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The Effectiveness of Acceptance and Commitment Therapy on Pain Perception, Post-Traumatic Stress Disorder, and Emotional Inhibition in Patients with Chronic Low Back Pain

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ABSTRACT

Aims: Psychological and emotional consequences of Chronic Low Back Pain (CLBP) often include anxiety, depression, emotional distress, and reduced Quality of Life (QoL), which can further exacerbate the perception of pain. This study aimed to evaluate the effectiveness of Acceptance and Commitment Therapy (ACT) on pain perception, Post-Traumatic Stress Disorder (PTSD), and emotional inhibition in patients with CLBP.

Method and Materials: The study employed a semi-experimental pre-test/post-test design with a control group, involving 36 patients with chronic low back pain (CLBP) from clinics in Qazvin in 2024. Participants were purposively selected and randomly assigned to either the intervention group (n = 18) or the control group (n = 18). Just the intervention group participated in eight 90-minute sessions of ACT. Data were collected using the McGill Pain Questionnaire, the Post-Traumatic Stress Disorder Scale, and the Emotional Inhibition Scale. The data were analyzed using MANCOVA in SPSS-27.

Findings: The results demonstrated that ACT significantly decreases pain perception (F=68.67), PTSD (F=21.39), verbal inhibition (F=64.86), timidity (F=66.08), disguise of feelings (F=67.81), and self-control (F=55.23) in individuals with CLBP (P< 0.001).

Conclusion: This study demonstrates that ACT not only alleviates the physical experience of CLBP but also effectively addresses the psychological barriers, such as PTSD and emotional inhibition, that amplify the condition. By fostering psychological flexibility, ACT offers a holistic approach to improving both the emotional well-being and pain management of CLBP patients.

Keywords: Acceptance and Commitment Therapy, Pain Perception, Post-Traumatic Stress Disorder, Emotional Inhibition, Chronic Low Back Pain

Introduction

Chronic Low Back Pain (CLBP) is a common and often debilitating situation with persistent pain in the lower back that continues for 3 months or longer [1]. Unlike acute back pain, which is typically associated with injury or strain, chronic low back pain (CLBP) may arise from various underlying factors, including musculoskeletal issues, nerve damage, or even psychological distress [2]. Chronic low back pain can significantly cause reduced mobility, diminished work productivity, and emotional distress such as anxiety and depression [3]. Furthermore, CLBP is often a complex condition to treat because it creates a cycle of pain, functional limitation, and psychological distress [4]. Thus, a multidisciplinary approach, Pharmacological treatments and including physical therapy, psychological interventions should be considered to address both the physical and mental health aspects of the condition [5]. As CLBP results from biological, psychological, and social factors, a holistic treatment strategy is recommended for improving Quality of Life and promoting long-term recovery [6].

Misperception or heightened perception of pain is one of the key factors that complicates the control of CLBP [7]. When people with CLBP experience pain more intense than what is physiologically expected, it can significantly exacerbate the condition, leading to a vicious cycle of increased pain and functional disability [8]. This changed pain perception often Results from central sensitization, where the nervous

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system becomes hyper-responsive to stimuli [9]. Psychological factors, such as depression, anxiety, and catastrophizing, further distort the perception of pain, making it feel more overwhelming and persistent [10]. As a result, individuals may become more focused on their pain, engage in avoidance behaviors, and develop a heightened fear of movement, which not only worsens the pain but also impedes recovery and rehabilitation efforts [11]. Addressing this misperception of pain is crucial for improving outcomes and breaking the cycle of pain and disability in CLBP patients [12].

Post-traumatic stress Disorder (PTSD) as a psychological factor can particularly influence the experience and severity of CLBP [13]. People with a history of trauma may be more prone to developing PTSD, which in turn can exacerbate their pain perception [14]. Post-traumatic stress Disorder is often associated with increased anxiety, hypervigilance, and emotional distress, which can make individuals more sensitive to physical discomfort and less capable of controlling pain [15]. The constant state of arousal and heightened emotional reactivity in PTSD can increase muscle tension, intensifying pain and decreasing mobility [16]. Furthermore, the psychological distress caused by PTSD may help to maladaptive coping mechanisms, such as avoidance or catastrophizing, which can further worsen the CLBP symptoms [17]. Therefore, addressing both PTSD and its psychological effects is crucial for the effective control and treatment of CLBP [18].

Emotions play a crucial role in pain perception, especially in chronic low back pain (CLBP) [19]. Emotional inhibition refers to the suppression or avoidance of emotional expression, and it has been revealed to contribute to the exacerbation of pain symptoms, particularly in those suffering from CLBP [20]. When individuals suppress their emotions, such as anger, sadness, or frustration related to their chronic pain, they fail to address the emotional distress that often accompanies the condition [21]. This emotional bottling can increase muscle tension as unexpressed emotions remain unresolved, leading to a higher perception of pain[22]. Moreover, emotional inhibition can heighten stress levels, making individuals more prone to catastrophizing and negative thinking patterns, which in turn amplify the pain experience [23]. As emotional suppression prevents healthy coping and emotional release, it perpetuates a cycle of emotional and physical discomfort, making it more challenging to break free from chronic pain [24].

Addressing psychological factors alongside traditional physical treatments is crucial for achieving comprehensive and long-lasting relief in CLBP [25]. Although physical therapies target the musculoskeletal aspects of CLBP, they often neglect the emotional and cognitive dimensions that contribute significantly to pain perception and disability [26]. Acceptance and Commitment Therapy (ACT) is one of the most effective psychological interventions for chronic low back pain (CLBP) [27]. Unlike traditional therapies that focus on pain reduction, ACT encourages patients to accept the presence of pain without allowing it to dictate their behavior or QoL [28]. Thus, ACT helps individuals confront their pain in a non-judgmental way through mindfulness and acceptance strategies, enabling them to remain engaged in meaningful activities despite the discomfort [29]. This psychological shift not only reduces pain-related distress but also enhances emotional resilience, allowing patients to better manage their pain in the long term [30].

Even in the face of chronic pain, ACT works by cultivating psychological flexibility, which is the ability to stay connected to one's values and goals [31]. This approach to managing pain empowers patients to move away from futile struggles against pain, fostering a healthier mindset that focuses on living a meaningful life rather than constantly striving to eliminate discomfort [32]. When combined with physical treatments, ACT promotes the overall treatment plan by addressing the emotional and cognitive aspects of pain [33]. Previous studies have demonstrated that this integrated approach can lead to improvements in both pain and mental well-being, reducing catastrophizing, enhancing self-efficacy, and improving quality of life

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(QoL) [34]. Therefore, ACT represents a valuable and complementary addition to the CLBP management, offering a holistic strategy that considers both the physical and psychological aspects of chronic pain [35].

In traditional treatments that focus only on physical symptoms, the psychological aspects of CLBP are often neglected [14]. However, PTSD, pain perception, and emotional inhibition are significant contributors to the intensity and persistence of pain, influencing how individuals experience and cope with pain [16]. Addressing these psychological factors is crucial as they can exacerbate physical discomfort and hinder recovery [19]. Integrating psychological interventions, such as ACT, into CLBP treatment plans can provide a more comprehensive approach by targeting both emotional distress and pain. This study aims to assess the effectiveness of ACT in improving pain perception, alleviating PTSD symptoms, and improving emotional expression in CLBP patients, ultimately offering a more holistic and sustainable solution to chronic pain management.

Method and Materials

This study was designed through a randomized controlled clinical trial. The participants were patients with chronic low back pain (CLBP) who were referred to physiotherapy and pain clinics in Qazvin Province, Iran, between September and November 2024. Out of 36 identified CLBP patients, 18 patients were randomly assigned to either the intervention or control group via block randomization with a 1:1 allocation ratio to ensure equal group sizes. To minimize selection bias, allocation concealment was achieved through the use of sealed, opaque envelopes. The sample size was determined based on previous research and calculated using G*Power software, considering an effect size of 1.50, a power (β) of 0.96, and a significance level (α) of 0.05.

A specialist confirmed the diagnosis of patients with CLBP. Experiencing Suffering from CLBP within the last two years, not having psychological issues, not using tobacco or alcohol, and being satisfied to participate in the study were inclusion criteria. Exclusion criteria included failure to complete the questionnaire, missing more than two therapy sessions, and experiencing increased pain during the intervention. Ethical considerations, including obtaining informed consent, ensuring confidentiality, and adhering to ethical guidelines for human research, were rigorously upheld. After data collection, responses were analyzed using SPSS software version 27. A Multivariate Analysis of Covariance (MANCOVA) was performed to assess the data with the significance level set at 0.05.

The following instruments were used in this study:

The Short-Form McGill Pain Questionnaire (SF-MPQ) was developed by Melzack [36]. It is one of the most commonly used instruments for assessing the sensory and affective dimensions of pain. The questionnaire consists of 15 descriptive items, each rated on a 4-point Likert scale, ranging from 0 (none) to 3 (severe). Items 1 to 11 are related to the sensory dimension of pain, while items 12 to 15 assess the affective dimension of pain. Additionally, the SF-MPQ includes the Present Pain Intensity (PPI) index, rated on a 6-point scale from 0 (no pain) to 5 (excruciating or burning pain). The reliability and validity of the SF-MPQ were assessed by Melzack [36], who reported Cronbach's alpha coefficients exceeding 0.75. Additionally, another study has shown that the SF-MPQ possesses adequate content validity and can effectively assess the sensory and affective dimensions of pain in different patients [37]. In the present study, a construct validity of 0.89 and a reliability of 0.86 were obtained.

Post-Traumatic Stress Disorder Scale (PTSDS): This 39-item scale is designed to assess PTSD [38]. The objects are rated on a five-point Likert scale, ranging from 1 to 5, and some of them are scored in reverse. Total scores range from 0 to 195. Scores below 65, 65-130, and above 130 indicate mild, moderate, and severe impairments, respectively. Four subscales of penetrating memories, difficulty in interpersonal communication, inability to control emotions, and depression are included in this questionnaire. It was demonstrated that its

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sensitivity coefficient for separating groups with and without disorders was 0.93 [38]. In Iran, the validity of the test, as assessed by the internal consistency method and the split-half method, was 0.92. Additionally, a test-retest method with a one-week interval yielded a validity of 0.91 [39]. The present study also indicated that Cronbach's alpha coefficient (0.90) of the PTSD scale was favorable.

The Emotional Inhibition Scale (EIS) consists of 16 items, which were developed by Kellner [40]. This scale assesses four subscales of verbal inhibition, timidity, disguise of feelings, and self-control. ,. Responses are rated on a 5-point Likert scale, ranging from "never" (0) to "always" [4]. To evaluate the overall level of emotional inhibition, the scores of all items are summed. Each subscale score ranges from 0 to 16, and the total score ranges from 0 to 64. Higher scores on the emotional inhibition index indicate higher levels of fear, introversion, and emotional restraint. The Cronbach's alpha coefficient for the overall scale was reported as 0.717. For the subscales, the coefficients were as follows: verbal inhibition (0.602), timidity (0.782), disguise of feelings (0.95), self-control (0.882), and the overall scale (0.749) [40]. In the present study, the overall Cronbach's alpha was 0.82. Additionally, the Cronbach's alpha coefficients for the subscales were 0.77 for verbal inhibition, 0.82 for timidity, 0.84 for disguise of feelings, and 0.80 for self-control, indicating the high reliability of the instrument.

After selecting the participants for the intervention and control groups, all participants completed research questionnaires as part of a pre-test. Due to the unfavorable conditions of the disease, the pre-test scores are obtained in person. Acceptance and Commitment Therapy sessions, led by a therapist specialized in pain, were conducted in the physiotherapy and pain clinics in eight 90-minute weekly group sessions specifically for the intervention group. The participants in the intervention group were instructed not to discuss the meeting content with the other group to prevent the exchange of information between the two groups. Acceptance and Commitment Therapy was designed based on the ACT programs proposed by Hayes et al. [41], and also taking into account the key characteristics in the design of ACT programs (Table 1). To comply with ethical principles, post-test treatment sessions were also conducted for the control group after data collection was completed.

Table 1) provides a succinct overview of the sessions derived from the framework of Acceptance and Commitment Therapy (41)

Session	Target	Topic	Change expected behavior
1	Introduction to Group Guidelines and Fundamental Concepts of ACT	Building Rapport Among Group Members and with the Therapist; Establishing Group Norms, Objectives, and Structure; Introduction to Therapeutic Commitments; Initial Discussions on the Principles of ACT	Learn about ACT
2	Introduction to Key Therapeutic Concepts in ACT, Covering Notions Such as Avoidance, Cognitive Fusion, and Psychological Acceptance	Assessing clients' problems from the perspective of ACT, extracting experience, avoidance, mixing, and values of the individual, making a list of advantages, disadvantages, and problem control practices	Do not try to avoid negative emotions.
3	Implement *ACT* techniques such as separation Cognitive, psychological awareness, self-embodiment	Specify inefficiency and control adverse events using metaphors, cognitive separation training, psychological awareness, and self-visualization	Accepting negative behaviors and emotions
4	Teaching therapy techniques, emotional awareness, and awareness Wisely (metaphor of your victim)	Distinguishing Between Evaluations and Personal Experiences, Adopting an Observational Stance Towards Thoughts Without Judgment, Aiming for Enhanced Mental Flexibility and Cultivation of Positive Emotions	Pay attention to current experiences and moment-by-mome0nt
5	Instruction and Application of Therapeutic Healing	Cultivate Present-Moment Awareness and Conceptualize Self as an Observing Entity,	Embracing Negative Emotions and Thoughts

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	Techniques, Incorporating Mindfulness Practices and Distress Tolerance Training	Instruct Techniques for Mindful Awareness and Building Tolerance Towards Anxiety, Emphasizing the Acceptance of Negative Emotions	Without Bias or Judgment
6	Instructing Therapeutic Strategies for Identifying and Embracing Personal Values with Clarity - Facilitating Value Clarification and Delivering Emotion Regulation Techniques	Assisting Clients in Identifying Life Values and Evaluating Their Significance, compiling a Catalog of Hindrances to Value Actualization, and Cultivating Positive Emotions	Strive for psychological flexibility
7	Teaching techniques of personal values and practice, Commitment, and increasing interpersonal efficiency	Offering Concrete Strategies to Surmount Obstacles, Employing Metaphors for Enhanced Understanding, and Formulating Plans to Enact Commitment Towards Values, Ultimately Cultivating a Sense of Life Purpose and Meaning.	Gain psychological flexibility
8	Revisiting and Applying Taught Therapeutic Techniques, with a Focus on Emotion Regulation and Cultivating Meaning in Everyday Life Situations	Compilation of a Progress Report Regarding Value Pursuit Steps, Encouraging Clients to Elaborate on Session Outcomes, and Encouraging Application of Taught Techniques in Real-Life Scenarios to Foster a Sense of Purpose and Elicit Positive Emotions	Mitigating Negative Emotions and Thoughts while Cultivating Psychological Flexibility

Findings

The mean and standard deviation of the ages in both the intervention and control groups were 34.65 ± 3.92 and 35.11 ± 4.32, respectively. Table 2 presents the other variables studied within both groups. This table also presents the results of the Shapiro-Wilk test (S-W), which evaluated the normality of variable distributions in the two groups. The Shapiro-Wilk statistics are not significant for any of the variables, indicating that the distributions are standard (see Table 2).

Table 2) Descriptive Indices of Study Variables in Control and Intervention Groups

Variables		Groups	Mean	SD	S-W	P*
Pain Perception	Pre-test	Intervention	40.72	1.93	0.105	0.072
		Control	40.61	1.85	0.115	0.062
	Post-test	Intervention	37.11	2.78	0.087	0.075
		Control	40.77	1.86	0.091	0.081
Post-Traumatic Stress Disorder	Pre-test	Intervention	70.83	3.80	0.112	0.069
		Control	70372	3.64	0.119	0.058
	Post-test	Intervention	66.67	3.83	0.087	0.070
		Control	70.55	2.09	0.121	0.081
Verbal inhibition	Pre-test	Intervention	11.83	0.92	0.110	0.090
		Control	11.72	0.89	0.122	0.066
	Post-test	Intervention	8.89	1.45	0.099	0.057
		Control	11.89	0.83	0.101	0.062
Timidity	Pre-test	Intervention	11.50	1.91	0.131	0.091
		Control	11.44	0.92	0.115	0.058
	Post-test	Intervention	8.72	0.85	0.122	0.101
		Control	11.55	0.87	0.095	0.069
Disguise of feelings	Pre-test	Intervention	9.72	1.31	0.093	0.078
		Control	9.66	1.28	0.084	0.081
	Post-test	Intervention	7.28	1.17	0.090	0.069
		Control	9.77	1.26	0.112	0.071
Self-control	Pre-test	Intervention	10.44	1.04	0.105	0.085
		Control	10.38	1.02	0.089	0.066
	Post-test	Intervention	7.38	1.50	0.093	0.052
		Control	10.50	1.04	0.114	0.094

* Shapiro-Wilk test

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In patients with CLBP, multivariate analysis of covariance was employed to evaluate the efficacy of ACT on pain perception, PTSD, and emotional inhibition. The results of the Levene test, which examined the homogeneity of variance of dependent variables across groups, showed that the variance of pain perception (F = 3.76, P = 0.061), PTSD (F = 3.28, P = 0.088), and emotional inhibition (F = 2.15, P = 0.152) was comparable among the groups. The results of the Box test used to assess the equality of the covariance matrix of dependent variables between both groups also indicated that the covariance matrix of the dependent variables was equal (Box M=44.179, F=1.677, P=0.052). Since the significance of the Box test is greater than 0.05, this assumption holds. Additionally, the results of the Chi-square-Bartlett test examining the sphericity or importance of the relationship among pain perception, PTSD, and emotional inhibition demonstrated a significant relationship between these variables (χ2=210.59, df=20, P<0.01). Another critical assumption of multivariate analysis of covariance is the homogeneity of regression coefficients. Notably, the homogeneity test of regression coefficients was evaluated through the interaction of dependent and independent variables (intervention method) during the pre-test and post-test. The interaction of these pre-tests and post-tests with the independent variable was not significant, indicating the homogeneity of the regression slope. Therefore, this assumption also stands. Given the establishment of multivariate analysis of covariance, the application of this test is permissible. Subsequently, to determine the differences between the groups, a multivariate analysis of covariance was conducted (Table 3).

According to Table 3, the results showed the effect of the independent variable on the dependent variable. In other words, the intervention and control groups exhibit a significant difference in at least one of the variables: pain perception, PTSD, and emotional inhibition. According to the calculated effect size, 73% of the total variance between the intervention and control groups is attributed to the effect of the independent variable. Moreover, the test's statistical power equals 1, indicating that the sample size is adequate. However, to determine in which areas the difference is significant, a univariate analysis of the covariance test was used in the MANCOVA, the results of which are reported in Table 4.

Table 3) The results of multivariate analysis of covariance on mean post-test scores

Test	Value	F	df	Error df	P	Effect Value
Pillai's Trace	0.73	10.377	6	23	<0.001	0.73
Wilks Lambda	0.270	10.377	6	23	<0.001	0.73
Hotelling Trace	2.707	10.377	6	23	<0.001	0.73
Roy's Largest Root	2.707	10.377	6	23	<0.001	0.73

Table 4) Results of univariate analysis of covariance on the mean of post-test scores of dependent variables in intervention and control groups

Variables	SS	DF	MS	F	P	Effect Value
Pain Perception	128.30	1	128.30	68.67	<0.001	0.71
Post-Traumatic Stress Disorder	141.93	1	141.93	21.39	<0.001	0.44
Verbal inhibition	83.78	1	83.78	64.86	<0.001	0.69
Timidity	74.49	1	74.49	66.08	<0.001	0.70
Disguise of feelings	57.54	1	57.54	67.81	<0.001	0.71
Self-control	88.94	1	88.94	55.23	<0.001	0.66

According to the data presented in Table 4, the F-statistic is significant for pain perception (F=68.67), PTSD (F=21.39), verbal inhibition (F=64.86), timidity (F=66.08), disguise of feelings (F=67.81), and self-control (F=55.23) at the 0.001 significance level. These results demonstrate a significant difference between the groups in these variables. Additionally, based on the calculated effect size, 71% of the variance in pain perception, 44% in PTSD, 69% in verbal inhibition, 70% in timidity, 71% in disguise of

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feelings, and 66% in self-control can be ACT to the effects of the intervention. Consequently, it can be concluded that ACT significantly decreases emotional adjustment while reducing pain perception, PTSD, and emotional inhibition (verbal inhibition, timidity, disguise of feelings, and self-control) in patients with CLBP.

Discussion

The present study was conducted to determine the effectiveness of ACT on pain perception, PTSD, and emotional inhibition in patients with CLBP. This study revealed that the experimental group experienced a significant reduction in pain perception after completing the therapy sessions. Furthermore, they experienced a noticeable decrease in the pain intensity, suggesting that the therapeutic focus on acceptance and mindfulness could help reduce the psychological burden associated with their physical pain [33]. This approach enabled patients to control their pain more effectively, reducing the emotional distress and cognitive patterns that often amplify the discomfort of CLBP [26].

The pain perception reduction among CLBP patients can largely be attributed to the core ACT principles, which emphasize acceptance of pain rather than its avoidance [41]. In traditional approaches, individuals often focus on eliminating or fighting against pain, which can heighten emotional distress and increase pain sensitivity [25]. However, acceptance and commitment therapy encourages patients to acknowledge and accept their pain rather than resist it. This shift in mindset helps patients reduce the emotional reactivity associated with pain, leading to a decreased perceived intensity [31]. Individuals can experience it as less overwhelming, reducing its psychological burden through learning to be present with the pain without judgment or fear [32]. Furthermore, ACT promotes mindfulness and psychological flexibility, which are key components in controlling chronic pain. Mindfulness teaches patients to observe their pain without becoming entangled in negative thoughts or catastrophic thinking, which often amplifies pain perception. Through ACT's emphasis on values-based living, patients also learn to focus on meaningful activities, even in the presence of pain [41]. This helps them build a sense of control over their symptoms and fosters adaptive coping mechanisms. As a result, patients with CLBP develop a healthier relationship with their pain, ultimately leading to a decrease in pain perception and an improvement in their overall quality of life [34].

In this study, CLBP who underwent ACT experienced a substantial decrease in PTSD symptoms. Thus, following the therapy, these patients experienced reduced levels of anxiety, hypervigilance, and intrusive thoughts, indicating that ACT effectively addressed trauma-related distress that often coexisted with chronic pain. This therapy helped patients better regulate their emotions and provided strategies for coping with past trauma, which in turn alleviated the psychological burden associated with CLBP [26]. By focusing on acceptance, mindfulness, and cognitive restructuring, ACT helped these patients move beyond their trauma, improving their emotional well-being and overall pain experience [35].

The reduction in PTSD symptoms among patients with CLBP can be primarily attributed to ACT's focus on acceptance and mindfulness, which helps individuals process trauma-related distress in a non-judgmental way [27]. Patients with chronic pain often experience heightened anxiety and hypervigilance due to their pain's unpredictability and the emotional toll it takes on them [31]. Acceptance and Commitment Therapy helps patients learn to observe their anxiety and intrusive thoughts without becoming overwhelmed by them, enabling them to develop a more balanced response to their emotional triggers [25]. Acceptance and Commitment Therapy reduces the emotional intensity of trauma-related symptoms, leading to improved emotional regulation through teaching patients to accept these thoughts and feelings rather than trying to control or avoid them [41]. Furthermore, ACT's value-centered approach encourages patients to reconnect with their life values and engage in

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meaningful activities despite the presence of pain or trauma [28]. This shift in focus helps patients with CLBP regain a sense of purpose and control over their lives, which is particularly beneficial for those struggling with PTSD, where feelings of helplessness and loss of control are common [30]. By committing to values-driven goals, patients are better able to distance themselves from the emotional distress associated with their traumatic experiences, thus reducing the overall impact of PTSD [29]. This increase in psychological flexibility allows patients to cope with both their trauma and pain more adaptively, resulting in a significant decrease in PTSD symptoms [32].

In the ACT group, a significant reduction in emotional inhibition was observed. Therefore, participants became more capable of expressing their emotions, particularly those related to pain, and reported a greater ability to process their feelings more healthily. This improvement in emotional flexibility contributed to better management of both psychological and physical aspects of CLBP [34].

The reduction in emotional inhibition observed in patients with CLBP can be attributed to ACT's emphasis on psychological flexibility and acceptance of emotions [26]. Chronic pain often leads to emotional suppression, where patients avoid expressing or confronting their feelings due to fear of vulnerability or the belief that expressing emotions might exacerbate their pain [31]. Acceptance and Commitment Therapy helps individuals recognize and accept their feelings, including pain-related distress, without judgment. This process allows patients to move away from avoidance behaviors and fosters a healthier relationship with their emotions [29]. Acceptance and Commitment Therapy promotes emotional expression and reduces the tendency to inhibit feelings, particularly those associated with pain and suffering, by teaching patients to sit with difficult emotions rather than suppressing them [27]. Additionally, ACT encourages patients to reframe their experiences with pain, not as something to fight against but as something to be acknowledged and understood [31]. This shift in perspective enables patients to express their emotions more freely, knowing that doing so does not exacerbate their pain [33]. As patients become more aware of their emotional states and develop the tools to process them healthily, they experience improved emotional regulation [35]. This enhanced emotional flexibility not only improves their psychological well-being but also contributes to better physical outcomes, as managing emotions in a constructive way can reduce stress and prevent the emotional buildup that often exacerbates the perception of pain in chronic low back pain (CLBP) [29].

One limitation of this study is the relatively small sample size, which may limit the broader applicability of the findings to a larger and more diverse population. Additionally, the research was conducted in a specific geographic area, which may have limited the generalizability of the results to other regions. Future studies should aim to include a more varied and larger sample, enhancing the external validity of the outcomes. Furthermore, long-term follow-up assessments would provide valuable insights into the sustained effects of ACT on pain management and emotional well-being in CLBP patients. It would also be beneficial to explore the potential synergy between ACT and other therapeutic interventions, offering a more comprehensive approach to treating both the physical and emotional dimensions of chronic pain.

Conclusion

The findings of this study highlight the significant effectiveness of Acceptance and Commitment Therapy in improving both the psychological and physical aspects of chronic low back pain (CLBP). These improvements in psychological health allowed patients to regain a sense of control over their pain, reduce the psychological burden of living with chronic conditions, and engage more fully in meaningful activities. The results suggest that incorporating Acceptance and Commitment Therapy into the treatment of Colonic Low Back Pain not only helps alleviate physical discomfort but also significantly enhances the

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overall well-being and quality of life for patients, making it a valuable addition to traditional pain management strategies.

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Authors' Contribution

GNKS & SN: Conceptualization and Supervision; ZH & SMH: Methodology; GNKS& SHM: Investigation. All authors contributed to the writing of the original draft. All authors confirmed the final manuscript.

Conflict of Interest

There were no conflicts of interest for this study.

Ethical Approval

Ethical principles have been adhered to the guidelines of the National Ethics Committee and the COPE regulations.

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