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Original Article

Comparing the Effectiveness of Compassion Focused Therapy and Acceptance and Commitment Therapy on the Pain Metaphorical Perception in Patients with Musculoskeletal Pain

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Abstract

Background and Aim: Pain is expressed in conceptual metaphors because of its abstract nature. Therefore, the purpose of this study was to compare the effectiveness of compassion-focused therapy and acceptance and commitment therapy on pain metaphorical perception in patients with musculoskeletal pain.
Materials and Methods: The method of this study was semi-experimental with a pre-test-post-test-follow-up design with a control group. Based on this, 45 patients with musculoskeletal pain were selected as candidates who were assigned to two experimental groups and one control group (15 people in each group) selected by a matching randomized method. All three groups responded to the Pain Metaphorical Perception Questionnaire in the pre-test, post-test, and follow-up stages. The compassion-focused therapy program was implemented in eight sessions on the first experimental group, and acceptance and commitment therapy was conducted in nine sessions on the second experimental group for an hour and a half weekly. The control group received no intervention. Data were analyzed using SPSS-26.
Results: The findings indicated that compassion-focused therapy and acceptance and commitment therapy promote the metaphorical pain perception of patients with musculoskeletal pain ($F=43.34$), and the effect of both treatments continues over time ($P<0.001$).
Conclusion: It seems Compassion-focused therapy and acceptance and commitment therapy can alter the psychological and cognitive-verbal aspects of pain.

Keywords: Pain metaphorical perception, Compassion focused therapy, Acceptance and commitment therapy, Musculoskeletal pain

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Introduction

Pain acts as the body's warning system and alerts people to physical threats, environmental threats, muscle injuries, or the presence of some disease conditions (1). But sometimes, the pain becomes prolonged and lasts more than six months. According to the International Association of Pain, it becomes chronic pain, which no longer serves as a warning and adaptation, and by causing many problems, it causes an unpleasant sensory or emotional experience for the patient (2). Therefore, pain perception is associated with various psychological characteristics (3). Chronic pain can cause not only physical and emotional suffering but also psychological problems, including high rates of depression and anxiety, and a negative impact on patients' thinking, attitudes, and self-perception (4). Musculoskeletal kinds of pain, which includes arthritis, back pain, and fibromyalgia, are chronic pain caused by serious medical concerns, especially in today's complex, industrial, and urban society (5). Interventions for chronic pain include cognitive (6) and mindfulness components that can help a person manage pain using mindfulness techniques (7). The effectiveness of mindfulness strategies in pain management can be studied from several perspectives. One of the new aspects that has recently received attention is the impact of mindfulness strategies on patients' metaphorical perception of pain. In this way, people have different perceptions of pain, which they use conceptual metaphors to express to provide a better understanding and conceptualization of the pain, which lacks external symptoms to the treatment personnel and others (8).

Conceptual metaphors are based on the cognitive science of language approach and based on Lakoff's theory (9). Lakoff and Johnson (10) believe language and thinking are fundamentally metaphorical. From this point of view, conceptual metaphors can play a critical role in recognizing and understanding abstract phenomena and affairs. Metaphors create a cultural model in mind according to which the behavioral chain is programmed (11). In explaining the formation of such a cultural model in the mind, they claim that conceptual metaphors in each semantic domain have two essential components: the source and target domains. The source domain, which is formed based on real experiences and human physicality, determines the abstract and conceptual status of the target domain. To understand the meaning, connections are formed between the source and target domains, which are called requirements or mapping. In other words, these mappings or connections between abstract and concrete concepts based on real experiences help individuals facilitate the understanding of abstract concepts (12).

It is important to note that although the conceptual source domains are similar in different languages, they are strongly influenced by cultural factors because cognition is culture-dependent (13). Scientific evidence also confirms the influence of cultural factors on the use of conceptual metaphors. A study (14) indicated that Persian speakers express their pain using source domains such as object, causality, path and direction, human, place, taste, container, force, and circle. In addition, conceptual metaphors of pain serve as an effective tool between the patient and the physician for diagnosis and treatment (15). The results of another study also showed that Persian speakers use conceptual metaphors to describe the types of pain and the process of cancer treatment (16).

Among interventions, cognitive (17) and mindfulness-based on compassion-focused therapy are effective on pain and its expression (18). Neff (19) defines the concept of self-compassion using three components: self-kindness against self-judgment, having common human experiences against self-identification, and mindfulness against excessive identification or avoidance. From another viewpoint, compassion therapy is defined as therapeutic compassion, the reduction of self-directed hostility, and the development of individual abilities to create a sense of self-assurance, kindness, and self-soothing (20). Compassion-focused therapy can act as an effective coping approach against the feeling of pain or pain perception (21). This is because most compassion-focused therapy activities focus on creating the capacity to be compassionate about pain (22). Therefore, compassion-focused therapy can be considered a dimensional construct that includes two related mentalities and can be effective in reducing chronic pain (23).

Acceptance and Commitment Therapy (ACT) is another method of cognitive-behavioral intervention

effective in reducing chronic pain, introduced by Hayes (24). This method helps people with chronic pain cope with stressful situations by increasing mindfulness, cognitive distancing (a technique for observing thoughts), engaging in active engagement with the outside world and trying to live a meaningful and authentic life to improve psychological flexibility. Instead of ignoring or suppressing experiences, this method emphasizes the importance of pursuing valuable aspects and ways of life, such as close relationships, meaningful work, and personal growth in the face of painful experiences (25). The therapeutic approach based on acceptance and commitment has six main processes, including acceptance, cognitive diffusion, self as context, connection with the present, values, and committed action (26).

Literature reviews suggest that compassion (27) and acceptance and engagement therapies reduce pain and pain perception or expression in musculoskeletal patients. For example, a study indicated that acceptance and commitment therapy reduced the amount of pain in patients with chronic back pain (28). Another study showed that compassion-focused therapy affects the chronic pain of women affected by marital infidelity (29). A study found that compassion-focused therapy is effective in reducing pain intensity in migraine patients (30). A study found that ACT is effective in reducing pain and pain perception in patients with painful diabetic neuropathy (31). In a study, results indicated that ACT reduces the pain intensity of multiple sclerosis patients (32). Another study found that compassion-focused therapy can relieve chronic pain (33). A systematic review concluded that compassion-focused therapy is effective in chronic pain (34).

One of the main motives for conducting the present study was to investigate the effect of cognitive-behavioral interventions on the cognitive-linguistic changes of pain at the level of metaphors. This is because the metaphorical perception of pain has been introduced as a new and interdisciplinary variable of a cognitive nature. Therefore, it can be assumed that treatments based on the third cognitive wave that use metaphors can change the cognitive system related to pain perception. This hypothesis led the researchers of this study to believe that the difference between the studied variables may be significant. In the present study, in addition to psychological aspects, a link between cognitive and linguistic variables has been established, which distinguishes this study from similar research. According to these cases, researchers are looking for an answer to the question of whether the use of the compassion-focused therapy approach and acceptance and commitment therapy on the metaphorical perception of pain in patients with Musculoskeletal pain produces different results

Methods

The method of this semi-experimental study was pre-test-post-test-follow-up with a control group. The statistical population of this research included all patients with musculoskeletal pain who were referred to physical medicine and rehabilitation clinics in Tehran from January to the end of June 2024. A sample of 45 people, based on Cohen's formula and the first and second type of error and the expected mean difference, was selected into two test groups and one control group (15 people in each group) using the available method and voluntary participation. Then, the sample members were randomly assigned into groups. The inclusion criteria were having personal satisfaction, having one of the types of musculoskeletal diseases (soft bones, osteoporosis, carpal tunnel syndrome, tendonitis, muscular dystrophy, myasthenia gravis, bursitis, arthritis of joints and spine, spinal deviation, inflammation of tendons and joints, myofascial pain syndrome, types of myopathy, etc.) for at least six months, being in the age range of 35 to 65 years. Exclusive criteria included unwillingness to continue cooperation and absenteeism for more than two sessions. This research has been approved by the ethics committee of Islamic Azad University, Tonkabon branch, with ID IR.IAU.TON.REC.1402.081. To maintain ethical principles in this research, we collected data after obtaining the consent of the participants. Participants were also assured of confidentiality, and the results were presented without names and birth certificate details. The data were analyzed using SPSS-26 software.

Materials

The data collection tools of this research were:

Demographic Information Questionnaire

This questionnaire was prepared to collect individual information about the participants based on gender, age, level of education, marital status, history, and type of disease.

Pain Metaphorical Perception Questionnaire

This 25-item questionnaire was designed by Raiisi (35) to measure the metaphorical perception of pain. Questionnaire items are scored based on a five-point Likert scale (completely agree= 5 to completely disagree= 1) and have four subscales: object, force, human, and causality. The validity of the questionnaire has been confirmed through content validity under the supervision of experts in psychiatry, psychometrics, linguistics, and specialist doctors using Waltz and Basel methods (36). The reliability of the questionnaire and its subscales have been investigated in a study with the participation of 250 monolingual Persian-speaking patients with chronic pain in 2022. Cronbach's alpha for the whole questionnaire and in the subscales of object, human power, and causality were (0.75), (0.73), (0.76), (0.72), and (0.77), respectively, which indicates the validity is desirable for use in other studies (35). In this study, Cronbach's alpha coefficient was 0.91.

After obtaining consent from the physical medicine and rehabilitation clinics of Tehran, the researcher asked the clients who had musculoskeletal pain to participate in the present study if they wanted to. The intervention program for the three separated groups was as follows: the first group was given eight sessions of compassion therapy, the second group was given nine sessions of acceptance and commitment therapy, one hour and a half session every week, and as a group. No intervention was provided for the control group. Before the intervention (as a pre-test) and after that (as a post-test), and two months after the intervention (as a follow-up), questionnaires of metaphorical perception of pain were completed by all three groups (Table 1,2).

Table 1. Summary of compassion focused therapy sessions (37)

Session	Subject	Content
1	Getting to know and explaining the rules of the meetings and the current problem	Introducing and communicating and creating good relations and solidarity in the treatment and explanation of group rules. Determining the treatment goal for the patients. Listening to patients' narratives about their pain and accompanying members with each other (teaching mental unity). Explanation of self-compassion and its elements. A brief description of shyness and self-deprecation in severe pain. Homework: practicing calming breathing to patients
2	Introducing self-compassion and self-criticism	Reviewing the previous session and examining the way people face themselves (with critical and compassionate methods). Defining self-criticism, its causes and consequences. Definition of compassion. Homework: answer to this question; How compassionate are you to yourself?
3	Introducing the characteristics and skills of self-compassion and how it affects an individual's mental state	Check the homework and review the previous session; What is self-compassion? Examining its characteristics and skills and how it affects the individual's mental state. Introducing three emotional regulation systems and how to deal with them. Homework: Specifying critical mentality and behavior towards oneself.
4	Introducing mental visualization	Check homework and review the previous session. Introduction to visualization and related reasoning. Teaching the practice of visualization and its implementation in the group (imagination of color, place, and compassionate characteristics). Homework: Visualization practice.

5	Developing self-compassion and defining the concepts of: knowledge, ability, intimacy, and commitment	Check the homework for the previous session. Developing self-compassion and defining the concepts of: knowledge, ability, intimacy, and commitment in creating compassion. Teaching how to visualize self-compassion. Homework: Self-compassion mental imagery.
6	Teaching compassionate letter-writing	Check the homework for the previous session. Teaching compassionate letter-writing Homework: "Suppose your self-compassionate writes you a letter, imagine a conversation and write something based on that."
7	Expressing the fear of self-compassion and identifying the mindsets that prevent the development of self-compassion.	Check homework and review the previous session. Fear of self-compassion. Identifying and changing thoughts that hinder the development of self-compassion. Homework: Paying attention to problems in the path of developing self-compassion and practicing compassion towards them.
8	Summarize concepts practiced in all sessions.	Check homework and review the previous session. Summarize concepts practiced in all sessions. The participants are asked to explain the consequences of the intervention in the group. Homework: Continuation of the given assignments.

Table 2. Summary of sessions of acceptance and commitment therapy (25)

Session	Subject	Content
1	Fully understanding the characteristics of pain and understanding the methods of dealing with it.	Introducing each member, and explaining the rules and regulations of group counseling in the group. Determine the main goals. Determining the clients' previous efforts to deal with severe pain. Describe beliefs and characteristics related to pain. Introducing the Hungry Tiger Metaphor. Homework: How did I give in to my intense pain?
2	Acute pain management as a problem/individual incident management	Presenting the metaphor (man in the pit). Introducing the chocolate cake metaphor. Paying attention to the individual talent of the client. Homework: Conscious mind anxiety sheet.
3	Dealing with the client's experience and strengthening and re-identifying the fact that (self-management is a fundamental problem)	Presenting the metaphor of a tug of war with a giant. Introducing the polygraph metaphor. Emphasizing the importance of increasing and developing mindfulness. Homework: Complete the Worry Performance Sheet.
4	Creating an orientation for developing mindfulness skills as an alternative to worry and introducing the concept of cognitive diffusion.	Jungle lion metaphor practice. Passion as a surrogate for pain management. Determining clear emotions versus unclear emotions. Introducing mindfulness through mindful breathing practice. Homework: Continue practicing

		mindfulness.
5	Introducing the importance of values and how to distinguish them from goals and setting simple behavioral goals to achieve specific values.	Introduction of values. Discussing the relationship between goals and values. Identify a valuable action (behavioral goal) to perform during the week. Homework: Present the values identification sheet, and perform a valuable action.
6	Continue to develop an orientation toward mindfulness and provide more practical ways to cultivate cognitive diffusion.	Identifying values: using the "tombstone" metaphor. Mindfulness Skills Manual. Practicing mindfulness. Homework: identify a valuable action (behavioral goal to be done during the week).
7	Attention to the function of emotions, the habit of functional-behavioral escape, and the distinction between clear and ambiguous emotions.	Instructions and discussion about the function of emotions. Emotional cycle control instructions. Emotional escape (hot stove metaphor). Clear emotions versus ambiguous emotions. Homework: Mindfulness practice.
8	Introduce the distinction between selves. Observers and conceptual selves and identifying the relationship between self-conceptualizations and anxiety and worry.	Identifying a valuable action (determining a behavioral goal to perform during the week). Chess board metaphor. Debate on self-observer versus the concept of self. Identify a valuable action (behavioral goal) to perform during the week. Homework: act with a specific value.
9	The meeting presented the idea of commitment and responsibility as a tool to move towards specific goals and strengthen choices to achieve those goals.	Commitment as a process. Identification of operational steps (smaller goals in the service of bigger goals). Presenting a gardening metaphor. Presenting the metaphor of climbing to the top. Homework: Act as a certain value consistently.

Results

The mean and standard deviation of the age of the patients in the compassion-focused therapy group was (46.25±7.480), in the acceptance and commitment therapy group (46.30±8.844), and the control group (45.95±6.812). Table 3 shows the mean and standard deviation of patients' pain metaphorical perception according to pre-test, post-test, and follow-up results.

Table 3 shows that the mean of pain metaphorical perception of both intervention groups has changed compared to the control group. Table 4 shows the results of the mixed variance analysis test in the metaphorical perception of pain in musculoskeletal patients. Table 4 shows that the effect of the time factor (within groups) (P=0.001, F=43.343) and the interaction effect of group and time (P=0.003, F=7.885) on patients' metaphorical perception of pain is significant. Table 3 demonstrates that the post-test and follow-up means of the pain metaphorical perception in the two experimental groups (compassion-focused therapy and acceptance and commitment therapy) have improved compared to the control group, who have not

received any intervention. Therefore, the effect size for group interaction and time for metaphorical pain perception was (Eta=0.27). In Table 5, Benferroni's post hoc test was used to check which study groups (compassion-focused therapy, ACT, and control) differ in metaphorical pain perception.

As Table 5 shows, there is no significant difference between the experimental groups of compassion-focused therapy and ACT (P<0.05). However, the two experimental groups have a meaningful difference from the control group (P=0.001). In other words, the amount of pain metaphorical perception of patients has increased in experimental groups. Moreover, Bonferroni's post-test results showed no significant difference between the post-test and the follow-up of the patient's pain metaphorical perception (P<0.05), which indicates that the lasting effect is maintained. The results also show that the compassion-focused therapy group performed better than the ACT group on the variable of metaphorical perception of pain.

Discussion

The present study investigated the effect of compassion-focused therapy and acceptance and commitment therapy on the metaphorical pain perception in patients with musculoskeletal pain. The findings showed that these two interventions have lasting effects on improving the metaphorical pain perception, i.e., the mean score of pain metaphorical perception in the two intervention groups increased significantly after conducting the protocols and in the follow-up stage. However, the performance of the compassion-focused therapy group on the pain metaphorical perception was better than the acceptance and commitment therapy group.

The results of this study are consistent with the background in the research literature, including the study of Raiisi et al. (27), who showed that compassion-focused therapy reduces pain by reducing pain catastrophizing. Soleimani et al. (28) indicated that ACT has a significant effect in reducing chronic back pain. Aghili et al. (29) found that compassion-focused therapy is effective in reducing women's chronic pain. Taheri et al. (31) found that acceptance and commitment therapy are effective in pain coping strategies and self-efficacy of patients with chronic neuropathic pain. Khalifeh-Soltani and Borhani (32/37) found that acceptance and commitment therapy are effective in reducing the pain intensity of multiple sclerosis patients. Shokoohi Nejad et al. (38) indicated that compassion-focused therapy is effective in the pain intensity of patients with fibromyalgia syndrome. Lai et al. (39) showed that acceptance and commitment therapy is effective in chronic pain. Penlington (40) reported that compassion-focused intervention was effective on persistent pain.

Table 3. Mean and standard deviation of patients' pain metaphorical perception according to study groups

Tests	**Compassion therapy**		**ACT**		**Control**	
Pretest	Mean	Sd	Mean	Sd	Mean	Sd
	81.07	13.62	79.07	11.87	81.27	12.85
Posttest	103.33	6.70	99.53	7.47	82.33	10.87
Follow-up	98.93	11.84	97.33	8.86	83.33	12.37

Table 4. The results of mixed analysis of variance in the pain metaphorical perception

dependent variable	**Sources of change**	**Sum of squares**	**Df**	**Mean of squares**	**F**	**sig**	**Eta**
Pain metaphorical perception	Time	5681.73	2	2840.86	43.34	0.001**	0.51
	Group×time	1280.60	2	640.300	7.88	0.001**	0.27

(**) Significance at the 0.01 level

Table 5. Bonferroni test results to investigate the lasting effect of the pain metaphorical perception

	Test steps	**Mean differences**	**SE**	**Sig**
Pretest	Posttest	-14.60	1.76	0.001**
	Follow-up	-12.73	1.90	0.001**
Posttest	Pretest	14.60	1.76	0.001**
	Follow-up	1.86	1.41	0.583

(**) Significance at the 0.01 level

In all of these trials, the researchers focused on changing the perception, intensity, and quality of pain experienced by patients. In the present study, the study on the metaphorical perception of pain is a new cognitive-verbal variable that distinguishes this study from other studies in the literature. In explaining this finding based on Gilbert's point of view (41), we can say that compassion-focused therapy deals with internal and personal processes that help a person regulate his relationships with his internal states, thoughts, and feelings, thus reducing internal symptoms and interpretation of pain. Research shows that compassion-focused therapy could decrease pain-related stress by lowering the hormone cortisol, which can improve the patient's perception of pain (42).

The stages of compassion-focused therapy cause the development of individual self-awareness and help the individual become less involved in pain. On top of that, the non-evaluative and non-conceptual nature of compassion-focused therapy avoids the cognitive processes of evaluation and threat that are present in all types of pain and thus reduces the bias of attention to sensory and emotional information related to chronic pain. People usually respond to pain through physical sensations and use metaphors such as fight, flight, or freeze to express their difficult and distressing feelings. In most cases, these metaphors activate the sympathetic nervous system, which is accompanied by a chain of reactions. This process starts with increased breathing, heart rate, and muscle cramps. These metaphors indicate that the body is responding to an internal or external threat and is preparing to fight, defend, or avoid (43).

Certainly, due to the cognitive nature of this treatment, the target person's cognitive schemas are altered, and, at the verbal level, the mind is reconstructed through conceptual metaphors. Similarly, this process is a kind of exposure and acceptance of one's characteristics in the face of pain. Finally, we can conclude that the method of compassion-focused therapy, with conscious and non-judgmental techniques, can have positive effects in improving and changing pain metaphors in musculoskeletal patients, and due to its cognitive nature, these effects will be stable over time. Considering that acceptance is the core of ACT (44), in this treatment method, chronic musculoskeletal pain sufferers choose new values for their lives over time. By accepting the problems and limitations caused by the disease, they find a new attitude to their pain and conditions. This new attitude affects their cognitive system. It is transferred to the verbal level and changes the type of metaphors of their pain. This process acts as a positive and informative factor for the continuation of pain treatment, leading to a positive view of pain, commitment to treatment, and changes in the cognitive-verbal system of patients with musculoskeletal pain. Thus, instead of ignoring or paying too much attention to pain, people try to change their cognitive system, change their mental metaphors, and consequently, focus on choosing new attitudes and behaviors to deal with pain. According to the pain gate control theory, pain can affect the mental processes related to feeling, cognition, emotion, and behavior. This control is done by stimulating the higher brain centers with peripheral inputs and the help of thoughts, emotions, and behaviors.

Evidence suggests that both compassion and acceptance and commitment therapies may be effective in interpreting and perceiving pain (45). Thus, when these two treatments are applied to the metaphorical interpretation of pain, they can change the perception of pain in patients with the components they have. In other words, by influencing the patient's cognitive system, compassion-focused therapy and acceptance and commitment therapy interventions correct inappropriate interpretations, direct negative self-talk, reconstruct irrational thinking, and correct dysfunctional cognitions. These processes lead to the reduction of negative emotions and more susceptible to pain and illness. Cognitive reconstruction and reinterpretation of pain and the existing situation leads to less transmission of sensory and movement information of pain, and finally, mental metaphors related to pain that distort it are reduced, and mental pain caused by primary maladaptive schemas is less perceived.

Conclusion

The study showed that these two intervention methods have lasting effects on improving the pain metaphorical perception. However, the performance of the compassion-focused therapy group on the metaphorical pain perception was better than the acceptance and

commitment therapy group. The current research is not free from limitations, the most important of which is the limitation of the research community to musculoskeletal patients, the lack of attention to modulating and intervening variables, and the lack of cooperation of the participants due to the severity of physical pain. Based on this, we suggest that health psychologists, physicians, and clinical specialists use the results of this study in their treatment approaches to change the patient's cognitive system through conceptual metaphors. We also propose the creation of interventional-therapeutic protocols of pain metaphors, designed by considering third-wave cognitive-behavioral metaphors, and to study their effectiveness on the interpretation of pain in patients with chronic pain.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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