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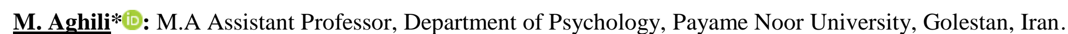
Original Article

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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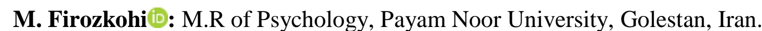
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Abstract

Background and Aim: 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. **Methods:** 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.

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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 and Lee, 2020). Therefore, chronic diseases are considered as a major source of stress and impose a lot of economic costs on society. Coronary heart disease is a rapidly growing (Ginucci, Koldegi, Romero, Virmani, and Finn, 2020). 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 main causes of death in people (Goodall, Erdman, Müller Min-Suk, Schangert, & Kong, 2020). 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 (Rezaei Far, Sepah Mansour, Intejar, and Kushki, 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 (Shams & 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, 2018). 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. perceives as threatening (Birami, Babapourkhairuddin 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, 2018).

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, Lee, Jang et al., 2020). Disease perception includes five elements of disease identity, disease cause, disease course, disease consequences, and disease treatment/controllability (Mokhtarinejad et al., 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 (Shrivastava, Fani, Rao, 2020). Studies have shown that negative perception of the disease can lead to depression, anxiety and behavioral problems (Han, Wei, Hu et al., 2020). Research has shown that fatigue also harms the quality of life (Berger et al., 2021). Fatigue is one of this disease's most common mental symptoms, sometimes making the patient's activity difficult (Hejazizadeh et al., 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 level of the patient's daily life activities (Pourbahrami et al., 2019).

Therapy based on acceptance and commitment as a psychological intervention is a healing, multidimensional, dynamic and powerful factor in adapting to problems (Ahmadi & Valizadeh, 2021). Treatment based on acceptance and commitment, 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 (Mirzaei Dostan, Zargar and Zandi, 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, Mariano, Rezende and Caramela, 2022). Avoiding unpleasant feelings (experiential avoidance) perpetuates psychological suffering. Being ready to experience unpleasant feelings and not avoiding them, which is referred to as acceptance and encouraging it, is a key process in acceptance and commitment therapy (Fishbein, Jude, Jenyoung, and Arch, 2022). In this regard, the results of Abbasi et al (2021) studies showed that the treatment based on acceptance and commitment is effective on the perceived stress and perception of the disease in people with asthma. Afshinpour et al (2021) found that acceptance and commitment-based therapy is effective on anxiety and quality of life in patients with non-cardiac chest pain. Karimi et al (2021) showed that treatment based on acceptance and commitment with cognitive behavioral therapy is effective on fatigue in patients with multiple sclerosis. Kazemeini et al (2022) found that cognitive therapy based on mindfulness and therapy based on acceptance and commitment lead to increased cognitive regulation of emotions in patients with heart failure. The research of Khosrowshahi et al (2019) showed that treatment based on acceptance and commitment has an effect on the perception of the disease in cardiovascular patients. In a study, Shecherd et al (2022) showed the effects of acceptance and commitment therapy for perceived stress. Larson et al (2022) found in a research that treatment based on acceptance and commitment is effective on general mental health, depression, anxiety and stress of students. Also, Graff et al (2021) found in a research that accepting and committing to therapy effectively reduces chronic pain. According to the presented materials, the main question of the research is as follows: Is acceptance and commitment therapy effect on the perceived stress and perception of the disease in people with heart disease?

Research method

In terms of the research method, the present research is in the quasi-experimental research group and its design is 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. Since Delavare (2012) suggested the sample size for experimental research to be 15 people in each group, 30 heart patients were selected by available sampling method. Then they were randomly placed in two experimental groups (15 people) and control group (15 people). The criteria for entering the research were informed consent to participate in the research, at least a diploma education, not taking psychiatric drugs, and the ability to participate in eight therapeutic intervention sessions, and the criteria for exiting were unwillingness to participate in the research, absence of more than two sessions. In order to analyze the data, descriptive statistics (mean and standard deviation) and to check the normality of the distribution of the variables, the Klomogrove Smirnov test and inferential statistics (multivariate covariance analysis) were used, following its assumptions and data analysis software spss_22.

Research tools

1. Perceived stress scale: Perceived stress scale was created by Cohen, Komark, and Marmelstein in 1983. This 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.

2. Illness Perception Questionnaire: This 9-question questionnaire was designed by Broadbent et al in 2006 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 et al., 2019).

3. Fatigue intensity questionnaire: The fatigue intensity scale was prepared by Krapp et al 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 et al., 2018).

4. Therapeutic intervention. The headings of acceptance and commitment-based treatment sessions taken from the treatment protocol of Hayes et al. (2007) are presented in the table below.

Table 1. Summary of acceptance and commitment therapy sessions

Session	Goals	Content	Assignments
1	Getting to know each other, building a group, identifying goals	Getting the members to know each other and the group leader, establishing a therapeutic alliance, creating a safe, comfortable and friendly environment, getting to know the rules and norms of the group and agreeing on them, identifying and dealing with the problematic behaviors of the members, dealing with the possible problems of the members.	Record problems and their impact in life
2	Identifying problematic behaviors of members and introducing therapy based on acceptance and commitment	Examining assignments, identifying problem behaviors of members, introducing therapy based on acceptance and commitment, the metaphor of two mountains	Record the methods and solutions used so far
3	Creating the concept of creative helplessness	Examining homework, expressing the difference between the inside and outside world, using the metaphors of the board, the pit, and the tug-of-war with the monster, increasing awareness of the control program, experiencing its inefficiency, reducing	Documenting ineffective solutions used so far and their effects

		dependence on the control program, creating a desire to let go of the ineffective control program,	
4	Present	Examining homework, examining the past and future, using the time machine metaphor, increasing conscious awareness of present experiences, conveying the concept of mindfulness through related exercises: mindful breathing, eating, and walking.	Practicing mindful attention and the metaphor of anchoring
5	Acceptance	Examining assignments, practicing mindfulness, facilitating understanding of the meaning of desire and acceptance through the metaphors of skating and neighbor's party, creating desire and acceptance, observing thoughts without judgment and acting independently of mental experiences.	Practicing mindfulness and completing the awareness expansion worksheet
6	Defusion of self as context (observer self)	Reviewing homework, practicing mindfulness, reducing distractions, looking at the true nature of thoughts, responding to thoughts functionally rather than interpreting them verbally. Practicing mindfulness, the effect of defusion in personal and social life, conveying the concepts of role, context and types of self and moving towards a valuable life with a self-accepting and observant.	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	Examining assignments, practicing mindfulness, basic assessment of values using the magic stick metaphor, clarifying values, understanding the difference between values and goals, understanding the importance of a value-based life. Creating a commitment to act in line with goals and values, identifying and overcoming obstacles, implementing values into continuous and renewable practice patterns.	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	Examining the process and experiences of the group, examining unfinished issues, preparing to end the group, summarizing and ending the experience of the group, coordination for the follow-up meeting.	Application of learning

Implementation

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 intensity of fatigue as a pre-test. The experimental group received 8 sessions of therapy based on acceptance and

commitment according to the therapy protocol of Hayes et al. (2007), 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.

Results

Demographic findings showed that most respondents were 51 years old, had a diploma and were female. The mean and standard deviation of the research variables are presented in Table 2.

Table 2. Mean and standard deviation of perceived stress variable, perception of illness and severity of fatigue

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	9/3	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	146/8	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	0/841

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 treatment based on acceptance and commitment, 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 Lune'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 square
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 (2Df=) 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	8/72			
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	6/71			
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	1/89			

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 the treatment based on acceptance and commitment.

Discussion and conclusion

This research was conducted to investigate the effectiveness of treatment based on acceptance and commitment on perceived stress, perception of illness and severity of fatigue in people with heart disease. The research results showed that treatment based on acceptance and commitment significantly reduces perceived stress, perception of illness and fatigue in people with heart disease. This finding is in line with the results of studies by Abbasi et al (2021), Afshinpour et al (2021), Shecherd et al (2022), Larson et al (2022) and Graff 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 to not look at 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 (Larson et al., 2022). Treatment based on acceptance and commitment 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 lead to improvement of 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 treatment based on acceptance and commitment. 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 (Afshinpour et al., 2021).

Also, treatment based on acceptance and commitment by focusing on thoughts helps heart patients first to 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, treatment based on acceptance and commitment by changing the cognitive distortions of heart patients such as catastrophizing, feeling helpless, anxiety and their evaluation and interpretation of the disease and its consequences can have a positive effect on the patients' perception of the disease (Mokhtarinejad et al. ., 2019). In this way, by increasing the acceptance of the disease and the commitment to treatment, the patient's perception of the disease and compliance with the treatment orders will increase. The purpose of applying therapy based on acceptance and commitment is to help clients to define their life values and act based on them. The goal of treatment based on acceptance and commitment is that in this process more vitality and meaning is 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 treatment based on acceptance and commitment, 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 (Khosrowshahi et al. ., 2019).

This treatment, by using mindfulness practice and making people aware of negative emotions and helping them accept these emotions, reduces cognitive avoidance and as a result reduces people's perception of pain. The reduction of pain perception is due to the increase of psychological flexibility of people against adverse physical and psychological conditions. In this regard, in such methods, it is assumed that mindfulness and cognitive flexibility is the main process of change. Therefore, mindfulness and cognitive flexibility are recognized as mediators in suffering disability and life satisfaction (Karimi et al., 2021). Treatment based on acceptance and commitment 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, treatment based on acceptance and commitment to people with heart disease can not only prevent the occurrence of psychological and physical fatigue, but also reducing the level of fatigue can affect improving the quality of life and providing optimal services to patients (Graff et al., 2021).

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 was not 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 researches, taking into account that the advantage of treatment based on acceptance and commitment compared to the common treatments before, is the prevention of return of symptoms, therefore, a longer period (at least two to six months) should be conducted to check the stability of the treatment effect. In order to generalize the results more, it is suggested that students and researchers in the future repeat such researches in other cities on other chronic patients to provide more evidence of the relationships obtained. Officials and practitioners of psychological health can consider the treatment program based on acceptance and commitment 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 by providing organized and semi-organized group activities in implementing various therapeutic interventions, including group therapy, to create areas for creating mental health for patients.

Ethical principles

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

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Conflict of interest

The authors of this study declared no conflict of interest.

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