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The effectiveness of acceptance and commitment therapy (ACT) on illness perception in orthopedic patients

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Abstract:

BACKGROUND: Orthopedic pain is diagnosed and treated as a global health problem. Therapeutic interventions can change the behavior of patients and improve their quality of life. This study was aimed to evaluate the effectiveness of acceptance and commitment therapy (ACT) on illness perception among orthopedic patients.

MATERIALS AND METHODS: This quasi-experimental study was conducted as a two-group design (one experimental group and one control group) with pretest and posttest. Participants were selected from patients referred to the Mooud Physiotherapy Center in Mashhad, Iran. Patients were randomly divided into experimental and control groups (12 in each group). The experimental group received weekly sessions for three months (eight sessions), whereas the control group did not receive any intervention. Data were collected through Weinman's Illness Perception Questionnaire (with Cronbach's alpha coefficient of 0.72). Data were analyzed using multivariate analysis of covariance (MANCOVA).

RESULTS: The results of the study showed that in terms of time, the outcome, and the meaning of disease, the patients in the ACT group had a lower mean in the posttest. Patients of the ACT group in personal and therapeutic controls showed a higher mean in the posttest than those of the control group. Therefore, ACT had a significant effect on improving the understanding of disease in orthopedic patients ($P < 0.05$).

CONCLUSION: Based on the results, ACT has a significant effect on the disease perception of orthopedic patients. Therefore, it is suggested that therapists use this therapy approach to illness perception in orthopedic patients.

Keywords:

Acceptance and commitment therapy, orthopedics, perception of illness

Introduction

Orthopedic disorders are very common and are increasing in most societies due to increasing age and life expectancy.[1] From a macro perspective, orthopedic pain is not only an issue that affects an individual, and its effects on individuals and society are also significant. If this pain becomes chronic, it results in long-term disability; in some patients, this pain and disability remain and lead to unemployment and loss of quality of life.[2] Since patients are active processors of their disease, perceptual representation determines how they respond to these factors and also determines the patients' adaptation to the disease and its symptoms.[3] One of the emotional dimensions associated with illness is the perception of it.[2,3]

Considering that knowing the perception of the disease has a predictive value in improving the health behaviors of patients with chronic diseases, various studies have supported the relationship between the perception of disease and

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adherence to treatment.[4] A study by Wicksell *et al*.[5] also showed the effectiveness of acceptance and commitment therapy (ACT) in reducing pain and improving daily functions of patients with chronic pain. In fact, the perception of illness is a reflection of people's beliefs and expectations of a disease or its manifestations.[6] Perception of an illness is related to quality of life, adaptation to the illness, depression, and the degree of adherence to treatment instructions.[7] Patients who believe that they have the ability to take measures to control the disease, its course and symptoms, have a clear understanding of said disease and will be able to accept and cope with reality; so these patients are less prone to depression, anxiety, and other disorders.[8]

Research shows that holding training sessions to increase patients' awareness and perception of their disease leads to a shorter recovery period and increased ability to return to their previous work environment.[9,10] Goodman *et al*.[11] suggested that interventions aimed at changing perceptual representations should base their work on cognitive behavioral techniques. With the advent of the third wave of behavioral therapy, management of and life with pain is one of its important areas, especially ACT. In ACT, the main goal is to create psychological flexibility: it means creating the ability to make a practical choice between different options that is more appropriate and not an action that is done or imposed on a person solely to avoid disturbing thoughts, feelings, memories, or desires.[12] ACT is the only psycho-experiential intervention in which acceptance and mindfulness strategies are used along with commitment and behavior change strategies to increase psychological flexibility.[13]

Various studies have investigated the effect of ACT on the negative emotions of patients with chronic pain. For example, a study by Wetherell *et al*.[14] showed that patients undergoing ACT improved in pain interference, depression, and pain-related anxiety. Actually, this treatment helps people accept pain (the desire to experience pain or unpleasant events without trying to control them) or thoughts related to pain and promotes meaningful aspects of life. This treatment helps patients engage in valuable activities and improve their quality of life instead of trying in vain to fight against pain.[13]

The evidence shows that in a wide range of acute and chronic diseases, a person's opinion on the nature of the disease, its consequences, control, duration, and cause, is effective in determining healthy behaviors and quality of life.[15,16] Accordingly, it seems that interventions that can affect the perception of the disease can facilitate their treatment process. Therefore, the aim of the present study was to evaluate the effectiveness of ACT on illness perception in orthopedic patients.

Materials and Methods

Study design and setting

The present research was a quasi-experimental study with a single-case structure and multiple baselines of the A-B-A design type. The study design was of pretest-posttest type with a control group.

Study participants and sampling

In this study, the statistical population of this research included all orthopedic patients who were referred to the Mooud Physiotherapy Clinic in Mashhad, Iran. The sample size in this researchwas determined to be 24 people according to the background of the similar study.[17] Here, 24 people after examination and diagnosis by a physiotherapist were selected based on convenience sampling and were randomly assigned to two groups (12 to the experimental group and 12 to the control group).

Inclusion criteria were patients not using psychotropic drugs, not receiving concomitant psychotherapy, and having low back pain diagnosed by a specialist at least six months before the study. Exclusion criteria were patients unwilling to continue cooperation and those absent of more than two sessions.

Data collection tool and technique

At first, the participants were assured that their information was confidential and anonymous, and all information obtained in this research would be kept confidential. Then the Illness Perception Questionnaire (IPQ) by a researcher was given to the patients and general explanations were given on how to answer them; all participants answered the questionnaire.

After completing the questionnaire and placing the patients randomly in two experimental and control groups, ACT therapy was performed on the participants of the experimental group. One-on-one treatment was carried out in private hours at the physiotherapy clinic. In this way, the patients participated in ACT treatment sessions that were held once a week for eight one-hour sessions for three months; participants in the control group received only their usual treatments. At the end of the sessions, all participants completed the IPQ as a posttest. The ACT treatment protocol was based on Hayes and Strosahl's[18] practical guidelines. The summary of the sessions is given in Table 1.

The IPQ is a self-report tool that was first developed in 1996 by Weinman *et al*.[19] Based on the Lontal model

Table 1: Summary of treatment sessions

Description	Session
✓ Examining the history of the reference problem and evaluating it. And the description of pain and its types	First
✓ Determine therapeutic goals and values;	
✓ Teaching the philosophy of intervention based on the act approach.A consulting contract includes attending on time and completing homework.	
✓ Investigate the interaction of thoughts, feelings, and actions	Second
✓ Creating frustration with previous methods that the person has done	
✓ Teaching that any action to avoid or control unwanted mental experiences is ineffective or has the opposite effect and causes them to intensify. Bringing clients to creative frustration and clarifying client values.	
✓ Continue to clarify values	Third
✓ Acceptance training, and novel techniques of fusion and psychological awareness using allegory	
✓ Investigating the relationship between negative thoughts and pain	
✓ Awareness of mental and physical emotions and focus on activities (such as walking) and emotions	Fourth
✓ The technique of being present in the moment and stopping thinking	
✓ Wise awareness	
✓ Investigating the relationship between stress and pain	
✓ Learn to rely on yourself as a background	Fifth
✓ Recognize the difference between acceptance and surrender	
✓ Pay attention to thoughts and feelings without clinging to its content,	
✓ Giving mindfulness tasks and getting feedback	
✓ Discuss barriers and practice exploring the feasibility of value-related activities	Sixth
✓ Non-judgmental processing of exercises related to satisfaction and dissatisfaction with life's sufferings	
✓ Provide an introduction to setting effective goals related to values and emotions	
✓ Teach the principle of commitment to action	
✓ Expression of selective attention technique	
✓ Increase interpersonal efficiency	Seventh
✓ Ability to choose in action	
✓ Anxiety tolerance training	
✓ Continue the discussion about the satisfaction of suffering	
✓ Exercises for clarifying values and emphasizing client empowerment	
✓ Practice trained therapy techniques and emphasize the sense of meaning in life	Eighth
✓ Motivation means committed action with the acceptance of mental experiences	

to assess cognitive representations of the disease, it is widely used to assess diseases. This questionnaire measures subscales of disease perception with 50 terms and has 9 subscales that include the following: identity, timeline, consequence, personal control, treatment control, illness coherence, emotional representation, time cycle, and causes of illness. All questionnaire items were graded based on a five-point Likert scale ("1" indicating strongly agree to "5" indicating strongly disagree). The reliability of the questionnaire by Moss Morris *et al*.[20] Through Cronbach's alpha coefficient, 0.79 to 0.89 was obtained for different parts of the questionnaire. Also, the correlation coefficient between different parts of the questionnaire was reported as 46-88%. In Iran, the reliability of this questionnaire was obtained by using Cronbach's alpha coefficient of 0.71 and its validity by retesting (0.73).[21]

In this study, IBM SPSS Statistics version 25.0 was used for analysis of the data. Multivariate analysis of covariance (MANCOVA) was used to evaluate the differences in the dimensions of disease perception and also to evaluate the effect of intervention programs on disease perception. Shapiro-Wilk test was used to check the normality of the population distribution due to the small sample size in each group (n > 50). Levine's test was also used to check the equality of variances.

Ethical consideration

This research has the code of ethics of Torbat-e Jam Azad University under the number IR.IAU.TJ.REC.1400.006 and the ethical issues approved by the Declaration of the World Medical Association of Helsinki have been considered in this research.

Results

Demographic variables including age, duration of illness, gender, and level of education in the experimental and control groups are listed in Table 2.

The results of independent *t*-test showed that there was no significant difference between the two groups with respect to mean age (P = 0.36) and duration of disease (P = 0.39), as well as gender distribution (P = 0.30) and education (P = 0.10). These findings showed that there

is no significant difference between the experimental and control groups in terms of demographic variables and the groups are homogeneous. The mean and standard deviation of the subscales of the disease perception variable are presented in Table 3.

The mean posttest scores of the experimental group compared to the pretest showed a decrease in the subscales of disease perception, but the control group did not show such a change in the posttest averages.

Also, as shown in Table 3, the assumption of homogeneity of variances in all disease perception variables was realized using Levine's test ($P < 0.05$). The results of examining the assumption of homogeneity of regression slope are given in Table 4.

The results show that the assumption of homogeneity of regression slope was met in all models ($P < 0.05$). According to the realization of the assumptions, MANCOVA was used. The results of Wilks's lambda test are given in Table 5.

According to the results, the difference between the adjusted means of the treatment groups based on acceptance, commitment, and control in the posttest is statistically significant ($P < 0.01$). The difference between the adjusted averages of treatment groups based on acceptance and commitment and control in the post-test is statistically significant ($P < 0.01$). The degree of difference in the scores of groups or the size of the effect of group membership is 0.82; this means that 82% of the variance of the remaining scores is affected by group membership.

The results of MANCOVA to examine differences in the dimensions of illness perception are presented in Table 6.

There was a significant difference in the posttest scores of illness perception dimensions and the elimination of the pretest effect ($P \geq 0.05$). This means that the difference in the scores of illness perception of the patients who received ACT was statistically significant compared to the difference scores of the illness perception of control group in the pretest and posttest.

Other results show that the size of the effect of group membership in creating differences in the dimensions of illness perception varies from 0.31 for treatment control to 0.76 for the meaning of illness. Subjects of the treatment group had lower averages in the dimensions of duration, disease outcome and disease meaning, and higher averages in personal control and therapeutic control than the subjects of the control group. Based on what was mentioned, the second hypothesis of the current research is confirmed. This means that ACT treatment has an effect on the perception of the disease in orthopedic patients.

Discussion

This study was aimed at evaluating the effectiveness of ACT on illness perception in orthopedic patients. The results showed that in terms of time, the outcome, and the meaning of the disease, the patients of the experimental group who received ACT had a lower mean in the posttest. In personal control and therapeutic control, the subjects of the experimental group had a higher average score than the subjects of the control group in the posttest. Therefore, providing the intervention (ACT)

Table 2: Demographic variables of participants in the study groups

Variable		Mean±SD		*t*	*P*
		Experimental Group	Control		
Age		31.75±4.71	29.83±5.27	0.94	0.36
Duration of illness (months)		3.64±5.28	5.62±5.81	−0.88	0.39
Variable		**Frequency (%)**		χ^2	*P*
		Experimental	Control		
Age	Female	8 (66.7)	7 (58.3)	0.18	0.30
	Male	4 (33.3)	5 (41.4)		
Education	≤ Diploma	9 (75.0)	5 (41.7)	2.74	0.10
	Above the diploma	3 (25.0)	7 (58.3)		

Table 3: Mean and standard deviation of experimental and control group variables in pretest and posttest

Variable	Experimental group		Control group		*F*	*P*
	Pretest	Posttest	Pretest	Posttest		
Duration of illness	17.17±1.95	14.50±2.50	17.25±3.28	16.58±3.75	1.25	0.28
Outcome of the disease	26.92±4.96	23.50±2.11	25.08±3.63	26.25±2.05	0.37	0.55
Personal control	20.42±3.90	23.50±2.78	21.83±2.25	21.50±3.73	0.13	0.72
Therapeutic control	13.17±2.69	16.08±3.29	12.25±3.14	12.92±3.12	0.16	0.69
Meaning of the disease	15.58±2.27	12.92±2.15	16.00±2.22	15.50±2.81	0.22	0.64

had a significant effect in improving the perception of the disease in orthopedic patients. In fact, people who face chronic disease form mental structures or cognitions of the disease in their cognitive system, in which internal and external variables such as personality factors, social environment and demographic factors play a role in their formation. Along with the threat of the disease, they affect the patient's understanding of the nature, cause, treatability, controllability, and consequences of the disease.[22] The feeling of control over the disease is one of the dimensions of the perception of the disease. Studies have shown that people who have a high sense of internal control use more task-oriented coping strategies than people who have a low sense of control. The high efficiency and sufficiency in these people lead them to proper control. In general, these people, relying on the feeling of efficiency and sufficiency in controlling stressful situations, consider the disease to be controllable and underestimate its negative emotional effects.[23] People who are faced with a chronic disease form mental structures or cognitions about the disease in their cognitive system, in which internal and external variables such as personality factors, social environment and demographic factors play a role in their formation. These factors along with the threat of the disease, they affect the patient's understanding of the nature, causes, treatability/controllability and consequences of the disease. Therefore, a person who has a positive mental structure of his disease is able to realistically and correctly describe the symptoms and other dimensions. Understand and analyze the disease.[24] On the other hand, if the consequences of the disease are not overestimated, the person will not show extreme attention to the disease and its consequences. Attention management along with the feeling of individual worth and competence causes the use of coping strategies that aim to change the situation or increase personal possibilities.[25] In other words, the positive perception of the disease, which is accompanied by the perception of control over the disease and the symptoms and emotions associated with it, leads to appropriate treatment measures, and the resulting recovery leads to a more positive perception.

Table 4: *F*-test results to investigate the homogeneity of regression slope in disease perception

Model	Total Squares	The Squares' Average	*F*	*P*
Duration of illness	6.72	3.36	1.20	0.34
Outcome of the disease	14.56	7.28	2.55	0.12
Personal control	2.53	1.27	1.11	0.37
Therapeutic control	25.62	12.81	2.69	0.11
Meaning of the disease	7.41	3.70	3.23	0.08

Table 5: Multivariate test results to examine differences in disease perception

Indicators	Coefficients
Wilks' lambda coefficient	0.18
F	11.54
df assumed	5
df error	13
P	0.0001

According to these results, when a person has a high level of control over his illness, he performs more realistic behaviors related to improving his health. Illness perception is actually the organized cognitive representations and beliefs of an individual about his illness. These representations influence the types of coping and health-related behaviors that a person uses to manage their illness. Illness perception can also affect self-efficacy skills in chronic diseases. Illness perception is actually a person's belief and expectation about his capacity to influence the desired outcome through individual efforts. In other words, the perception of the disease affects his motivation, and the stronger the belief, the more active the person is and the more effort he makes and the more persistent the behavior will be in achieving the specific goal.

In line with the results of this research, the evidence shows that in a wide range of diseases (acute and chronic diseases such as multiple sclerosis and chronic pain), a person's attitude toward the nature of the disease, its

Table 6: Results of analysis of covariance the difference in the dimensions of disease perception in the two groups by eliminating the effect of pretest

Variable	Source of Changes	Total Squares	The Squares' Average	*F*	*P*	Eta Squared Share
Duration of illness	Pretest	159.79	159.79	160.32	0.0001	0.9
	Group membership	11.99	11.99	12.03	0.003	0.41
Outcome of the disease	Pretest	22.51	22.51	8.94	0.008	0.35
	Group membership	61.17	61.17	24.29	0.0001	0.59
Personal control	Pretest	154.11	154.11	36.15	0.0001	0.68
	Group membership	42.82	42.82	10.05	0.006	0.37
Therapeutic control	Pretest	102.83	102.83	18.81	0.001	0.53
	Group membership	41.10	41.10	7.52	0.01	0.94
Meaning of the disease	Pretest	113.11	113.11	261.20	0.0001	0.94
	Group membership	22.95	22.95	52.99	0.0001	0.76

consequences, control, duration, and cause is effective in determining healthy behaviors.[26] In such a way that these behaviors had a negative relationship with the acute time line, periodic time line, the consequences of the disease and the meaning of the disease; while they had a positive relationship with the treatment control and personal control. That is, having a positive attitude leads to shortening the duration of the disease, and on the other hand, it leads to an increase in individual control and treatment of the disease. These results are also consistent with the findings of Sungur *et al*.,[27] Karabulutlu *et al*.,[28] and Richters *et al*.[29]

Regarding the dimensions of understanding of the disease, time course (acute/chronic), consequences of the disease, the meaning of the disease, personal controllability, and treatability, the results indicate that before the intervention, most of the research units in both groups had an unfavorable understanding. With regard to the similarity of the control and experimental groups before the intervention in terms of average changes in perception of the disease, it can be said that ACT in the experimental group was able to have significant impact compared to the control group, and this confirms the effect of ACT. According to Leventhal's theory,[3] patients adjust their behavior and emotional reaction to the disease based on their perceptions of its nature, causes, consequences, controllability, treatability, and duration.[30] Considering that the perception of the disease has a predictive value in improving the health behaviors of patients with chronic diseases, various studies have supported the relationship between the perception of the disease and adherence to treatment.[4]

In explaining these findings, it should be said that patients who believe that they have the ability to take measures to control the disease, its course and symptoms, have a clear understanding of their disease and the ability to accept and cope with reality. Therefore, these patients are less prone to depression, anxiety and other mental disorders that these explanations can be explained and justified in the form of the treatment control subscale of disease perception.[31] Even the patient's belief about how long the disease may last in the form of an acute timeline, their belief about potential risk factors, and their psychological characteristics in increasing the likelihood and severity of the disease can be related to the general factor of the patient's perception of control and potential ability. It can be explained by the disease. Different studies have supported the relationship between the perception of illness and adherence to treatment.[32] For example, after receiving treatment, they expect less severity of their illness and consider their illness to be chronic, controllable and treatable. They have more homogeneity with the disease and have also achieved more positive cognitive and emotional manifestations of their disease; that is, they have a more benign interpretation of their disease and its related conditions.

Limitation and recommendation

The present study has limitations such as restrictions on the selection of the sample group, which were selected only from orthopedic patients referred to the physiotherapy clinic. Moreover, the evaluation period in the study was limited to three months, taking into account the follow-up period after the treatment, more favorable results can be obtained. Therefore, caution needs to be exercised in generalizing the results. It is recommended to compare the effectiveness of this treatment method with other behavioral treatments and also to investigate changes in brain wave pattern and cognitive functions in orthopedic patients.

Conclusion

The results showed that ACT was effective in increasing personal and therapeutic control and reducing the timing, consequences, and meaning of the disease in patients in the experimental group. The use of ACT is suggested as an effective and complementary psychological intervention in the perception of the disease in orthopedic patients. In this regard, it is necessary for specialists and therapists to pay attention to the quality of life and the person's understanding of the disease in the form of a dominant psychological phenomenon in most orthopedic patients, and in addition to drug therapy, they should also provide psychological treatment for their behavior. They should also pay attention to supportive treatments that reduce the psychological discomfort of these people.

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Conflicts of interest

There are no conflicts of interest.

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