Predictors of Self-Care Behaviors in Heart Failure Patients: A Cross-Sectional Study

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Abstract

Introduction: Adherence to self-care behaviors and determining its related factors in patients with chronic illnesses are mandatory. The objective of the present study was two-fold: first, to examine the self-care behaviors adherence among heart failure patients and second, to determine its predictors in a comprehensive study of various factors in patients with heart failure.

Methods: This descriptive cross-sectional study was conducted on 239 patients with heart failure referred to Dr.Heshmat hospital as the only heart center in Guilan province (Northern Iran). The consecutive sampling method was used. Data were collected by Self-Care Heart Failure Index, Cardiac Depression Scale, Mini-Mental State Examination, and Charlson Comorbidity Index and were analyzed by descriptive statistics and analytical statistics in SPSS.

Results: Results showed educational level, history of receiving information, and cognitive function as predictors of self-care maintenance. Also, monthly income, history of receiving information, and ventricular dysfunction were predictors of self-care management. Monthly income, admission status, number of hospitalizations, history of receiving information, and cognitive function are mentioned as predictors of self-confidence. Predictors of total self-care were monthly income, history of receiving information, and cognitive function. (P ≤ 0.05).

Conclusions: Promoting self-care behaviors could prevent the adverse effects of diseases such as readmission, prolonged hospitalization, and bed occupancy ratio. The majority of the participants had non-adherent self-care, and, according to the results, it is recommended that assessing predictors in these patients and planning. Also, it is suggested that more observational, qualitative, and mixed-method studies be done in the future.

INTRODUCTION

Cardiovascular disease is the leading cause of mortality, worldwide and heart failure (HF) accounts for most deaths among all cardiovascular diseases [1]. In Iran, statistics from the Ministry of Health and Medical Education show that 33-39.3% of deaths in the country are due to cardiovascular diseases [2]; and 25% of patients admitted to cardiac wards in Iran have heart failure [3]. HF is one of the most common chronic diseases which accompanies progressive prevalence and unpredictable hospital admission [4, 5]. According to the increasing trend and its costly management, HF has become a significant burden for health care systems [6]. Although there is no specific statistic, it is believed to be an epidemic issue in developed and developing countries [1]. In the United States annually, more than 1 million new cases are identified, which is similar to European countries [7]. Also, it has been noted that at least 50% of heart failures, patients had insufficient follow-up after discharge, and it led to readmission [8]. Previous Iranian investigation noted 29-47% re-hospitalization in patients with HF from 3 to 6 months after the initial discharge [9].

Adherence to self-care behaviors in patients with chronic illnesses is mandatory. By implementing appropriate self-care behaviors, patients can impact their comfort, functional abilities, and disease process [5, 10]; better self-care has been shown to improve patients' outcomes [11, 12]. Also, it has been estimated that half of the re-hospitalizations can be prohibited through better adherence to self-care behaviors [13, 14]. Self-care signifies presence in performances that endorse health and bound illness. The situation-specific theory hypothesized three parts for the self-care process for HF, which consisted of (a) self-care maintenance, (b) self-care management, and (c) self-care confidence [15]. However, according to earlier studies, there is no consensus on their orders. Cameron et al. indicated self-care maintenance as the highest part [13]. Although, in the US and Mexican samples, self-care confidence was noted as the highest part [16].

Furthermore, different predictors such as demographic characteristics [13, 16], the experience of disease, physical function, anxiety, social support, daytime drowsiness, attitude (e.g., self-confidence) [1], psychological status, cognitive function, and depression [13] can be noted in assessing self-care behaviors. Also, the results from a systematic review study of factors related to self-care behaviors showed that further study is needed to offer a more comprehensive understanding of predictive and associating factors [17].

In addition to the above, the main difference that needs to be considered in Guilan province is the high prevalence of heart failure in this province, which is the second province in the country in terms of the prevalence of this disease [18]. Also, another significant difference that is important in these patients is eating style and salt consumption. According to available statistics, the amount of salt consumption in Guilan province is about 10-12 g/day, which is 4-5 times higher than the standard [19]. Also, Guilan and especially Rasht (the center of the Guilan province, which is the biggest city located in the north of Iran) have humid subtropical climates with relatively high temperatures in summer and mild winters and occasional winter storm with rainfall coming from convectional thunderstorm activity that these climate changes affect the prevalence and severity of heart disease [20].

Due to the controversial results mentioned by previous studies in different populations [1, 13, 16], and according to the differences in climate, culture, and ethnicity in Guilan, we aimed to determine:

The self-care behaviors are adherence among heart failure patients.

Its predictors in a comprehensive study of various factors in patients with heart failure.

METHODS

Design
This study is a descriptive cross-sectional study that was conducted on patients with heart failure by convenient sampling. Setting and sample subjects referred to Dr.Heshmat hospital as the only heart center in Guilan province from September to December 2013 were included. Based on sample size formula, 248 samples were indicated ($\alpha = 0.05$, $\beta = 0.90$ and $r = 0.32$) [21].

Inclusion criteria were indicated as age 45 years and more medical diagnosis of HF confirmed by a specialist, evidence of cardiac dysfunction in the report of echocardiography, an ejection fraction of 25% or higher, class I, II or III of the New York Heart Association (NYHA) classification and ability to speak and read and write in the Persian language. Also, exclusion criteria were previous history of a neurological disorder (i.e., cerebrovascular accident, transient ischemic attack, dementia or impaired short-term memory), emotional instability, hearing, and visual disorders.

The needed samples were selected consecutively from the patients referred to the cardiac care ward and specialty clinic of the before mentioned hospital.

Ethical Considerations
The Ethics Committee approved this study of Research Deputy at Guilan University of Medical Sciences (approval code: IR. GUMS. REC.1391.164). Written informed consent was obtained from all of the participants at the beginning of the study. All participants were informed of the voluntary nature of participation and were assured about the confidentiality of their personal information.

Measurements/Instruments
Data were gathered by a form which included five parts through interview. The first part consisted of demographic characteristics and disease-related questions. The second part assessed the self-care condition of patients by psychometric testing of the Self-Care of Heart Failure Index (SCHFI) [22]. The third part evaluated depression in patients with heart failure by the Cardiac Depression Scale (CDS) [23].

The fourth part evaluated cognitive function through the Mini-Mental State Examination (MMSE) [24], and the fifth part was the Charlson Comorbidity Index [25].

Self-Care of Heart Failure Index (SCHFI)

The SCHFI Scale consists of 15 items divided into three subscales: self-care maintenance, self-care management, and self-care confidence, with 4 and 5 option answers (with a score of 1-4 and 0-4, respectively) the Likert scale. Responses of each subscale are transformed to a 0–100 scale score. Scores ≥ 70 reflect adequate self-care [22]. The researcher examined the validity and reliability of the questionnaire. The validity of the questionnaire was assessed with content validity; to determine the validity, the questionnaire was given to 10 faculty members of Guilan University of Medical Sciences, and after collecting suggestions and making the necessary corrections, the final questionnaire was modified. The CVR score of all items was greater than the number of the Lawshe table (0.62), and the results of CVI were 0.83 and higher. The reliability of the questionnaire was determined by internal consistency and Cronbach's alpha coefficients, which was obtained as α = 0.80.

Cardiac Depression Scale (CDS)

The CDS Scale involves 26 items with seven subscales (sleep, anhedonia, uncertainty, mood, cognition, hopelessness, inactivity). A seven-point response scale is used for each item. Positive items are scored in a reverse manner. Ninety is considered a cut-off point [23, 26]. Also, 26 and 182 are considered as the lowest and highest scores, respectively. Higher scores show more severe depression [23]. The validity and reliability of this questionnaire were obtained in the same way as the SCHFI questionnaire mentioned in its description (CVR > 0.62, CVI = 0.83, α = 0.86).

Mini-Mental State Examination (MMSE)

The MMSE scale consists of 20 questions that screen orientation, short-term memory, concentration, and visual-spatial skills. Some questions contain several items, and each correct answer has one point. The maximum score is 30. A score of less than 22 is indicative of cognitive impairment [24].

Foroughan et al. and Seyedian et al. has validated the Persian version of this tool [27, 28].

Charlson Co-Morbidity Index

The severity of co-morbidities was assessed using the Charlson Co-morbidity Index. It classifies co-morbidities based on quantity and severity. The weighted index of co-morbidity is a significant predictor of 1-year survival. Higher scores indicate a greater risk of mortality. Commonly, an index of 1 is assigned to diseases, and a weighted score of 2, 3, or 6 would be given in more severe conditions. Finally, the total score should be divided into four stages and ranked as 0, 1-2, 3-4, and ≥5 co-morbidities [26].

Table 1. Sociodemographic and Clinical Characteristics of Participants

Sociodemographic and Clinical Characteristics	N (%)
Gender	
Female	75 (31.4)
Male	164 (68.6)
Age (Mean ± SD)	59.04 ± 9.91
Marital status	
Married	214 (89.5)
Unmarried (including single, widowed, divorced)	25 (10.5)
Educational level	
Ability to read and write	166 (69.5)
Under diploma	17 (7.1)
Diploma and higher	56 (23.4)
Living location	
Urban	155 (64.9)
Rural	84 (35.1)
Having insurance	
Yes	237 (99.2)
No	2 (0.8)
Having supplemental insurance	
Yes	95 (39.7)
No	144 (60.3)
Status of Hospitalization	
Inpatient	141 (59)
Outpatient	98 (41)
Duration of illness (Mean ±S D)	3.92 ± 5.82
The percentage of ejection fraction (Mean ± SD)	36.28 ± 7.87
Functional class of NYHA	
I	95 (39.7)
II	57 (23.8)
III	87 (36.4)
Co-morbidity (based on Charlson index)	
0	105 (43.9)
1-2	56 (23.4)
3-4	64 (26.8)
≥ 5	14 (5.9)

Analysis

Data were collected and analyzed by descriptive statistics (percentage, mean and standard deviation) and analytical statistics (Kolmogorov-Smirnov test, and due to the abnormal distribution of data: Spearman correlation, Chi-square, Fisher's exact test, Mann-Whitney, Kruskal-Wallis test and logistic regression) in SPSS version 19. Also, 90% power and 95% Confidence interval were indicated. P-value ≤ 0.05 was defined as statistical significance. Logistic regression analyses using a Backward: LR method indicated predictors of self-care maintenance, management, self-confidence, and total self-care scores. Also, the socio-demographic and clinical variables were assessed in this analysis.

RESULTS

According to nine missing data, 239 records were eligible to be analyzed. Tables 1 and 2 presented Socio-demographic, clinical characteristics, and self-care status. According to results, 155 (64.9%) cognitive impairment and 138 (57.7%) depression symptoms were noted.

Table 2. Status of Self-Care and Its Domains in Participants

Domains	N (%)
Self-care maintenance	
≥ 70 (adequate)	12 (5)
< 70 (undesirable)	227 (95)
Mean ± SD	44.08 ± 12.26
Self-care management	
≥ 70 (adequate)	11 (4.6)
< 70 (undesirable)	228 (95.4)
Mean ± SD	42.52 ± 16.03
Self-care confidence	
≥ 70 (adequate)	18 (7.5)
< 70 (undesirable)	221 (92.5)
Mean ± SD	42.63 ± 14.75
Total self-care	
≥ 70 (adequate)	6 (2.5)
< 70 (undesirable)	233 (97.5)
Mean ± SD	43.07 ± 11.62
Total	239 (100)

Table 3. Regression Coefficients of Self-Care Predictors Based on Logistic Regression (LR Method)

Predictors	B	SE	OR	95% Confidence Interval of OR		P Value
				Min	Max	
Maintenance						
History of receiving information						
Through doctor	0.92	0.34	2.50	1.28	4.89	0.007*
Through nurse	0.94	0.41	2.57	1.14	5.77	0.022*
Without history	Reference	-	-	-	-	-
Educational level						
Ability to read and write	0.59	0.46	1.81	0.73	4.50	0.191
Under diploma	1.87	0.69	6.47	1.68	24.90	0.007*
Diploma and higher	Reference	-	-	-	-	-
Cognitive function	0.14	0.04	1.15	1.05	1.25	0.002*
History of receiving information						
Management						
Through doctor	0.79	0.33	2.19	1.16	4.17	0.016*
Through nurse	0.89	0.41	2.43	1.09	5.41	0.032*
Without history	Reference	-	-	-	-	-
Having ventricular dysfunction						
Yes	-0.65	0.27	0.52	0.31	0.89	0.018*
No	Reference	-	-	-	-	-
Income	0.08	0.04	1.09	1	1.17	0.031*
History of receiving information						
Self-confidence						
Through doctor	1.09	0.40	2.99	1.36	6.58	0.006*
Through nurse	0.99	0.48	2.70	1.06	6.88	0.034*
Without history	Reference	-	-	-	-	-
Status of Hospitalization						
Inpatient	0.84	0.32	2.31	1.23	4.34	0.009*
Outpatient	Reference	-	-	-	-	-
History of Hospitalization						
≥ 5	1.51	0.77	4.51	1	20.30	0.050*
3-4	0.51	0.64	1.66	0.47	5.89	0.433
1-2	-0.01	0.54	0.89	0.31	2.56	0.831
0	Reference	-	-	-	-	-
Cognitive function	0.12	0.03	1.13	1.05	1.22	0.001*
Income	0.16	0.05	1.17	1.06	1.30	0.003*
History of receiving information						
Total self-care						
Through doctor	1.24	0.34	3.44	1.76	6.72	0.001*
Through nurse	1.03	0.41	2.79	1.24	6.29	0.011*
Without history	Reference	-	-	-	-	-
Income	0.12	0.05	1.13	1.03	1.23	0.013*
Cognitive function	0.06	0.03	1.07	0.99	1.14	0.050*

* P ≤ 0.05

Regression coefficients of self-care predictors based on logistic regression were noted in Table 3. Results demonstrated that educational level, history of receiving information, and cognitive function as predictors of self-care maintenance. Also, monthly income, history of receiving information, and the presence of ventricular dysfunction were predictors of self-care management. Monthly income, admission status, number of hospitalizations, history of receiving information, and cognitive function are mentioned as predictors of self-confidence. Furthermore, results noted monthly income, history of receiving information, and cognitive function as total self-care predictors (P ≤ 0.05).

DISCUSSION

Due to the increasing longevity of elderly patients [29], self-care can be considered as an essential outcome, and self-care education should be indicated as a necessary part of comprehensive health care planning [4].

Results showed non-adherent self-care in all domains which were consistent with the results mentioned by Jaarsma [30]; but were inconsistent with the results mentioned by Cameron [13], that noted adherent self-care maintenance, management, and confidence by using SCHFI tool. Riegel compared two developed (the United States and Australia) and developing countries (Thailand and Mexico) by using SCHFI tools and demonstrated mixed results [30]. It was observed that Australian patients had adherent self-care maintenance and non-adherent self-care management. However, the highest and lowest level of self-care management had been obtained in American and Thai patients, respectively (52.5% vs. 5%). Also, the highest and lowest levels of self-confidence are dedicated to Mexican and Thai patients, respectively (65.6% vs. 17.5%). Also, by the European Heart Failure Self Care Behavior (EHFSCB) tool, Klimm indicated adherent total self-care in patients with systolic heart failure (24.7 ± 7.8) [31]. Therefore, it seems that these different results might be noted as a result of higher age, rural residency, lower level of education, low socioeconomic status, being a governmental hospital, lack of medical equipment's and supplemental insurance, instability in health insurance, inappropriate training and lack of proper follow-up and supervision; disbelief to the positive impact of self-care behaviors on relieving symptoms, various tools and differences in cultures & climates.

The people of Guilan have a different culture and eating style, which is especially important in patients with heart failure and can lead to worsening of the disease and severe complications such as congestion and pulmonary edema. For example, the amount of salt consumption in Guilan province is about 10-12 g/day, which is 4-5 times more than the standard. Also, the different climate changes that exist in Guilan are not ineffective. Guilan and especially Rasht have humid subtropical climates with relatively high temperatures in summer and mild winters and occasional winter storm with rainfall coming from conventional thunderstorm activity. These climate changes affect the prevalence and severity of heart disease.

Also, it seems that non-adherent self-care was noted due to a higher class of NYHA in the majority of patients, and SCHFI's cut off point might not be applicable in our population.

Regression analysis showed that educational level, history of receiving information, and cognitive function were the significant predictors of self-care maintenance. However, Cameron reported that age (older age P <

0.01) and moderate to severe levels of co-morbidities (P < 0.05) were its predictors [13]. However, Riegel indicated that higher education, lower NYHA class, and country could be mentioned as self-care maintenance [30]. Therefore, it seems that these differences might be a result of dissimilarity in demographic and disease-related characteristics.

In this study, patients with education level under diploma had a higher chance for self-care maintenance, which was inconsistent with the results mentioned by Riegel [30]. It seems that patients with higher educational levels considered less importance for self-care recommendations and had more confidence in their health care behaviors. Also, people with a history of receiving information and better cognitive function had a higher chance of self-care maintenance; the researcher believes that better cognitive function, receiving information and awareness in patients about the disease, the dangers ahead, and related care can help them make the correct decisions and function and maintain their self-care.

In the management domain, income, history of receiving information, and ventricular dysfunction had been determined as self-care predictors, which was inconsistent with Cameron [13]. They demonstrated gender, moderate to severe comorbidities, depressive symptoms, and higher self-confidence as self-care predictors (P < 0.05). Also, Riegel showed lower age and more co-morbidities as predictors [30]; and Smeulders showed that patients with lower educational levels and better cognitive status benefited most from a self-management group program [32]. Investigators indicated that different inclusion criteria and ethnographic characteristics caused these different results. Also, patients with a history of receiving information, higher monthly income, and without ventricular dysfunction had a better chance of self-care management; the researcher believes that having a history of education and awareness in patients can help them make better decisions and function in self-care management. On the other hand, people with higher incomes may have less mental involvement in the financial field, which is not ineffective in following medical and non-medical treatment, will have better self-management. People without ventricular dysfunction will also have better self-care management because they have better disease status than people with ventricular dysfunction.

Furthermore, the present study showed income, status, and history of hospitalization, history of receiving information, and cognitive function as the predictors of self-confidence, which was inconsistent with Riegel [30]. Lower age, less co-morbidity, higher education, lower NYHA class, and country were observed as the predictors. Also, Cameron indicated depressive

symptoms (B = -0.22, P = 0.01) and male gender (B = -0.19, P = 0.02) as the predictors [33]. These different results might be a result of differences in sampling, design, and socio-cultural status. Also, patients with a history of receiving information, higher monthly income, and better cognitive function had a better chance of self-confidence; the researcher believes that sometimes the existence of information, awareness, and income can have the false result, a group of patients may have high self-esteem in self-care and have this perception. However, in practice, the opposite is observed. As observed, patients with more hospitalization history were more likely to have self-confidence than those without a history of hospitalization.

In the current study, we found income, history of receiving information, and cognitive function as the total self-care predictors. However, Holzapfel by means of EHFSCB tool showed mild depression (B = -0.19, P = 0.001), age (B = 0.34, P = 0.001), multiple co-morbidity (B = -0.14, P = 0.01), left ventricle ejection fraction (B = -0.19, P = 0.001) and family status (B = -0.14, P = 0.02) as the predictors [34]. Also, Lee using the SCHFI tool, indicated age, level of education, co-morbidity, recently diagnosed HF, NYHA functional class, heart failure type, and the country as the self-care predictors [35]. These different results might be as a result of differences in tools and scorings. Also, patients with a history of receiving information, higher monthly income, and better cognitive function had a more chance of total self-care; the researcher believes that better cognitive function, receiving information and awareness in patients about the disease, the dangers ahead, and related care can help them make the correct decisions and function and better self-care. On the other hand, people with higher incomes, because they may have less mental involvement in the financial field, which is not ineffective in following medical and non-medical treatment, will have better self-care.

Study Limitations

Nonrandomized Sampling and excluding patients with less than 25% ejection fraction were identified as limitations of this study. Also, the data collection tool in this study was a self-report questionnaire, which can be another limitation of the present study. In this regard, it is suggested that in the future, more studies be done by the observational, qualitative, or mixed-method.

CONCLUSIONS

Being diagnosed with heart failure not only has a significant impact on the persons' quality of life but also the usage of health care facilities is challenged. According to the results mentioned above, promoting self-care behaviors could prevent adverse effects of diseases such as readmission, prolonged hospitalization,

increased drug costs, and bed occupancy ratio. Also, since most participants had non-adherent self-care and, according to the results mentioned above, recommended that assessing predictors in these patients and planning based on. The interventions that focus on specific self-care behaviors may be more effective than general educational programs; assessing predictors in these patients could be recommended for further planning.

Promoting self-care behaviors could prevent the adverse effects of diseases such as readmission, prolonged hospitalization, and bed occupancy ratio. Since the majority of the participants had non-adherent self-care and, according to the results mentioned above, recommended that assessing predictors in these patients and planning based on. Also, it's suggested that more observational, qualitative, and mixed-method studies be done in the future.

The data collection tool in this study was a self-report questionnaire, which can be another limitation of the present study. In this regard, it is suggested that more studies be done by observational, qualitative, or mixed-method so that these patients can be examined more comprehensively and from different angles. Also, the instrument used to assess cognitive impairment and other confounding variables may be affected by the results of the present study. A more precise instrument may lead to a better diagnosis. Then, researchers should focus on designing special tools for evaluating the cognitive function in patients with HF in future studies.

Ethical Considerations

The Ethics Committee approved this study of Research Deputy at Guilan University of Medical Sciences (approval code: IR. GUMS. REC.1391.164). Written informed consent was obtained from all of the participants at the beginning of the study. All participants were informed of the voluntary nature of participation and were assured about the confidentiality of their personal information.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, or publication of this article.

Authors' Contribution
Conception (F Moaddab, A Ghanbari, M Sedghi Sabet), design (F Moaddab, A Ghanbari), supervision (A Ghanbari, E Kazemnezhad Leyli, M Sedghi Sabet), data collection (F Moaddab, A Salari), data analysis (F Moaddab, A Ghanbari, E Kazemnezhad Leyli), literature review (F Moaddab, A Salari), manuscript writing (F Moaddab, A Salari), manuscript editing and revision (F Moaddab, A Ghanbari, E Kazemnezhad Leyli, M Sedghi Sabet).

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