ORIGINAL ARTICLE
FACTORS ASSOCIATED WITH ADHERENCE TO MEDICATIONS, DIET AND SELF-MONITORING IN PATIENTS WITH HEART FAILURE

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Objectives: Adherence to treatment and lifestyle changes is necessary for patients with heart failure. The objective of this study was to determine the factors associated with adherence to medications, diet, and self-monitoring of patients with heart failure.

Methodology: This research was conducted as a descriptive cross-sectional study. The data were collected using the patient information form and beliefs and compliance scales for patients with chronic heart failure.

Results: The average age of patients was 68.75 ± 12.54. While the medication adherence barrier scores of the patients were slightly higher (21.53 ± 0.32), the diet adherence benefit scores of the patients were slightly higher (20.67 ± 0.40), and self-monitoring adherence barrier scores of the patients were higher (34.55 ± 0.29).

Conclusion: Identifying barriers or benefits of medication and dietary adherence may improve self-care behaviours in patients with HF. In clinics, it may be useful to provide training about potential barriers perceived by patients.

Keywords: adherence, heart failure, nursing

INTRODUCTION

Heart failure (HF) is one of the most common chronic cardiac conditions, and it is characterized by high mortality, morbidity, and health care costs.[1,2] The prevalence of heart failure is around 12% among adults. The prevalence increases with age; while it is about 1% for those under 55 and more than 10% for those aged 70 and over.[3]

The European Society of Cardiology (ESC) recommends the self-care strategies for patients with HF as well as to prescribed medicine. Self-care strategies suggest self-manage fluid intake, recognize the benefits taking medication, monitor body weight, fluid restriction of 1.5-2 L/day, avoid excessive salt intake (>6g/day), smoking cessation, abstain from or avoid excessive alcohol.[4] Self-care regimens in patients with HF such as monitor symptoms, weight fluctuations, restrict sodium intake, medications, and physical activity is complex.[5] Despite guideline, patients adherence to medication, and self-care strategies such as fluid restriction, monitor body weight, and smoking cessation is not enough.[1] Patients with heart failure have low adherence to medication.[6] Medication adherence, low sodium diet, and fluid restriction may be associated with risk for hospitalization and readmission.[5,7] Non-adherence in patients with HF adversely affects clinical outcomes, leads to symptoms exacerbation, and decreased physical function.[1,8]

In the 2016 ESC guideline stated that multidisciplinary management programs such as palliative care and cardiac rehabilitation should be included in addition to standard care for patients with HF.[4] Palliative care in patients with HF focused on improvement in quality of life, control of symptoms, early detection, and treatment of episodes of deterioration, alleviate and prevent suffering, identification of goals of care, and support for complex treatment, and responding to family concerns.[8,9] Palliative care is associated with improved patient quality of life, reduced symptom burden, improved caregiver outcomes, and decreased hospitalizations.[9,10]

The study aims were to measure the level of self-reported adherence to medication, dietary, and self-monitoring and to determine the factors associated with adherence to medications, diet, and self-monitoring in patients with heart failure.

METHODOLOGY

The research was as a descriptive cross-sectional study. Participants were recruited from the cardiology department of the hospital between July and October 2015 in Trabzon Ahi Evren Chest and Cardiovascular Surgery Education and Research Hospital Turkey. The Hospital Ethics Committee approved the study. (Date: March 17, 2015, No. 24237859/202). The purpose of the research was explained to the participants. Written informed consent was obtained from the participants who voluntarily agreed to participate in the study. The

participant could withdraw from the survey at any moment without providing any justification.

The study sample constituted 130 patients with HF of 18 years of age or older and capable of verbal communication. Participants were excluded if they had a history of chronic obstructive pulmonary disease, cancer, or any psychological disorder that required treatment. Eligible Subjects were interviewed in person by the researcher and data regarding demographics and time elapsed since diagnosis of HF less than 1 year and New York Heart Association (NYHA) functional classification) were recorded from the patients' medical files.

The patient information form consists of socio-demographic characteristics (7 questions), and clinical characteristics (15 questions). After completing demographic data, participants were asked a variety of yes/no questions such as do you experience difficulty in sleeping at night, do you exercise recommended by your doctor, do you experience difficulty in maintaining salt restriction recommended by your doctor, receiving information associated with the HF before discharge. NYHA functional classification was made in accordance with the recommendations of the guidelines.[4]

Beliefs about medication compliance scale (BMCS), Beliefs about dietary compliance scale (BDCS) and Beliefs about self-monitoring scale (BSMS) for patients with chronic heart failure: The scale was developed by Bennet et al. in 2000. The BMCS scale consist of 12 items and has 2 sub-dimensions: perceived benefits and barriers that are six items each. The BMCS is a five-point likert type scale response scale from 1, to 5, absolutely agree. Sub-dimension scores range from 6 to 30, with higher scores reflecting higher perceived benefits or benefits. One barrier is reverse scored. The total scale score range is 12 to 60. The BDCS scale consists of 12 items and has 2 sub-dimensions: perceived benefits and barriers. The BDCS has a five-point likert type response scale from 1, to 5, absolutely agree. Seven items (1,2,3,4,5,11,12) measure perceived benefits, with higher scores reflecting higher perceived benefits, and scores range from 7 to 25.Five items (6,7,8,9,10) measure perceived barriers, with higher scores reflecting higher perceived barriers, and scores range from 5 to 25. The total scale score range is 12 to 60. One benefit is reverse scored. The BSMS scale consists of 18 items and has 2 sub-dimensions: perceived benefits and barriers. The BSMS has a five-point likert type scale response from 1, to 5, absolutely agree. Six items (3,5,11,15,16,17) measure perceived benefits, with higher score reflecting higher perceived benefits, and scores range from 6 to 30. 12 items (1,2,4,6,7,8,9,10,12,13,14,18) measured perceived barriers, with higher score reflecting higher barriers, and scores range 12 to 60. The total scale score range is 18 to 90.[11,12] Oğuz et al. adapted the scale to Turkish in 2010.[13]

The Charlson Comorbidity Index that was developed in 1987 used to assess for comorbid conditions. Diseases were scored between 1 and 6 according to mild to severe disease among 19 diseases in this index. A total score was used to assess morbidity risk based on comorbidites assessed. The validity and reliability of the Charlson Comorbidity Index has been proven by studies.[14,15]

Multiple regression models were used to analyze significant variables to predict BMCS, BDCS, and BSMS scales. It was examined which variables predicted the BMCS, BDCS, and BSMS scale or not. The value $p<0.05$ was accepted as statistically significant. The Statistical Package for Social Sciences (SPSS 15.0, IBM, USA) software was used for statistical analysis.

RESULTS

Of the patients included in the study, 66.7% were male and 56.2% were married. The average age of patients was 68.75±12.54 years. Of the patients, 43.8% had graduated from primary school and 50% had equal income and expenses. Of patients, 47.7% did not smoke and 76.9% did not use alcohol. The average Charlson Comorbidity Index of patients was 1.38±1.00 reflecting low risk for future morbidity/mortality. In 59.2% of patients, expressed difficulty in maintain a low sodium diet. Of patients, 73.8% received education about the disease. A group of 80% said they had difficulty sleeping at night and 85.4% reported that they did not exercise (Table1).

Table 1: Socio-demographic and clinical characteristics of patients

Characteristics	Summary (N=130)
Gender	
Male	88 (67.7%)
Age	68.75±12.54
Marital status	
Married	73 (56.2%)
Educational status	
< Primary school	58 (44.7%)
Primary school	57 (43.8%)
High school and university	15 (11.5%)
Place of residence	
Village	10 (7.7%)
Distrcit	58 (44.6%)
Province	62 (47.7%)
Caregivers	
Self/Other family members*	5 (3.8%)
Partner	18 (13.8%)
Partner and children	52 (40%)

Children	55 (42.3%)
Level of income	
Less than expenses	53 (40.8%)
Equal to expenses	65 (50%)
More than expenses	12 (9.2%)
Charlson comorbidity index	1.38±1.00
0 score	20 (15.4%)
1 score	59 (45.4%)
2 score	32 (24.6%)
3 score	19 (14.6%)
Smoking status	
Yes	10 (7.7%)
Cessation due to illness	58 (44.6%)
No	62 (47.7%)
Alcohol use	
Yes	4 (3.1%)
Cessation due to illness	26 (20%)
No	100 (76.9%)
Family history of heart disease	
Yes	98 (75.4%)
Time elapsed since diagnosis of heart failure	
Less than 1 year	36 (27.7%)
1-3 year	53 (40.8%)
4-5 year	25 (19.2%)
>5 year	16 (12.3%)
NYHA, functional classification	
I	6 (4.6%)
II	41 (31.5%)
III	73 (56.2%)
IV	10 (7.7%)
Ejection fraction, %	
%10 - %25	72 (55.4%)
%26 - %35	40 (30.8%)
%36 - %49	18 (13.8%)
Hospitalizations due to heart failure over the past 12 months, number	
1 time	53 (40.8%)
1-3 time	55 (42.3%)
>3 time	22 (16.9%)
Length of hospitalization, day	
3-5 day	82 (63.1%)
6-10 day	45 (34.6%)
>10 day	3 (2.3%)
Time to recently discharge, month	5.08±3.15
0-3 month	47 (36.2%)
4-6 month	42 (32.3%)
7-9 month	27 (20.8%)

≥10 month	14 (10.8%)
Do you experience difficulty in maintaining a low sodium diet recommended by your doctor?	
Yes	77 (59.2%)
Do you experience difficulty in sleeping at night?	
No	104 (80%)
Do you exercise recommended by your doctor?**	
No	111 (85.4%)
Receiving information associated with the heart failure	
Yes	96 (73.8%)
Health personnel providing information about heart failure (n=96)	
Doctor	80 (83.3%)
Adequacy of the information about heart failure (n=96)	
Insufficient	54 (56.3%)

Self and other family members were combined.
**The frequency of exercise: Patients stated that jogging or walking 1-2 days a week (14), jogging or walking 1-2 days a month (5)

Patients' beliefs about medication compliance included both benefits and barriers, with barrier scores being slightly higher; 17.65±0.30 and 21.53±0.32, respectively. Patients' beliefs about diet compliance included benefits and barriers, with benefit scores being slightly higher; 20.67±0.40 and 10.45±0.16, respectively. Patients' beliefs about self-monitoring compliance included benefits and barriers, with barrier scores being higher; 16.26±0.45 and 34.55±0.29, respectively.

Regression Analyses of Barrier and Benefit of BDCS, BMCS, BSMS and variables: Regression analysis were used to determine the variables that were associated with adherence to medication, diet and self-monitoring in patients with HF (Table 2). Of factors assessed for association with medication compliance, 3 were associated with medication benefits and 4 were associated with medication barriers, see Table 2. Of factors assessed for association with diet compliance, 3 were associated with diet benefits and 8 were associated with diet barriers, see table 2. No variables studied were associated with self-monitoring benefits or barriers, using the BSMS scale (Table 2).

Table 2: Regression Analysis Results of Associations between BDCS, BMCS, BSMS and variables

Variables	Coefficient	Standard Error	Standardized Coefficient	P-value
BMCS*				
BENEFIT				
Gender	1.62	0.75	0.24	0.03
Age	0.10	0.04	0.38	0.07
Marital status	1.44	0.77	0.38	0.07
Family history of heart disease	1.95	0.80	0.22	0.02
Time elapsed since diagnosis of heart failure less than 1 year	0.04	0.04	0.08	0.29
NYHA class	0.08	0.05	0.10	0.17
Length of hospitalization	-0.07	0.07	-0.08	0.31
Last time of discharge	0.52	0.32	0.15	0.11
Do you exercise recommended by your doctor?	1.83	0.84	0.26	0.03
Adequacy of the information about heart failure	-0.95	0.70	-0.14	0.18
R:,655 R²: ,429 F:4.574 p:0.000				
BARRIER				

Age	0.01	0.00	0.31	0.00
Place of residence	0.07	0.06	0.09	0.27
Comorbidity	1.20	0.36	0.28	0.01
NYHA, functional class	1.53	0.71	0.32	0.04
Do you experience difficulty in sleeping at night	0.22	0.10	0.17	0.03
Do you exercise recommended by your doctor?	-0.15	0.11	-0.10	0.21
R:,705 R²: ,498 F:14.981 p:0.000				
BDCS**				
BENEFIT				
Gender	-1.49	0.72	.-229	0.04
Marital status	0.79	0.49	0.23	0.11
Family history of heart disease	-0.56	0.42	-0.14	0.19
Do you exercise recommended by your doctor?	0.62	0.23	0.36	0.01
Health personnel providing information about heart failure	-0.46	0.17	-0.25	0.01
R:,630 R²: ,397 F:6.575 p:0.000				
BARRIER				
Age	0.02	0.01	0.35	0.00
Level of income	0.83	0.35	0.31	0.02
Education status	-0.24	0.09	-0.31	0.01
Alcohol use	-0.84	0.41	-0.22	0.04
Comorbidity	0.26	0.06	0.36	0.00
NYHA, funcitonal class	-0.54	0.24	-0.22	0.02
Do you experience difficulty in sleeping at night	-0.44	0.19	-0.26	0.03
Do you experience difficulty in maintaining a low sodium diet recommended by your doctor	-1.14	0.36	-0.33	0.00
Adequacy of information about heart failure	-0.41	0.36	-0.12	0.25
R:,571 R²: ,326 F:3.344 p:0.001				
BSMS***				
BENEFIT				
Place of residence	1.59	0.93	0.19	0.09
Comorbidity	1.44	0.52	0.27	0.07
Smoking status	-1.31	0.80	-0.16	0.10
Length of hospitalization	-1.60	0.88	-0.18	0.07
Health personnel providing information about heart failure	-3.02	1.31	-0.22	0.06
R:,517 R²: ,267 F:1.406 p:0.13				
BARRIER				
Gender	-0.65	0.60	-0.17	0.28
Age	0.06	0.02	0.24	0.08
Family history of heart disease	-1.12	0.69	-0.17	0.11
Do you exercise recommended by your doctor?	-0.97	0.90	-0.12	0.28
Health personnel providing information about heart failure	1.80	0.74	0.24	0.18
R:,452 R²: ,205 F:1.276 p:0.21				

* Beliefs about medication compliance scale
** Beliefs about dietary compliance scale
*** Beliefs about self-monitoring scale

DISCUSSION

Successful HF management requires adherence to lifestyle changes, complicated medication therapy and diet, and monitoring symptoms and signs. Older age, lower level of education, lower level of income, having comorbidites, NYHA class III, and experiencing difficulty in sleeping at night were found to be associated with perceived barrier in the adherence to medication and dietary. Qadir showed that were high perceived barriers to low sodium diet in patients with HF who were older age, who were lower level of education, and who were lower level of income.[16] Amininasab et al. found that medication adherence was associated with lower level of education, and having comorbidities.[6] Kasar and Erzincanlı showed that adherence to medication was associated with age, level of education, having comorbidities, and level of income.[17] The level of education of the patients is important in understanding the effects and side effects of the treatment, and management of the disease. Economic factors such as patients' level of income and the costs of treatment may lead to perceived barriers to treatment adherence, and can also affect the course of the disease.[18,19] Contrary in present study, a systematic review reported that there was no significant relationship between NYHA class and non-adherence to treatment in patients with HF.[2] Köseoğlu and Enç found that the effects of medications in patients with heart failure lead to impairment in the sleep pattern and sleep disorder was found to be a factor in enhancing the perception of barrier to belief in medication treatment.[20] Patients may experience sleep problems due to factors such as the timing their diuretic intake

or simply not believing in the benefit of treatment or do not know that adherence with treatment can alleviate the symptoms.

Gender, and exercise were found to be associated with adherence to treatment. It was found that patients' who were female and who did exercise perceived more benefit in the adherence to medication and diet treatment. Contrary in present study, Seid et al. was found that women showed less adherence to self-care recommendations than men.[21] Family history of heart disease was associated with perception of benefit in adherence to medication treatment. This result may be related to the belief patients had that heart disease could be managed with positive results with treatment, a belief based on their past experiences with family members.

Patients who experienced difficulty maintaining a low sodium diet had more perceptions of barrier in adherence to diet. It may be possible to explain this as follows: Salt consumption in Turkish society is about two times higher than what the World Health Organization recommends. According to 2017 Turkey Household Health Research report daily salt intake is 9.9 gram.[22] In the 2016 ESC guide emphasizes self-care behavior such as sodium restriction may help control the symptoms and signs of congestion in patients with symptomatic heart failure classes III and IV.[4] Alcohol use was associated with perception of barrier in adherence to diet treatment. Sliwa et al. emphasized that adherence of patients with HF avoiding alcohol consumption is higher.[23] According to the guidelines, patients with HF are advised to abstain from or avoid excessive alcohol intake.[4] Perception of alcohol use as a barrier to diet treatment may explain that individual may exhibit excessiveness in their alcohol intake or smoking behaviors, using this excessiveness as a coping mechanism reaction to stressors.

Patients who were informed about HF by health professionals were higher benefit perceptions of adherence to diet treatment. Current evidence suggest that the patient education is effective in creating behavioral change.[24] Providing health professionals with adequate training regarding heart failure and ensuring their effectiveness in their role in educating patients are important factors in ensuring patient adherence to treatment. Patients are better enabled to adapt to their illness and treatments when they received education by health professionals. Studies stated that adherence to self care practices such as low-sodium diet, fluid restriction, regular exercise, and weight monitoring were significantly related to the level of patients' knowledge about HF.[16,25] In line with the above results, it may be said that the information

and adequacy of information that patients with HF receive are important factors in their adherence to diet treatment.

Several methodological limitations may affect the interpretation of the data from our study. Our sample size may have been too small to complete regression analysis. The sample was from a single center. Cultural characteristics of participants may cause differences in their adherence to medication, diet and self-monitoring. Low socioeconomic status and educational levels, fewer females and high average age represent another limitation of the study. The other limitation may be that some patients, in their desire to present themselves in a more positive light, may have reported a high benefit and low barriers and adherence. The level of perception of variables studied and answers chosen by the patients are limited.

CONCLUSION

As a result, adherence to treatment in patients with HF is influenced by many factors. Inadequate information about the diseases of patients may cause barriers in the adherence to medication or diet treatment. Patients' beliefs and attitudes towards the necessity of cure, worries about the negative effects of cure may lead to display negative attitudes to adherence to medication, dietary and self-monitoring. Therefore, enhancing HF patients' knowledge by supplying them with needed information and creating awareness of the barriers related to HF may facilitate adherence to treatment. Training organized by evidence-based practices may be more beneficial in patients with HF before discharge. There is a need for further study to assess and develop patient behavior to improve adherence to heart failure.

AUTHORS' CONTRIBUTION:

NN and SA: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. NN and SA: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

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