

The Effectiveness of Acceptance and Commitment-Based Therapy on Perceived Stress, Perception of Illness and Severity of Fatigue in People with Heart Disease

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ABSTRACT

Objective: Coronary heart disease is associated with an epidemic and a very high prevalence in both developed and developing countries and is considered as one of the most basic causes of death in people. This research was conducted with the aim of investigating the effectiveness of treatment based on acceptance and commitment on perceived stress, perception of illness and severity of fatigue in people with heart disease.

Method: The research method was a quasi-experimental pre-test-post-test type with a control group. The statistical population of the study included all people with heart disease admitted to Shahid Sayad Shirazi Hospital in Gorgan city in 2022, from among whom 30 people were randomly selected in 2 experimental and control groups (15 people in each group). The experimental group underwent 8 sessions of 60-minute therapy based on acceptance and commitment, and the control group did not receive any intervention until the end of the study. The research tools included the questionnaires of perceived stress by Cohen et al. (1983), perception of illness by Broadbent et al. (2006) and severity of fatigue by Krapp et al. (2001). The research data was analyzed by multivariate analysis of covariance and using spss software version 22.

Results: The findings of the research showed that the treatment based on acceptance and commitment is effective on the perceived stress, perception of the disease and severity of fatigue in people with heart disease ($P < 0.05$).

Conclusion: The results of the research indicate that the treatment based on acceptance and commitment, by using the required cognitive skills and thought control, leads to a reduction of perceived stress, perception of the disease and the severity of fatigue in people with heart disease.

Keywords: acceptance and commitment therapy, perceived stress, perception of illness, fatigue, heart disease.

1. Introduction

With social, cultural, and industrial changes, the disease pattern has changed, and as a result, chronic diseases are considered the most important health and psychological problems in people (Lee, Park, & Lee, 2020). Therefore, chronic diseases are considered a major source of stress and impose a lot of economic costs on society. Coronary heart disease is rapidly growing (Jinnouchi et al., 2020). *Coronary heart disease* is associated with an epidemic and a very high prevalence in both developed and developing countries. It is considered one of the main causes of death in people. The heart's inability to supply blood causes many symptoms, such as shortness of breath, dizziness, angina pectoris, edema, and ascites. These symptoms lead to intolerance to activity and cause changes in the patient's lifestyle, affecting his satisfaction and quality of life (Dryden, 2019). One of the important factors in the psychological explanation of the problems of people with heart disease is stressful life events (Rezaifar et al., 2019). *Stress* is a response to a perceived (real or imagined) threat to a person's mental, physical and emotional health, leading to psychological and physiological responses and adaptations (Shamsolvaezin & Babakhani, 2018). A person's cognitive evaluation of a stressful factor means how a person interprets the stressful stimulus, and emotional interpretation means mixing and labeling the interpreted information about the stress factor. The combination of these two factors (cognitive evaluation and emotional interpretation) represents how the stressful factor is perceived (Gross, 2008). More important than the stressor is the perception and inference from the stressor that is important. *Perceived stress*, a function of primary and secondary processes and evaluations, is a psychological state or process during which a person improves his physical and psychological well-being while perceived as threatening (Beyrami et al., 2018). The studies conducted on stress emphasize the important point that what affects people's health is not stress itself but the pattern of how a person evaluates stress and how to deal with it. Stress coping strategies is a process in which a person tries to manage stressful stimuli (Bahrami Rad & Rafezi, 2019).

The level of knowledge and attitude of people towards the disease plays a significant role in controlling the disease. By increasing the knowledge and attitude towards heart disease, it is possible to help affected people in controlling their diet and, consequently, the disease (Kim et al., 2020). *Illness perception* includes five elements: identity, cause, period, consequences, and treatment/controlability (Mokhtarinejad,

Mirzaian, & Hassanzadeh, 2020). False or abnormal beliefs about these five elements cause the adoption of maladaptive strategies, such strategies can have harmful effects on life and experience (Shrivastva et al., 2020). Studies have shown that negative perception of the illness can lead to depression, anxiety and behavioral problems (Han et al., 2020). Research has shown that *fatigue* also harms the quality of life (Berger et al., 2013). Fatigue is one of this disease's most common mental symptoms, sometimes making the patient's activity difficult (Hejazizadeh, Pazokian, & Abdi, 2020). In fact, the fatigue associated with heart disease is a general abnormal lack of energy that significantly limits a person's physical and mental ability, regardless of the level of neurological disability. This fatigue affects motor and cognitive ability and can manifest as a decrease in energy, feeling unwell, motor weakness, and difficulty in maintaining concentration. It can also harm employment, the process of socialization and adaptation to the disease. As a result, it reduces the patient's daily life activities (Bahrami Rad & Rafezi, 2019).

Acceptance and commitment therapy as a psychological intervention is a healing, multidimensional, dynamic and powerful factor in adapting to problems (Ahmadi & Valizadeh, 2021). ACT, as one of the third-generation treatments, due to its emphasis on functional cycles and considering motivational aspects along with cognitive aspects, causes the effect and continuity of this treatment to be more effective than other treatments (Mirzaeidoostan, Zargar, & Zandi Payam, 2019). This therapy enables a person to directly target emotional distress by accepting unpleasant thoughts and emotions. In fact, this treatment improves the individual's performance by increasing psychological flexibility to reduce the individual's distress (Ferreira et al., 2022). Avoiding unpleasant feelings (experiential avoidance) perpetuates psychological suffering. Being ready to experience unpleasant feelings and not avoiding them, referred to as acceptance and encouragement, is a key process in ACT (Fishbein et al., 2022). In this regard, Afshinpour et al. (2018) found that ACT effectively improve anxiety and quality of life in patients with non-cardiac chest pain (Afshinpour, Khorami, & Nabavi, 2018). Karimi et al. (2022) showed that ACT with cognitive behavioral therapy is effective on fatigue in patients with multiple sclerosis (Karimi et al., 2022). Kazemeini et al. (2022) found that cognitive therapy based on mindfulness and ACT lead to increased cognitive regulation of emotions in patients with heart failure (Kazemeini et al., 2022). Khosroshahi et al. (2019) showed

that ACT affects cardiovascular patients' perception of the illness (Khosroshahi, Mirzaian, & Hasanzadeh, 2019). Shepherd et al. (2022) showed the effects of ACT on perceived stress (Shepherd, Golijani-Moghaddam, & Dawson, 2022). Larson et al. (2022) found that ACT is effective in students' general mental health, depression, anxiety, and stress (Larsson, Hartley, & McHugh, 2022). Also, Van de Graff et al. (2021) found that ACT effectively reduces chronic pain (Van de Graaf et al., 2021). According to the presented materials, the main question of this research is: Does ACT affect the perceived stress and perception of the illness in people with heart disease?

2. Methods

2.1. Study design and Participant

In terms of the research method, the present research is in the quasi-experimental research group, with a two-group design (one experimental group and one control group) with pre-test and post-test. The statistical population of the research is all people with heart disease admitted to Shahid Sayad Shirazi Hospital in Gorgan City in 2022. Thirty heart patients were selected by the available sampling method. Then they were randomly placed in two experimental groups (15 people) and a control group (15 people). The inclusion criteria were: consenting to participate in the research, at least a diploma degree, not taking psychiatric drugs, and the ability to participate in eight therapeutic intervention sessions. Exclusion criteria were: unwillingness to participate in the research, absence of more than two sessions.

After receiving the code of ethics from the research unit of Payam Noor University, and obtaining the necessary permits, researchers went to Sayad Shirazi Hospital in Gorgan, and with the cooperation of the hospital staff, an orientation meeting was held for people with heart disease in the hospital's chapel. By stating the research objectives, 30 patients who were willing to participate and met the entry criteria were selected as available. Then they were placed in two experimental and control groups (15 people in each group) by random assignment. Both groups responded to the questionnaires of perceived stress, perception of illness and severity of fatigue as a pre-test. The experimental group received 8 sessions of ACT according to the therapy protocol of Hayes et al. (2006), one 60-minute session per week. However, the control group received intervention at the end of the research. After the end of the treatment sessions, both groups answered the research questionnaires as a post-test.

People were also assured that all information is confidential and will be used for research purposes; In order to respect privacy, people were asked to refrain from mentioning their first and last names in the questionnaires, and at the end of the research, the control group became part of the participants of the project, and the therapeutic intervention was also implemented on them.

2.2. Measurements

In order to collect data, *Perceived Stress Scale* (1983), *Illness Perception Scale* (2006), and *Severity of Fatigue Scale* were used.

2.2.1. Perceived Stress

Perceived stress scale has 14 items. Each item is answered based on a five-point Likert scale (none, little, moderate, much, and very much), these options are scored 0, 1, 2, 3, and 4, respectively. The perceived tension scale measures two subscales: a) the subscale of negative perception of tension and b) the subscale of perceived positive tension. Cronbach's alpha reliability coefficients of the scale ranged from 0.84 to 0.86 in two groups of students and one group of smokers in the quitting program. Perceived stress scale is significantly correlated with life events, depressive and physical symptoms, use of health services, social anxiety and low life satisfaction (Shamsolvaezin & Babakhani, 2018).

2.2.2. Illness Perception

Illness perception scale is a 9-item scale designed to evaluate the emotional and cognitive visualization of the disease. The questions measure consequences, duration, personal control, treatment control, nature, worry, cognition of illness, emotional response, and cause of illness, respectively. The range of scores for the first 8 questions is from 1 to 10. Question 9 has an open answer and questions the three main causes of disease respectively. In the final analysis, it is recommended that each of the subscales be analyzed separately. Cronbach's alpha of the whole questionnaire is 0.80 and the retest reliability coefficient after 6 weeks for different questions is reported from 0.42 to 0.75 (Broadbent et al., 2016). The concurrent validity of the scale with the revised disease perception questionnaire shows the correlation of subscales from 0.32 to 0.63. In Iran, Bagharian and colleagues prepared the Persian version of this scale. Cronbach's alpha of the Persian version is 0.84

and its correlation coefficient with the Persian version of the revised disease perception questionnaire is 0.71 (Mokhtarinejad, Mirzaian, & Hassanzadeh, 2020).

2.2.3. Fatigue Severity

The fatigue intensity scale is created to measure the intensity of fatigue in chronic diseases. This scale measures patient fatigue with 9 items on a seven-point Likert scale, and a higher score indicates more fatigue. Cronbach's alpha was 0.88 in healthy people, 0.81 in MS patients and 0.89 in lupus patients. The Persian version of this test had internal consistency (Cronbach's alpha 0.98) and retest validity 0.93. In Iran, a research was conducted by Basampour and Manzabi in 1384 under the title of investigating the rate of use and effectiveness of fatigue-reducing methods in patients referred to the Iranian MS Association. The validity

of the content was used by experts and for reliability, the retest was used, the correlation coefficient of which was 0.83, which showed that this tool has high reliability and validity and does not need to be adjusted (Rahmani, 2020).

2.3. Intervention

The experimental group received 8 sessions of ACT according to the therapy protocol of Hayes et al. (2006) (Hayes et al., 2006), one 60-minute session per week. However, the control group received intervention at the end of the research.

2.3.1. ACT

The content of ACT sessions taken from the protocol of Hayes et al. (2006) is presented in the Table 1.

Table 1

ACT sessions and assignemnts

Session	Goals	Content	Assignments
1	Getting to know each other, building a group, identifying goals	Group familiarization, management of disturbing cognitions, assessment of factors affecting marital burnout and emotional alexithymia, introduction of sources of motivation for couples' thoughts, increasing internal control instead of external control through the introduction of RT principles, conscious breathing practice, providing homework	Recording problems and their impact in life
2	Identifying problematic behaviors of members and introducing ACT	Treatment of mental problems caused by marital burnout and emotional alexithymia, review of the assignment of the last session, introduction of different types of thinking, familiarization with the concept of fusion, defusion through the metaphor of palm on the face and practice of looking at fusion from 6 angles, taking the wrist of the mind and labeling to thoughts, writing down thoughts, seeing thoughts as independent entities and normalizing thoughts and validating thoughts, practice letting them pass, providing homework	Recording the methods and solutions used so far
3	Creating the concept of creative helplessness	Effective thought management in creating marital burnout and alexithymia, examining the perceived source of control, challenging self-blaming and self-comparing thoughts, separating with gratitude, evaluating the general orientation (D) of participants in the WDEP system, providing homework	Documenting ineffective solutions used so far and their effects
4	Present	Improvement of negative emotions, review of the assignment of the last session, creative despair to show fruitless effort to get rid of unpleasant emotions, acceptance and lack of control of unpleasant emotions through the metaphor of war with the monster, breaking away from unpleasant thoughts and feelings through the metaphor of a rebellious horse. Identifying needs and their role in regulating emotions, providing homework	Practicing mindful attention and the metaphor of anchoring
5	Acceptance	Correcting the emotions that hinder a satisfactory marital relationship, examining the task of the last meeting, the metaphor of the 40th birthday party in order to clarify the values, examining how to act according to the values using visual exposure and feedback in a stressful situation in order to increase internal control. Practice accepting the conscious mind in order to reduce stress (accepting bodily sensations, naming feelings, paying attention to thoughts and behavioral tendencies, practicing surfing on emotions, presenting homework	Practicing mindfulness and completing the awareness expansion worksheet
6	Defusion of self as context (observer self)	Modifying the behaviors that facilitate marital burnout and alexithymia, reviewing the assignment of the last session, being aware of behaviors incompatible with a satisfactory marital relationship, creating internal control instead of external control over behavior, creating positive addiction in order to improve marital burnout and marital alexithymia. The metaphor of the sky, weather and air in order to get to know the observer and himself as a context for behavioral evaluation, presenting homework	Practicing mindfulness and defusion during the week and examining its effect on personal and social life. Practicing self-observation, good self and bad self and examining its impact on personal and social life

7	Committed values and action	Correcting facilitating behaviors, reviewing the assignment of the last session, metaphor of the chess board in order to externally monitor what they do in life, training wild dogs in the path of life, fighting procrastination to do postponed tasks in order to improve marital burnout and emotional alexithymia. Performing committed actions through the correct way of planning, getting to know about setting goals in the marital relationship, presenting homework	Determining the values and prioritizing them and completing the desire and action worksheet and applying the learnings
8	Examining the process and experiences of the group, summarizing the meetings, conducting the post-test	Physical activation to reduce marital burnout and emotional alexithymia, reviewing the assignment of the last session, identifying more with the need for survival, getting to know the ideal world in the field of physical needs, getting to know the WDEP method in order to improve communication with the body. The technique of restraining wild dogs on the way to physical goals, providing homework	Applying techniques

2.4. Data Analysis

In order to analyze the data, descriptive statistics (mean and standard deviation and Shapiro-wilk's test) and inferential statistics (multivariate covariance analysis) were used with SPSS-26.

3. Findings and Results

Demographic findings showed that most respondents were had a diploma and were female. The mean and standard deviation of the research variables are presented in Table 2.

Table 2

Descriptive findings of experimental and control groups in three stages

Variable	Exp. Group	Mean	Standard deviation	Control Group	Mean	Standard deviation	Shapiro-wilks	Sig.
Perceived stress	Pre-test	29.82	6.83	Pre-test	30.06	9.30	0.953	0.551
	Post-test	22.75	7.66	Post-test	30.43	5.23	0.942	0.435
Illness perception	Pre-test	147.81	26.95	Pre-test	147.22	21.59	0.967	0.837
	Post-test	121.82	21.78	Post-test	146.80	22.15	0.955	0.542
Fatigue severity	Pre-test	26.35	8.29	Pre-test	26.23	8.18	0.937	0.331
	Post-test	18.72	6.19	Post-test	26.72	8.39	0.969	0.841S

Table 2 shows the mean and standard deviation of perceived stress, perception of illness, and intensity of fatigue for the pre-test and post-test phases. After the ACT, the scores of the experimental group had a significant difference. According to the results of the Shapiro-Wilks test, because the significance levels presented in both stages and for the variables are more than 5%, therefore the studied variables have a normal distribution. The results of Levene's test showed that the assumption of homogeneity of variance is also maintained for all variables of perceived stress ($F=0.053$), perception of illness ($F=0.074$) and fatigue severity ($F=0.738$) ($p<0.05$). The results of multivariate covariance analysis are reported in Table 3.

Table 3

Multivariate analysis of variance test results

Test	value	F	Df	Sig.	Eta ²
Pillai's Trace	0.455	3.472	2	0.001	0.252
Wilks' Lambda	0.539	3.472	2	0.001	0.252
Hotteling's Trace	0.841	3.472	2	0.001	0.252
Roy's Largest Roost	0.841	3.472	2	0.001	0.252

As seen in Table 3, the results of multivariate covariance analysis indicate that F obtained in all tests is significant with 2 degree of freedom at $P<0.05$ level. The results showed that there is a significant difference in the research variables after removing the pre-test effect ($P<0.05$) and ($Df=2$) and ($F=3.472$ and Pillai's Trace=0.455). In the following,

univariate analysis of covariance test is used to better understand and investigate the independent variable's effect

on the dependent variables.

Table 4

Results of analysis of variance of perceived stress scores, perception of illness and severity of fatigue in two experimental and control groups

Variable	Stage	Sum of squares	df	Mean square	F	Sig.	Effect size
Perceived stress	Pre-test	214.11	1	214.11	43.31	0.001	0.653
	Group	51.15	1	51.15	21.39	0.001	0.471
	Error	8.72	27	0.32			
Illness perception	Pre-test	225.87	1	225.87	41.36	0.001	0.654
	Group	92.95	1	92.95	32.60	0.001	0.583
	Error	22.82	27	0.84			
Fatigue severity	Pre-test	54.35	1	54.35	29.61	0.001	0.597
	Group	38.71	1	38.71	16.55	0.001	0.362
	Error	65.44	11	65.44			

The results of Table 4 show a significant difference between the two experimental and control groups in perceived stress, perception of illness and intensity of fatigue ($p < 0.001$). The obtained eta coefficient indicates that the difference between the two groups in the post-test is due to the effectiveness of ACT.

4. Discussion and Conclusion

This research was conducted to investigate the effectiveness of ACT to perceived stress, perception of illness, and severity of fatigue in people with heart disease. The research showed that ACT significantly reduces perceived stress, perception of illness, and fatigue severity in people with heart disease. This finding is in line with the results of some past studies (Afshinpoor, Khorami, & Nabavi, 2018; Larsson, Hartley, & McHugh, 2022; Shepherd, Golijani-Moghaddam, & Dawson, 2022; Van de Graaf et al., 2021).

In explaining this finding, it can be said that therapeutic exercises in this approach can cause cognitive changes in the thought patterns of people with heart disease. In addition, by performing committed and responsible actions and with serious follow-up, they can make lasting changes in their thought patterns and realize that thoughts are just thoughts, not truth and reality. Based on this, this treatment helps people with heart disease not view thoughts as disturbing and stressful realities so that they perceive less stress. In addition, in this treatment, people are placed in the position of an observer and only look at the unstable and transitory nature of thoughts, feelings and emotions. In fact, not these people are dominated by emotional and emotional thoughts and states, but people who monitor and dominate them (Larsson, Hartley, & McHugh, 2022). ACT allows clients to

change relationships with their inner experiences, reduce experiential avoidance and increase flexibility, and then teach people with heart disease to increase action in valuable ways. Changing relationships with inner experiences include broadening and clarity of inner awareness, which can improve mental state. In addition, people with heart disease have learned to stick to their goals in life and accept their current conditions as a result of ACT. Finally, instead of struggling daily and dealing with problems emotionally, act purposefully in life. A purposeful life can also improve people's coping power and resilience and thereby experience less perceived stress (Afshinpoor, Khorami, & Nabavi, 2018).

Also, ACT, by focusing on thoughts, helps heart patients become aware of their thoughts and feelings. In addition, by identifying cognitive distortions and ineffective beliefs and replacing them with real and more objective solutions, correct them and improve their information processing and reasoning process. One of the assumptions of treatment methods and techniques based on acceptance and commitment is that people react to them according to their perception of affairs and events, and the second assumption is that wrong cognitions cause emotional disorders. Therefore, ACT by changing the cognitive distortions of heart patients, such as catastrophizing, feeling helpless, and anxiety, and their evaluation and interpretation of the disease and its consequences can have a positive effect on the patient's perception of the disease (Mokhtarinejad, Mirzaian, & Hassanzadeh, 2020). In this way, increasing the acceptance of the illness and the commitment to treatment will increase the patient's perception of the disease and compliance with the treatment orders. The purpose of applying ACT is to help clients to define their life values and

act based on them. The goal of ACT is that in this process, more vitality and meaning are added to the client's life, and his (psychological) flexibility increases. This group of treatments will focus more on accepting reality. Since the characteristics that were mentioned for people are in accordance with the achievements of the ACT, therefore, the effect of the treatment based on commitment and acceptance in reducing the perception of the disease and its better tolerance in heart patients can be explained in this way (Khosroshahi, Mirzaian, & Hasanzadeh, 2019).

ACT reduces cognitive avoidance by using mindfulness practice, making people aware of negative emotions, and helping them accept them; As a result, ACT can reduce people's perception of pain. The reduction of pain perception is due to the increase in psychological flexibility of people against adverse physical and psychological conditions. In this regard, in such methods, it is assumed that mindfulness and cognitive flexibility are the main processes of change. Therefore, mindfulness and cognitive flexibility are recognized as mediators in suffering disability and life satisfaction (Karimi et al., 2022). ACT as a non-pharmacological method makes a person understand the relationship between stressful events, spontaneous thoughts, and his behavioral and emotional reactions and can change his reactions to that event by changing his understanding of stressful events. Therefore, ACT to people with heart disease can not only prevent the occurrence of psychological and physical fatigue but also reduce the level of fatigue can affect improving the quality of life and providing optimal services to patients (Van de Graaf et al., 2021).

5. Limitations

This research was conducted only on cardiac patients in Gorgan City. Therefore, caution should be taken to generalize the results to other communities and clinical samples. The follow-up period still needs to be done due to time constraints. In line with the limitations of the current

research, it is recommended to conduct research in a larger sample to increase the generalizability of the findings. It is suggested that in future research, taking into account that the advantage of ACT compared to the common treatments, is the prevention of the return of symptoms. Therefore, a longer period (at least two to six months) should be conducted to check the stability of the treatment effect.

6. Suggestions and Applications

It is suggested that students and researchers in the future repeat such research in other cities on other chronic patients to provide more evidence of the relationships obtained. Officials and practitioners of psychological health can consider ACT in their long-term planning in order to reduce the increase in psychological health. Also, in order to prevent the occurrence of personal, family, and social consequences following this problem, they should save a lot of human and material costs imposed on the beneficiary authorities and institutions. It is suggested that providing organized and semi-organized group activities in implementing various therapeutic interventions, including group therapy, create areas for creating mental health for patients.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethics principles

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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