Original Article

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Perceived Stress, Self Efficacy and Quality of Life in Patients with Heart Failure: A Structural Equation Model

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Abstract

Background: The high prevalence and mortality of heart failure is associated with reduced quality of life. The aim of the study was to determine the relationship between self-efficacy and perceived stress with quality of life in patients with heart failure.
Methods: Participants were 298 patients referred to the cardiac unit of Farabi Tamin Ejtemaiy hospital in Mashhad. They completed three questionnaires. They were evaluated with the Minnesota living with heart failure questionnaire MLHFQ, 21 items (Rector 1984), self-efficacy (10 items, Schwarzer et al., 1982), and perceived stress questionnaire (14 items, Cohen et al., 1983). Data were analyzed by SPSS and LIZREL software.
Results: The findings revealed that the quality of life of patients with heart failure is affected by perceived stress and self-efficacy. Therefore, perceived stress hurts the quality of life. Self-efficacy has also been able to mediate the relationship between perceived stress and quality of life, so that its path coefficient was equal to -0.36. Evaluation of the model with multiple indices RMSEA (0.082) and GFI (0.92) showed that the proposed model fits the data.
Conclusions: Due to the fact, perceived stress conversely and also through self-efficacy can improve the quality of life of patients with heart failure.

Keywords: Patients heart failure, Quality of life, Self-efficacy, Stress, Structural equation model.
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Introduction

Heart failure (HF) is one of the most important chronic diseases in the world.[1,2,3] HF is considered a final common pathway for many cardiovascular diseases.[1] About 26 million people in Asian countries live with heart failure. The prevalence of this disease in Asian countries is about 1.26% to 6.7%.[1,4] The cost of the disease in the United States in 2012 was estimated at $ 30.7 billion.[4] Almost a decade ago, the cost of this disease in Iran was estimated at about 40 billion Tomans per year.[5] The prognosis of this disease is poor. However, the death toll has dropped.[4] But new treatments have only increased the number of patients and their longer life expectancy.[6,7] Although risk factors for developing heart failure is different in different regions and ethnic groups,[4] but the physical and psychological signs and symptoms in patients with heart failure are the same.[1,3,6,8] These conditions cause many mental disorders in patients.[2] Of course, all patients with heart failure have a lower quality of life than the general population experience.[1-3,6-13] Many factors affect the quality of life of patients. Management of chronic diseases by recognizing the factors associated with quality of life is possible.[14]

Quality of life represents the emotional health and psychological characteristics of individuals.[6,13] Quality of life is a concept higher of health, which is influenced by many factors.[11] Research shows that the quality of life of individuals influences the characteristics of the disease, linked and influenced by the personal and psychological characteristics of individuals.[9] There is no doubt that chronic disease has an adverse quality of life.[14] Besides, Quality of life in HF patients is affected by many factors such as gender,[7] social support,[15] personality,[16] and lifestyle.[7,14] Of course, studies have shown that stress is one of the major risk factors to the quality of life in the HF.[14,17-24]

Studies have shown that if the perceived stress continues, it has an impact on the formation of quality of life in the elderly,[17,19] nurses,[20] students,[23] and pharmacy students.[21,22] Perceived stress is associated with feelings of shame,[25] negative effects, hardiness, and self-criticism.[26] Moreover in the normal population, perceived stress is one of the most important Variables in causing anxiety and depression[27] and reducing the quality of life in chronic patients.[18,28-30]

Stress,[31] anxiety, and depression are reported in people with heart failure very severe.[8,32] Also the effect of perceived stress on disturbed sleep in patients with heart failure has been reported to be very high.[33] Studies have shown that in addition to demographic variables (such as female gender, low income, etc.),[34] personality type D characteristics (negative emotions and social inhibition including restlessness, irritability, and anxiety),[16] happiness, anxiety and depression can also increase perceived stress in people with heart failure.[35] Also, some believe, the relationship between perceived stress and disease is moderated by some variables.[36,37] Studies have shown that programs leisure,[38] depression, anxiety,[39] hardiness,[40] and social support[25] can be mediated the relationship between perceived stress and quality of life. Self-efficacy is considered as another mediating variable of perceived stress and quality of life.[41] Self-efficacy is defined as the ability to execute tasks. Self-efficacy is a psychological structure that affects how challenging the environment is.[29,42,43] Self-efficacy of the

factors that can directly manage heart failure.[44] Perceived stress can also lead to lower self-efficacy and lower self-efficacy by activating the endocrine system. As a result, higher self-efficacy is associated with less perceived stress.[29,45,46] However, research has shown that self-efficacy modulates the effect of perceived stress.[29,41,47] However, so far, research in patients with heart failure has not surveyed the mediating role of self-efficacy in the relationship between perceived stress and quality of life. Therefore, the main goal of the present study is to investigate the mediating role of self-efficacy in the relationship between perceived stress and quality of life in patients with heart failure.

Materials and Methods

A cross-sectional descriptive study and correlation using structural equation modeling were conducted. Participants in the study were 298 HF patients who were selected by convenient sampling method. Participants completed the questionnaires in the first quarter of 2019. All participants in the study had three features of the age between 50 and 65 years, five-year history of cardiovascular disease, and living in the cities of Mashhad. Gender was the moderating variable of the study. Participants completed the written consent participation of the research before completing the questionnaires. The research tool was three questionnaires which are Minnesota living with heart failure questionnaire (MLHFQ), perceived stress questionnaire, and self-efficacy scale.

Minnesota living with heart failure questionnaire (MLHFQ): Rector (1984) set up this questionnaire to assess the quality of life in patients with heart failure. The questionnaire has 3 subscales and 21 items.[13] Scoring is on a Likert type scale from zero to five. The number zero indicates the best state and five the worst state. The questionnaire scores are between 0 and 105. Behlouli has specified the cutting points of the questionnaire: a score below 24 (good quality of life), a score of 24 to 45 (average quality of life), and a score above 45 (bad quality of life).[48] Kubo (2004) reported that there was a significant relationship between MLHFQ scores and the severity of heart failure based on the NYHA classification.[49] The questionnaire has appropriate face validity and reliability.[13,48,49] Abbasi et al reported the reliability of the questionnaire by Cronbach's alpha method of 0.96[50] and Eskandari et al reported it as 0.95.[13]

Perceived stress questionnaire: Cohen et al. (1983) set up this questionnaire. The questionnaire has three versions of,[4,10] and 14 items.[51] The scoring of the questionnaire, using the Likert scale type, is a range of zero to four. The lowest score is zero and the highest score is 56. Items 4, 5, 6, 7, 9, 10, and 13 are scored in reverse. A higher score showed more perceived stress. In the present study, a 14-item version has been used. This questionnaire has two subgroups of negative and positive perceptions of stress.[52] Cronbach's alpha coefficient for the 14-item version in three studies have been 0.84, 0.85, and 0.86.[53] The Cronbach α coefficient for the PSS total score indicated has adequate internal consistency in Ghasedi Qazvivini and Kiani research (2018) ($\alpha=0.73$)[23] and as well as Ali Mohammadi, Sotoudeasl and Karami research (2019) ($\alpha=0.83$).[17] The validity of the perceived stress concept for psychosomatic interactions is supported by evidence that high scores on Cohen's perceived stress scale.[17,23]

General Self-Efficacy (GSE): Schwarzer and Jerusalem (1984) set up this questionnaire. The questionnaire has ten positive items. Scoring is done using a four-choice Likert scale type from the point that is not correct at all until the point is completely correct. The lowest score in each item is one and the highest score is four. The lowest self-efficacy score is ten and the highest is forty. Schwarzer et al. obtained the internal consistency coefficient of general self-efficacy scale editions for students in Germany 0.84, Costa Rica, and Spain 0.81, and China 0.91.[54] In Iran, Delavar et al. (2013) reported that the scale reliability was 0.87 for all subjects, 0.85 for men and 0.8 for women.[55] Also in the study of Shams et al. (2011), Cronbach's alpha of this questionnaire was reported between 0.81 to 0.91%, and its internal consistency coefficient was between 0.81 to 0.91%.[56] The hypothesis and research model were investigated using pathway analysis method and using SPSS & LIZREL software

Results

Participants had a mean age of 58.32 and a standard deviation of 23.5. Also, 58.7% of the participants were married and 20.1% were single. The history of given other diseases was 68.8%. All participants were male. The hypothesis was tested to examine structural equation modeling analysis. The model of the research was examined in the form of a proposed model using the collected data. The normality of the data was analyzed. Table 1 shows the descriptive indices of the variables including mean, standard deviation, skewness, and kurtosis.

Table1. Mean scores of variables among participants of the study

Variable	Mean	SD	Skewness	Kurtosis
Perceived stress	37.38	12.14	0.54	-0.98
Self efficacy	20.08	09.54	0.37	-1.52
Quality of life	64.43	31.37	-0.26	-1.64

Table 2 shows the relationship between the variables. The correlation coefficient of perceived stress with quality of life was -0.346. The correlation coefficient of self-efficacy with quality of life is 0.445 and also self-efficacy with perceived stress is -0.389, which is statistically significant at the level of 0.01.

Table 2. Bivariate correlations among the target variables

Variable	Quality of life	Perceived stress	Self efficacy
Quality of life	1		
Perceived stress	-0.346**	1	
Self efficacy	0.445**	-0.389**	1

**P<0.01

As seen in table 3, all indicators were goodness fit. Therefore, the validity of the model is generally confirmed. The final measurement model was found to be of sufficient reliability to continue with constructing as a structural model.

The significant effect of each independent variable on the dependent is determined using T-statistic. The table below shows the result of the hypothesis test for the path coefficient of -0.67 and the value of T is equal to -9.33. As a result, perceived stress has a negative and significant effect on the quality of life. In the experiment of another hypothesis with a path coefficient of 0.54 and a T value of equal to 7.57, it was found that self-efficacy has a positive and significant effect on the quality of life. The results of the main hypothesis test with a path coefficient of -0.25 and a T value of equal to -3.67 indicate that perceived stress has a negative and significant effect on the quality of life.

Figure 1 shows the factor coefficients and the effect of each of the load factors, which must be higher than 0.4. Figure 2 shows the significance of each of the load actors and path coefficients, which should be higher than 1.96 at the error level of 0.05. The significant effect of each independent variable on the dependent is determined using T-statistic. The table 4 shows the result of the hypothesis test for the path coefficient of -0.67 and the value of T is equ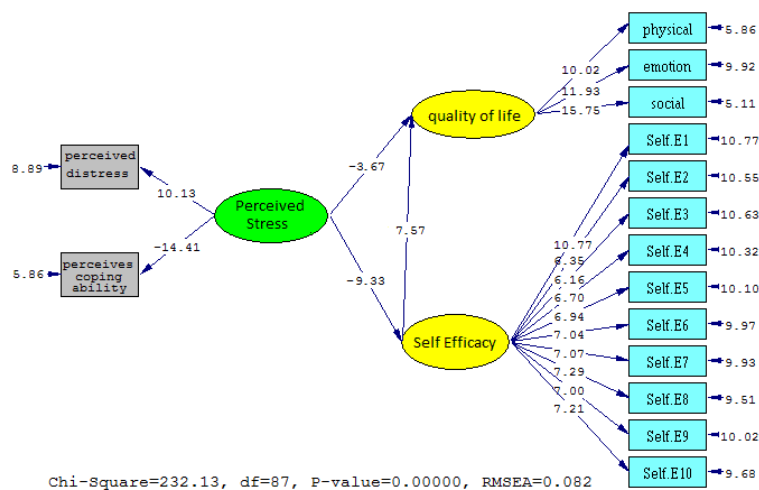al to -9.33. As a result, perceived stress has a negative and significant effect on the quality of life. In the experiment of another hypothesis with a path coefficient of 0.54 and a T value of equal to 7.57, it was found that self-efficacy has a positive and significant effect on the quality of life. The results of the main hypothesis test with a path coefficient of -0.25 and a T value of equal to -3.67 indicate that perceived stress has a negative and significant effect on the quality of life.

Table3. Goodness of fit (GOF) indices for the baseline model

Model fit indices	Description	Minimum acceptable limit	Final measurement model
X^2/df	Relative chi-square	3<	2.67
RMSEA	The root of the mean power of the approximation error	0.1<	0.08
GFI	Goodness of fit index	0.9>	0.92
RMR	The root mean square residual	0.1<	0.07
NFI	Normed fit index	0.9>	0.91
CFI	Comparative fit index	0.9>	0.91

Chi-Square=232.13, df=87, P-value=0.00000, RMSEA=0.082
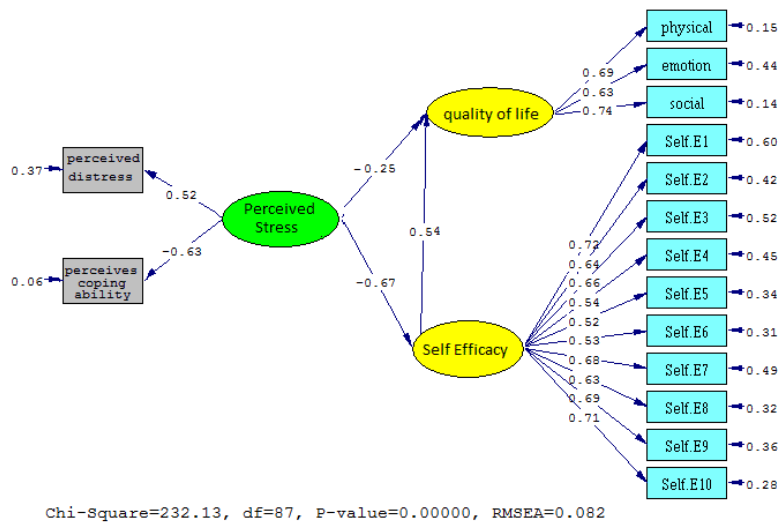
Figure 1. Factor coefficients and path coefficient of research model

Chi-Square=232.13, df=87, P-value=0.00000, RMSEA=0.082

Figure 2. Model t-test results

Table 4. Standardized correlation coefficients between variables using the structural equation regression model

Path	Path coefficient	T statistics	Standard eror (SE)	Result
Perceived stress on self-efficacy	-0.67	-9.33	-0.072	Reception
Self-efficacy on quality of life	0.54	7.57	0.071	Reception
Perceived stress on quality of life	-0.25	3.67	0.067	Reception

Due to the confirmation of the relationship between the variables separately, it can be said that self-efficacy has a mediating effect on the relationship between perceived stress and quality of life. So that its path coefficient is equal to -0.67 $\times$ -0.54 = -0.36, the Zabel test was also used to make the effect of the mediating variable significant. The result of the Zabel test also confirmed the hypothesis. Zabel test uses a Z statistic. Overall, the results show that perceived stress has an indirect and negative effect on the quality of life with mediating and moderating of self-efficacy in heart failure patients.

Discussion

The results of the study confirmed our hypothesis that the links between perceived stress and quality of life with the intermediacy effect of self-efficacy are there. It can be said that the quality of life of people with heart failure has a direct relationship with perceived stress through self-efficacy. The results show that increasing the quality of life of patients with cardiovascular failure can be associated with reducing perceived stress and increasing self-efficacy. The results of the present study are in line with previous studies in chronic patients.[29,47] This model indicates the fact that the reduction of perceived stress can lead to an increase in quality of life in patients with heart failure.

In analyzing and explaining the relationship between variables, it is important to state some things. The quality of life of chronic patients is affected not only by psychological factors but also by disease conditions.[14,29] Quality of life is affected by perceived stress.[17,18,23,28,29,30] Heart patients respond to environmental stimuli with high-stress reactions, as a result of which this perceived stress exacerbates the symptoms and complications of the disease[34,37] and reduces a person's ability to face problems.[46] Also, perceived stress weakens the immune system. Therefore, it plays a major role in the incidence of chronic diseases.[18] Obesity, excessive alcohol consumption, and smoking are more common in people with high perceived stress.[34] These variables are risk factors for heart disease.[12] Highly perceived stress, according to Lazarus stress theory, reduces the quality of life in obese people,[23] people with heart failure, as well as other chronic patients.[24] Because high stress leads to an underestimation of a person's resources and abilities to cope with illness, the ability to deal with problems is lost and ultimately reduces the quality of life in patients.[18] Lazarus' theory states Stress created after the initial appraisal of stimuli. Then cognitive appraisal is made as to whether the stimulus is inherently harmful, damage, or dangerous. As a result, the perception that stress is a stimulus makes a secondary assessment to examine individual resources. Symptoms of perceived stress experience if a person does not consider their resources sufficient to cope with stimulus.[30]

Thus, although several variables, including the elderly living with adult children,[19] the inability to use mindfulness methods, and the training of adaptive coping strategies,[30] are effective in perceived stress. But the most important source of stress perception is the individual's own thoughts.[26] Assessing competencies and believing in competencies shows a person's self-efficacy.[36] According to Bandura's theory, self-efficacy is formed through proper behavior, observational learning, verbal persuasion, and emotional states (low of stress).[43] Therefore, if people evaluate their internal resources to cope well with illness, their quality of life will increase.[45] So self-efficacy can immediately affect perceived stress[36] and quality of life.[29,47] Self-efficacy also increases self-confidence and the ability to cope with problems.[43,46] The effects of self-efficacy are observed in a great many domains. Behavior including smoking, pain control, health, recovery of heart disease, coping with chronic disease, and psychological states, such as anxiety, stress, arousal and, mood states.[29] Hence, self-efficacy may be expected to mediate between perceived stress and the quality of life experienced by patients with heart failure. However, low self-efficacy is not a predictor of disease.[14] But self-efficacy directly and mediates the quality of life of heart failure patients.[29] Thus, perceived stress and self-efficacy, in general, can predict the quality of life both directly and indirectly. The training classes for patients with heart failure, to know ways to cope with stress and make confident is recommended. These can improve the quality of life. Further research needs to consider the role of other psychological variables in quality of life patients with heart failure.

Acknowledgement

Conflict of Interest

The authors declare that they have no conflict of interest.

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