



Effectiveness of Acceptance and Commitment Therapy on Pain Perception and Self-Care in Individuals with Migraine

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Abstract

Background and Objective: The present study aimed to examine the effect of Acceptance and Commitment Therapy (ACT) on pain perception and self-care in individuals with migraines.

Materials and Methods: A quasi-experimental pretest–posttest design with a control group was conducted at Shahid Fahmideh Hospital, Tehran, Iran, from 2023 to 2024. The sample consisted of 24 (12 per group) women with migraine headaches who were purposively selected and assigned to the intervention and control groups. The experimental group received eight 90-min ACT sessions; the control group received no intervention. Pain perception and self-care were measured using the Short-Form McGill Pain Questionnaire and the Madah Questionnaire. Moreover, data were analyzed by multivariate analysis of covariance (MANCOVA).

Results: The findings indicated that the effect of group assignment on overall pain perception and its components—including sensory, affective, evaluative, and self-care dimensions was significant. After controlling for pretest scores, a significant difference between the groups was found ($P < 0.01$).

Conclusions: The findings indicate that ACT reduces pain perception and improves self-care behaviors in women with migraines, suggesting it may be an effective psychological intervention for this population.

Keywords: Acceptance and Commitment Therapy (ACT); Migraine; Pain perception; Self-care

Background

Migraine is a common neurological disorder characterized by recurrent headache attacks accompanied by symptoms such as nausea, vomiting, and sensitivity to light and sound [1]. Diagnostic criteria require at least five attacks lasting 2–72 hours, with features including unilateral or bilateral location, pulsating quality, moderate to severe intensity, and aggravation by routine physical activity, often with nausea, vomiting, photophobia, or phonophobia [2]. Subtypes include migraine without aura, migraine with aura (reversible neurological symptoms preceding or accompanying the headache), and chronic migraine (headache on at least 15 days per month for over three months) [3]. Additionally, people with migraine experience neck pain more often than those without primary headache disorders, and neck pain is associated with greater perceived burden and disability [4].

Migraine causes physical, cognitive, and emotional disturbances, imposing a substantial burden on family, social, financial, and occupational life [4]. It affects about 10% of adults globally, with over one billion people affected worldwide [5, 6]. As a non-fatal disease burden, migraine ranks second globally. Prevalence is about 20% in women, two to three times higher than in men [5]. Migraine primarily

occurs during the productive years (ages 25–55), with peak incidence in the late 30s and a higher prevalence between 35–45 years [6, 7]. The female-to-male ratio is approximately 3:1, with a one-year prevalence of approximately 15% in the general population and nearly 30% among women in their 30s. Prevalence rises after menarche, peaks in the early 40s, and declines after menopause [7]. Consequently, migraine is a leading cause of disability among adults under 50 [8].

Women experience more severe migraine symptoms and greater disability than men, making migraine a leading cause of disability in women. It negatively impacts daily activities, sleep, relationships, finances, and quality of life. Although most patients seek help, diagnosis often takes over three years, nearly half discontinue follow-up after the first visit, and many remain undiagnosed or untreated [6]. Despite its high burden, migraine is undertreated, though managing risk factors can help reduce attack frequency and severity.

Pain perception in women with migraines is shaped by biological, hormonal, cognitive, and emotional factors. Women experience higher migraine prevalence, greater pain intensity, more functional disability, and increased emotional distress than

men [9]. Hormonal changes across the menstrual cycle, pregnancy, and menopause can heighten pain sensitivity and lower pain tolerance [10, 11]. Cognitive factors like pain anticipation, symptom focusing, catastrophizing, ineffective coping, and emotional issues, such as anxiety and depression, further intensify pain [12]. Therefore, for women with migraines, pain is not merely sensory but deeply intertwined with psychological and social contexts.

Self-care, a key approach in migraine management, effectively reduces the severity and frequency of attacks and enhances patients' quality of life [13]. It involves conscious health-related behaviors, such as a healthy lifestyle, adherence to treatment, stress management, proper nutrition, physical activity, and health monitoring [14]. For migraine patients, self-care includes identifying triggers, following medication routines, maintaining sleep hygiene, healthy eating, and stress management, ultimately enhancing empowerment and quality of life [15].

Migraine is a debilitating disorder with limited treatment options and significant side effects, leading patients toward complementary therapies, such as Acceptance and Commitment Therapy (ACT), a mindfulness-based intervention [16]. ACT focuses on accepting unpleasant internal experiences and enhancing psychological flexibility, making it effective for chronic pain conditions, including migraines [17-18]. The approach involves six core processes: acceptance, cognitive defusion, contact with the present moment, self-as-context, values clarification, and committed action [19]. Instead of avoiding or controlling internal experiences, ACT teaches individuals to change their relationship with them while acting on personal values [20]. ACT has been successfully applied to a wide range of psychological disorders and chronic physical illnesses [21].

Objectives

Although previous psychological interventions have indicated benefits for migraine management, they may not sufficiently address psychological inflexibility and pain-related avoidance. Therefore, ACT was selected because it aims to enhance psychological flexibility and acceptance of pain-related experiences. In their research, Fathi et al. [22] demonstrated that ACT effectively reduces headache catastrophizing, which in turn alleviates associated anxiety and pain-related fear. This reduction leads to decreased headache severity and an improved quality of life for patients with chronic headaches. While ACT serves as an experiential treatment for chronic pain, the findings of Vasilyev et al. [23] provide evidence that it is also beneficial

for managing headaches in patients with migraines. Furthermore, a study by Grazzi et al. [24] suggests that combining pharmacological treatments with ACT can enhance key clinical outcomes, specifically reducing headache frequency and medication usage in patients experiencing high-frequency episodic migraines.

Migraine is a debilitating neurological disorder affecting pain perception, emotional function, and quality of life. Pain perception in migraine is influenced by cognitive and emotional factors, such as experiential avoidance, pain catastrophizing, and emotion regulation difficulties. Pharmacological treatments often fall short, leading to unsatisfactory relief or medication overuse. ACT, which enhances psychological flexibility and acceptance of pain, offers a promising alternative. However, empirical research on ACT's effect on migraine-related pain perception is limited, particularly in Iran. Therefore, the present study aimed to investigate the effectiveness of ACT on pain perception in individuals suffering from migraine.

Materials and Methods

This quasi-experimental study used a pretest-posttest design with a control group. The statistical population comprised women with migraine headaches referred to Shahid Fahmideh Hospital in Tehran, Iran, from early 2023 to the end of 2024. Hospital records showed 65 confirmed migraine cases during this period. After evaluating the inclusion criteria, the sample size was determined using G*Power software ($\alpha=0.05$, power=0.80). Ultimately, 24 women with migraines were purposively selected and randomly assigned equally to two groups (12 each). Inclusion criteria were a specialist-confirmed migraine diagnosis, absence of acute physical or psychological symptoms, a minimum high school diploma education, an age range of 20–40 years, and no other psychological interventions in the previous two months. Exclusion criteria were absence from more than two consecutive therapy sessions, failure to complete homework assignments, or participation in other psychological interventions within the preceding two months.

The McGill Pain Questionnaire (Melzack, 25) includes 20 descriptor sets assessing sensory, affective, evaluative, and miscellaneous pain qualities. Its short form contains 12 descriptors (evaluating sensory and affective dimensions) and six items measuring pain intensity on a verbal rating scale from 0 (no pain) to 6 (excruciating pain). Khosravi et al. [26] reported a Cronbach's alpha of 0.85, indicating acceptable reliability, along with satisfactory construct validity.

The Self-Care Questionnaire (Harrison and Oakland, 27) consists of 12 items rated on a four-point Likert scale: 0 (inability to perform the skill), 1 (ability but not performed), 2 (performed with encouragement), and 3 (performed independently). Harrison and Oakland [27] confirmed face and content validity through expert opinions. Reliability was established with a Cronbach's alpha of 0.72. Both instruments demonstrate adequate psychometric properties for use in clinical research,

with the McGill Questionnaire focusing on multidimensional pain perception and the Madah scale assessing self-care abilities in patient populations. A summary of the ACT session content based on the Hayes and Smith [28] protocol is presented in Table 1. Treatment integrity was maintained by delivering all ACT sessions according to a standardized protocol by a trained therapist. Session content was monitored to ensure adherence to the treatment framework.

Table 1. Summary of ACT sessions based on Hayes and Smith's protocol [28]

Session	Title	Objectives (Main Purpose/Focus)
1	Establishing a therapeutic relationship	Familiarizing individuals with the research topic, explaining headaches, their symptoms and signs, as well as pharmacological and non-pharmacological treatments, assessing the individual's willingness to change, responding to questions, and establishing a therapeutic contract.
2	Initial assessment	Discovering and examining therapeutic techniques, assessing the impact of treatment methods, instilling a sense of helplessness regarding the temporary and limited effectiveness of treatments through the use of metaphors, receiving feedback, and providing assignments.
3	Assisting and guiding the client	Assisting in the recognition of personal events, thoughts, and memories; identifying ineffective strategies and tracking their futility; accepting painful personal events without struggling against them or attempting to control them through the use of metaphors; receiving feedback, and providing assignments.
4 and 5	Avoidance of painful experiences	Explaining the avoidance of painful experiences and the awareness of the consequences of such avoidance, identifying avoided situations and engaging with them through acceptance, teaching the steps of acceptance while clarifying the concepts of willingness and barriers, articulating the meaning of assessment and description using metaphors, shifting language concepts with the aid of metaphors, teaching relaxation techniques, receiving feedback, and providing assignments.
6	Self-observation	Explaining the concepts of role and context, observing oneself as a framework, and establishing contact with oneself through the use of metaphors, increasing awareness of various sensory experiences, and detaching from sensations that are considered part of mental content. In this session, exercises will be provided for participants to learn how to focus on their activities, such as breathing and walking, while maintaining awareness of their state in each moment without self-judgment. Feedback will be received, and assignments will be given.
7	Identifying the concepts of values, goals, and needs	Explaining the concept of values and articulating the differences between values, goals, and needs; clarifying the client's values; fostering motivation for change and empowering the client to lead a better life; practicing focus on activities such as breathing, walking, eating, brushing teeth, etc.; receiving feedback, and providing assignments.
8	Commitment and action	Teaching commitment to action, identifying behavioral plans aligned with values, and creating commitments to act on them; reviewing assignments and summarizing sessions with the client; conducting a post-test.

Research instrument

After participants were selected and assigned to the experimental or control groups, all participants completed a pain perception questionnaire as a pretest. The experimental group then underwent eight 90-min sessions of ACT, while the control group received no intervention. Following the intervention, the pain perception questionnaire was administered again to both groups to evaluate the effectiveness of the therapeutic approach on the study's variables. For data analysis, we first calculated descriptive statistics, including means, standard deviations, minimums, and maximums. This was followed by a multivariate analysis of covariance (MANCOVA) to analyze the research data. Before conducting inferential analyses, we tested for the assumptions of normality of data distribution, homogeneity of covariance matrices, and homogeneity of regression slopes. Homogeneity of covariance matrices and homogeneity of regression slopes.

Results

In terms of age distribution, the experimental group had 71% aged 20–30 years and 29% aged 31–40 years, while the control group had 68% and 32%, respectively. Regarding education, the most common level in the experimental group was a high school diploma (57%), followed by a master's or higher (25%) and a bachelor's degree (18%). In the control group, 55% had a high school diploma, 44% had a master's or higher, and 21% had a bachelor's degree. For marital status, the experimental group consisted of 56% single and 44% married, whereas the control group had 44% single and 56% married. Concerning disorder duration, in the experimental group, 57% reported 2–4 years, 25% reported 1–2 years, and 18% reported 4 years or longer. In the control group, 55% had a duration of 4 years or longer, 24% had 2–4 years, and 21% had 1–2 years. Overall, both groups were generally similar in age and education, but differed somewhat in marital status and illness duration.

Table 2. Descriptive statistics of pain perception and self-care across assessment phases in ACT and control groups.

Variable	Group	Pretest		Post-test		Follow-up	
		Mean	SD	Mean	SD	Mean	SD
Sensory pain perception	ACT	17.86	2.53	10.66	1.63	10.20	1.78
	Control	15.26	1.70	20.73	1.27	24.66	0.89
Affective pain perception	ACT	10.66	1.63	7.20	0.67	6.40	0.63
	Control	11.26	1.38	13.73	0.79	14.73	0.70
Evaluative pain perception	ACT	10.20	1.78	8.20	0.56	7.53	0.63
	Control	9.93	1.33	12.53	0.74	14.33	1.04
Total score	ACT	38.73	1.26	26.73	1.83	22.93	1.16
	Control	36.46	2.85	47.00	1.36	53.73	1.33
Self-care	ACT	16.66	2.38	24.33	2.35	28.20	1.20
	Control	20.93	2.49	13.26	1.16	9.26	1.33

Table 2 displays that the mean scores of pain perception (sensory, affective, and evaluative dimensions of pain) in the ACT group decreased from the pre-test to the post-test and follow-up

stages, whereas an increasing trend was observed in the control group. Moreover, the mean scores of self-care in the ACT group increased from the pre-test to the post-test and follow-up stages.

Table 3. Results of multivariate analysis of covariance (MANCOVA) on pain perception

Source of Dispersion	Variable	Sum of Squares	df	Mean Square	F	Sig.	Effect Size	Test Power
Group	Sensory pain perception	632.521	1	632.521	566.925	0.001	0.958	1
	Affective pain perception	250.642	1	250.642	592.522	0.006	0.860	1
	Evaluative pain perception	119.599	1	119.599	313.065	0.001	0.966	1
	Overall pain perception	2695.456	1	2695.456	1670.261	0.002	0.985	1
	Self-care perception	530.262	1	530.262	149.842	0.0001	0.847	1

As presented in Table 3, significant differences were observed between the experimental and control groups on the subscales of pain perception and self-care from pre-test to post-test. These findings collectively suggest that ACT has a significant effect on pain perception and self-care in individuals with migraine.

Discussion

The present study aimed to investigate the effectiveness of ACT on pain perception in individuals with migraines. The results indicated that ACT significantly reduced overall pain perception among women suffering from migraines. These findings are consistent with previous research by Behdad et al. [16], Arab-Bafrani et al. [17], Bernstein et al. [18], Fathi et al. [22], Vasiliu et al. [23], and Grazi et al. [24], which indicated that ACT helps reduce pain catastrophizing and associated negative emotions. Consequently, this alleviates headache intensity and frequency, enhances the quality of life for individuals with chronic headaches and migraines, and improves clinical migraine management, especially when combined with pharmacotherapy, to lessen reliance on medication. The ACT emphasizes the importance of changing how individuals interact with their pain experience, demonstrating significant efficacy in modulating pain perception among migraine sufferers [24]. In this therapeutic approach, pain is viewed as an inherent biopsychosocial experience, while the suffering it causes stems from the individual's interpretation, evaluation, and response to that pain. Individuals with migraines often display

maladaptive patterns, such as pain catastrophizing, experiential avoidance, and intense focus on thoughts related to their attacks. These patterns can worsen their perception of pain. ACT addresses this by enhancing acceptance, cognitive defusion, and present-moment awareness. These components help patients create a healthier psychological distance from bodily sensations and distressing thoughts, enabling them to experience pain without excessive resistance. Unlike traditional treatments that primarily aim to reduce or eliminate pain, ACT focuses on changing the individual's relationship with pain. In the case of migraines, pain perception is affected by factors like experiential avoidance, pain catastrophizing, rumination, and an excessive preoccupation with thoughts related to the attacks [23]. By incorporating pain acceptance, cognitive defusion, present-moment contact, and the observing self, ACT helps migraine patients experience pain without excessive resistance, indirectly reducing perceived pain intensity and suffering. Psychologically, ACT alters pain processing by reducing ineffective control efforts, which often increase pain-focused attention and central sensitization [19]. Acceptance of pain is linked to reduced catastrophizing, anxiety about attacks, and hyperfocus on bodily symptoms. ACT breaks the harmful cycle of "pain-anxiety-hyperattention" by stopping ineffective attempts to control or eliminate pain. Acceptance does not mean giving up; rather, it involves letting go of the exhausting mental struggle, which reduces hypervigilance and catastrophizing. Mindfulness practices help regulate attention and reduce

entanglement with negative thoughts about migraine consequences [19]. This shift in cognitive and emotional processing lowers the perceived intensity and unpleasantness of pain, allowing greater tolerance during attacks [29]. Overall, ACT provides a valuable psychological approach to managing migraine-related suffering. Ultimately, ACT helps migraine patients clarify personal values and take committed action, enabling meaningful life activities despite ongoing pain. This shift—from pain reduction to living by one's values—enhances quality of life, reduces headache-related disability, and strengthens perceived internal control over pain. Values clarification and committed action maintain alignment with personal goals, diminish functional impairment, improve self-efficacy, and indirectly affect pain perception [30]. Recent research indicates that ACT is an effective supplementary psychological intervention alongside medical treatments, playing a crucial role in managing migraine pain and alleviating its psychological burden.

By enhancing psychological flexibility and fostering acceptance, ACT plays a fundamental role in improving self-care among migraine patients. Individuals with migraine are often caught in cycles of worry, experiential avoidance, and heightened symptom sensitivity, which impairs effective care behaviors. Rather than suppressing pain, ACT teaches acceptance of pain as part of human experience and encourages value-consistent health actions. Skills, such as mindfulness, cognitive defusion (de-literalization), and values clarification, help patients maintain daily self-care, including sleep regulation, nutrition, stress management, trigger control, medication adherence, and relaxation techniques, without capitulation during attacks. By reducing rumination and anticipatory worry, ACT helps patients develop a healthier relationship with symptoms and a greater sense of control [28]. Ultimately, through lasting changes in pain coping styles and increased commitment to care behaviors, this approach reduces attack frequency and severity, enhances perceived competence, and improves quality of life. Therefore, ACT is an efficient complementary approach for promoting self-care and managing this chronic condition.

Despite promising evidence for acceptance and ACT in reducing migraine pain and improving self-care, limitations include small sample sizes, self-reported measures, quasi-experimental designs, and lack of long-term follow-up. Future research should use randomized controlled trials, diverse samples, objective markers, and extended follow-ups. Clinically, ACT is recommended as an adjunct to

medication, especially for patients with pain catastrophizing or high impairment, and therapists should tailor protocols to migraine-specific challenges like attack unpredictability.

Conclusion

The present study demonstrates that ACT significantly reduces pain perception and enhances self-care behaviors in women with migraine, as evidenced by pre- to post-test improvements in the experimental group versus the control group. ACT's dual efficacy stems from fostering psychological flexibility, through acceptance, cognitive defusion, present-moment awareness, and values-driven action, which disrupts maladaptive cycles of pain catastrophizing, experiential avoidance, and hypervigilance while empowering patients to engage in consistent self-care activities (e.g., trigger management, medication adherence, sleep regulation, and stress reduction). By shifting focus from pain elimination to adaptive engagement with health-promoting values, ACT mitigates pain intensity and suffering while improving quality of life and internal locus of control, positioning it as a valuable adjunct to pharmacotherapy. Future randomized controlled trials with larger, diverse samples, objective markers, and long-term follow-ups are needed to confirm durability and mechanisms, alongside clinical implementation tailored to migraine unpredictability.

Ethical Considerations

The study participants first read the written informed consent form and completed it if they were willing to participate in the study. In addition, the research received ethical approval from the Ethics Committee of Islamic Azad University, Roudehen Branch, Iran, with the ethical reference code IR.IAU.R.REC.1404.016.

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Author Contributions

All authors contributed significantly to this work and read and approved the final manuscript.

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Conflicts of Interest

The authors declare that there is no conflict of interest.

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