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The effect of a program for improving positivity skill on perceived stress among patients with chronic heart failure

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Abstract:

BACKGROUND: Since chronic heart failure would cause various physical outcomes and limitations, it could create significant changes in the mental status of the patients. One of the problems among these patients is increased stress levels. Therefore, the present study was conducted to determine the effect of a program for improving positive skills on perceived stress among patients with chronic heart failure.

MATERIALS AND METHODS: The present randomized clinical trial was conducted on 72 chronic heart failure patients who were hospitalized at Chamran Medical Center of Isfahan. The samples were selected using available sampling from patients and meeting the inclusion criteria. Then the samples were randomly divided into intervention and control groups. A positive skill improvement program was performed for the intervention group during 6 sessions. Data gathering tools included demographic characteristics form and Perceived Stress Scale (PSS). This questionnaire was completed by the patients before, right after, and one month after the intervention. Data were analyzed using SPSS software 22 and descriptive and inferential statistical tests.

RESULTS: Results showed no significant difference between the intervention and the control groups regarding the mean score of perceived stress and its dimensions before the intervention ($P = 0.156$). The mean score of perceived stress in the intervention group right after ($P < 0.001$) and one month after the intervention ($P < 0.001$) showed a statistically significant difference. While, no significant difference was observed in the control group, before, right after, and one month after the intervention ($P > .597$).

CONCLUSION: It is recommended that similar interventions be conducted for hospitalized patients by the nurses.

Keywords:

Education, heart failure, positive psychology, stress

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Introduction

Cardiovascular diseases have recently emerged as a leading cause of global mortality and disability. According to WHO, cardiovascular diseases claim approximately 17.9 million lives annually.^[1] Heart failure, one of the most prevalent cardiovascular conditions, affects over 64 million individuals worldwide.^[2] In Iran, heart

failure accounts for 46% of all mortalities and 23% of the disease burden.^[3] Physical symptoms of chronic heart failure (CHF), such as breathlessness, fatigue, edema, and dizziness, significantly impact patients' personal, social, and family lives.^[4] The disease's chronic and progressive nature exacerbates mental health issues, including high levels of perceived stress, which worsen physical outcomes and increase hospitalizations.^[5,6] High perceived stress in heart failure patients has been linked

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to adverse physiological changes, accelerated disease progression, and compromised cardiac function.^[7,8] Endrighi *et al.* (2019) showed that stress impairs cardiac function, while Esler (2017) found it exacerbates disease progression.^[9,10] Thus, effective interventions for managing stress in these patients are essential for enhancing longevity, symptom management, and quality of life.^[11]

While traditional stress-reduction methods, such as cognitive behavioral therapy and self-compassion training, yield varying results,^[12,13] positive psychology offers a potentially more accessible approach for hospitalized heart failure patients. This field emphasizes positive thinking and coping mechanisms, enhancing psychological resilience and fostering positive health behaviors.^[14] Positive thinking can significantly improve patients' mental health and help them manage stress by boosting self-awareness, self-efficacy, and emotional regulation.^[15,16] By enhancing positive perceptions and reducing negative emotions, positivity-focused interventions help patients adjust to their chronic condition and improve stress management.^[17] Research shows that such interventions have successfully reduced stress among patients with psychosomatic disorders and mothers of children with autism.^[18,19]

This study is one of the first to explore the impact of a structured positivity skill improvement program on perceived stress among patients with CHF. Although positive psychology interventions have been applied to various chronic illnesses, few studies have specifically targeted CHF patients—a population in which high stress exacerbates physical symptoms, impacts the quality of life, and increases healthcare utilization. This research fills an important gap by introducing and assessing a novel, non-pharmacological approach to managing stress in CHF patients, potentially offering a scalable, cost-effective complement to traditional treatment. The findings contribute to the limited literature on psychological interventions in heart failure management and suggest a new pathway for enhancing mental health and quality of life in this vulnerable population. Therefore this study aims to evaluate the effectiveness of a positive skill improvement program for reducing perceived stress in hospitalized CHF patients.

Methods and Materials

Study design and setting

This randomized controlled clinical trial (RCT) with a pre-test/post-test design was conducted to evaluate the effect of a positivity skill improvement program on perceived stress among patients with CHF. The study took place at Chamran Hospital in Isfahan between March and August 2023.

Study participants and sampling

The study population included CHF patients hospitalized at Chamran Hospital. Patients aged 35 to 70 who were diagnosed with heart failure for at least one year, could read and speak Persian, and possessed a smartphone with social media access were considered eligible. Additional inclusion criteria included a willingness to participate, no history of psychological disorders requiring hospitalization or drug therapy, and no major life stressors, such as divorce or the death of a close relative, within the last six months. Exclusion criteria included the inability to complete the intervention due to severe physical or psychological distress, missing two or more educational sessions, and reluctance to continue participation. Sample size was

calculated using the formula
$$\frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 (S_1^2 + S_2^2)}{(d)^2}$$

and the study of Samin (2018) and Assarzadegan (2019) and considering a 95% confidence interval and 80% test power.^[20,21] The number of samples was achieved to be 70 and was increased to 78 considering the rate of sample loss. At the beginning, researchers selected 96 patients and 18 were not enrolled in the study due to not having the inclusion criteria or unwillingness to participate. Then the remaining 78 patients were randomly divided into two groups of control (39 patients) and intervention (39 patients). During the study, 3 participants dropped out of the intervention group. Dyspnea was aggravated in two of these patients and one patient needed aggressive therapeutic intervention. From the control group, the physical symptoms of one patient were aggravated, and 2 patients were excluded from the study due to incomplete answers to the questions, and the final analysis was performed on 36 patients in each group [Figure 1]. Samples were selected using convenient sampling from the patients who hospitalized at Chamran hospital and had the inclusion criteria. Then samples were randomly allocated into two groups of intervention and control. Random allocation of the samples was conducted using the table of random numbers.

Data collection tool and technique

Data gathering was conducted using the demographic characteristics form and the Perceived Stress Scale by Cohen *et al.* (PSS). Demographic characteristics form included age, gender, marital status, educational level, income level, place of residence, and caring for the patient at home. Perceived Stress Scale by Cohen *et al.* (1983)^[22] is used for evaluating the general level of perceived stress during the past month and evaluates the thoughts and emotions related to stressful events, and the ability to control, overcome, and confront mental and experienced stress. This scale has 14 items and each item is scored based on a 5-point Likert scale from totally disagreed to agreed as nothing (score of 0), low (score of 1), moderate (score of 2), high (score of 3),

and very high (score of 4). This questionnaire has two subscales of negative perception of stress (perceived frustration) and positive perception of stress (perceived self-efficacy), which are scored in reverse; meaning that nothing is scored as 4 and very high as 0. The achieved score for this questionnaire is between 0 and 56. It must be noted that the lowest score of positive perception of stress was 0 and the highest score was 28; whereas higher scores indicate better mental condition of the patient. The score of negative perception of stress was between 0 and 28 where lower scores indicate better condition of the patient. Cohen approved the reliability of this questionnaire using the test-retest method with a Cronbach's α of 0.85 for the entire questionnaire and 0.84 and 0.86 for each of the aspects.^[22] In Iran, Safaei and Shokri reported Cronbach's α for the aspects of positive perception of stress and negative perception of stress and the total score of the questionnaire to be 0.80, 0.60, and 0.76, using test-retest method.^[23] Also, Durán *et al.*^[24] in Iran, reported that the Cronbach's α for this questionnaire was 0.74.

Ethical consideration

To conduct the present study, first, the researcher obtained the ethics code from the ethics committee of the Isfahan University of Medical Sciences (IR.MUI.NUREMA.REC.1401.155) and registered the clinical trial under the clinical trial code of IRCT20180601039934N2. Then, after obtaining a recommendation letter from the deputy of research of the Isfahan University of Medical Sciences for entering the study environment, referred to the Chamran Medical Center. After meeting with the authorities of the hospital, providing the recommendation letter, introducing themselves, and explaining the methods and goals of the study, the researcher obtained the consent of the authorities for performing the study. The researcher visited the hospitalization wards at specific hours and selected the samples using a convenient sampling method from the hospitalized patients who had the inclusion criteria. After explaining the methods and goals of the study, patients were invited to participate and after providing the necessary explanations about the goals and stages of the study, informed consent was obtained from the participants. Then the participants were randomly divided into intervention and control groups. Afterward, a positivity skill program was conducted for the intervention group during 6 sessions of 45–60 minutes daily in the afternoon. Sessions were held in the format of 4-participant groups by the researcher who had obtained the license for a positivity psychology workshop before in the patient's room. Sessions' educational content was gathered based on the previous literature and Seligman's educational package (2005),^[25] which was approved by 5 academic members of the psychiatric nursing department of nursing and midwifery faculty of Isfahan [Table 1]. If the patient was discharged from the hospital before

6 days, the educational content was shared with them using social media applications and if the patient had no access to social media, a meeting was scheduled for educating the patient. After the intervention Perceived Stress Scale was again completed by the participants of both groups right after and one month after the intervention. To respect ethical considerations, after the study was ended, educational pamphlets and a summary of the educational sessions were provided to the participants of the control group.

Statistical analysis method

Data were analyzed using SPSS version 22. To assess the distribution of scores between the intervention and control groups, the Kolmogorov–Smirnov test was applied. T-tests and Fisher's exact tests were used to compare baseline characteristics between the groups. Repeated measures analysis of variance (ANOVA) evaluated changes in perceived stress over time within and between groups. The primary outcome was the difference in mean perceived stress scores over time, with significance set at $P < 0.05$.

Results

In the present study, 72 patients with CHF (36 in the control group and 36 in the intervention group) were evaluated. The mean and SD of the patient's age in the control group and the intervention group were respectively 56.58 ± 8.93 and 53.68 ± 12.02 years old ($P = 0.58$). Also, most of the patients in the control group (63.9%) and the intervention group (61.6%) were male ($P = 0.808$). No statistically significant difference was observed between the intervention and the control group regarding the demographic characteristics of the participants ($P > 0.05$) [Table 2]. As shown in Tables 3 and 4, results of variance analysis with repeated measures showed no significant difference between the intervention and the control group regarding the mean score of perceived stress before the intervention (intervention: 31.38 ± 3.77 , control: 31.36 ± 5.56) ($P < 0.05$). However, the mean scores of perceived stress in the intervention group right after and one month after the intervention were 29.78 ± 2.97 and 29.36 ± 2.67 , respectively; while in the control group, the mean scores were 31.69 ± 5.35 and 32.06 ± 4.85 , respectively. Results indicated a significant decrease in the mean score of perceived stress of the intervention during the following month after the intervention ($P < 0.001$), while no significant decrease was observed in the mean score of perceived stress and its dimensions in the control group following the intervention ($P < 0.05$). Also, according to the results shown in Tables 3 and 4, results of variance analysis with repeated measures showed a significant decrease in the mean scores of dimensions of perceived

Table 1: Content of the educational sessions based on positivity skill improvement program

Session	Educational content	Homework
1 st	-Greetings and introduction to the researcher and the program -Getting to know the group and its rules -Getting to know the concept of CHF -Getting to know the concept of positivity -Performing the pre-test stage	Write down at least two of your thoughts (positive or negative) during the day
2 nd	-Reviewing the previous session and its homework -Understanding the formation of thoughts and emotions -Understanding negative and irrational thoughts and methods for regulating them -Educating positivity through challenging negative thoughts -Dismissing negative thoughts in life -Positive thinking and its effect on an individual's health and life span	Write down one of your thought distortions and then replace it with a more regulated thought
3 rd	-Review the previous session and its homework -Acknowledgements -Emphasize good memories and gratitude	Write down three good things that make you thankful for others Find something for gratitude or appreciation during the day share it with your favorite person and write it down
4 th	-Review the previous session and its homework -Hope -Optimism	Share at least one of your successes during the day with people around you
5 th	-Review the previous session and its homework -Enjoyable life -Sharing joyful experiences with others -Making memories -Congratulating yourselves	Write down one of the joyful experiences of your life during the past week that was shared with someone else
6 th	-Review the previous session and its homework -Summarizing the mentioned topics in previous sessions and creating a new structure for individual's cognition, behavior and excitement -Performing the post-test stage -Acknowledgement and gifting the participants	

stress (negative and positive perceived stress) right after and one month after the intervention in the intervention group, in comparison to the control group ($P < 0.001$).

Discussion

Results showed a significant decrease in the mean score of perceived stress and its dimensions (negative and positive perceived stress) right after and one month after the intervention in the intervention group while no significant changes were observed in the control group. In this regard, the results of the study by Shokrpour *et al.*^[17] (2021) showed that positivity education would decrease the level of stress in hemodialysis patients, which is in line with the results of the present study. Although the type of chronic disease in the present study was different from the study by Shokrpour *et al.*,^[17] since the main cause of stress in most of the patients with chronic diseases is unawareness or negative thoughts about themselves and their environment, and also considering that the main goal of programs based on positivity skill improvement is educating internal and external control for confronting the problems, optimistic thinking and fighting negative thoughts, and improving

the relationships and awareness of individuals about their strengths and abilities; therefore, it could affect the stress level of all patients with chronic diseases. It could be said that patients who underwent the intervention in the present study were also able to decrease the level of their perceived stress through the mechanism of action of positivity skills.

The results of the present study were in line with the results of the study by Barjoe *et al.*^[26] (2022). In their study, they revealed that educating positivity would decrease the level of perceived stress in women suffering from cancer. Although the study population of the mentioned study was different from the present study, both studies had similarly used the Perceived Stress Scale by Cohen for data gathering, which would provide more accurate results of the effect of positivity education on perceived stress in the chronic patients of both studies. Both studies have provided useful approaches for patients to determine negative thoughts about disability for controlling stress and anxiety through positivity education, and it has helped the patients to acknowledge their perceived stress, improve their confrontation and endurance ability, and increase their internal resistance against stress.

Table 2: Comparing the demographic characteristics between the control and the intervention groups

Studied variable		Mean±SD		Results of intergroup comparison
		Control	Intervention	
Patients' age		58.56±8.93	53.86±12.02	P=0.064*
Studied variable		No. (percent)	No. (percent)	Results of intergroup comparison
Gender	Female	13 (36.1)	14 (38.9)	P=0.808**
	Male	23 (63.9)	22 (61.6)	
Marital status	Married	30 (83.3)	26 (72.7)	P=0.576**
	Single	3 (8.3)	5 (13.9)	
	Divorced	0 (0)	2 (5.56)	
	Widow	3 (8.3)	3 (8.3)	
Occupation	Employee	10 (27.8)	5 (13.9)	P=0.374**
	Unemployed	5 (13.9)	3 (8.3)	
	Retired	7 (19.4)	12 (33.3)	
	Housewife	13 (36.1)	13 (36.1)	
	Disabled	1 (2.8)	3 (8.3)	
Educational level	Under diploma	26 (72.2)	18 (50)	P=0.133**
	Diploma	5 (13.9)	11 (30.6)	
	Academic	5 (13.9)	7 (19.4)	
Income level	Less than living expenses	30 (83.1)	32 (88.9)	P=0.602**
	Equal to living expenses	5 (14.1)	4 (11.1)	
	More than living expenses	1 (2.8)	0 (0)	
Place of residence	City	28 (77.8)	29 (80.6)	P=0.772**
	Village	8 (22.2)	7 (19.4)	
Caregiver at home	Spouse	25 (69.4)	25 (69.4)	P=0.924**
	Son	2 (5.6)	1 (2.8)	
	Daughter	5 (3.9)	5 (3.9)	
	Sister	1 (2.8)	0 (0)	
	Mother	2 (5.6)	4 (11.2)	
	Nobody	1 (2.8)	1 (2.8)	

*t-test. **Fisher's exact tes

Table 3: Comparing the mean score of perceived stress and its dimensions between the control and the intervention groups before, right after and one month after the intervention

Dimensions of perceived stress	Group	Mean±SD			Results achieved by the effect of time in each group	Results of the simultaneous effect of group therapy and time*
		Before the intervention	Right after the intervention	One month after the intervention		
Negative perception of stress	Control	9.22±4.56	9.28±4.05	9.14±3.81	<0.001	<0.001
	Intervention	9.03±3.17	17.72±2.41	15.22±2.17		
	Results of comparing two groups at independent times	>0.05	<0.001	<0.001		
Positive Perception of Stress	Control	15.42±4.00	15.03±3.76	14.81±3.87	<0.001	<0.001
	Intervention	15.14±3.17	8.50±2.21	11.42±2.33		
	Results of comparing two groups at independent times	>0.05	<0.001	<0.001		
Total perceived stress	Control	31.36±5.56	31.69±5.35	32.06±4.85	<0.001	<0.001
	Intervention	31.38±3.77	29.78±2.97	29.36±2.67		
	Results of comparing two groups at independent times	>0.05	<0.001	<0.001		

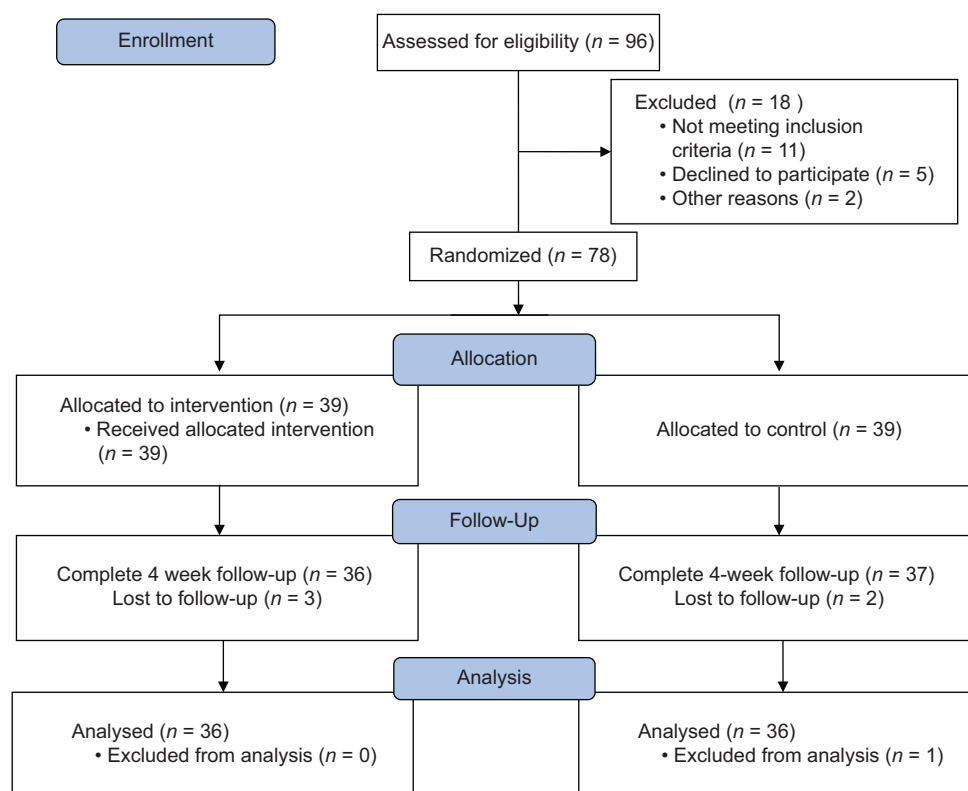
*Variance analysis with repeated measures

Also, results of the study by Ahangarzadeh Rezaei *et al.* (2017) showed that right after and two weeks after the positivity education, the level of stress was decreased in the patients suffering from coronary heart disease,^[27] which was in line with the results of the present study. Considering that patients with heart failure would

describe their mental disorders such as stress about negative thoughts, it is obvious that by controlling the mind and directing it toward positivity, their level of stress could significantly be improved, in a way that, as was seen in the present study, the effect of positivity education was still obvious one month after the intervention.

Table 4: Variance analysis with repeated measures with three measurements before, right after, and one month after the intervention

	Source	Sum of squares	Degree of freedom	Mean of squares	<i>f</i>	Level of significance	η	<i>P</i>
Intra-variable	Time	36.778	2.00	18.389	5.526	0.005	0.073	0.846
	Time*Group	98.037	2.00	49.019	14.731	0.000	0.174	0.999
	Error	465.852	140.00	3.328	-	-	-	-
Inter-variable	Group	102.782	1.00	102.782	2.054	0.156	0.029	0.293
	Error	3503.509	70	50.050	-	-	-	-

**Figure 1:** Study flow diagram

The results of the present study were also in line with the results of the study by Fan *et al.*^[28] (2023), which showed the significant effect of positivity education on decreasing the level of stress in stroke patients right after and one month after the intervention. In the present study, similar to the study by Fan *et al.*, the technique of positivity was used to decrease the stress level of patients. Although the present study was different in the type of disease from the study by Fan *et al.*^[28] but results have indicated that, for any subject, thinking about the positive aspects and eliminating the negative thoughts would have a significant effect on the level of stress. Also, the content of one of the educational sessions was thinking about positive and good memories, which could be a good reason for decreasing the individual's stress level. Results of two other studies on patients following stroke approved that positivity interaction, by improving the quality of life in both physical and mental aspects, would decrease the level of their stress.^[29,30]

Unlike the present study, the results of Huffman *et al.*'s^[31] study (2016) showed that the positive thinking training intervention did not affect the feeling of optimism among heart patients one month after the intervention. Among the reasons for the non-alignment of the results of this study with Hoffman *et al.*'s^[31] study was the difference in the type of educational content and the number of educational sessions provided to patients. Therefore, paying attention to the content of interventions based on positivity to improve the mental status of heart patients should be the attention of researchers. The results of the present study were inconsistent with the results of the study by Cohn *et al.*^[32] (2014), in which it was reported that the positivity intervention did not change the happiness of patients with type 2 diabetes immediately after the intervention. One of the reasons for the discrepancy between the results of the present study and the study by Cohen *et al.*^[32] was the difference in the type of chronic disease among the patients studied.

in the present study compared to the study by Cohen *et al.* (patients with CHF and patients with type 2 diabetes, respectively). Therefore, it seems that patients with chronic diseases have different needs in terms of physical, psychological, and social effects on psychological status and stress according to their disease, its complications and consequences, and it is necessary to design and implement programs based on promoting positivity based on these cases.

To explain the results of the present study, it should be noted that the positivity improvement program has caused the patients to focus on negative thoughts and consequently, decrease the level of their perceived stress. Since perceived stress indicates the mental evaluation of the amount of stressfulness in life situations,^[33] it seems that the positive skill improvement program has strengthened positive thinking in patients suffering from heart failure and therefore, has decreased the level of their stress. In other words, probably, positivity intervention has enabled heart failure patients to have an appropriate understanding of their behaviors, attitudes and emotions and calmly, decrease their stress level.

Limitation and recommendation

One limitation of this study was the potential influence of the participants' mental condition on their responses, which may have introduced variability or bias. Since data were collected using a self-report method, participants' subjective perceptions and potential biases in answering questions could have affected the accuracy and reliability of the results. Additionally, the study was conducted at a single medical center, which may limit the generalizability of the findings to broader populations. Future research should consider multi-center studies with larger and more diverse samples to enhance the external validity of the results.

Conclusions

According to the results of the present study, the positivity skill improvement program has been effective in reducing the level of perceived stress in patients with CHF. Therefore, it is recommended that hospital authorities apply necessary arrangements for providing positive skill improvement programs to decrease the level of perceived stress in patients with CHF.

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Ethical considerations

This article was adapted from the Master's thesis of nursing that was approved by the Isfahan University of Medical Sciences under the ethics code of IR.MUI.NUREMA.REC.1401.155. All the participants had provided written informed consent and they were assured that all their information would remain confidential.

Author's contributions

All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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Conflicts of interest

There are no conflicts of interest.

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