Research Paper

The Effectiveness of Acceptance and Commitment Therapy on Pain Control and Adherence to Treatment in Dialysis Patients

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ABSTRACT

Background: Pain control and adherence to treatment is one of the most common problems in dialysis patients. Psychological treatments can be effective in reducing the problems of these patients. This study attempted to investigate the effectiveness of acceptance and commitment therapy (ACT) on pain control and adherence to treatment among dialysis patients.

Methods: It was a semi-experimental pre-test, post-test study with a control group. The statistical population consisted of 40 people who were referred to a dialysis clinic in 2022 and an available sampling method was used to select and randomly assign patients to two experimental and control groups. In the experimental group, ACT was performed in eight sessions of 90 minutes. McGill pain questionnaire (MPQ) and adherence to treatment scale were used. Data were analyzed using SPSS software, version 21 and analysis of covariance.

Results: There was a significant difference between the mean scores of pain control and adherence to treatment in the two experimental and control groups ($P<0.05$). The effect of this treatment on increasing the pain control score was 51% and on increasing the adherence to treatment score was 44%.

Conclusion: ACT can increase pain control and adherence to treatment in dialysis patients; thus, it can be used in designing treatment plans for dialysis patients.

Keywords: Acceptance and commitment therapy, Pain management, Treatment adherence, Dialysis

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1. Introduction

Chronic kidney failure is a progressive and irreversible disorder, which leads to the formation of urea and other toxic substances in the blood. In other words, chronic kidney failure is defined as a progressive and irreversible loss of kidney function, which often leads to end-stage kidney disease [1]. The prevalence of this disease in the world is 242 cases per one million individuals, which increases by about 8% annually, and its incidence varies in different countries. In the final stage of kidney disease, alternative treatments, such as hemodialysis, peritoneal dialysis, and kidney transplant are used [2]. Hemodialysis is the most common treatment used among these patients. Wide access to hemodialysis has extended the life duration of hundreds of thousands of patients within the end stages of kidney disease [3].

One of the major problems in dialysis patients is complications after dialysis, including muscle pain, headache, chest pain, back pain, and fatigue. After saving the patient's life, pain relief is one of the most important medical priorities, and many efforts have been made to control pain [4]. Pain is defined by the International Association for the Study of Pain (IASP) as an unpleasant sensory and emotional experience associated with actual or potential tissue damage [5]. Chronic pain patients, such as kidney disease usually suffer from depression and anxiety. Pain, anxiety, and depression can occur together due to common anatomy and neurotransmitters. There is a significant correlation between mortality and pain intensity and recurrence in hemodialysis patients. The symptoms of disability, depression, insomnia, extreme irritability, anxiety, and inability to cope with stress are more common in hemodialysis patients who have pain than in patients without pain [6]. Sheykh Mohammadi et al. showed that acceptance and commitment therapy (ACT) was effective in reducing pain perception in women with breast cancer [7]. Also, Soleimani et al. showed the effectiveness of ACT on pain in patients with chronic low back pain [8]. On the other hand, mental problems and pain are important factors in reducing adherence to treatment [9]. Even the mental and psychological problems of these patients may affect the treatment staff and cause their burnout [10]. Adherence to treatment is also a behavior that is consistent with medical or health recommendations in terms of taking medicine, diet, or other lifestyle changes. It is a complex behavioral process and is affected by several factors, including the biological-psycho-social model and the model of medical and psychological integra-

tions, which are known as dominant models of health psychology [11]. Non-participation of depressed patients in treatment adds to their medical problems and endangers their health and ultimately causes their premature death [12]. Moreover, pain prevents adherence to recommended diets and treatments and has a negative effect on self-care and treatment results. Patients who have higher social support and lower levels of anxiety have higher levels of self-care [13].

For pain control and adherence to treatment in dialysis patients, various psychological treatments have been provided. One of the effective approaches in this field is ACT [14]. Karimi et al. showed the effectiveness of ACT on adherence to treatment among dialysis patients [15]. Sabetfar et al. showed the effectiveness of the diet based on commitment to self-care behaviors and cognitive emotion regulation in patients with hypertension [16]. ACT is a third-wave behavioral therapy that motivates people to accept changing the function of thoughts and feelings instead of changing their content or frequency [17]. This treatment has six central processes that lead to psychological flexibility. These six processes are acceptance, failure, self as context, connection with the present, values, and committed action [18]. ACT is one of the recently developed models whose key therapeutic processes differ from traditional cognitive-behavioral therapy. Its underlying principles include: 1) Acceptance, or the willingness to experience pain or other disturbing events without trying to control them. 2) Action based on value or commitment combined with the desire to act as meaningful personal goals more than eliminating unwanted experiences in interaction with other non-verbal dependencies in a way that leads to healthy functioning. This method includes experiences and exercises based on exposure, linguistic metaphors, and methods, such as mental relaxation [19].

ACT allows clients to take steps by accepting inner experiences, increasing flexibility in the path of action according to values, and reducing experiential avoidance [20]. As a result, considering the sensitivity and importance of dialysis patients' health and their low ability in pain control and adherence to treatment, as well as no comprehensive research on this issue, we attempted to determine the effectiveness of ACT in clinical symptoms and adherence to treatment in dialysis patients.

2. Methods

This research was a semi-experimental study with a pre-test and post-test control group design carried out in a Dialysis Clinic in Torbat-e-Heydarieh, Iran, in 2022.

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The statistical population included all patients who were referred to the Musa Bin Jafar Dialysis Clinic. Before starting the intervention, the necessary explanations were given to the subjects about the objectives of the research, and after obtaining their informed consent, they entered the study. The statistical sample was determined to be 40 people (20 people in each group) based on the statistical Equation 1 and similar studies [21-23].

$$1. \ n = \frac{(z1-\frac{\alpha}{2}+z1-\beta)^2(\sigma12+\sigma22)}{(\mu1-\mu2)}$$

Available sampling method and random assignment were used and people were assigned to two experimental and one control groups. The criteria for entering the research included dialysis patients, low pain control score, and low treatment adherence score, and the exclusion criteria also included participating in other treatment programs at the same time, receiving individual counseling or drug therapy, missing more than two sessions in training sessions, no satisfaction, and cooperation, and not doing the specified tasks in the training process. At the beginning of the study, both groups were pre-tested by McGill pain control questionnaire and treatment adherence scale. According to Harris protocol [24], the ACT intervention was implemented by a psychologist with a PhD degree in the experimental group during eight sessions in 90 minutes (two sessions per week) through face-to-face sessions, following protocols and social distancing and using personal protective equipment. During the implementation of the therapeutic intervention, the control group was on the waiting list. After the last treatment session, a post-test was conducted for both groups, and the data were analyzed based on the covariance analysis test using SPSS software, version 21. After the end of the study, ACT was also held in the form of face-to-face meetings for the control group, observing social distancing, and using personal protective equipment. Figure 1 indicates the CONSORT diagram of the study. The content of therapy sessions is reported in Table 1.

McGill pain questionnaire (MPQ)

This questionnaire is one of the most prominent tools for measuring pain first used by Melzack in 1975 on 297 patients suffering from various types of pain. It has 20 sets of phrases and its purpose is to measure people's understanding of pain from different dimensions of sensory perception of pain (1-10), emotional perception of pain (11-15), perception of pain evaluation (16), and diverse
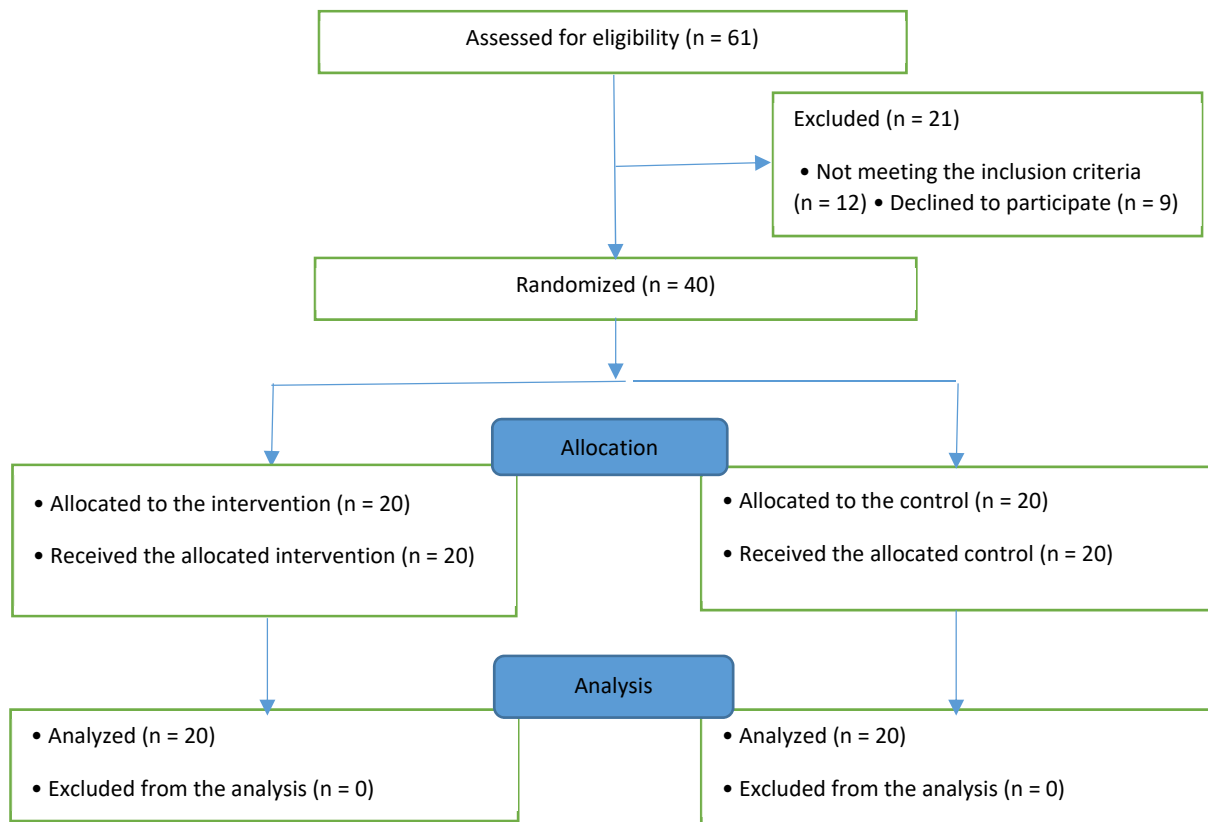
Assessed for eligibility (n = 61)

Excluded (n = 21)

• Not meeting the inclusion criteria (n = 12) • Declined to participate (n = 9)

Randomized (n = 40)

Allocation

• Allocated to the intervention (n = 20)

• Received the allocated intervention (n = 20)

• Allocated to the control (n = 20)

• Received the allocated control (n = 20)

Analysis

• Analyzed (n = 20)

• Excluded from the analysis (n = 0)

• Analyzed (n = 20)

• Excluded from the analysis (n = 0)

Figure 1. CONSORT diagram

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Table 1. ACT session titles [24]

Session	Purpose
1st	Acquaintance and communication of the members with each other, preliminary explanations, problem conceptualization, client preparation, and pre-exam implementation. Providing explanations about dialysis, clinical symptoms, pain control, and following doctor's orders. Also, preparing a list of enjoyable activities and including it in the weekly schedule.
2nd	Acquaintance with ACT therapeutic concepts (psychological flexibility, psychological acceptance, psychological awareness, cognitive separation, clarifying values, and committed action) and discussing experiences and evaluating them.
3rd	Mindfulness training (emotional awareness and wise awareness), training clients about the observed skills and how skills are not judged and still focused and how these skills work. Also, the use of the time-out technique by members when increasing responsibility and commitment and expressing control is a measurement problem.
4th	First, the focus is on increasing psychological awareness, and then, people are taught how to properly respond and face their mental experiences and create a goal, enjoy a social lifestyle, and have a practical commitment. Examining the positive and negative points of the members and weakening the self-concept and true self-expression without any judgment and emotional reaction and behavioral commitment.
5th	Training to tolerate distress and increasing tolerance and responsibility (skills to persevere in crises, diverting senses, self-soothing using the six senses, and practicing awareness). Reviewing previous meetings and giving feedback to each other.
6th	Emotion management training (goals of this training, knowing why emotions are important, recognizing emotions, increasing positive emotions (changing emotions through action opposite to the recent emotion, practical training of what has been learned, providing feedback by the group and the therapist).
7th	Increasing individual and interpersonal efficiency, training interpersonal skills (describing and expressing, expressing oneself and having courage, open trust, negotiation, and self-esteem). Measuring performance, introducing the concept of value, and showing the risks of focusing on results.
8th	Understanding the nature of desire and commitment, determining suitable action patterns with values, summarizing, and conducting post-examination.

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and various pains (16-20) scored on a 6-point Likert scale and gives a general score of pain perception (pain intensity) where higher scores indicate higher pain [25]. Dworkin et al. reported a high validity and reliability for this questionnaire so that the results of exploratory and confirmatory factor analysis indicated the existence of four sub-scales. Moreover, Cronbach's α coefficient for four subscales of sensory pain, emotional pain, perception of pain evaluation, and various pains was reported as 0.87, 0.87, 0.83, and 0.86, respectively [26]. In Iran, Torbati et al. translated and checked the reliability of the MPQ in 2012 and stated that this questionnaire has sufficient cultural adaptation and reliability to be used in epidemiologic studies of chronic pain in Iran. In their study, content validity and confirmatory factor analysis were investigated and reliability was checked by Cronbach's α method for sensory pain, emotional pain, perception of pain evaluation, and various pains, which were 0.96, 0.96, 0.82, and 0.81, respectively, and the value for overall pain was 0.97. Total reliability was obtained by the internal consistency method by calculating Cronbach's α coefficient of 0.86 [27]. The reliability of this study was 0.87 based on a test re-test method.

General adherence to treatment scale

The general adherence scale was designed by Hayes in 1994, which measures the patient's willingness to follow the doctor's recommendations in general [14]. The scale has five items. The subject can answer the items of this scale within 2 to 3 minutes, and for each question, a 6-point Likert scale is used (always, most of the time, at a suitable time, sometimes, a few times, and never). Two items (questions one and three) are graded in reverse. Obtaining a higher score indicates more adherence to treatment and obtaining a lower score indicates less adherence to treatment. In Hayes' study, the validity of the test was investigated through construct validity with the internal consistency method reported as 0.81, and the reliability of this scale was 0.77 based on a test re-test method with an interval of one year [28]. In Fahimi et al.'s research, Cronbach's α coefficient was used to check the reliability of the questionnaire, which was equal to 0.68 [29]. The reliability of this study was 0.84 based on a test re-test method.

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3. Results

The mean age in both groups was 36.54±9.3 years. In terms of marital status, most married participants were in the control group (45%) followed by the experimental group (40%). In terms of education, most subjects in the experimental group were under a diploma (50%), and the control group had a diploma (45%). The highest employment status in the experimental group (40%) and the control group (50%) was self-employed. According to the chi-square test results, there were no significant differences between the studied groups in terms of age, sex, marital status, occupation, and education level, and they were homogeneous (P>0.05).

In this research, multivariate analysis of covariance (MANCOVA) was used for the inferential analysis of the results. First, the required assumptions were examined. The normality of the distribution of data, homogeneity of variances of grades, and equality of covariances of grades were investigated. The results of the Kolmogorov-Smirnov test showed the normality of the community distribution (P>0.05). Levene's test on pain control (P=0.140, F=0.340) and adherence to treatment (P=1.351, F=2.241) showed that the assumption of equality of variances was confirmed in all research variables. Based on the results of the Box's M test (P=0.816, F=0.490, Box's M=3.331), the presumption of equality of covariances was confirmed. Due to the confirmation

Table 2. Descriptive indicators of the samples

Variables		Group	Mean±SD	
			Post-test	Pre-test
Pain control	Total score	Case	32.53±1.086	36.67±1.153
		Control	32.67±1.081	32.63±1.087
	Sensory perception	Case	16.93±1.016	18.73±1.035
		Control	17.67±0.950	17.34±0.657
	Emotional perception	Case	6.47±0.291	7.73±0.441
		Control	6.06±0.452	6.07±0.3
	Pain assessment	Case	2.33±0.187	3.20±0.243
		Control	2.08±0.218	2.07±0.314
	Miscellaneous pain	Case	6.80±0.341	8±0.436
		Control	6.92±0.348	6.93±0.419
Adherence to treatment		Case	6.47±0.624	8.40±0.815
		Control	0.263±5.87	5.86±0.839

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Table 3. Multivariate analysis of covariance results regarding the effect of group on pain control scores and following doctor's orders

Test	Value	F	Hypothesis df	Error df	P	Partial Eta Squared	Observed Power
Pillai's trace	0.667	14.042	3.000	21.000	0.001	0.66	1.000
Wilk's lambda	0.333	14.042	3.000	21.000	0.001	0.66	1.000
Hotelling trace	2.006	14.042	3.000	21.000	0.001	0.66	1.000
Roy's larger root	2.006	14.042	3.000	21.000	0.001	0.66	1.000

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Table 4. Multivariate analysis of covariance to compare the effect of treatment on research variables

Variables	Sum of Squares	df	Mean Square	F	P	Partial Eta Squared	Observed Power
Pain control	187.092	1	187.092	24.115	0.0001	0.51	0.921
Adherence to treatment	21.778	1	21.778	18.600	0.0001	0.44	0.952

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of all presuppositions, the MANCOVA was used to examine research hypotheses. The Mean±SD of the scores of pain control variables and adherence to treatment, in the pre-test and post-test in the experimental and control groups are shown in Table 2.

MANCOVA results to compare the experimental and control groups regarding dependent variables are also presented in Tables 3 and 4. As can be seen in Table 3, the value of Wilks's lambda was significant ($P<0.05$). This means that there was a significant difference between the experimental and control groups in the post-test scores of pain control variables and following the doctor's orders and the amount of this difference was 0.66, that is, 66% of the individual differences in the variables were related to the difference between the groups.

Based on the results of Table 4, by removing the effects of the pre-test scores, the difference between the mean post-test scores in pain control and adherence to treatment in the experimental and control groups was significant ($P<0.05$). The effect of this treatment on the increase in pain control score was 51% and the increase in treatment compliance score was 44%.

4. Discussion

This study was conducted to determine the effect of ACT on pain control and adherence to treatment in dialysis patients. The results showed that ACT increased pain control in patients, which is consistent with the results of similar studies reporting that ACT increased adherence to treatment [30-33]. Pain is common in dialysis patients, and the symptoms of the disease are usually concentrated in the lower limbs [34]. ACT helps people engage in high-value behaviors and is even more tolerant when personal events are unpleasant. Committed action creates an active will to experience unpleasant personal events [14]. In general, acceptance and commitment therapy supports all treatment processes so that people can become more valuable in their lives and achieve psychological resilience. Mindfulness skills enable people to tolerate negative emotions and consequently have more resistance to pain [15].

Also, the findings of this study showed that ACT affects the adherence of dialysis patients to physician's orders, which is consistent with the results of similar studies indicating that ACT affects the increase in adherence to treatment [35-37].

Adherence to treatment in patients with chronic diseases is very important and patients can influence their comfort, functional abilities, and disease processes by acquiring their skills and cause self-care, participation, and acceptance of responsibility by the patient him/herself [38]. Most chronic patients, such as dialysis patients, face obstacles in complying with treatment, and their poor self-care can lead to frequent hospitalizations and low quality of life [7]. In ACT, the person is encouraged to do his/her best to achieve the goal [39]. ACT has two parts of mindfulness and action in the present and teaches people to live in the present moment by accepting their emotions and better cope with everyday challenges [40]. ACT teaches people to accept despite their hardships and sufferings and to think about making their life and goals worthwhile. ACT allows people to be attentive, aware, and observant of their inner events. Therefore, these people will be more likely to improve their disease and follow their medical and therapeutic instructions [14].

The limitations of the present study were no intervention for the control group to neutralize the placebo effect of the treatment, limited statistical population, probable previous contact, and familiarity of the control group with the intervention group outside of the treatment sessions that might have affected the treatment results and also as the control group did not receive a different intervention, it was not possible to compare the psychological interventions with each other, which is suggested to be considered in future studies.

5. Conclusion

The findings of this research showed that ACT can increase pain control and adherence to treatment in dialysis patients. Therefore, considering the high importance of adherence to treatment and pain control in these patients, it is suggested that this psychological intervention be used in the design of treatment programs for dialysis patients by clinical psychologists and therapists.

Ethical Considerations

Compliance with ethical guidelines

This article was approved by the Ethics Committee of Islamic Azad University, Torbat-e Jam Branch (Code: IR.AUI.TJ.REC.1401.072).

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Authors' contributions

Conceptualisation and study design: Amir Hossein Sadeghi and Seyed Ali Ahmadi; Data collection: Amir Hossein Sadeghi; Analysis and interpretation of results: Abbas Ghodrati-Torbati and Hamideh Yaghoubi; Preparation of the draft: Abbas Ghodrati-Torbati and Hamideh Yaghoubi; Final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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