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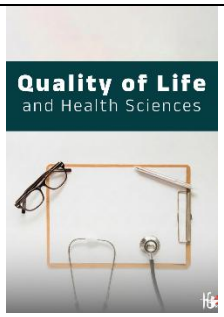

The Effectiveness of Acceptance and Commitment Therapy on Experiential Avoidance, Pain Acceptance, and Quality of Life Among Patients With Fibromyalgia

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A B S T R A C T

Objective: This study aimed to determine the effectiveness of Acceptance and Commitment Therapy on experiential avoidance, pain acceptance, and quality of life among patients with fibromyalgia.

Methods and Materials: This quasi-experimental study was conducted using a pretest–posttest design with a control group and a two-month follow-up period. The statistical population consisted of patients with fibromyalgia who referred to rheumatology and pain management clinics in Tehran. A total of 40 patients were selected through purposive sampling and assigned to an experimental group and a control group, with 20 participants in each group. The experimental group received Acceptance and Commitment Therapy in eight weekly sessions of approximately 90 minutes, while the control group received no psychological intervention during the same period and continued routine medical care. Data were collected using the Acceptance and Action Questionnaire-II, the Chronic Pain Acceptance Questionnaire, and the World Health Organization Quality of Life Questionnaire-BREF. Data were analyzed using repeated-measures analysis of variance and Bonferroni post hoc tests in SPSS software.

Findings: The results showed significant time, group, and time × group interaction effects for experiential avoidance, pain acceptance, and quality of life. Repeated-measures analysis of variance indicated that Acceptance and Commitment Therapy significantly reduced experiential avoidance in the experimental group compared with the control group ($p < 0.001$). The intervention also significantly increased pain acceptance among participants in the experimental group ($p < 0.001$). In addition, quality of life improved significantly after the intervention compared with the control group ($p < 0.001$). Bonferroni post hoc comparisons showed significant differences between pretest and posttest and between pretest and follow-up for all three variables, while the differences between posttest and follow-up were not significant, indicating the stability of treatment effects over time.

Conclusion: Acceptance and Commitment Therapy was effective in reducing experiential avoidance, increasing pain acceptance, and improving quality of life among patients with fibromyalgia, and its effects remained stable at the two-month follow-up.

Keywords: *Acceptance and Commitment Therapy, experiential avoidance, pain acceptance, quality of life, fibromyalgia, chronic pain.*

1. Introduction

Fibromyalgia is a complex chronic pain syndrome characterized by widespread musculoskeletal pain, fatigue, sleep disturbance, cognitive complaints, emotional distress, and reduced functional capacity. Although pain is usually the most visible symptom, the burden of fibromyalgia extends far beyond sensory discomfort and often affects psychological functioning, interpersonal relationships, occupational performance, and overall quality of life. Contemporary views of fibromyalgia emphasize that it should not be understood only as a peripheral pain condition, but rather as a multidimensional syndrome involving biological, psychological, behavioral, and social mechanisms. In this regard, recent studies have highlighted the importance of psychological features in fibromyalgia, including emotional distress, maladaptive coping strategies, pain-related fear, catastrophizing, avoidance behaviors, and difficulties in emotion regulation (Andreghetti et al., 2024; Pasini et al., 2023). These psychological characteristics may intensify the experience of pain and contribute to the persistence of disability, even when pharmacological or medical interventions are provided. Therefore, effective management of fibromyalgia requires attention not only to symptom reduction but also to the ways in which patients relate to pain, respond to distressing internal experiences, and maintain meaningful activity in daily life.

The etiology and maintenance of fibromyalgia are influenced by multiple interacting mechanisms. Biological pathways such as central sensitization, altered pain modulation, neuroendocrine dysregulation, inflammatory processes, and oxidative stress have been discussed as important components of the condition (Assavarittirong et al., 2022). At the same time, psychological stress can interact with pain processing and exacerbate symptom burden. The relationship between pain and stress appears to be reciprocal, such that chronic pain increases psychological stress, while stress may heighten pain sensitivity, reduce coping capacity, impair sleep, and increase emotional vulnerability (Aboushaar & Serrano, 2024). This mutually reinforcing cycle is especially relevant in fibromyalgia, where patients often experience persistent pain alongside anxiety, fatigue, sleep difficulties, and reduced confidence in bodily functioning. In this context, psychological interventions are increasingly considered essential components of comprehensive care, particularly when they target the behavioral and cognitive processes that maintain pain-related suffering and functional impairment.

Quality of life is a central outcome in fibromyalgia because the condition affects multiple domains of functioning. Patients may experience limitations in physical activity, reduced social participation, impaired emotional well-being, decreased work productivity, and diminished satisfaction with daily life. The quality-of-life burden associated with chronic pain is not determined exclusively by pain intensity; rather, it is shaped by psychological flexibility, acceptance, coping style, perceived control, self-management skills, social support, and the ability to remain engaged in valued life activities despite symptoms. Research on quality of life in anxiety and chronic distress conditions also indicates that psychological symptoms, avoidance patterns, and functional restrictions are closely linked to poorer life satisfaction and reduced well-being (Wilmer et al., 2021). For patients with fibromyalgia, therefore, improving quality of life requires more than eliminating pain; it requires helping patients develop more adaptive relationships with pain, distress, fatigue, and uncertainty.

Conventional medical approaches remain important in fibromyalgia management, but their effects are often incomplete. Pharmacological treatments may provide relief for some patients, yet many individuals continue to experience residual pain, fatigue, emotional distress, and reduced functioning. Comparative research on fibromyalgia medications has shown that pharmacological options vary in effectiveness and tolerability, which reinforces the need for complementary non-pharmacological approaches (Farag et al., 2022). Similarly, exercise-based interventions have been widely recommended for fibromyalgia and may contribute to improved physical functioning and symptom management, particularly when adapted to patients' tolerance and needs (Silva et al., 2024). However, exercise intensity and psychosocial outcomes in musculoskeletal disorders remain complex, and interventions must consider pain-related fear, motivation, adherence, and emotional responses to activity (Klaps et al., 2022). These considerations suggest that psychological readiness, acceptance, and flexible engagement with activity are essential for sustained improvement.

Multicomponent treatment approaches have gained increasing attention in fibromyalgia because they integrate physical, psychological, educational, and behavioral strategies. Systematic review evidence supports the potential effectiveness of multicomponent interventions for patients with fibromyalgia, especially when treatment addresses both symptom burden and functional adaptation (Araya-Quintanilla et al., 2025). Self-management strategies have

also been emphasized as foundational for fibromyalgia care, including patient education, pacing, sleep management, activity regulation, stress reduction, and digital support tools (Foustoukos et al., 2024). Moreover, telerehabilitation and digital interventions have expanded access to fibromyalgia treatment and may offer feasible alternatives for patients who face barriers to in-person care (Wu et al., 2023). Nevertheless, systematic reviews of e-health interventions targeting pain-related psychological variables in fibromyalgia show that digital and psychological interventions still require stronger empirical support, clearer intervention protocols, and more focused evaluation of psychological mechanisms such as avoidance, acceptance, and pain-related distress (Donisi et al., 2023).

Among psychological constructs relevant to chronic pain, experiential avoidance has particular importance. Experiential avoidance refers to attempts to escape, suppress, control, or reduce unwanted internal experiences, including pain sensations, distressing emotions, unpleasant thoughts, memories, fatigue, fear, and bodily discomfort. Although avoidance may provide temporary relief, it often narrows behavioral repertoires and prevents engagement in meaningful activities. In chronic pain conditions, avoidance can strengthen disability by leading patients to withdraw from movement, social interaction, work, and valued roles. A meta-analysis on psychological inflexibility and flexibility in chronic pain populations has shown that psychological inflexibility is associated with multiple adverse outcomes, while psychological flexibility is linked to better functioning and adjustment (Fang & Ding, 2022). For patients with fibromyalgia, experiential avoidance may be especially problematic because symptoms are chronic, fluctuating, and difficult to fully control. When patients organize their lives around avoiding pain or distress, their quality of life may decline even further.

Pain acceptance represents a contrasting adaptive process. Rather than resignation or passive tolerance, pain acceptance refers to willingness to experience pain without excessive struggle while continuing to pursue meaningful life activities. Higher pain acceptance can reduce the dominance of pain in daily decision-making and increase functional engagement, even when symptoms remain present. Acceptance-based approaches are therefore particularly relevant in fibromyalgia, where complete symptom elimination is often unrealistic. Research on mindfulness-based interventions for fibromyalgia has emphasized the potential value of cultivating nonjudgmental awareness, acceptance, and a different relationship with bodily sensations and distressing thoughts (Leça & Tavares, 2022). Broader conceptual work also suggests that mindfulness-based interventions may improve stress regulation and quality of life in chronic conditions by changing how individuals attend to and respond to internal experiences (Prather, 2022). These findings provide a theoretical foundation for interventions that target acceptance, present-moment awareness, and values-based action.

Acceptance and Commitment Therapy is a contextual behavioral intervention designed to increase psychological flexibility. Psychological flexibility refers to the capacity to remain in contact with the present moment and act in accordance with personal values, even in the presence of difficult thoughts, emotions, sensations, or memories. ACT does not primarily aim to eliminate pain or distress; rather, it helps individuals reduce ineffective control strategies, practice acceptance, defuse from unhelpful thoughts, clarify values, and commit to meaningful behavior. This model is highly compatible with chronic pain management because it shifts the therapeutic focus from symptom control to flexible and purposeful living. Feasibility research on ACT for destructive experiential avoidance indicates that ACT-based approaches can directly target avoidance processes and support more adaptive behavioral patterns (Na et al., 2022). Similarly, work on online ACT programs focused on repetitive negative thinking has supported the perceived utility of ACT-based self-help content in addressing perseverative cognitive processes that often accompany distress and chronic conditions (Sierra & Ruiz, 2022).

The relevance of ACT has been examined across different chronic health conditions. In asthma, group-based ACT has been shown to improve psychological and disease-management outcomes, suggesting that acceptance-based approaches can be useful in conditions involving chronic symptoms, uncertainty, and self-regulation demands (Zargar et al., 2022). In cancer populations, ACT has been applied to chronic pain, fear of progression, death anxiety, and quality of life. For example, protocols and trials have investigated ACT for cancer survivors with chronic painful chemotherapy-induced peripheral neuropathy, reflecting the growing interest in acceptance-based interventions for persistent pain after medical treatment (Daniëlle et al., 2022). ACT has also been compared with mindfulness-based stress reduction among patients with head and neck cancer, with attention to positive psychology, depression, anxiety, and quality of life (Zhang et al., 2022). More recent studies have evaluated ACT for fear of progression in breast cancer

and death anxiety in cancer survivors, further indicating its applicability to distress related to illness, uncertainty, and bodily vulnerability (Alimolk et al., 2024; Chen et al., 2026).

The application of ACT is also expanding through group, digital, and videoconference formats. Videoconferencing group-based dyadic ACT has been proposed for patients with chronic heart failure and their family caregivers, with quality of life as an important outcome (Zhang et al., 2024). Pilot randomized evidence also supports the feasibility of videoconference-delivered ACT for family caregivers of people with dementia, showing that ACT can be adapted for populations experiencing chronic stress and caregiving burden (Han et al., 2025). Digital behavioral therapy has also demonstrated benefits for patients with persistent pain in axial spondyloarthritis, suggesting that behavioral and psychological pain interventions may improve outcomes in chronic rheumatologic and musculoskeletal conditions (Kiefer et al., 2025). Related research on videoconference programs for adults with peripheral neuropathy further supports the acceptability of remote psychological interventions for individuals affected by chronic physical symptoms and emotional distress (Decker et al., 2023). These developments are important because fibromyalgia patients may face barriers to consistent care due to pain, fatigue, transportation limitations, and fluctuating symptom severity.

Mindfulness- and acceptance-based cognitive-behavioral therapies have also shown promise for bodily distress and medically related suffering. Meta-analytic evidence indicates that mindfulness- and acceptance-based cognitive-behavioral therapies can be effective for adults with bodily distress, supporting their relevance for conditions in which physical symptoms and psychological responses are closely interconnected (Bermpohl et al., 2023). Psychological and behavioral treatments have also been examined in gastrointestinal disorders such as irritable bowel syndrome, which share with fibromyalgia a biopsychosocial profile involving chronic symptoms, stress sensitivity, and functional impairment (Sweeney et al., 2025). Likewise, psychological interventions in endometriosis, another chronic pain condition, have been systematically reviewed, reinforcing the broader role of psychological care in conditions where pain affects identity, mood, relationships, and quality of life (Pino-Sedeño et al., 2024). Mindfulness-based interventions have also been reviewed in pediatric physical health conditions, emphasizing the value of psychological approaches across age groups and chronic illness contexts (Hughes et al., 2023). Occupational therapy-related interventions for pediatric chronic pain similarly highlight the importance of functional participation and patient-centered rehabilitation in chronic pain management (Suder et al., 2022).

Within fibromyalgia-specific psychotherapy, integrative psychological models have emphasized the therapeutic relationship, emotional processing, pain acceptance, and individualized chronic pain management. The INTEGRO protocol for fibromyalgia has described an integrated psychotherapeutic intervention for chronic pain management and has emphasized the importance of addressing psychological variables within the therapeutic process (Pasini et al., 2024). Earlier work on the INTEGRO approach also highlighted the role of the therapeutic relationship in managing chronic pain among patients with fibromyalgia, indicating that effective psychological care must attend not only to techniques but also to relational and motivational processes (Pasini et al., 2023). Emotional awareness and expression therapy has also been introduced as an approach for pain conditions, emphasizing the therapeutic value of emotional processing and the reduction of maladaptive emotional suppression (Maroti et al., 2025). These perspectives converge with ACT in recognizing that chronic pain treatment should help patients change their relationship with internal experiences rather than rely exclusively on efforts to suppress or avoid them.

Recent discussions of exposure-based interventions for chronic pain and bodily symptoms further support the importance of reducing avoidance and increasing adaptive engagement with feared or uncomfortable experiences (Schemer et al., 2026). Although exposure-based and acceptance-based approaches differ in their specific theoretical emphases, both challenge the long-term costs of avoidance and encourage patients to approach previously avoided experiences in a more flexible and functional manner. In chronic pain, this may include gradually re-engaging in movement, social contact, self-care, and valued roles despite discomfort. ACT contributes to this field by connecting exposure and acceptance processes with values clarification and committed action. For patients with fibromyalgia, this is particularly relevant because pain-related avoidance may not only maintain disability but also erode identity, autonomy, and life meaning.

Patient-reported outcomes are especially important in evaluating interventions for fibromyalgia because symptom improvement must be understood from the patient's perspective. Interprofessional collaboration and patient-reported outcomes have been emphasized in inpatient care,

reflecting the broader movement toward patient-centered evaluation and the need to capture subjective functioning, well-being, and quality of life (Kaiser et al., 2022). In chronic pain, patient empowerment and self-management are increasingly viewed as essential treatment goals. A multicomponent workshop for chronic pain has been shown to improve self-management and quality of life, supporting the idea that patients benefit when interventions strengthen active coping, knowledge, and engagement in daily life (Romero et al., 2025). For fibromyalgia, these outcomes are particularly relevant because patients often must manage symptoms over long periods and adapt to fluctuating physical and emotional demands.

The concept of psychological flexibility has also gained increasing attention across chronic disease populations beyond pain. A scoping review of psychological flexibility and inflexibility in diabetes showed that flexibility-related processes are relevant to living with and managing chronic illness, including adherence, emotional adjustment, and quality of life (Roberts et al., 2025). This broader evidence base supports the theoretical assumption that psychological flexibility may be a transdiagnostic mechanism through which ACT improves adjustment to long-term health conditions. For fibromyalgia, targeting flexibility may help patients disengage from rigid control efforts, reduce avoidance, improve pain acceptance, and restore participation in valued domains. Despite the growing body of evidence supporting psychological, behavioral, mindfulness-based, digital, and multicomponent interventions for chronic pain and related conditions, there remains a need for focused empirical studies examining ACT among patients with fibromyalgia, particularly with experiential avoidance, pain acceptance, and quality of life as simultaneous outcomes.

In the Iranian context, patients with fibromyalgia may experience additional barriers related to delayed diagnosis, limited access to specialized psychological pain services, high reliance on medical treatment, and insufficient integration of behavioral interventions into routine care. Evaluating ACT among patients with fibromyalgia in Tehran can therefore contribute to both clinical practice and the broader literature by clarifying whether a structured group-based ACT protocol can improve key psychological and quality-of-life outcomes in this population. Because experiential avoidance and pain acceptance are theoretically central to ACT, and because quality of life represents a clinically meaningful outcome for patients with chronic pain, examining these variables together provides a coherent framework for evaluating the intervention. The aim of this study was to determine the effectiveness of Acceptance and Commitment Therapy on experiential avoidance, pain acceptance, and quality of life among patients with fibromyalgia in Tehran.

2. Methods and Materials

2.1. Study Design and Participants

This study was conducted using a quasi-experimental pretest–posttest design with a control group and a two-month follow-up period. The statistical population consisted of patients with fibromyalgia who referred to rheumatology and pain management clinics in Tehran. The final sample included 40 patients with fibromyalgia, who were selected through purposive sampling based on the study inclusion criteria and then assigned to an experimental group and a control group, with 20 participants in each group. The inclusion criteria were a confirmed diagnosis of fibromyalgia by a rheumatologist, age between 25 and 55 years, ability to read and complete the questionnaires, willingness to participate in the study, and absence of participation in another structured psychological intervention during the study period. The exclusion criteria included severe psychiatric disorders, active substance abuse, major neurological disease, uncontrolled medical conditions, absence from more than two intervention sessions, and unwillingness to continue participation. Before the beginning of the study, all participants received an explanation about the purpose of the research, the voluntary nature of participation, confidentiality of information, and their right to withdraw from the study at any stage without any negative consequences. Written informed consent was obtained from all participants. The experimental group received Acceptance and Commitment Therapy, whereas the control group received no psychological intervention during the same period and continued their routine medical care.

2.2. Measures

Data were collected using a demographic and clinical information form, the Acceptance and Action Questionnaire-II, the Chronic Pain Acceptance Questionnaire, and the World Health Organization Quality of Life Questionnaire. The demographic and clinical information form was designed to collect information regarding age, gender, marital status, educational level, duration of fibromyalgia diagnosis, medication use, and

history of psychological treatment. Experiential avoidance was assessed using the Acceptance and Action Questionnaire-II developed by Bond and colleagues. This questionnaire consists of 7 items and is designed to measure experiential avoidance and psychological inflexibility. Items are scored on a 7-point Likert scale, ranging from 1 to 7, with higher scores indicating higher levels of experiential avoidance and psychological inflexibility. Pain acceptance was measured using the Chronic Pain Acceptance Questionnaire developed by McCracken and colleagues. This instrument includes 20 items and assesses the extent to which individuals are able to engage in valued activities despite pain and reduce attempts to control or avoid pain experiences. The questionnaire contains two main components, including activity engagement and pain willingness, and higher scores indicate greater acceptance of chronic pain. Quality of life was assessed using the World Health Organization Quality of Life Questionnaire-BREF. This questionnaire consists of 26 items and evaluates quality of life in the domains of physical health, psychological health, social relationships, and environmental health. Items are scored on a 5-point Likert scale, and higher scores indicate better perceived quality of life. The validity and reliability of these instruments have been confirmed in previous studies, and in the present study, internal consistency was evaluated using Cronbach's alpha coefficients for all scales and subscales.

2.3. Intervention

The intervention was implemented based on Acceptance and Commitment Therapy principles in eight weekly sessions, each lasting approximately 90 minutes. The sessions were conducted in small groups by a trained therapist familiar with ACT-based interventions for chronic pain. The first session focused on establishing therapeutic rapport, introducing the nature of fibromyalgia as a chronic pain condition, explaining the relationship between pain, emotional suffering, avoidance, and quality of life, and presenting the overall rationale of ACT. The second session addressed creative hopelessness and helped participants examine the limited effectiveness of previous control-based strategies used to eliminate pain, fatigue, and distress. The third session focused on experiential avoidance and encouraged participants to recognize how attempts to suppress or escape unpleasant physical and emotional experiences may increase psychological distress and reduce life engagement. The fourth session introduced acceptance skills and mindfulness exercises aimed at increasing openness to pain-related sensations, emotions, and thoughts without unnecessary struggle. The fifth session focused on cognitive defusion techniques, helping participants observe pain-related thoughts, catastrophic beliefs, and self-critical evaluations as mental events rather than literal truths. The sixth session addressed self-as-context and present-moment awareness through experiential exercises designed to strengthen psychological flexibility. The seventh session focused on values clarification, helping participants identify personally meaningful life domains such as family relationships, self-care, work, spirituality, and social participation. The final session emphasized committed action, relapse prevention, and the development of practical behavioral plans for continuing valued activities despite pain and fatigue. Participants were given between-session exercises, including mindfulness practice, values-based activity planning, and monitoring of avoidance patterns in daily life.

2.4. Data Analysis

Data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to summarize demographic characteristics and research variables. Before conducting the main analyses, the assumptions of parametric testing were examined, including normality of distribution, homogeneity of variances, and homogeneity of regression slopes. The Shapiro–Wilk test was used to assess normality, and Levene's test was used to examine equality of variances between groups. To evaluate the effectiveness of Acceptance and Commitment Therapy on experiential avoidance, pain acceptance, and quality of life, repeated-measures analysis of variance was used to compare changes across the pretest, posttest, and follow-up stages between the experimental and control groups. When significant effects were observed, Bonferroni post hoc comparisons were applied to determine the specific differences between measurement stages. Effect sizes were reported using partial eta squared to determine the magnitude of intervention effects. All statistical analyses were conducted using SPSS software, and the significance level was set at 0.05.

3. Findings and Results

The study was conducted on 40 patients with fibromyalgia, including 20 participants in the experimental

group and 20 participants in the control group. The mean age of the participants in the experimental group was 42.35 years with a standard deviation of 7.18, and the mean age of the participants in the control group was 43.10 years with a standard deviation of 6.94. The results of the independent samples t-test showed that there was no statistically significant difference between the two groups in terms of age, indicating that the groups were homogeneous with respect to this demographic variable. In terms of gender distribution, most participants in both groups were women, which is consistent with the higher prevalence of fibromyalgia among female patients. In the experimental group, 17 participants were female and 3 were male, while in the control group, 16 participants were female and 4 were male. The chi-square test indicated no significant difference between the two groups in gender distribution. Regarding marital status, 14 participants in the experimental group and 15 participants in the control group were married, and the remaining participants were single, divorced, or widowed. In terms of educational level, most participants had diploma or university education, and no significant difference was observed between the groups. The mean duration of fibromyalgia diagnosis was 4.28 years in the experimental group and 4.46 years in the control group, and the difference between the two groups was not statistically significant. Overall, the demographic findings showed that the experimental and control groups were comparable before the intervention, and the observed differences in the main research variables after the intervention could not be attributed to major demographic differences between the two groups.

Table 1

Descriptive Statistics of Experiential Avoidance, Pain Acceptance, and Quality of Life in the Experimental and Control Groups Across Three Measurement Stages

Variable	Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Follow-up Mean	Follow-up SD
Experiential Avoidance	Experimental	34.85	5.62	24.30	4.91	25.10	5.08
Experiential Avoidance	Control	35.20	5.47	34.60	5.31	34.95	5.42
Pain Acceptance	Experimental	48.75	7.84	64.90	8.11	63.85	7.96
Pain Acceptance	Control	49.30	7.51	50.10	7.66	49.75	7.72
Quality of Life	Experimental	57.40	8.26	72.65	8.74	71.90	8.52
Quality of Life	Control	58.15	8.09	58.80	8.18	58.35	8.31

As shown in Table 1, the experimental and control groups had relatively similar mean scores at the pretest stage in all three research variables, indicating that the two groups were comparable before the implementation of the intervention. In the experimental group, the mean score of experiential avoidance decreased from 34.85 at pretest to 24.30 at posttest and remained relatively stable at 25.10 during the follow-up stage. This pattern indicates that Acceptance and Commitment Therapy reduced patients' tendency to avoid unpleasant internal experiences, including pain-related thoughts, emotions, bodily sensations, and distressing psychological reactions. In contrast, the control group showed no meaningful reduction in experiential avoidance across the three stages, as the mean scores remained almost unchanged from pretest to posttest and follow-up. Regarding pain acceptance, the experimental group showed a considerable increase from 48.75 at pretest to 64.90 at posttest, with the follow-up mean remaining high at 63.85. This finding suggests that participants who received Acceptance and Commitment Therapy became more capable of accepting chronic pain experiences and engaging in meaningful activities despite the presence of pain. However, the control group demonstrated only minimal changes in pain acceptance over time. Similarly, the mean score of quality of life in the experimental group increased from 57.40 at pretest to 72.65 at posttest and remained stable at 71.90 during the follow-up stage, whereas the control group showed almost no meaningful improvement. Overall, the descriptive findings indicate a clear pattern of improvement in the experimental group after the intervention, while the control group remained relatively stable across all three stages.

Table 2

Results of Repeated-Measures Analysis of Variance for the Effects of Time, Group, and Time × Group Interaction

Variable	Source of Effect	Sum of Squares	df	Mean Square	F	p-value	Partial Eta Squared
Experiential Avoidance	Time	622.84	2	311.42	48.76	<0.001	0.562
Experiential Avoidance	Group	1024.61	1	1024.61	31.94	<0.001	0.457
Experiential Avoidance	Time × Group	514.38	2	257.19	40.27	<0.001	0.515
Pain Acceptance	Time	1198.52	2	599.26	54.83	<0.001	0.591
Pain Acceptance	Group	1362.40	1	1362.40	28.75	<0.001	0.431
Pain Acceptance	Time × Group	1086.91	2	543.45	49.72	<0.001	0.567
Quality of Life	Time	1064.73	2	532.36	46.18	<0.001	0.549
Quality of Life	Group	1287.66	1	1287.66	25.83	<0.001	0.405
Quality of Life	Time × Group	941.22	2	470.61	40.84	<0.001	0.518

The results presented in Table 2 show that the main effect of time was statistically significant for experiential avoidance, pain acceptance, and quality of life. This means that the scores of the participants changed significantly across the pretest, posttest, and follow-up stages. However, the significance of the time effect alone does not fully explain whether these changes were due to the intervention or occurred equally in both groups. Therefore, the group effect and the interaction effect between time and group are especially important. The main effect of group was significant for all three variables, indicating that the experimental and control groups differed significantly when their overall scores across the three stages were considered. More importantly, the time × group interaction effect was statistically significant for experiential avoidance, pain acceptance, and quality of life. This finding indicates that the pattern of change over time was significantly different between the experimental and control groups. In other words, the experimental group experienced a meaningful reduction in experiential avoidance and meaningful increases in pain acceptance and quality of life after receiving Acceptance and Commitment Therapy, while the control group did not show comparable changes. The partial eta squared values also indicate large effect sizes for the interaction effects, suggesting that a substantial proportion of the variance in post-intervention changes was attributable to the ACT intervention. Therefore, the repeated-measures analysis confirms that Acceptance and Commitment Therapy had a significant and stable effect on the psychological and quality-of-life outcomes of patients with fibromyalgia.

Table 3

Bonferroni Pairwise Comparisons of Pretest, Posttest, and Follow-up Scores in the Experimental Group

Variable	Comparison	Mean Difference	Standard Error	p-value
Experiential Avoidance	Pretest–Posttest	10.55	1.21	<0.001
Experiential Avoidance	Pretest–Follow-up	9.75	1.18	<0.001
Experiential Avoidance	Posttest–Follow-up	-0.80	0.64	0.642
Pain Acceptance	Pretest–Posttest	-16.15	1.74	<0.001
Pain Acceptance	Pretest–Follow-up	-15.10	1.69	<0.001
Pain Acceptance	Posttest–Follow-up	1.05	0.71	0.438
Quality of Life	Pretest–Posttest	-15.25	1.63	<0.001
Quality of Life	Pretest–Follow-up	-14.50	1.58	<0.001
Quality of Life	Posttest–Follow-up	0.75	0.68	0.719

As shown in Table 3, the Bonferroni pairwise comparisons in the experimental group demonstrated significant differences between pretest and posttest scores for all three variables. Experiential avoidance significantly decreased from pretest to posttest, indicating that participants became less involved in avoidance-based responses toward unpleasant thoughts, emotions, and pain-related internal experiences after receiving Acceptance and Commitment Therapy. The difference between pretest and follow-up was also statistically significant, showing that the reduction in experiential avoidance was maintained two months after the end of the intervention. However, the difference between posttest and follow-up was not statistically significant, which indicates that the treatment

gains remained stable and did not meaningfully decline over time. For pain acceptance, the results showed a significant increase from pretest to posttest and from pretest to follow-up. This finding suggests that ACT improved participants' ability to accept pain as part of their lived experience and to engage in valued activities without making pain elimination the main condition for action. The non-significant difference between posttest and follow-up indicates that the improvement in pain acceptance was preserved after the intervention. Similarly, quality of life increased significantly from pretest to posttest and from pretest to follow-up, while the difference between posttest and follow-up was not significant. This pattern demonstrates that the positive effects of Acceptance and Commitment Therapy on quality of life were not limited to the immediate post-intervention stage and remained relatively stable during follow-up. Overall, the pairwise comparison results support the effectiveness and durability of ACT in reducing experiential avoidance, increasing pain acceptance, and improving quality of life among patients with fibromyalgia.

4. Discussion

The present study examined the effectiveness of Acceptance and Commitment Therapy on experiential avoidance, pain acceptance, and quality of life among patients with fibromyalgia in Tehran. The findings showed that participants who received ACT demonstrated a significant reduction in experiential avoidance from pretest to posttest, and this reduction remained stable at the two-month follow-up. In contrast, the control group showed no meaningful change across the three measurement stages. The results also indicated that ACT significantly increased pain acceptance in the experimental group, suggesting that participants became more willing to experience pain-related sensations, thoughts, and emotions without excessive struggle or avoidance. Furthermore, quality of life improved significantly after the intervention and remained relatively stable at follow-up. The significant time × group interaction effects for all three variables confirmed that the observed changes were attributable to the intervention rather than to the passage of time or routine care. Overall, the results support the effectiveness of ACT as a psychological intervention for improving psychological flexibility, adaptive pain adjustment, and perceived quality of life among patients with fibromyalgia.

The significant reduction in experiential avoidance is consistent with the theoretical foundation of ACT, which assumes that much psychological suffering is maintained by rigid attempts to control, suppress, or escape unwanted internal experiences. In fibromyalgia, pain, fatigue, cognitive difficulties, sleep disturbance, and emotional distress often create a cycle in which patients increasingly restrict activity and avoid situations that may intensify discomfort. Although avoidance may reduce distress in the short term, it can gradually narrow behavioral functioning and increase disability. The present findings suggest that ACT helped participants notice avoidance patterns and develop greater willingness to remain in contact with difficult internal experiences while engaging in meaningful behavior. This interpretation is aligned with evidence showing that psychological inflexibility and avoidance are strongly associated with poorer outcomes among chronic pain patients, whereas psychological flexibility is associated with better adjustment and functioning (Fang & Ding, 2022). It is also consistent with feasibility findings indicating that ACT can directly target destructive experiential avoidance and support more adaptive responses to distressing internal experiences (Na et al., 2022).

The reduction in experiential avoidance may also be explained by the ACT processes of acceptance, cognitive defusion, present-moment awareness, and self-as-context. Through these processes, patients learn to observe pain-related thoughts and sensations without automatically responding to them as threats that must be eliminated before life can continue. In fibromyalgia, this distinction is clinically important because complete control over symptoms is often unrealistic. The finding is supported by broader literature on mindfulness- and acceptance-based therapies for bodily distress, which indicates that these approaches can be beneficial for adults whose physical symptoms are closely connected to psychological responses and behavioral restriction (Bermpohl et al., 2023). Studies on mindfulness-based interventions for fibromyalgia have similarly emphasized that changing the patient's relationship with pain and distress may be more clinically useful than repeated attempts to suppress or control symptoms (Leça & Tavares, 2022). Therefore, the observed decrease in experiential avoidance appears to reflect a core mechanism through which ACT improves functioning in chronic pain conditions.

The significant increase in pain acceptance among participants in the experimental group is another important finding. Pain acceptance does not mean giving up or denying the reality of pain; rather, it means reducing the struggle with pain and increasing engagement in valued activities despite

symptoms. Patients with fibromyalgia often organize daily life around the goal of avoiding pain or preventing symptom flare-ups. Over time, this can lead to inactivity, social withdrawal, emotional distress, and reduced self-efficacy. ACT appears to have helped participants shift from a control-based agenda toward a values-based agenda, in which meaningful action becomes possible even when pain is present. This result is consistent with research on chronic pain management in fibromyalgia, which emphasizes the importance of psychological interventions that address pain-related beliefs, acceptance, emotional responses, and functional engagement (Pasini et al., 2024; Pasini et al., 2023). It is also aligned with recent discussions of exposure-based interventions for chronic pain and bodily symptoms, which highlight the importance of reducing avoidance and helping patients approach previously avoided experiences in a gradual and adaptive manner (Schemer et al., 2026).

The improvement in pain acceptance may also be understood in relation to the reciprocal relationship between pain and stress. Chronic pain increases emotional strain, and stress can intensify pain perception, increase physiological arousal, disrupt sleep, and reduce coping capacity (Aboushaar & Serrano, 2024). ACT may interrupt this cycle by reducing the emotional struggle surrounding pain. When patients become more willing to experience pain-related sensations without catastrophic interpretation or excessive avoidance, the stress response associated with pain may decrease. This does not necessarily imply that pain intensity disappears, but it suggests that pain becomes less dominant in regulating behavior and identity. This interpretation is compatible with evidence that fibromyalgia is shaped by both biological mechanisms, such as oxidative stress and altered physiological regulation, and psychological processes that influence symptom burden and adaptation (Andreghetti et al., 2024; Assavarittirong et al., 2022). Therefore, the increase in pain acceptance observed in the present study may reflect a clinically meaningful improvement in how patients manage the chronic and fluctuating nature of fibromyalgia.

The results also demonstrated a significant improvement in quality of life among patients who received ACT. This finding is particularly important because fibromyalgia affects multiple domains of life, including physical functioning, psychological well-being, social relationships, work ability, and daily activity. The improvement in quality of life may be explained by the simultaneous reduction in experiential avoidance and increase in pain acceptance. When patients are less governed by avoidance and more capable of engaging in valued activities, they may experience greater autonomy, participation, emotional stability, and life satisfaction. This finding is consistent with studies showing that psychological interventions can improve quality-of-life outcomes in chronic health conditions by strengthening coping, self-management, and adaptive engagement (Prather, 2022; Romero et al., 2025). It is also supported by research indicating that patient-reported outcomes are central in evaluating health interventions because meaningful improvement must be reflected in patients' perceived functioning and well-being (Kaiser et al., 2022).

The quality-of-life findings are also consistent with evidence from ACT studies in other chronic medical populations. For example, ACT has been used in asthma management and has shown beneficial effects on psychological and disease-related outcomes (Zargar et al., 2022). ACT-based interventions have also been applied among patients with cancer-related distress, chronic pain, fear of progression, death anxiety, and quality-of-life concerns (Alimolk et al., 2024; Chen et al., 2026; Daniëlle et al., 2022; Zhang et al., 2022). Although these populations differ from patients with fibromyalgia, they share common psychological challenges, including uncertainty, bodily vulnerability, distressing internal experiences, and difficulty maintaining valued activities. The present findings therefore add to the growing evidence that ACT may be useful across chronic illness contexts because it targets transdiagnostic processes such as psychological inflexibility, avoidance, and values-disconnected behavior. This conclusion is further supported by research on psychological flexibility in diabetes, which suggests that flexibility-related processes are important for living with and managing long-term health conditions (Roberts et al., 2025).

The stability of treatment gains at the two-month follow-up is also noteworthy. The Bonferroni comparisons showed significant improvement from pretest to posttest and from pretest to follow-up, while the difference between posttest and follow-up was not significant. This pattern indicates that the intervention effects were maintained after treatment completion. The durability of the results may be related to the skills-based nature of ACT. Participants did not merely receive information about fibromyalgia; they practiced mindfulness, acceptance, cognitive defusion, values clarification, and committed action. These skills can be applied after the intervention ends, especially when patients continue to face pain, fatigue, and distress in daily life. The finding is compatible with the increasing attention to self-

management strategies in fibromyalgia, including approaches that help patients develop sustainable tools for managing symptoms and maintaining function (Foustoukos et al., 2024). It also aligns with evidence supporting multicomponent approaches for fibromyalgia, which suggests that durable improvement is more likely when interventions address psychological, behavioral, and functional dimensions of the condition (Araya-Quintanilla et al., 2025).

The present findings also fit within the broader movement toward accessible and flexible psychological interventions for chronic pain. Although the current study used an in-person group format, the mechanisms targeted by ACT may be adaptable to digital or remote formats. Previous studies have examined telerehabilitation for fibromyalgia and e-health interventions targeting pain-related psychological variables, suggesting that technology-based delivery can expand access to care for patients who face mobility, fatigue, or geographic barriers (Donisi et al., 2023; Wu et al., 2023). Videoconference and digital behavioral interventions have also been applied in chronic heart failure, dementia caregiving, peripheral neuropathy, and axial spondyloarthritis, supporting the feasibility of remote psychological and behavioral care for chronic health-related distress (Decker et al., 2023; Han et al., 2025; Kiefer et al., 2025; Zhang et al., 2024). These studies support the clinical relevance of developing ACT-based interventions that can be delivered in different formats while preserving core therapeutic processes.

The findings of this study are also consistent with literature on psychological interventions for other pain-related and chronic physical conditions. Psychological and behavioral treatments for gastrointestinal disorders, psychological interventions in endometriosis, and mindfulness-based interventions for pediatric physical health conditions all point to the importance of addressing emotional, cognitive, and behavioral responses to persistent bodily symptoms (Hughes et al., 2023; Pino-Sedeño et al., 2024; Sweeney et al., 2025). Similarly, occupational therapy-related interventions for chronic pain emphasize the restoration of function and participation, which is conceptually compatible with ACT's focus on committed action and values-based living (Suder et al., 2022). The convergence of these findings suggests that interventions for chronic pain should move beyond symptom reduction alone and should help patients reclaim meaningful life roles despite ongoing physical symptoms.

5. Conclusion

Overall, the findings of the study indicated that Acceptance and Commitment Therapy was effective in improving the psychological functioning and quality of life of patients with fibromyalgia. The intervention significantly reduced experiential avoidance, meaning that patients became more willing to experience pain-related thoughts, emotions, and bodily sensations without excessive avoidance or struggle. It also significantly increased pain acceptance, suggesting that participants were better able to continue meaningful life activities despite the presence of chronic pain. In addition, quality of life improved significantly in the experimental group, reflecting positive changes in patients' perceived physical, psychological, social, and environmental functioning. The stability of the results at the two-month follow-up stage indicates that the effects of the intervention were maintained after the completion of treatment. Therefore, the findings support the use of Acceptance and Commitment Therapy as an effective psychological intervention for patients with fibromyalgia. The present results also have implications for understanding the psychological treatment of fibromyalgia in relation to emotional processing. Emotional awareness and expression therapy has emphasized that unresolved or avoided emotional experiences may contribute to pain-related suffering and that emotional processing can support recovery in some chronic pain conditions (Maroti et al., 2025). Although ACT does not focus primarily on emotional expression, it similarly discourages emotional suppression and encourages openness to internal experiences. Thus, the reduction in experiential avoidance in the present study may have allowed participants to relate differently not only to physical pain but also to fear, sadness, frustration, and hopelessness associated with fibromyalgia. This broader emotional openness may have contributed to improvements in quality of life and pain acceptance.

6. Limitations & Suggestions

This study had several limitations that should be considered when interpreting the findings. First, the sample size was relatively small and included patients with fibromyalgia from Tehran, which may limit the generalizability of the results to broader populations, including patients from other cities, rural areas, or different cultural and healthcare contexts. Second, the study relied on self-report questionnaires, which may be influenced by response bias, social desirability, subjective interpretation of

items, or participants' emotional state at the time of assessment. Third, the follow-up period was limited to two months, and therefore the long-term durability of the intervention effects remains unclear. Fourth, the control group did not receive an active psychological comparison intervention, which limits the ability to determine whether the observed effects were specifically due to ACT processes or partly related to nonspecific therapeutic factors such as group support, attention, and therapist contact. Finally, although the study assessed experiential avoidance, pain acceptance, and quality of life, it did not include additional clinical outcomes such as pain intensity, fatigue severity, sleep quality, physical functioning, medication use, or healthcare utilization.

Future studies should replicate this research with larger and more diverse samples of patients with fibromyalgia from different clinical settings and geographical regions. Randomized controlled trials with active comparison groups, such as cognitive-behavioral therapy, mindfulness-based stress reduction, pain education, or supportive counseling, are recommended to clarify the specific effectiveness of ACT. Future research should also include longer follow-up periods, such as six months or one year, to determine whether improvements in experiential avoidance, pain acceptance, and quality of life remain stable over time. It would also be valuable to examine mediating mechanisms, including psychological flexibility, values-based action, cognitive defusion, mindfulness, pain catastrophizing, and emotion regulation, in order to identify how ACT produces change among patients with fibromyalgia. In addition, future studies may compare in-person, online, and blended ACT formats to determine which delivery methods are most feasible, acceptable, and cost-effective for this population.

The findings suggest that Acceptance and Commitment Therapy can be used as a complementary psychological intervention for patients with fibromyalgia, particularly for those who experience high experiential avoidance, difficulty accepting chronic pain, and reduced quality of life. Clinicians working with fibromyalgia patients should consider incorporating acceptance-based strategies, mindfulness exercises, values clarification, and committed action planning into treatment programs. ACT may be especially useful when patients are caught in repeated efforts to eliminate pain before engaging in life activities, because it helps them shift toward meaningful functioning despite ongoing symptoms. Healthcare centers and pain clinics may benefit from offering structured group-based ACT programs alongside routine medical care, physiotherapy, and patient education. In practice, therapists should adapt ACT exercises to the fatigue, cognitive difficulties, and fluctuating pain levels commonly experienced by patients with fibromyalgia, while emphasizing gradual, realistic, and values-consistent behavioral change.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

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