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The relationship between frailty syndrome and self-care ability in the elderly with heart failure

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Abstract:

BACKGROUND: Identification of frailty syndrome in patients with heart failure can affect the process of the disease and their ability to self-care. Considering the lack of a study on the relationship between frailty syndrome and self-care ability in the elderly with heart failure in the Guilan province, the North of Iran, this study was conducted to determine the relationship between frailty syndrome and self-care ability in these patients.

MATERIALS AND METHODS: The present cross-sectional correlational study was conducted in 2020. Research settings were the CCU and post CCU wards in the East Guilan public hospitals. The sample size was 125 people who were selected by the convenience sampling method. The research tools include; Self-Care Heart Failure Index and Tilburg Frailty Index Questionnaires. Data were analyzed using SPSS software version 20 using descriptive and inferential statistics with a significance level of 0.05.

RESULTS: The results showed that the mean score of frailty syndrome in the elderly with heart failure was 5.44 ± 2.47 . In addition, the mean score of self-care in the elderly with heart failure was 67.16 ± 10.96 . There was a significant and negative correlation between frailty syndrome and the ability to care in the elderly with heart failure ($P < 0.001$, $r = -0.358$).

CONCLUSIONS: According to the results, the elderly with frailty syndrome cannot take good care of themselves. This indicates that in the management of heart failure, the assessment of frailty syndrome as a care/treatment goal in the care programs of these patients should be considered.

Keywords:

Aged, frailty, heart failure, self-care

Introduction

In the new century; with modern and advanced technology, the world's population is also increasing.^[1] It is estimated that the world's elderly population will reach 1.1 billion by 2025 and 2 billion by 2050 that 54% of them will be in Asia.^[2] In Iran, there is evidence of a significant increase in the elderly population in the near future.^[3] Elderly people are susceptible to a variety of chronic diseases.^[4] It is estimated that 80% of the elderly have at least one chronic disease

and 50% have two chronic diseases.^[5] One of the most common diseases in the elderly group is cardiovascular diseases.^[6] Heart failure is a chronic disease resulting from a functional cardiac disorder^[7] that causes dyspnea, fatigue, intolerance to activity, confusion, weakness, pulmonary edema, chest pain, and palpitations in the patient and it leads to poor quality of life and high costs for the individual and society.^[8] The disease is spreading around the world, and affecting twenty million people. Part of the increase in the incidence of heart failure is due to heart disorders such as myocardial infarction, valvular heart disease, and

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arrhythmias, treatment of these patients is associated with increased survival and increased heart failure statistics.^[9]

Patients with cardiovascular diseases are highly susceptible to frailty syndrome and self-care disorders.^[10] Frailty is a definite sign of aging that is associated with several adverse conditions and consequences.^[11] Various studies have estimated the prevalence of this syndrome in the elderly in different communities from 7% to 26%.^[12] In Iran, few studies have been conducted on frailty.^[13] According to the findings of one study in Amirkola, north of Iran, the prevalence rates of frailty and pre-frailty in older adults were determined at 33.4% and 43.5%, respectively.^[14] In another study in the rural elderly population of Shabestar, East Azarbayjan, Iran, the prevalence of frailty was approximately 50%.^[13]

Frailty is not really a disease but a complex combination of the natural aging process and various medical problems and it has recently attracted the attention of geriatricians around the world. This complex situation is associated with weakness, slowness, decreased energy, decreased physical activity, and in severe cases, extra unintentional weight loss.^[12] Self-care in heart failure is a set of behaviors including diet and medication, restriction of sodium and fluid intake, the amount of activity allowed, daily weighing and searching, and deciding on appropriate treatment measures when the disease intensifies. In fact, the most important principle in self-care is the participation and acceptance of responsibility by the patient.^[15] Self-care in heart failure is a complex process that requires adherence to medical diets, interpretation of the symptoms of heart failure, and the ability to perform primary care and work with caregivers.^[16] Today, self-care is considered as the individual rights and responsibilities of the patient and people are expected to show changes in their health behavior to prevent and treat the disease. Nurses' attention to the concept of self-care provides a good opportunity for patients to increase their authority and participate more in making decisions about treatment and taking care of them.^[17] Various studies have examined frailty syndrome and the ability to self-care in the elderly with heart failure.^[18-20] The review of the literature indicates that studies on old-age frailty have been done mainly in western countries^[13] and so far no study has been conducted to investigate the relationship between frailty syndrome and self-care ability in the elderly with heart failure in Guilan province as the oldest province in Iran. However, given the growing population of the elderly in Iran, identifying these issues can help to obtain more information about the elderly and better planning for them. Therefore, the researchers decided to conduct the present study with the aim of determining the relationship between frailty syndrome and self-care

ability in the elderly with heart failure hospitalized in public hospitals in the East Guilan province.

Materials and Methods

Study design and setting

The present cross-sectional correlational study was conducted in 2020. The study setting was the CCU and post CCU wards of the East Guilan public hospitals that affiliated to Guilan University of Medical Sciences, the North of Iran. Out of 6 public hospitals, three hospitals were randomly selected.

Study participants and sampling

The study population included the elderly with heart failure hospitalized in CCU and post CCU wards of the East Guilan public hospitals that were selected by convenience sampling.

To determine the sample size, based on the study of Uchmanowicz *et al.*^[18] and considering the 95% confidence interval and 80% Statistical power, the sample size was calculated 114. Considering the 10% probability of missing, the final sample size was 125.

The United Nations defines older persons as those aged 60 years or over.^[21] Inclusion criteria were: Age 60 years and above of both sexes (male and female) live in their own homes, heart failure based on clinical signs, ECG and echocardiography, which shows an ejection fraction of < 40% based on the patient's file and with the approval of a cardiologist and the ability to establish communication and providing informed consent to participate in the study. Exclusion criteria included patients with severe mental or cognitive impairment (score <22 on cognitive instruments), neurological problems, patients with cerebrovascular accidents, transient ischemic attack, short-term memory impairment or dementia, and mental instability, (according to the medical record, inability to speak, and the presence of hearing and vision disorders). Exclusion criteria also included the death of the subject and unwillingness to continue cooperation in the study.

Data collection tool and technique

The research instruments included demographic characteristics questionnaire (including age, sex, education, etc.), self-care questionnaire for patients with heart failure, and Tilburg frailty syndrome questionnaire.

Self-care heart failure index

Riegel *et al.* designed the questionnaire for patients with heart failure that includes 15 questions with three subscales included self-care maintenance (5 questions), self-care management (6 questions), and self-care confidence (4 questions) in based on Likert scale with 4 and 5 options (with a score of 1–4). To deal with the

uneven number of items in subscales, responses in each subscale were transformed to 100 points. Higher scores indicating better self-care. The maximum score in each set is 100 for a total possible score of 300 points.^[22] This questionnaire was validated in Moadab *et al.*'s study and its validity was higher than 0.83%.^[23] The reliability of this questionnaire in the present study was obtained using Cronbach's alpha coefficient of 0.82%.

Tilburg Frailty Syndrome Questionnaire (Tilburg frailty index)

It includes 15 questions in three components (physical function, psychological and social): Physical function containing 8 questions with yes/no answers, psychological function including 4 questions with yes/no and yes/sometimes/No answers and of social practice consists of three questions with yes/no and yes/sometimes/no answers. Scoring is zero and one. The maximum score is 15 and a score of 5 or higher indicates the presence of frailty in the elderly. The validity and reliability of this questionnaire were measured by Gobbens *et al.* using a retest method and its reliability was reported to be 0.79.^[24] Mazoochi *et al.* have studied the validity of this questionnaire in Iran.^[25]

For data collection in this study, the researcher after obtaining permission from the ethics committee of Guilan University of Medical Sciences and relevant officials referred to the medical center. After selecting the samples and providing sufficient explanations about the purpose of the research and obtaining their written consent, the questionnaires were completed during the interview with them.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 20 (IBM Corp., Armonk, NY, USA). The Kolmogorov-Smirnov test was used to investigate the hypothesis of normal data distribution. Data were analyzed using descriptive statistics (frequency distribution tables, mean, and standard deviation) and analytical (Spearman correlation test) with a significance level of 0.05.

Ethical consideration

According to the principles of research ethics, all ethical principles are observed in this article. Participants were reminded that the information obtained from them would be kept confidential and they could be excluded from the study whenever they wished. At each stage of the study, the research units could refuse to continue their cooperation if they did not want to. They were also reminded that, if they wished, the results of the research would be made available to them and that their information would be kept confidential.

Results

The results related to the demographic characteristics of the elderly with heart failure hospitalized in East of Guilan hospitals showed that most patients (55.2%) were male, in the age group of 75-90 years (54.4%), married (57.6%), illiterate (71.2%) and low income (60%).

Findings related to the mean score of frailty syndrome in the elderly with heart failure showed that the mean score of frailty syndrome in the elderly with heart failure was 5.44 ± 2.47 , which showed that most of the elderly with heart failure have this syndrome [Table 1].

The results in relation to the frailty components showed that in the physical component, the majority of them (68.8%) had physical fatigue tiredness. In the psychological component, a significant percentage (57.6%) had felt angry or anxious over the past month, but the majority of them (73.6) said they could handle your problems well. social component showed that the majority of patients (88%) receive enough support from other people [Table 2].

Findings related to the status of self-care ability in the elderly showed that the average self-care score in the elderly with heart failure was 67.16 ± 10.96 and it can be concluded that self-care in the elderly with heart failure is not satisfactory [Table 3].

Findings related to the relationship between frailty syndrome and self-care ability in the elderly showed a significant and negative correlation between frailty syndrome and self-care ability in the elderly with heart failure ($r = -0.358, P < 0.001$) [Table 4].

The results related to the relationship between self-care ability and fertility syndrome with demographic variables in elderly people with heart failure showed that there is a significant relationship between self-care ability with age, sex, marriage, education, and income but between fertility syndrome and these variables, no significant correlation was observed [Table 5].

Table 1: Mean score of frailty syndrome and its components in elderly patients with heart failure hospitalized in East of Guilan public hospitals (n=125)

Variable	Mean±SD	Maximum	Minimum
Frailty components			
Physical	3.29±1.975	8	0
Psychological	1.20±0.967	4	0
Social	0.98±0.684	3	0
Total score of frailty syndrome	5.47±2.445	11	1

SD=Standard deviation

Table 2: Descriptive statistics for the tilburg frailty indicator in elderly patients with heart failure hospitalized in East of Guilan public hospitals (n=125)

Frailty components	Yes and sometimes, n (%)	No, n (%)
Physical component		
Do you feel physically healthy?	55.2	44.8
Have you lost a lot of weight recently without wishing to do so?	23.2	76.8
Do you have difficulty in walking?	43.2	56.8
Do you have difficulty maintaining your balance?	33.6	66.4
Do you have poor hearing?	29.6	70.4
Do you have poor vision?	37.6	62.4
Do you have lack of strength in your hands?	48	52
Do you have physical tiredness?	68.8	31.2
Psychological component		
Do you have problems with your memory?	8	92
Have you felt down during the last month?	28	72
Have you felt nervous or anxious during the last month?	57.6	42.4
Are you able to cope with problems well?	73.6	26.4
Social component		
Do you live alone?	15.2	84.8
Do you sometimes miss having people around you?	71.2	28.8
Do you receive enough support from other people?	88	12

Table 3: Mean score of self-care ability and its dimensions in the elderly with heart failure admitted to public hospitals in East of Guilan (n=125)

Variable	Mean±SD	Maximum	Minimum
Self-care ability			
Self-care maintenance	28.24±4.39	38	17
Self-care management	17.98±3.96	24	6
Self-care self-confidence	20.49±4.05	24	6
Total score of self-care ability	67.16±10.96	87	31

SD=Standard deviation

Discussion

The aim of this study was to determine the relationship between frailty syndrome and self-care ability in the elderly with heart failure. Findings related to frailty syndrome in the elderly with heart failure showed that most of these people have frailty syndrome.

The results of the study by Rodriguez-Pascal *et al.* (2017) and Uchmanowicz *et al.* (2015) are in line with the results of the present study revealing that most of the patients with heart failure had this syndrome.^[16,26]

With increased age, physiological changes in various systems of the body decrease. These changes are due to a combination of genetic, environmental, and lifestyle factors. Therefore, some people become increasingly become frailty due to these factors in old age.^[27]

Aging-related complications in the elderly such as loss of function are important and affect patient well-being and potentially disease outcomes.^[28] Frailty syndrome is more common in patients with heart failure than in the general population. Patients with concomitant heart

failure and frailty syndrome are at higher risk for side effects than non-frail patients.^[26]

In addition, the presence of problems such as frailty syndrome acts as an independent predictor of patients' referral to the emergency department, hospitalization, and even mortality.^[26] Assessment of frailty syndrome is possible in patients with heart failure and the prognostic value in these patients is more specific.^[19]

Findings related to self-care ability in the elderly with heart failure showed that self-care ability in these people be not satisfactory.

The results of Moadab *et al.*'s study, Khoshtarash *et al.*, Shojaee *et al.*, Vidán *et al.* are in line with the results of the present study and showed the undesirable self-care status in the elderly with heart failure.^[23,28-30] Many factors affect the performance of self-care behaviors, for example, the increasing age and disease severity can reduce self-care behaviors.^[31]

With aging, the physical and mental functioning of the elderly worsen.^[26] Older age causes more obstacles such as forgetfulness, inability, and more complications.^[32]

The results related to the relationship between self-care ability and demographic variables in elderly people with heart failure showed that there is a significant relationship between self-care ability with age, sex, marriage, education, and income.

The results of Moadab *et al.*'s study showed that gender, income, and educational level were predictors of overall

Table 4: Correlation between frailty syndrome and self-care ability in the elderly with heart failure admitted to public hospitals in East of Guilan (n=125)

Variable	Self-care ability					
	Maintenance		Management		Self-confidence	
	Correlation (r)	Significance	Correlation (r)	Significance	Correlation (r)	Significance
Frailty components						
Physical	-0.015	0.867	-0.094	0.298	-0.012	0.011*
Psychological	-0.009	0.923	-0.172	0.055	-0.023	0.001**
Social	0.055	0.542	-0.055	0.545	-0.033	0.766
Correlation between total score of frailty and self-care ability	$r = -0.358, P = 0.000^{**}$					

Significant difference of values is indicated by * $P < 0.05$ and ** $P < 0.001$

Table 5: Association between the self-care ability and the fertility syndrome with demographic variables in the elderly with heart failure admitted to public hospitals in East of Guilan (n=125)

Variable	n (%)	Frailty syndrome		Self-care ability	
		Mean±SD	P	Mean±SD	P
Demographic					
Age					
60-74	57 (45.6)	5.26±2.588	0.323	59.22±0.495	<0.001**
75-90	68 (54.4)	5.63±2.298		66.17±0.503	
Sex					
Male	69 (55.2)	5.23±2.498	0.471	60.27±0.497	<0.001**
Female	56 (44.8)	5.75±2.337		66.37±0.504	
Marital status					
Single	53 (42.4)	5.68±2.456	0.884	63.51±0.503	<0.001**
Married	72 (57.6)	5.31±2.418		62.30±0.503	
Education					
Literate	36 (28.8)	5.47±2.501	0.940	58.31±0.494	<0.001**
Illiterate	89 (71.2)	5.46±2.417		64.90±0.503	
Income					
Enough and relatively enough	50 (40)	5.21±2.686	0.221	44.42±0.381	<0.001**
Low income	75 (60)	5.52±2.377		67.42±0.501	

Significant difference of values is indicated by ** $P < 0.001$. SD=Standard deviation

self-care status^[23] which is consistent with the results of the present study. Similar results regarding the relationship between self-care ability and demographic characteristics were reported in the study of Sheikh Sharafi and Seyed Amini, Shahbaz and Hemmati-Maslakpak.^[33,34]

Patients with heart failure face many obstacles in performing self-care behaviors, such as lack of information, physical limitations, incompatibility with multiple and complex treatments, emotional problems, and other chronic diseases that all of which affect their self-care behavior.^[29]

The self-care abilities of patients with heart failure are low and there is still no convincing explanation for this.^[26] Severe physical problems in patients with heart failure make them unsuccessful in self-care. Restriction due to old age, association with other chronic diseases, vision and hearing impairment and dementia, decreased income, and lack of knowledge about treatment and diet, make self-care difficult in patients with heart failure.^[30] Therefore, if frailty is suspected, a comprehensive and multidisciplinary

assessment of the medical and functional aspects of the patient should be performed.^[35]

Findings on the relationship between frailty syndrome and self-care ability showed a significant inverse correlation between frailty syndrome and self-care ability in the elderly with heart failure. The results of a systematic review and meta-analysis study in 2020 reported the association between frailty and heart failure. In this study, it was reported that people with heart failure are 3.4 times more likely to develop frailty syndrome.^[36] A study by Uchmanowicz *et al.* showed that hospitalized patients with heart failure have higher scores of frailty syndrome^[26] which is consistent with the results of the present study. This indicates the inability of this group of patients and their need of medical care. It can also be the result of self-care disorders in elderly patients with chronic heart failure.^[20] The Son *et al.*' study showed that frailty had a negative and significant relationship with self-care behaviors^[37] which is consistent with the present study. In addition, the study of Mlynarska *et al.* showed a relationship between frailty syndrome and low level of self-care.^[20]

On the other hand, the presence of other problems along with heart failure makes the components of patients' self-care behaviors more and more complex, which will affect self-care behavior.^[36] Therefore, it is suggested that the factors affecting frailty syndrome and self-care ability in the elderly with heart failure be further investigated to take the necessary measures to combat these factors.

Clinically, frailty should be assessed to ensure optimal monitoring for patients with heart failure and to make necessary changes in the treatment process of these patients. Early detection of risk factors for frailty syndrome can improve treatment outcomes of heart failure.^[38]

Higher scores on the social component in the study by Uchmanowicz *et al.* indicate limited social support in elderly patients and are associated with a higher risk of readmission to the hospital.^[38]

The main strength of this study is that it addresses the issue of frailty as one of the most important issues in the elderly, which has been less studied in our country. In other words, addressing this issue provide new information that awareness of its results can be considered by the authorities to plan in care programs to assess the frailty syndrome and increase the ability of self-care in these patients.

One of the limitations of the present study was the use of questionnaires that some patients may not provide completely correct answers. This study examined the frailty syndrome and self-care ability in the elderly with heart failure in the CCU and post-CCU wards of East of Guilan public health centers, therefore its results cannot be generalized to the frailty syndrome and self-care ability of the elderly in general or the elderly to other diseases in other cities and places. Therefore, it is suggested that the status of frailty syndrome and self-care ability of the elderly with other diseases should be performed in separate studies and their results compared.

Conclusions

The results showed a significant relationship between frailty syndrome and self-care ability in the elderly with heart failure. In general, the relationship between heart failure and frailty syndrome is complex. In addition, the coexistence of heart failure and frailty syndrome can negatively affect concomitant diseases and increase the risk of falls, disability, hospitalization, and death. Longitudinal studies to examine the bilateral pathophysiological pathways between heart failure and frailty are needed to further elucidate this relationship and show whether specific treatments for heart failure may prevent frailty or exacerbate it.

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Conflicts of interest

There are no conflicts of interest.

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