to confirm reliability.[27] Criterion validity showed a significant correlation between the Persian version with the "Minnesota Living with HF Questionnaire" ($r = 0.175$) and the "Behavior Care-Self HF European Questionnaire" ($r = 0.83$). An internal correlation with a Cronbach's alpha coefficient of 0.843 was confirmed, and test-retest results to confirm the Intraclass Correlation Coefficient showed a reliability coefficient of 0.886.[28]

Herth Hope Index-Persian version

The questionnaire is a brief version of the Herth Hope Index, designed to assess hope in heart disease patients. It consists of 11 items and uses a four-point Likert scale from 1 (completely disagree) to 4 (completely agree). A score between 11 and 44 is considered a general score.[29] This Index was validated in Persian for heart disease patients. It was found to have high criterion validity, with significant correlations to the "Herth Hope Index" ($r = 0.92$), "Existential Well-Being Scale" ($r = 0.84$), and "Nowotny Hope Scale" ($r = 0.81$). Divergent validity with the Hopelessness Scale was -0.73. The reliability was confirmed with a Cronbach's alpha coefficient of 0.97 and a reliability coefficient of 0.91 in test–retest.[29] Construct validity with good estimates reported based on GFI = 0.929, CFI = 0.938, NFI = 0.903, and IFI = 0.918. The internal consistency was confirmed with a Cronbach's alpha coefficient of 0.856.[30]

The data were analyzed using IBM SPSS Statistics 25 software. Descriptive statistics like frequency, percentage, mean, and standard deviation (SD) were used. Pearson's correlation coefficient was used to measure variable relationships. The independent samples *t*-test and one-way analysis of variance were used to check the significant relationship of variables with self-care. The general linear model (GLM) was conducted to determine predictive factors in the self-care of HF patients. All tests were conducted at a significance level of 0.05 with a 95% confidence interval.

Ethical consideration

This study was conducted based on a research proposal approved by the Vice Chancellor for Research and Technology of Shiraz University of Medical Sciences with the approval ID 21206. It was also approved by the Research Ethics Committee of Shiraz University of Medical Sciences with the approval ID IR.SUMS. REC.1399.1019 and approval date November 25, 2020. All methods were performed according to relevant guidelines and regulations, and written informed consent was obtained from all patients. The participants were fully informed about the study objectives, confidentiality of information, and voluntary participation.

Results

This study analyzed 113 HF patients at Imam Reza Clinic in Shiraz. Results showed that 54.90% (*n* = 62) were male and 45.10% (*n* = 51) were female, with an average age of 57.27 ± 8.40 years, and 79.65% (*n* = 90) were educated up to the bachelor level. The HF duration ranged from 1 to 20 years, with an average of 6.59 ± 4.26 years. Other demographic characteristics are reported [Table 1].

The results of the study showed that 15.04% (*n* = 17) of the HF patients had very good self-care, 77% (*n* = 87) had good self-care, and 7.96% (*n* = 9) had moderate self-care. None of the participants reported poor self-care. To further investigate the participants' characteristics, the mean and SD of the scores of self-care, HF knowledge, and hope are given [Table 2].

Table 1: Demographic characteristics of the study participants (*n*=113)

Demographic characteristics	Categories	*n* (%)
Age	31-53	39 (34.51)
	54-76	74 (65.49)
Sex	Male	62 (54.90)
	Female	51 (45.10)
Marital status	Married	92 (81.40)
	Single	5 (4.40)
	Widow	11 (9.80)
	Divorced	5 (4.40)
Educational status	Illiterate	23 (20.35)
	≤ High school	76 (67.26)
	≥ University	14 (12.39)
Residence	City	73 (64.60)
	Village	40 (35.40)
Employment status	Unemployed	11 (9.73)
	Housewife	44 (38.94)
	Employed	58 (51.33)
HF duration	1-10	94 (83.18)
	11-20	19 (16.82)
Having other diseases	Yes	43 (38.10)
	No	70 (61.90)
Access to information resource	No resource	13 (11.50)
	Doctors and Nurses	74 (65.50)
	TV and Radio	51 (45.10)
	Family and Friends	23 (20.40)
	Internet	12 (10.60)
	HF Patients	3 (2.70)
	Journals and Books	2 (1.80)
	Scientific articles	0 (0)
	Educational classes	0 (0)

HF=Heart failure

Table 2: Descriptive analysis of self-care behavior, heart failure knowledge, and hope

Characteristics (Dimensions/No. of items)	Actual range	Potential range	M±SD
Self-care (55)	146-261	55-275	198.57±23.75
Self-care requisite (45)	131-213	45-225	174.35±18.45
Self-care agency (8)	10-40	8-40	19.49±5.93
Self-care agent (2)	2-10	2-10	4.73±1.94
HF knowledge (15)	1-13	0-15	4.44±2.53
Symptoms knowledge (5)	0-4	0-5	0.95±0.99
General knowledge (4)	0-4	0-4	1.34±0.97
Treatment knowledge (6)	0-6	0-6	2.16±1.23
Hope (11)	23-44	11-44	32.42±4.28

HF=Heart failure

The Pearson correlation between the demographic, self-care, HF knowledge, and hope was measured. Significant and positive correlations were observed between "age and HF duration" (r = 0.515, *P* = 0.0001), "age and self-care" (r = 0.514, *P* = 0.0001), "self-care and HF knowledge" (r = 0.410, *P* = 0.0001), "self-care and hope" (r = 0.532, *P* = 0.0001, "HF knowledge and hope" (r = 0.432, *P* = 0.0001) [Table 3].

A descriptive analysis of demographic characteristics, HF knowledge, and hope with self-care behavior reported. Finally, age, sex, employment status, access to information resources, knowledge of symptoms and treatment, and hope were entered as candidate variables into GLM [Table 4]. The results of regression analysis showed that HF knowledge symptoms (*P* = 0.0001), hope (*P* = 0.0001), and employment status (*P* = 0.042, *P* = 0.0001) predicted the self-care behavior of HF patients. The mean scores of self-care in unemployed and housewife patients were 46.39 (*P* = 0.042) and 34.16 (*P* = 0.0001) units higher than those of employed patients, respectively [Table 5].

Discussion

Over 50% of HF patients demonstrated good self-care. Considering that some of the self-care requisite questions were related to how to behave in adverse weather, using a face mask, and observing health precautions, These results suggest that the COVID-19 pandemic did not negatively impact self-care in these patients, aligning with previous studies in Ethiopia.[31] Meanwhile, in studies conducted in Egypt,[32] HF patients showed low levels of self-care, with 67.50% reporting an average level in a study by Asadi *et al*. conducted in Iran, possibly due to either inadequate self-care or the use of a different scale for measurement.[33] This study showed that HF knowledge in patients is weak, which is consistent with the results of studies conducted on heart patients in Egypt.[32] However, in a study conducted in Singapore, the HF knowledge of patients was above a sufficient level.[34]

Age was found to be significantly correlated with self-care and self-care requisite in this study, and a study found that the relationship between self-care and health-related quality of life differs between younger and older HF patients.[35] Age appears to enhance self-care experiences among patients with chronic diseases. The results of this study showed that employment status predicted self-care behavior among HF patients. In fact, unemployed and housewife patients exhibited better self-care than employed patients. However, another study involving samples of HF patients indicated that there was no significant correlation between self-care and employment status.[36]

The study found a significant positive correlation between self-care and HF knowledge, consistent with previous results suggesting that HF knowledge can enhance self-care performance in HF patients.[37] This study found that "self-care dimensions and HF knowledge" had a positive and significant correlation, with a self-care agent, agency, and requisite showing the highest to lowest correlations. Among "self-care and HF knowledge dimensions," HF knowledge symptoms

Table 3: Correlation among demographic characteristics, self-care behavior, heart failure knowledge, and hope

	Age	HF duration	Self-care	Self-care requisite	Self-care agency	Self-care agent	HF knowledge	Symptoms knowledge	General knowledge	Treatment knowledge	Hope
Age	1										
HF duration	0.515*	1									
	0.000										
Self-care	0.514*	0.096****	1								
	0.000	0.542									
Self-care requisite	0.643*	0.152****	0.981*	1							
	0.000	0.174	0.000								
Self-care agency	0.234****	-0.132****	0.808*	0.667*	1						
	0.123	0.243	0.000	0.000							
Self-care agent	0.134****	-0.124****	0.663*	0.471*	0.901*	1					
	0.264	0.287	0.000	0.000	0.000						
HF knowledge	-0.047****	-0.092****	0.410*	0.269**	0.565*	0.574*	1				
	0.744	0.452	0.000	0.008	0.000	0.000					
Symptoms knowledge	0.199****	0.051****	0.528*	0.422*	0.624*	0.529*	0.767*	1			
	0.153	0.632	0.000	0.000	0.000	0.000	0.000				
General knowledge	-0.127****	-0.033****	0.184****	0.091****	0.293**	0.323**	0.731*	0.354**	1		
	0.875	0.923	0.153	0.434	0.009	0.003	0.000	0.001			
Treatment knowledge	-0.243****	-0.159****	0.329**	0.203****	0.455*	0.456*	0.866*	0.539*	0.412*	1	
	0.065	0.098	0.005	0.077	0.000	0.000	0.000	0.000	0.000		
Hope	0.161****	0.064****	0.532*	0.423*	0.534*	0.610*	0.432*	0.373*	0.224***	0.349**	1
	0.384	0.542	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.001	

HF=Heart failure. *$P<0.0001$, **$P<0.01$, ***$P<0.05$, ****$P>0.05$

and HF knowledge treatment had the highest and lowest correlations, respectively. Based on the GLM, HF knowledge symptoms predicted the self-care behavior of HF patients ($P = 0.0001$). A previous study has also suggested that better knowledge can improve self-care.[18]

However, the results of the present study showed a positive and significant correlation between "self-care and HF knowledge". Other study results in line with the current study have indicated that disease knowledge is effective in the self-care performance of HF patients.[38] The study found a correlation between most "self-care dimensions and HF knowledge dimensions," except for "self-care requisite with HF knowledge in general" and "self-care requisite with HF knowledge treatment." A previous study confirmed a relationship between self-care and knowledge in heart disease patients. This study suggests that self-care and knowledge are important for HF patients, and patient education can effectively improve both.[39]

The regression analysis results reported that hope predicted the self-care behavior of HF patients. One study found that hope in HF patients was average, while another study conducted by researchers reported hope levels to be low among HF patients.[40] A study showed that patients with valvular heart disorders had high levels of hope.[38] In another study, positive correlation was found between "self-care and hope."[41] The study examined the correlation between "self-care dimensions

and hope," revealing a positive correlation from highest to lowest between self-care agents, agencies, and requisites. In the qualitative study, a strong motivation for self-care adherence was a sense of optimism and hope.[41]

Hope can motivate patients to achieve treatment goals, leading to effective disease management and self-care.[42] Hope is linked to reduced stress, better mental health, and increased physical strength in those with heart disorders. Those who strive to create more strategies to reach their goals will be more motivated to achieve positive outcomes despite their illness.[38] This study showed a positive correlation between "HF knowledge and hope." In a study conducted by Batvandi and Elahi, the results indicated no significant relationship between the two variables of knowledge and hope in HF patients.[40] Increasing disease knowledge in nonmalignant chronic patients reduced their hospitalization rate, surgery rate, and medical costs. It also shifts patients from a passive and negative attitude toward treatment and disease to a more positive and proactive attitude toward prevention and treatment. Additionally, this increased knowledge significantly boosts patients' hope.[43]

The study found a significant correlation between "HF knowledge dimensions and hope," particularly in HF symptoms and treatment. This suggests that increasing patient awareness of HF symptoms and treatment can help them better manage their condition and ultimately foster greater hope.

Table 4: Descriptive analysis of demographic characteristics, heart failure knowledge, and hope with self-care behavior of the study participants

Characteristics	M±SD	Value	P
Age	57.27±8.40	0.514*	0.000
Sex			
Male	194.02±23.70	-2.29**	0.024
Female	204.12±22.83		
Marital status			
Married	195.88±21.80	2.38***	0.073
Single	207.20±33.33		
Widow	208.82±24.62		
Divorced	217±37.17		
Educational status			
Illiterate	205.56±26.44	1.27***	0.285
≤ High school	196.66±23.52		
≥ University	198.12±14.93		
Residence			
City	199.03±24.54	0.272**	0.786
Village	197.75±22.51		
Employment status			
Unemployed	213.10±38.37	5.06***	0.008
Housewife	202.98±20.68		
Employed	192.48±20.83		
HF duration			
1-10	197.76±23.15	-0.782**	0.436
11-20	202.35±26.65		
Having other diseases			
Yes	198.13±23.28	-0.254**	0.800
No	199.30±24.75		
Access to information resource			
Yes	182.46±21.13	2.67**	0.009
No	200.67±23.53		
Symptoms knowledge	198.57±23.75	0.528*	0.000
General knowledge	198.57±23.75	0.184*	0.153
Treatment knowledge	198.57±23.75	0.329*	0.005
Hope	198.57±23.75	0.532*	0.000

M=Mean, SD=Standard deviation. *r, **t-test, ***F

The study revealed a significant correlation between self-care, HF knowledge, and hope. HF patients with lower health literacy had less knowledge of HF and reported performing less self-care.[44] The results of studies have shown that those with good HF knowledge adhered to self-care recommendations more than those with poor knowledge.[45] Knowledge is the power that enables self-care, which should be specific and organized around the known self-care requisite.[15] The hope in HF patients was reported low level. Furthermore, the results indicated a correlation between hope with severity and duration of illness. Patients who had frequent doctor visits and hospitalizations within the past year, as well as those experiencing readmission and fatigue in both the current month and last month, showed lower levels of hope. Additionally, more prescribed medications were associated with decreased hope among HF patients.[40] HF patients may experience hopelessness due to treatment failure, even though they have faithfully adhered to it.[46] Educating patients about disease and treatment can improve their understanding, medical knowledge, and control techniques, leading to increased participation in self-care and higher hope levels. Ultimately, this can enhance the quality of life for patients.[43]

Limitation and recommendation

The results of this study will contribute to the existing literature on HF management by highlighting the importance of disease knowledge and hope in promoting self-care among HF patients. Additionally, Assessment of patients' self-care is based on Orem's self-care model, one of the most well-known nursing theories. The results may inform healthcare professionals and policymakers in developing targeted interventions to enhance disease knowledge and foster hope in this population. Improving self-care can ultimately lead to better patient outcomes and quality of life for individuals with HF. However, it is important to acknowledge several limitations of this study. Firstly, the study's sample may not represent all adults with HF, as participants were recruited from specific healthcare settings. Additionally, the COVID-19 pandemic reduced access to HF patients. Future studies could employ a longitudinal design to examine the long-term effects of disease knowledge and hope on self-care. Qualitative studies could also provide deeper insights into the lived experiences of individuals with HF and their perspectives on self-care.

Conclusions

The results of the study indicated a positive and significant correlation between the variables "self-care and HF knowledge," "self-care and hope," and "HF knowledge and hope" in HF patients. The results of this study, in addition to informing the audience about the self-care of HF patients, showed the correlation between self-care variables, HF knowledge, and hope in these patients. According to the study results, it seems necessary for doctors and nurses to pay attention to providing educational programs and patients' education regarding increasing HF knowledge in various dimensions of HF to improve self-care and hope in patients. With the help of the results of this study, it is possible to take steps in future studies in the direction of planning to improve self-care, HF knowledge, and the hope of HF patients.

Table 5: General linear model of demographic characteristics, heart failure knowledge, and hope with self-care behavior of the study participants

Characteristics	β	SE	CI 95%		t	P
			Lower limit	Higher limit		
Age	0.32	0.22	-0.117	0.76	1.46	0.148
Sex						
Male	1.05	16.53	-31.75	33.84	0.06	0.950
Female	Ref					
Employment status						
Unemployed	46.39	22.56	1.62	91.16	2.06	0.042
Housewife	34.16	8.82	16.65	51.66	3.87	0.000
Employed	Ref					
Access to information resource						
No	-2.24	6.96	-16.04	11.57	-0.32	0.749
Yes	Ref					
Symptoms knowledge	9.15	2.08	5.01	13.28	4.39	0.000
Treatment knowledge	1.05	1.78	-2.49	4.59	0.59	0.558
Hope	1.90	0.44	1.01	2.78	4.26	0.000

SE=Standard error, CI=Confidence interval, Ref=Reference

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Conflicts of interest
There are no conflicts of interest.

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