Article

Investigating the relationship of electronic health literacy and self-care behaviors with life quality in patients with heart failure

Masoomeh Bakhshayesh[1], Mitra Hojatansari[2*], Soheila Rabie Siahkali[2]

[1]Department of Emergency and Critical Care Nursing, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran
[2]Department of Operating Room and Anesthesiology, School of Nursing and Midwifery, Zanjan University of Medical Sciences, Zanjan, Iran

Article Info

Article history:
Received: 19 Feb 2023
Accepted: 14 Nov 2023

Keywords:
Heart failure, Self-care, Health literacy, Quality of life

[*]**Corresponding author:**
Zanjan University of Medical Sciences, Dr.Sobouti Blvd. School of Nursing and Midwifery, Zanjan, Iran

Email: mitraansari@zums.ac.ir

Abstract

Background: A suitable approach to improve the quality of life (QoL) of patients with heart failure (HF) is to promote electronic health literacy (e-HL) and encourage self-care behaviors among patients.
Objectives: This study was conducted to divulge the association of e-HL and self-care behaviors with QoL in patients with HF.
Methods: This cross-sectional descriptive study was conducted on 200 patients suffering from HF admitted to the CCU and POST-CCU departments of the Amir-Al Momenin Hospital of Maragheh City, Iran, who were enrolled by convenience sampling. Data were collected using WHO Quality of Life-BREF (WHOQOL-BREF), the e Health Literacy Scale (e HEALS), and the European Heart Failure Self-care Behavior Scale (EHFScBs) and analyzed using SPSS v. 21 Software. The statistical tests included ANOVA, the independent t-test, Pearson correlation, and hierarchical linear regression.
***Results*:** The Pearson correlation test showed that there was a direct and statistically significant relationship between e HL, self-care behaviors, and QoL (P-value <0.05). The correlation between self-care behaviors and QoL was the strongest (r=0.747, P-value <0.001). According to hierarchical linear regression analysis, self-care behaviors were the strongest predictors of QoL (β =0.647, P-value =0.001). Overall, e-HL (β=0.163, P-value=0.001), self-care behaviors (β=0.647, P-value <0.001), and demographic variables were able to predict 57.6% of the variance of QoL (R=0.576, P-value <0.001).
Conclusion: Electronic health literacy and self-care behaviors may play an important role in improving the QoL of HF patients. Regarding the role of these parameters in preventing and managing HF, the health system should pay attention to upgrading these elements by appropriate training.

Application of Study Results in Preventive Care in Nursing and Midwifery:

- Increasing the level of electronic literacy improves self-care behaviors and the quality of life of patients with heart failure.
- Due to their close relationship with patients, nurses can play an important role in implementing educational programs to increase the electronic literacy of patients with heart failure, as well as smoking cessation and other self-care behaviors. Therefore, the design and implementation of such interventions will increase the efficiency of the health system, reduce economic costs and solve the challenges of the defective cycle of the health system and improve the quality of care.

Introduction

Heart failure (HF) is the most common cardiovascular disease (CVD) and the final stage of most of them. This condition refers to the heart's failure in adequate pumping of blood to meet the metabolic, nutritional, and oxygen requirements of body tissues [1]. The prevalence of HF has risen considerably in recent years due to population aging, as well as the improved survival of patients with coronary artery disease [2].

The prevalence of HF among people over 45 years old is 1-2% in most countries and 3-5% in the world [3]. It has been reported that at least 26 million people worldwide suffer from HF. The prevalence of HF ranges from 1% to 6% in Asian countries and is around 1.8% among Iranian elderlies [4,5].

The total direct costs of HF medical care are estimated to increase from 24.7 billion dollars in 2010 to 77.7 billion dollars in 2030, and most of these costs are related to the re-hospitalization of these patients [6]. Heart failure is accompanied by

an increased incidence of Intense signs and symptoms and reduced quality of life (QoL) [7]. Despite great advances in the management of HF, this condition still brings considerable adverse consequences for patients, their families, and health care systems and significantly demotes their QoL, caused by frequent hospitalizations and a high mortality rate [8]. These restrictions inflict patients' fulfillment of job obligations, as well as their familial and social affairs, contributing to their social isolation and a higher propensity for death [7,9].

Quality of life is a subjective, multifaceted, and dynamic entity comprising a combination of cognitive (e.g., satisfaction) and emotional (e.g., happiness) elements [10]. Quality of life embraces dimensions such as physical health, mental health, economic status, personal beliefs, and interactions with surroundings [11]. The study of Marteneson et al. on 1382 male and female patients with HF suggested that women experienced a poorer QoL compared to men [12]. Abbasi et al. also conducted a study on 612 patients with HF and reported that these patients had poor QoL [13].

One of the factors that can improve the QoL of patients with HF is their participation in their self-care and treatment [14]. A study by Jarsema et al. showed that the encouragement of self-care behaviors in patients with HF significantly mitigated their symptoms and complaints and improved their QoL [15]. Another study by Abu-Talebi in Iran delineated economic, socio-cultural, individual, familial, environmental, and medical barriers as the main obstacles contributing to poor self-care performance among Iranians [16]. The improvement of self-care behaviors can empower patients to control their disease [17].

Health literacy is another determinant with a great impact on the level of awareness and, therefore, the prevention and control of HF [18]. Health literacy and electronic health (e-health) literacy have been introduced as a global issue and debate in the 21st century. Howard et al. presented a definition of health literacy from the perspective of the World Health Organization as "cognitive and social skills determining the motivation and ability of people to acquire, comprehend, and apply information in a way that can promote and maintain one's health" [19]. Similarly, e-health literacy refers to one's ability to locate, assimilate, and evaluate health-related information from electronic databases and apply this information to detect and solve a health issue [15]. Regarding the importance of health literacy, according to studies by the American Center for Health Care Strategies, people with low health literacy are less likely to understand and adhere to the written and spoken information presented to them by health specialists, causing them to have a poorer health condition [20], higher rates of hospitalization and referrals to doctors [21], and poor self-care performance [22]. Compared to parameters such as income, age, education, and employment status, health literacy offers a stronger and more effective indicator of an individual's health condition, so low health literacy is not only a problem for patients but also a challenge for health care providers and health systems [23]. Consequently, it is important to scrutinize health literacy and its relationship with the QoL of HF patients regarding the chronic nature of their disease and the fact that these patients spend every day of their lives learning its symptoms, which potentially can profoundly affect their QoL [24].

In spite of the fact that QoL of HF patients has been investigated in numerous studies, the complexity and wide definition of this concept and its dimensions, as well as the presence of different assessment methods, highlight the importance of conducting new experiments on this topic. In our literature review, we encountered a few studies on the link between e-health literacy, self-care behaviors, and QoL. Designing and implementing integrated educational programs for HF patients warrant identifying the factors affecting self-care behaviors and QoL. In the present study, we aimed to investigate the association of e-health literacy and self-care behaviors with QoL in patients with HF admitted to the CCU and POST-CCU wards of Amir-Al-Momenin Hospital of Maragheh City in 2021.

Methods

The present descriptive-analytical, cross-sectional study was conducted to investigate the association of e-health literacy and self-care behaviors with QoL in patients with HF admitted to the CCU and POST-CCU wards of Amir-Al-Momenin Hospital of Maragheh City in 2021.

The study population included all those admitted to the Heart Diseases ward of our hospital due to HF. After obtaining the necessary permits, 200 HF patients hospitalized in the Heart Diseases ward of Amir-Al-Momenin Hospital of Maragheh City were consecutively entered into the study. Inclusion criteria encompassed providing consent to participate in the study, having writing and reading literacy, Affliction with HF for more than six months, ejection fraction (EF) below 40%, and age above 18 years old. Patients presenting a history of psychological disorders (based on medical profile) were not eligible to enter the study. The sample size for estimating the mean of a population (sd=31.88, 95%CI) was calculated as n=167 based on a study by Baltouni et al. (2012). Considering an attrition rate of 10%, 200 patients were included in the study.

For data collection, a demographic information questionnaire, the eHealth Literacy Scale (eHEALS), WHO Quality of Life-BREF (WHOQOL-BREF), and the European Heart Failure Self-care Behavior Scale (EHFScBs) were used. The demographic information questionnaire included queries about age, gender, education status, marital status, and smoking status.

The eHEALS included eight queries to assess, for example, the level of familiarity with online health resources available on the Internet. This scale aims to scrutinize a person's skills needed to use the Internet for health promotion. The scoring of the questionnaire is based on a five-point Likert scale for each item (very poor, poor, moderate, good, and very good with a score range of 1 to 5; score 1 for very poor and score 5 for very good). The psychometric analysis of the questionnaire was conducted by Bazm et al., who analyzed its validity and reliability. In the present study, the scale's internal consistency was adequate (α=0.88, p<0.001), and retesting analysis delivered an acceptable reliability coefficient (r=0.96, p<0.001) [25].

The EHFScBs tool was utilized to analyze self-care behaviors among HF patients. This tool was developed by Jaarsma et al. [26] and contains 12 items scored on a 5-point Likert scale from strong agreement (score 5) to strong disagreement (score 1). A higher score indicated better self-care behaviors and vice versa. The tool has been approved to be valid and reliable in various studies [27,28]. In Iran, the validity and reliability of the questionnaire have been confirmed by Salehzadeh et al., reporting Cronbach's alpha of 0.71 [29]. In the present study, Cronbach's alpha coefficient of 0.88 verified the internal consistency of the questionnaire.

The standardized Persian version of the WHO-QOL-BREFF) questionnaire was used to measure the QoL Patients with HF. This questionnaire determines an individual's overall QoL, as well as QoL, in four dimensions: physical health, mental health, social communication, and environmental health. Out of 26 questions in this questionnaire, the first two questions address overall QoL, and 7, 6, 3, and 8 questions evaluate physical health, mental health, social communication, and environmental health, respectively. The scoring is based on a 5-point Likert scale from abysmal (score 1) to excellent (score 5). Each dimension's extreme scores are 4 and 20, reflecting the poorest and best QoL, respectively. These scores can be transformed into a range of 0 to 100. For example, according to the WHO's instructions, for an individual achieving the lowest possible scores in physical health (i.e., 7), mental health (i.e., 6), social communication (i.e., 3), and environmental health (i.e., 8) dimensions, their scores should be unanimously converted to 4. The validity and reliability of this questionnaire have been measured in more than 40 countries worldwide, rendering it a valid tool in the eyes of the scientific community [30,31]. Also, this questionnaire has been validated and standardized regarding all four dimensions with Cronbach's alpha coefficients of 0.70, 0.73, 0.55, and 0.84 for physical health, mental health, social communication, and environmental health dimensions, respectively [32]. In the present study, the internal consistency of the questionnaire was confirmed based on Cronbach's alpha coefficient of 0.91.

After the approval of the research proposal by the Research Deputy of Zanjan University of Medical Sciences, and obtaining ethical approval, We were referred to the Heart Diseases ward of Amir-Al-Momenin Hospital of Maragheh City with an introduction letter in order to gather the data, and data collection was conducted by attending the CCU and POST-CCU wards and filling out the questionnaires after being granted the permission by university and hospital authorities. The timing for completing the questionnaires was

prescheduled in such a way that they would be in their resting times. The questionnaires were completed by the researcher by conducting face-to-face interviews with patients.

After completing the questionnaires, the data were entered into SPSS 21 software and analyzed using appropriate statistical tests. The Kolmogorov-Smirnov test was used to check the normality of data distribution. For data analysis, descriptive (frequency, frequency percentage, mean, and standard deviation) and inferential (one-way analysis of variance, independent t-test, Pearson correlation, and linear regression analysis to identify independent QoL predictors) statistics were used at a significance level of $P<0.05$.

Results

In this study, 200 patients with HF hospitalized in the CCU and POST-CCU wards of the Amir-Al-Momenin Hospital of Maragheh City were examined. Most participants aged 50 years old and older (77.5%) were men (65%) and had a high school diploma (32.5%). Also, 48.5% of the participants reported that they were smokers. Descriptive statistics (prevalence, frequency, percentage) related to demographic data have been provided in Table 1.

Table 1: The frequency and relative frequency of participants' demographic features (n=200)

Variables		Frequency (n)	%
Age (years)	≤50	45	22.5
	>50	155	77.5
Gender	Male	130	65
	Female	70	35
Education	Below diploma	42	21
	High school diploma	65	32.5
	Bachelor's degree	74	37
	Master's degree and higher	19	9.5
Smoking	No	103	48.5
	Yes	97	51.5

Table 2 describes the average scores for e-health literacy, self-care behaviors, and QoL in the participants.

Table 2: The mean and SD of e-health literacy, self-care behaviors, and quality of life among participants (n=200)

Variables	Min	Max	Mean	SD
e-health literacy	8	40	18.09	9.08
Self-care behaviors	21	41	31.81	4.80
Quality of life	106	282	181.83	43.74

Regarding the relationship between demographic variables (age, gender, education level, and smoking) and e-health literacy among HF patients participating in this study, it was noticed that all these variables, except for gender ($P=0.172$), were significantly associated with e-health literacy ($P<0.001$). Among the mentioned variables, the self-care behaviors and QoL of HF patients were significantly associated only with educational level ($P<0.001$, Table 3).

Table 3: The relationship of demographic variables with e-health literacy, self-care behaviors, and quality of life in patients with heart failure participating in the study (n=200)

		e-Health Literacy			Self-care Behaviors			Quality of Life		
		Mean	**SD**	**P value**	**Mean**	**SD**	**P value**	**Mean**	**SD**	**P value**
Age (years)	≤50	24.06	12.38	<0.001	31.68	5.84	0.863	182.33	55.59	0.942
	>50	16.36	7.01		31.85	4.47		181.68	39.87	
Gender	Male	18.67	8.01	0.172	31.99	5.05	0.478	180.97	45.32	0.708
	Female	17.01	6.99		31.48	4.29		183.41	40.93	
Education	Below diploma	8.57	2.08	<0.001	28.18	3.40	< 0.001	151.57	38.05	<0.001
	High school diploma	24.60	4.36		33.86	3.67		167.29	31.30	
	Bachelor's degree	31.18	7.16		35.57	2.67		208.01	32.29	
	Master's degree and higher	31.26	8.95		30.63	6.89		196.47	64.82	
Smoking	No	15.65	8.65	<0.001	32.17	4.69	0.304	178.58	37.68	0.310
	Yes	20.38	8.90		31.47	4.90		184.88	48.76	

*Independent sample T-Test
**ANOVA

The correlation of QoL with the variables of e-health literacy and self-care behaviors has been demonstrated in Table 4, showing a significant direct correlation between these variables, with the strongest correlation being observed between self-care behaviors and QoL (r=0.747, P<0.001).

Table 4: Correlation analysis between e-health literacy, self-care behaviors, and quality of life in patients with heart failure participating in the study (n=200)

Variables		**e-Health Literacy**	**Self-care Behaviors**	**Quality of Life**
e-Health Literacy	r	1	-	-
	p	1	-	-
Self-care Behaviors	r	0.535	1	-
	p	0.001	1	-
Quality of Life	r	0.502	0.747	1
	p	0.001	0.001	1

***Pearson correlation coefficient**

Hierarchical linear regression analysis was used to determine the strongest independent predictors of QoL (Table 5). In the first step, demographic variables (age, gender, educational level, and smoking status) were entered into the model, revealing that these variables were able to explain 26% of the variance in QoL. Among demographic variables, age, and educational level were identified as significant predictors of QoL, and between these two, educational level was a stronger predictor (β=0.553). In the second step, the variables of e-health literacy and self-care behaviors entered the model, which boosted its predictive power to 57.6%. Moreover, e-health literacy and self-care behaviors were observed to be significant independent predictors of QoL, with the variable of self-care behaviors being a stronger predictor (β=0.647).

Table 5: Hierarchical regression analysis for predicting the quality of life of patients with heart failure participating in the study (n=200)

Steps/variables	β (step 1)	P-value	β (step 2)	P-value
Age	0.189	0.010	0.069	0.224
Gender	0.056	0.519	0.002	0.981
Educational level	0.553	0.001	0.026	0.740
Smoking	0.015	0.859	0.011	0.867
e-health literacy			0.163	0.043
Self-care behaviors			0.647	0.001
R^2	0.260	0.001	0.576	0.001

Discussion

The present study was conducted to assess the association of e-health literacy and self-care behaviors with QoL in patients with HF admitted to the Heart Diseases ward of the Amir-Al-Momenin Hospital of Maragheh City, Iran. Our findings showed that higher e-health literacy and self-care behaviors improved QoL in patients with HF. According to the findings of the present study, the promotion of self-care behaviors could upgrade QoL in Hf patients. Our results revealed that patients older than 50 years old had significantly lower e-health literacy scores compared to those younger than 50 years old. In agreement, Xesfingi et al. reported that young people had higher levels of e-health literacy [33]. The higher e-health literacy of younger people can be partly related to their higher access to electronic devices such as mobile phones, computers, and laptops. On the contrary, Norman et al. and Park et al. found no significant relationship between age and e-health literacy [34,35]. Possible reasons for justifying this discrepancy can be the different geographical locations of these studies, variability in the access of people to electronic devices, and variations in people's economic power to afford these devices.

In the present study, the mean e-health literacy score was higher in the participants who had higher levels of education. Consistently, other studies have also reported a link between e-health literacy and education level [36-38]. These observations suggest that e-health literacy can be affected by educational level, intrinsic motivation for seeking health information, as well as the ability to use and access the Internet.

The findings of the present study disclosed that smoker patients attained a significantly lower mean score of e-health literacy than their non-smoker peers. In line, Mitsutake et al. declared a statistically significant relationship between smoking and low e-health literacy [39]. One of the possible reasons justifying a lower rate of smoking among people with high e-health literacy can be their higher health awareness, as well as their higher ability to access health-related information via the Internet, increasing their adherence to health-promoting behaviors and avoidance of health-demoting behaviors.

In this study, it was observed that more educated patients had a higher mean score of self-care behaviors compared to less-educated individuals. Shojaei et al.'s study on patients with HF demonstrated that people with higher educational levels had better self-care behaviors [40]. It is noteworthy that in some studies on HF patients, such as Asadi et al.'s study on patients referred to the Imam Ali Heart Hospital of Kermanshah City [41] and Javadi et al.'s study [42], no statistically significant relationship was observed between the level of education and self-care behaviors. The discrepancy between the results of these studies highlights the need for more investigations to determine if educational level and self-care behaviors are, in fact, interconnected. On the other hand, the poor performance of less-educated people with regard to self-care behaviors underlies the need for providing appropriate self-care training to these individuals, requiring paying special attention to this issue by health policymakers.

The findings of the present study indicated that the QoL of HF patients was significantly poorer in those with lower levels of education. In the study of Audi et al. on patients with HF in Greece, there was a statistically significant relationship between QoL and education level [43]. The results of another study by Aggelopoulou et al. on patients with HF showed that less educated people suffered from a poorer QoL [44]. These findings

indicate that a higher level of education can probably help patients improve their QoL by influencing factors such as self-care behaviors and their awareness of how to manage disease complications. It is not far from expecting to see HF patients with poor QoL, and in fact, it is a common phenomenon in most cases. Actually, to see HF patients having poor QoL seems to be inevitable. The QoL of these patients is mostly compromised by disease-related adverse physical symptoms and treatment-related negative impacts, leading to social restrictions.

Our findings showed that patients with HF participating in the current study had low e-health literacy. In a study conducted by Isazadeh et al., the mean score of e-health literacy was reported to be 29.28 [45]. In Tennant et al.'s study on an American population, e-health literacy was estimated to be at a high level [46]. The reasons explaining the relatively low e-health literacy of Iranian populations can be their lack of access to and familiarity with online health databases, including MedlinePlus, the restricted number of reliable health-related online resources, and Iranian users' distrust of these sources.

The findings of the present study disclosed a significant direct relationship between e-health literacy and self-care behaviors, meaning that with an increase in e-health literacy, self-care behaviors also increased. A study by Cho and Ha in South Korea on patients with hypertension revealed a significant direct link between e-health literacy and the patients' self-care behaviors and health awareness [47]. In another study, Wong et al. approved the positive impact of e-health literacy on self-care behaviors [48], highlighting the importance of paying attention to e-health literacy among these patients. Thus, health planners and policymakers, as well as health care providers, are required to design and implement comprehensive training programs to increase these patients' health literacy. In order to improve the health literacy of HF patients, these training programs can be focused on introducing authentic scientific websites and educating how to use them.

The results of the present study showed that there was a significant direct relationship between e-health literacy and QoL in patients with HF. Also, hierarchical linear regression analysis revealed that after self-care behaviors, e-health literacy was the strongest predictor of QoL in these patients. According to the results of the hierarchical linear regression model, self-care behaviors, e-health literacy, and demographic variables were able to predict 57.6% of variance in QoL in patients with HF. The findings of a study by Li et al. on Chinese adults demonstrated that e-health literacy could directly and indirectly predict QoL through self-care behaviors. According to the results of the recent study, e-health literacy was able to predict 40.6% of variance in QoL among Chinese adults [49]. These observations suggest that an improvement in e-health literacy can promote people's QoL. Therefore, health planners are advised to pay special attention to increasing patients' e-health literacy to improve their QoL.

Our findings also revealed a significant direct relationship between self-care behaviors and QoL in patients suffering from HF. Furthermore, according to the results of hierarchical linear regression analysis, self-care behaviors were able to best predict QoL. In studies by Tong et al. [50] on patients with benign prostatic hyperplasia in China and Pakaya et al. [51] on hemodialysis patients, a strong relationship was observed between self-care behaviors and QoL. In their study, Polikandrioti et al. reported that an improvement in self-care behaviors substantially contributed to an increase in the QoL of patients with diabetic foot ulcers [52]. Based on these findings, it appears that improving self-care behaviors can upgrade people's satisfaction with life. Therefore, it is suggested that when designing educational interventions, special attention be paid to promoting self-care behaviors to improve the QoL of patients.

The present study suffered from a number of limitations. There was a probability for the non-cooperation of patients. So, we tried to adequately explain the objectives of the research to the patients and establish sincere communication with them. Another limitation of the present study was the fact that we used a questionnaire for data collection, so we could not rule out the possibility that patients' responses could have been affected by their psychological and emotional conditions. Therefore, we tried to complete the questionnaires when the patients were in optimal psychological and emotional shape. Another possible limitation of this study was the patients' lack of familiarity with how to use health-related electronic media

and resources, and to address this issue, researchers who were adequately accustomed to working with electronic media were employed to complete the questionnaires.

Conclusion

The results of the present study uncovered that older, less educated, and smoker HF patients had relatively low e-health literacy. This finding highlights the need for designing and implementing training programs to increase e-health literacy among these patients. Also, according to our findings, less educated patients had lower adherence to self-care behaviors and poorer QoL, so this group of patients should receive training programs so that they are encouraged to follow self-care behaviors and enjoy better QoL. According to data analysis, e-health literacy and self-care behaviors play a substantial role in improving the QoL of patients with HF. Therefore, it is recommended to improve e-health literacy and self-care behaviors among these patients.

Ethical Consideration

The present study was approved by the Research Ethics Committee of Zanjan University of Medical Sciences (ethics code: IR.ZUMS.REC.1400.106).

Acknowledgments

The present study was the result of a master's thesis in the field of special care nursing, entitled "Evaluating the association of e-health literacy and self-care behaviors with quality of life in patients with heart failure hospitalized in the CCU and POST-CCU wards of Amir-Al-Momenin Hospital of Maragheh city in 2021" and approved by the Zanjan University of Medical Sciences. We express our appreciation toward the respected managers, officials, and experts of the Amir-Al-Momenin Hospital of Maragheh City for their cooperation.

Conflict of interest

The authors declare no conflict of interest.

Funding:

This research was financially supported by the Research and Technology Deputy of Zanjan University of Medical Sciences.

Authors' contributions:

M.B.: Study design, data collection, analysis, and interpretation, preparation of the first draft of the manuscript, and reviewing and approving the final version of the manuscript.

M.H.A.: Study design, data collection, analysis, and interpretation, supervising the preparation of the manuscript, reviewing and revising the manuscript, and approving the final version of the manuscript.

S.R.S.: Study design, supervising the preparation of the manuscript, approving the final version of the manuscript.

S.A.S: Study design, supervising the preparation and revising of the manuscript, and approving the final version of the manuscript.

References

1. Liou HL, Chen HI, Hsu SC, Lee SC, Chang CJ, Wu MJ. The effects of a self-care program on patients with heart failure. J Chin Med Assoc. 2015; 78(11): 648-56. doi: 10.1016/j. jcma.2015.06.004.

2. Coats AJS. Ageing, demographics, and heart failure. Eur Heart J Suppl. 2019; 21(Suppl L): L4-L7. doi: 10.1093/ eurheartj/suz235.

3. Savarese G, Lund LH. Global public health burden of heart failure. Card Fail Rev. 2017; 3(1): 7-11. doi: 10.15420/ cfr.2016:25:2.

4. Ahmadi A, Soori H, Mobasheri M, Etemad K, Khaledifar A.Heart failure, the outcomes, predictive and related factors in Iran. Journal of Mazandaran University of Medical Sciences. 2014; 24(118): 180-8. [In Persian]

5. Reyes EB, Ha JW, Firdaus I, Ghazi AM, Phrommintikul A, Sim D, et al. Heart failure across Asia: same healthcare burden but differences in organization of care. Int J Cardiol. 2016; 223: 163-7. doi: 10.1016/j.ijcard.2016.07.256.

6. Hwang B, Moser DK, Dracup K. Knowledge is insufficient for self-care among heart failure patients with psychological distress. Health Psychology. 2014;33(7):588.

7. 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.

8. Bos-Touwen I, Jonkman N, Westland H, Schuurmans M, Rutten F, de Wit N, et al.

Tailoring of self-management interventions in patients with heart failure. Curr Heart Fail Rep. 2015; 12(3): 223-35. doi: 10.1007/s11897-015-0259-3.
9. Jalilian M, Mostafavi F, Sharifirad G. Association between self-efficacy, perceived social support and quality of life in patients with cardiovascular diseases: A cross-sectional study. J Health Syst Res. 2013;9(5):531-9.
10. Burg MM, Barefoot J, Berkman L, Catellier DJ, Czajkowski S, Saab P, et al. Low perceived social support and post–myocardial infarction prognosis in the enhancing recovery in coronary heart disease clinical trial: the effects of treatment. Psychosomatic medicine. 2005; 67(6): 879-88.
11. Woodend AK, Sherrard H, Fraser M, Stuewe L, Cheung T, Struthers C. Telehome monitoring in patients with cardiac disease who are at high risk of readmission. Heart & lung. 2008;37(1):36-45.
12. Mårtensson J, Dracup K, Canary C, Fridlund B. Living with heart failure: depression and quality of life in patients and spouses. The Journal of heart and lung transplantation. 2003; 22(4): 460-7.
13. ABBASI A, Fayazi S, Ahmadi F, Haghighizadeh M. The efficacy of home walking exercise program on functional performance and quality of life in patients with heart failure. 2007.
14.Kodiath M, Kelly A, Shivelly M. Improving quality of life in patient with heart failure. J Cardiovasc Nurs 2005; 20(1): 43-4.
15.Jaarsma T, Halfen R, Abusaad H, Dracup K, Diederiks j.Self care and quality of life in patient with advanced heart failure:the effect of a supporative educational intervaention. Heart Lung 2000;29(5):319-330.
16.Aboutalebi Daryasari G, Memarian R, Vanaki Z, Kazemnezhad A, Naderi N. Limitations of self-care behaviour in heart failure patients-a qualitative research with approach Orems theory. Biomed Res. 2016; Special Issue: S437-S42.
17. Stephen SA. Fatigue in older adults with stable heart failure. Heart & Lung. 2008;37(2):122-31.
18. Howard DH, Sentell T, Gazmararian JA. Impact of health literacy on socioeconomic and racial differences in health in an elderly population. Journal of general internal medicine. 2006;21(8):857-61.
19. Howard DH, Sentell T, Gazmararian JA. Impact of health literacy on socioeconomic and racial differences in health in an elderly population. Journal of general internal medicine. 2006;21(8):857-61.
20. Soltani R, Kafee M, Salehi E, Karashki H, Rezaee S. Survey the quality of life in Guilan university students. 2010; 10;19(75): 25-35. [In Persian]
21. Farghadani Z, Taheri-Kharameh Z, Amiri-Mehra A, Ghajari H, Barati M. The relationship between health literacy and self-care behaviors among patients with heart failure. Journal of hayat. 2018;24(2):186-96. [In Persian]
22. Matsuoka S, Tsuchihashi-Makaya M, Kayane T, Yamada M, Wakabayashi R, Kato NP, et al. Health literacy is independently associated with self-care behavior in patients with heart failure. Patient education and counseling. 2016;99(6):1026-32.
23. Fox S DM. Health online. Pew Internet and American Life Project; 2013. Jan 15, Retrieved from http://www.pewinternet.org/~/media//Files/Reports/PIP_HealthOnline.pdf.
24.Cajita MI, Cajita TR, Han HR. Health literacy and heart failure: a systematic review. J Cardiovasc Nurs. 2016; 31(2): 121-30. doi: 10.1097/jcn.0000000000000229.
25. Bazm S, Mirzaei M, Fallahzadeh H, Bazm R. Validity and reliability of the Iranian version of eHealth literacy scale. Journal of Community Health Research. 2016;5(2):121-30.
26. 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. European journal of heart failure. 2009;11(1):99-105.
27. 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. European journal of heart failure. 2009;11(1):99-105.
28. 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. European journal of cardiovascular nursing. 2013;12(2):214-8.

29. Salehzadeh A, Rahmatpour P. Self-care behaviors and related factors in patients with heart failure reffering to medical & educational center of heart in Rasht. Journal of Holistic Nursing And Midwifery. 2013;23(1):22-9. [In Persian]
30. Darvishpoor Kakhki A, Abed Saeedi Z, Yaghmaie F, Alavi Majd H, Montazeri A. Survey correlation between quality of life and disease and demographic variables of diabetic patients referred to Tehran hospitals in 2004. Iranian Journal of Endocrinology and Metabolism. 2006; 8(1): 49-56. [In Persian]
31. Heidari S, Salahshoorian A, Rafiee F. Relationship between perceived social support and social network with quality of life in cancer patients. Journal of Feyz. 2008;12(2):101-8. [In Persian]
32. Khaje-Bishak Y, Payahoo L, Pourghasem B, Jafarabadi MA. Assessing the quality of life in elderly people and related factors in tabriz, iran. Journal of caring sciences. 2014;3(4):257.
33. Xesfingi S, Vozikis A. eHealth literacy: in the quest of the contributing factors. Interactive journal of medical research. 2016;5(2):e4749.
34. Norman CD, Skinner HA. eHEALS: the eHealth literacy scale. Journal of medical Internet research. 2006;8(4):e27.
35. Park H, Cormier E, Gordon G, Baeg JH. Identifying health consumers' eHealth literacy to decrease disparities in accessing eHealth information. CIN: Computers, Informatics, Nursing. 2016;34(2):71-6.
36. Hsu W, Chiang C, Yang S. The effect of individual factors on health behaviors among college students: the mediating effects of eHealth literacy. Journal of medical Internet research. 2014;16(12):e3542.
37. Kim S, Jeon J. Factors influencing eHealth literacy among Korean nursing students: A cross-sectional study. Nursing & health sciences. 2020;22(3):667-74.
38. Tsukahara S, Yamaguchi S, Igarashi F, Uruma R, Ikuina N, Iwakura K, et al. Association of eHealth literacy with lifestyle behaviors in university students: Questionnaire-based cross-sectional study. Journal of medical Internet research. 2020;22(6):e18155.
39. Mitsutake S, Shibata A, Ishii K, Oka K. Associations of eHealth literacy with health behavior among adult internet users. Journal of medical Internet research. 2016;18(7):e192.
40. Shojaei F, Asemi S, NAJAF YA, Hosseini F. Self – care behaviors in patient with heart failure. Payesh J. 2009;8(4): 361-9. [In Persian]
41. Asadi P, Ahmadi S, Abdi A, Shareef OH, Mohamadyari T, Miri J. Relationship between self-care behaviors and quality of life in patients with heart failure. Heliyon. 2019;5(9):e02493.
42. Javadi S ST, Anticchi M. The Self-Care Behaviors in Patients with Heart Failure Admitted to Afshar Hospital in Yazd. Aflak Journal. 2017;9(32):1-12.
43. Audi G, Korologou A, Koutelekos I, Vasilopoulos G, Karakostas K, Makrygianaki K, et al. Factors affecting health related quality of life in hospitalized patients with heart failure. Cardiology research and practice. 2017;2017.
44. Aggelopoulou Z, Fotos NV, Chatziefstratiou AA, Giakoumidakis K, Elefsiniotis I, Brokalaki H. The level of anxiety, depression and quality of life among patients with heart failure in Greece. Applied Nursing Research. 2017;34:52-6.
45. Isazadeh M, Asadi ZS, Tahmasebi Gharajehmalek M, Soleimanifar M. Evaluation of Electronic Health Literacy Level of Patients Referring to a Selected Military Hospital in Tehran. Journal of Piavard. 2020;14(1):79-85. [In Persian]
46. Tennant B SM, Dodd V, Chaney B,, Chaney D PS, et al. . eHealth literacy and Web 2.0 health information seeking behaviors among baby boomers and older adults. J Med Internet Res. 2015;17(3):e70.
47. Cho GY, Ha MN. Mediating effects of health belief on the correlations among disease-related knowledge, eHealth literacy, and self-care behaviors in outpatients with hypertension. Korean Journal of Adult Nursing. 2019; 31(6): 638-49.
48. Wong AKC, Bayuo J, Wong FKY. Investigating predictors of self-care behavior among homebound older adults: The role of self-efficacy, eHealth literacy, and perceived social support. Journal of Nursing Scholarship. 2021.
49. Li S, Cui G, Yin Y, Wang S, Liu X, Chen L. Health-promoting behaviors mediate the relationship between eHealth literacy and health-related quality of life among Chinese older adults: a cross-sectional study. Quality of Life Research. 2021:1-9.

50. Tong Y, Xie K, Li S. Self-care and quality of life in elderly Chinese patients with benign prostatic hyperplasia. Nursing science quarterly. 2020;33(1):79-84.
51. Pakaya RE, Syam Y, Syahrul S. Correlation of self-efficacy and self-care of patients undergoing hemodialysis with their quality of life. Enfermería Clínica. 2021;31:S797-S801.
52. Polikandrioti M, Vasilopoulos G, Dousis E, Gerogianni G, Panoutsopoulos G, Dedes V, et al. Quality of Life and Self-care Activities in Diabetic Ulcer Patients, Grade 3: Gender Differences. Journal of Caring Sciences. 2021;10(4):184.