



Cognitive-Behavioral Approaches in Physical Therapy Addressing the Psychological Aspects of Chronic Pain and Recovery

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Abstract - Chronic pain is a complex condition that significantly impacts individuals' physical and psychological well-being. Cognitive-behavioral therapy (CBT) has emerged as a crucial intervention in physical therapy, addressing the multifaceted nature of chronic pain by integrating psychological strategies into physical rehabilitation. This approach recognizes that pain perception is influenced not only by biological factors but also by cognitive, emotional, and social aspects. By employing techniques such as cognitive restructuring, activity pacing, and relaxation training, CBT empowers patients to modify their thoughts and behaviors related to pain, ultimately enhancing their coping mechanisms and quality of life. Research indicates that CBT can lead to improved functional outcomes for patients with chronic pain. It encourages a biopsychosocial model of care, where physiotherapists are trained to incorporate CBT principles into their practice. This integration helps patients confront fears associated with movement, fosters self-efficacy, and promotes active engagement in rehabilitation activities. Evidence suggests that when combined with traditional physical therapy techniques, CBT not only alleviates pain but also reduces disability and enhances overall psychological resilience. As such, incorporating cognitive-behavioral approaches into physical therapy represents a significant advancement in the management of chronic pain, facilitating a more holistic recovery process.

Keywords - Cognitive-Behavioral Therapy, Chronic Pain, Physical Therapy, Biopsychosocial Model, Rehabilitation, Coping Strategies.

1. Introduction

1.1. Understanding Chronic Pain

Chronic pain is defined as persistent pain that lasts for more than three months, often outlasting the typical healing process associated with injuries or illnesses. It affects millions of individuals worldwide and can stem from various conditions, including arthritis, fibromyalgia, and neuropathy. Unlike acute pain, which serves as a protective mechanism signaling injury or illness, chronic pain can become a disease in itself, leading to significant physical limitations and emotional distress. The complexity of chronic pain necessitates a comprehensive approach to treatment that goes beyond traditional medical interventions.

1.2. The Role of Psychological Factors

Research has shown that psychological factors play a crucial role in the experience and management of chronic pain. Cognitive processes, such as thoughts and beliefs about pain, can significantly influence how individuals perceive and react to their symptoms. For instance, catastrophizing an exaggerated negative thought pattern can exacerbate pain experiences and hinder recovery. Additionally, emotional states such as anxiety and depression are frequently comorbid with chronic pain, creating a cycle that can perpetuate both physical and psychological suffering. This interplay between psychological and physical factors highlights the importance of addressing mental health in pain management. Patients often report feelings of helplessness, frustration, and isolation due to their condition. Therefore, integrating psychological approaches into physical therapy can empower patients to regain control over their lives and improve their overall well-being.

1.3. Cognitive-Behavioral Therapy in Physical Therapy

Cognitive-behavioral therapy (CBT) has emerged as an effective method for addressing the psychological dimensions of chronic pain within the context of physical therapy. CBT focuses on identifying and modifying negative thought patterns and behaviors that contribute to the experience of pain. Techniques such as cognitive restructuring help patients challenge maladaptive beliefs about their pain, while behavioral strategies encourage gradual exposure to feared activities. By incorporating CBT into physical therapy practices, therapists can provide a more holistic treatment approach that acknowledges the biopsychosocial model of health. This model recognizes that biological, psychological, and social factors all interact to influence an individual's experience of pain. As such, CBT not only aids in reducing pain perception but also enhances coping strategies, promotes resilience, and fosters a more active engagement in rehabilitation efforts. This integrated approach ultimately leads to improved outcomes for patients suffering from chronic pain.

2. Technological Advancements in Chronic Pain Management

The image offers a visual representation of a holistic approach to managing chronic pain by integrating both traditional pain treatment methods and modern Virtual Patient Engagement strategies. At its core, the human figure symbolizes the patient, with marked regions on the body indicating common areas affected by chronic pain, such as the head, neck, back, and knees. This central figure serves as a reminder of the personalized nature of pain management and the need for tailored interventions. On the left side, the image emphasizes the diverse range of treatments employed to manage chronic pain. Psychological treatments, including cognitive behavioral therapy (CBT) and mind-body therapies, address the emotional and mental dimensions of pain.

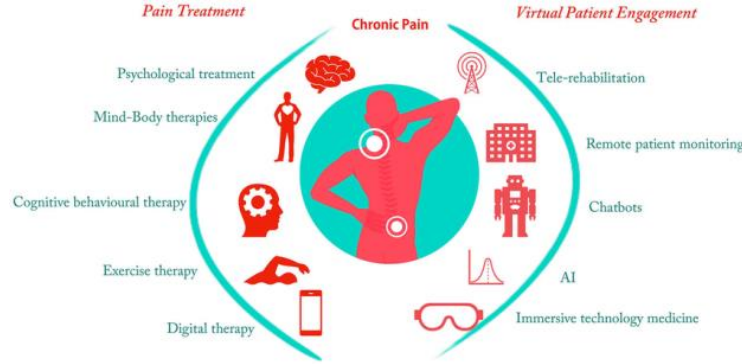


Fig 1: Multidisciplinary Pain Treatment and Virtual Engagement

These therapies recognize that chronic pain often has psychological components, such as stress and depression that exacerbate the experience of discomfort. Physical interventions, such as exercise therapy and digital therapy, focus on restoring movement and functionality, supporting physical rehabilitation, and alleviating pain through gradual, therapeutic exercises. Together, these methods form an integrative approach that seeks to address the whole person both physically and emotionally thereby enhancing the potential for recovery. On the right side, the image illustrates how Virtual Patient Engagement strategies are revolutionizing pain management. Technologies like tele-rehabilitation and remote patient monitoring allow healthcare professionals to provide care over long distances, maintaining regular patient interaction and real-time monitoring of their progress. The use of chatbots for communication and support provides patients with constant, accessible resources for pain management, while advanced innovations like AI and immersive technology, such as virtual reality, offer novel methods for engaging patients in their recovery process. These technological tools foster a more personalized and dynamic approach to chronic pain cares, enhancing both treatment efficacy and patient involvement. By juxtaposing the traditional and technological aspects of pain treatment, the image highlights the importance of a multi-disciplinary, patient-centered approach. It underscores how the integration of psychological, physical, and technological therapies can collectively improve the quality of life for individuals dealing with chronic pain, providing a comprehensive strategy that addresses the complexities of this condition from all angles.

3. Chronic Pain and Psychological Factors

The image visually captures the Physical/Psychological Cycle of Chronic Pain, depicting how chronic pain and its associated effects create a self-sustaining loop. At the center, the human figure symbolizes an individual suffering from chronic pain, with pain points highlighted across various parts of the body, including the head, spine, arms, and legs. These pain points emphasize the widespread and often debilitating nature of chronic pain. Surrounding the central figure, circular arrows connect a series of psychological and physical consequences of chronic pain, illustrating the cyclical nature of this condition. The cycle begins with physical pain or the fear of pain, which leads individuals to avoid physical activity.

This lack of activity causes the body to weaken, making muscles and joints more prone to pain. As pain increases, individuals experience higher levels of depression, anxiety, and distress, leading to negative emotions and a lack of contentment. The emotional burden further exacerbates the perception of pain, contributing to greater inactivity and perpetuating the cycle. The interconnected arrows symbolize how physical and psychological factors reinforce one another, trapping individuals in a loop that is challenging to break without intervention. This visual representation highlights the importance of addressing both the psychological and physical aspects of chronic pain. Cognitive-behavioral approaches, such as cognitive restructuring, relaxation techniques, and graded exposure, aim to disrupt this cycle by helping individuals manage their emotions, reduce fear-avoidance behaviors, and gradually regain physical activity and confidence. By depicting the interplay between mind and body, the image underscores the need for holistic treatment strategies, making it an ideal complement to discussions about psychological and behavioral therapies in physical therapy.

Physical/psychological cycle of chronic pain

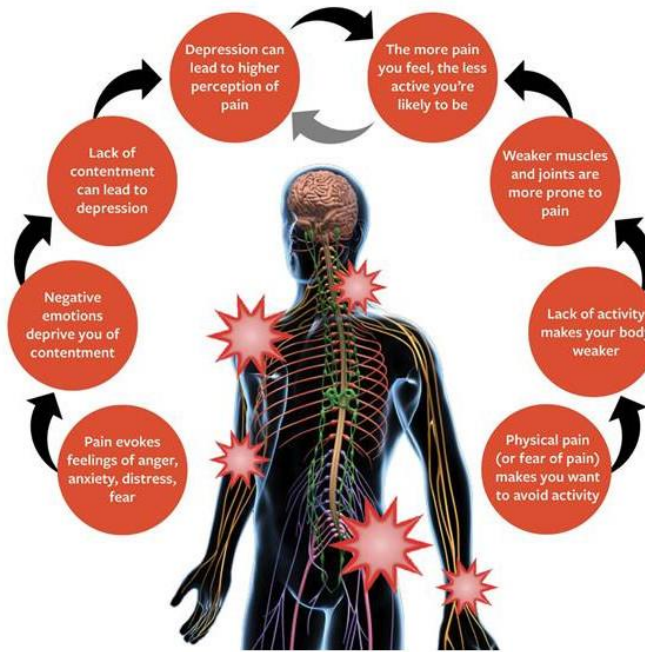


Fig 2: Physical and Psychological Cycle of Chronic Pain

3.1. Definition and Impact of Chronic Pain

Chronic pain is defined as pain that persists for more than three months, affecting approximately 20% of adults in the Western world. This condition can be severely debilitating, leading to significant physical impairments and disruptions in daily functioning. Chronic pain is further classified into high-impact chronic pain (HICP), characterized by prolonged pain that severely restricts major life activities, including work, self-care, and social participation. Recent studies indicate that nearly 11 million adults in the U.S. experience HICP, emphasizing its pervasive nature and the profound burden it places on quality of life. The chronic nature of this condition not only impairs individual productivity but also generates substantial economic strain on healthcare systems.

3.2. Prevalence of Chronic Pain

Chronic pain has emerged as a significant public health concern globally. According to the National Health Interview Survey (2021), approximately 20.9% of U.S. adults reported experiencing chronic pain, while 6.9% reported HICP. These statistics highlight the growing prevalence of chronic pain and its impact on society. The table below summarizes the prevalence rates:

Table 1: Prevalence of Chronic Pain and High-Impact Chronic Pain

Condition	Prevalence (%)	Estimated Number of Adults
Chronic Pain	20.9	51.6 million
High-Impact Chronic Pain (HICP)	6.9	17.1 million

3.3. Impact on Daily Life

Chronic pain significantly affects various aspects of an individual's life, extending well beyond physical discomfort. For individuals with HICP, higher levels of anxiety, depression, and cognitive impairments are commonly reported compared to those experiencing less severe chronic pain. These psychological comorbidities exacerbate the suffering and disability associated with chronic pain. Moreover, chronic pain is associated with increased healthcare utilization, including frequent doctor visits, medical procedures, and pain management interventions. It also imposes a substantial economic burden on society due to lost work productivity and rising healthcare costs. Addressing both the physical and psychological dimensions of chronic pain is therefore critical to improving patient well-being and reducing societal burdens.

3.4. Psychological Dimensions of Chronic Pain

Chronic pain is deeply interconnected with psychological factors that can worsen the pain experience and hinder recovery. The most significant psychological dimensions include fear-avoidance beliefs, anxiety, and depression.

3.4.1. Fear-Avoidance Beliefs

Fear-avoidance beliefs refer to an individual's tendency to avoid activities they believe may worsen their pain. This avoidance behavior often results in deconditioning and a decline in physical function, perpetuating a cycle of pain and disability. The following table highlights common fear-avoidance beliefs and their impact on pain experience:

Table 2: Impact of Fear-Avoidance Beliefs on Pain Experience

Fear-Avoidance Belief	Impact on Pain Experience
"Activity will worsen my pain."	Leads to reduced mobility and increased disability.
"I cannot trust my body."	Results in heightened anxiety and reduced engagement.
"Pain indicates damage."	Promotes avoidance and perpetuates pain perception.

3.4.2. Anxiety and Depression

Anxiety and depression are highly prevalent among individuals with chronic pain, particularly those with HICP. Studies demonstrate that individuals experiencing high-impact chronic pain report greater psychological distress, including severe anxiety and depressive symptoms, compared to those with less restrictive chronic pain. The relationship between chronic pain and mental health is bidirectional: while chronic pain can lead to psychological distress, pre-existing anxiety or depression can intensify the perception of pain. This interplay underscores the importance of psychological interventions in the treatment and management of chronic pain.

3.5. Importance of Addressing Psychological Factors

Addressing psychological factors is essential to achieving effective and sustainable outcomes for individuals with chronic pain. Integrating cognitive-behavioral therapy (CBT) into physical therapy has proven particularly beneficial in helping patients develop coping strategies, challenge maladaptive pain-related beliefs, and reduce fear-avoidance behaviors. By targeting the psychological components of pain, CBT empowers patients to actively engage in rehabilitation, breaking the cycle of inactivity and worsening pain.

3.6. Relevance of Addressing Psychological Factors in Physical Therapy

The integration of psychological strategies into physical therapy is increasingly recognized as a critical component of chronic pain management. Traditional physical therapy often focuses solely on physical rehabilitation; however, acknowledging the mind-body connection allows for a more holistic approach to treatment.

- **Enhancing Treatment Outcomes:** Research indicates that combining psychological interventions, such as CBT, with physical therapy significantly improves patient outcomes. By addressing cognitive distortions related to pain perception, patients can adopt healthier coping mechanisms, enabling them to participate more actively in physical rehabilitation programs. This integrated approach results in improved physical function, reduced pain levels, and enhanced emotional well-being.
- **Comprehensive Pain Management Strategies:** Effective pain management requires a multidisciplinary approach, involving collaboration among physical therapists, psychologists, and other healthcare professionals. This comprehensive model ensures that both the physical and psychological dimensions of chronic pain are addressed. Multidisciplinary care has been shown to improve patient satisfaction, reduce disability, and promote long-term functional recovery.

4. Implementation in Clinical Practice

The implementation of Cognitive-Behavioral Therapy (CBT) in clinical practice for chronic pain management has gained traction due to its evidence-based effectiveness in addressing the psychological aspects of pain. This section discusses the strategies for integrating CBT into clinical settings, the training required for healthcare professionals, and the challenges faced during implementation.

4.1. Strategies for Integration

To effectively incorporate CBT into clinical practice, a structured approach is essential. The following strategies can facilitate the integration of CBT within pain management programs:

- **Multidisciplinary Collaboration:** Establishing a team of healthcare professionals, including psychologists, physical therapists, and pain management specialists, can enhance the delivery of CBT. This collaboration allows for a comprehensive treatment plan that addresses both the physical and psychological dimensions of chronic pain.
- **Structured CBT Protocols:** Developing standardized CBT protocols tailored to chronic pain patients can streamline treatment delivery. For example, a recent study implemented a 16-session CBT program focusing on cognitive restructuring, relaxation techniques, and behavioral activation. Each session was designed to build upon previous skills learned, promoting gradual patient engagement and progress.

- **Patient Education:** Educating patients about the role of cognitive and emotional factors in pain can empower them to take an active role in their treatment. Psychoeducation sessions can cover topics such as the mechanisms of pain, the impact of thoughts on pain perception, and strategies for managing pain through cognitive techniques.
- **Use of Technology:** Integrating technology into CBT delivery can enhance accessibility and engagement. Web-based platforms or mobile applications can provide resources for self-management, including guided exercises and progress tracking tools.

4.2. Training Healthcare Professionals

Effective implementation of CBT requires appropriate training for healthcare professionals involved in pain management. Training programs should focus on:

- **Understanding CBT Principles:** Professionals should be well-versed in the theoretical foundations of CBT and its application to chronic pain.
- **Skill Development:** Training should include practical skills such as conducting cognitive restructuring exercises, teaching relaxation techniques, and facilitating mindfulness practices.
- **Supervision and Support:** Ongoing supervision from experienced practitioners can help less experienced therapists refine their skills and ensure adherence to evidence-based practices.

4.3. Challenges in Implementation

Despite its benefits, several challenges hinder the widespread adoption of CBT for chronic pain management:

- **Limited Availability:** Access to trained therapists who specialize in CBT for chronic pain may be limited, particularly in rural or underserved areas.
- **Stigma around Psychological Treatment:** Some patients may perceive seeking psychological help as a sign of weakness or may not recognize the importance of addressing psychological factors in their treatment.
- **Insurance Coverage:** Reimbursement policies for psychological interventions vary widely among insurance providers, which can limit patient access to CBT.

Addressing these challenges requires concerted efforts from healthcare systems, policymakers, and professional organizations to promote awareness about the efficacy of CBT and improve access to these essential services.

5. Benefits and Outcomes of Cognitive-Behavioral Therapy (CBT) for Chronic Pain

Cognitive-Behavioral Therapy (CBT) has been extensively studied for its effectiveness in managing chronic pain. The therapy focuses on altering negative thought patterns and behaviors associated with pain, leading to improved psychological and physical outcomes for patients. This section outlines the benefits of CBT, supported by data from various studies, along with a summary table of key outcomes.

5.1. Psychological Benefits

CBT has been shown to significantly reduce psychological distress associated with chronic pain. Key findings include:

- **Reduction in Anxiety and Depression:** Studies indicate that CBT leads to substantial decreases in anxiety and depression levels among chronic pain patients. For instance, a follow-up study demonstrated significant reductions in the Beck Depression Inventory (BDI) scores after CBT intervention, with a medium to large effect size ($F = 4.61$, $P = .01$).
- **Improved Coping Strategies:** CBT equips patients with effective coping mechanisms to manage their pain. Research shows that participants report enhanced psychological flexibility, which is associated with reduced pain-related anxiety and avoidance behaviors.

Table 3: Psychological Outcomes of CBT for Chronic Pain Management

Psychological Outcome	Effect Size	Statistical Significance (P-value)
Reduction in Anxiety (GAD-7)	Medium	$P < .01$
Reduction in Depression (BDI)	Medium to Large	$P < .01$
Improved Coping Strategies	Not quantified	N/A

5.2. Physical Benefits

The physical outcomes of CBT are equally significant, impacting daily functioning and pain perception:

- **Decreased Pain Intensity:** Patients undergoing CBT often report a reduction in perceived pain intensity. A study found that the Pain Catastrophizing Scale (PCS) scores decreased significantly post-treatment ($F = 6.52$, $P = .003$), indicating less catastrophic thinking about pain.
- **Enhanced Quality of Life:** The European Quality of Life 5-Dimensions (EQ-5D) scores showed significant improvement following CBT interventions, suggesting better overall quality of life for participants ($F = 3.82$, $P = .03$).

Table 4: Physical Outcomes of CBT for Chronic Pain Management

Physical Outcome	Effect Size	Statistical Significance (P-value)
Decrease in Pain Intensity (PCS)	Medium	P < .003
Improvement in Quality of Life (EQ-5D)	Medium	P < .03

5.3. Long-Term Effects

The long-term benefits of CBT are noteworthy, as many studies have demonstrated sustained improvements even months after treatment completion:

- **Sustained Improvements:** A follow-up study indicated that the benefits of CBT persisted for at least 1.5 years post-treatment, with no significant changes in scores from post-treatment assessments. This suggests that the skills learned during therapy can continue to aid patients in managing their chronic pain effectively.
- **Meaningful Improvements Over Time:** Research has shown that up to 67.5% of participants reported meaningful improvements in functioning and well-being at a 9-month follow-up after completing an ACT-based CBT program.

Table 5: Long-Term Outcomes of CBT in Chronic Pain Management

Long-Term Outcome	Percentage Reporting Improvement	Follow-Up Duration
Sustained Improvement	67.5%	9 months
No Significant Change Post-Treatment	N/A	1.5 years

6. Limitations of Cognitive-Behavioral Therapy (CBT) in Chronic Pain Management

Despite the proven effectiveness of Cognitive-Behavioral Therapy (CBT) in managing chronic pain, several limitations hinder its widespread implementation and efficacy. One significant challenge is the variability in patient response to CBT. Not all individuals with chronic pain may benefit equally from this approach; factors such as personality traits, the severity of pain, and comorbid psychological conditions can influence outcomes. For instance, patients with high levels of catastrophizing or entrenched negative thought patterns may require more intensive or tailored interventions to achieve significant improvements. Additionally, the reliance on patient engagement and motivation can impact the success of CBT. Some patients may struggle to actively participate in therapy due to feelings of hopelessness or fatigue associated with chronic pain, limiting their ability to implement learned strategies effectively.

Another limitation is the accessibility and availability of trained therapists who can deliver CBT within clinical settings. In many regions, particularly underserved areas, there is a shortage of mental health professionals specializing in CBT for chronic pain management. This gap can lead to delays in treatment and limit patient access to these valuable resources. Furthermore, insurance coverage for psychological therapies varies widely, which can pose financial barriers for patients seeking CBT. The stigma surrounding mental health treatment may also deter some individuals from pursuing psychological interventions as part of their pain management strategy.

7. Future Directions

Looking ahead, there are several promising directions for enhancing the effectiveness and accessibility of CBT in chronic pain management. One potential avenue is the integration of technology into CBT delivery. Digital platforms, including mobile applications and telehealth services, can provide patients with access to CBT resources and support from therapists regardless of geographical constraints. Such innovations could help bridge the gap in service availability and allow for more personalized treatment plans that cater to individual needs.

Additionally, future research should focus on refining CBT techniques specifically tailored for chronic pain populations. This includes exploring hybrid models that combine elements of mindfulness-based therapies with traditional CBT approaches, as preliminary studies suggest that mindfulness can enhance emotional regulation and reduce pain perception. Longitudinal studies examining the long-term effects of these integrated approaches will be essential for establishing best practices in chronic pain management.

Ultimately, fostering a more interdisciplinary approach that combines physical therapy, psychology, and medical management will be critical in addressing the complex nature of chronic pain. By continuing to evolve and adapt therapeutic strategies, healthcare providers can improve patient outcomes and enhance the quality of life for those living with chronic pain conditions.

8. Conclusion

Cognitive-Behavioral Therapy (CBT) has emerged as a vital component in the management of chronic pain, addressing not only the physical aspects of pain but also the psychological factors that significantly influence patients' experiences. By

integrating cognitive and behavioral strategies into treatment, CBT empowers individuals to challenge maladaptive thought patterns, develop effective coping mechanisms, and enhance their overall quality of life. The evidence supporting the efficacy of CBT in reducing pain intensity, anxiety, and depression is compelling, demonstrating its role as an essential therapeutic approach in chronic pain management.

Despite its benefits, challenges remain in the widespread implementation of CBT within clinical practice. Variability in patient responses, accessibility issues, and the need for trained professionals can limit its effectiveness. However, advancements in technology and ongoing research into tailored interventions present promising opportunities for enhancing the delivery and impact of CBT. By embracing a multidisciplinary approach that combines physical therapy, psychological support, and innovative treatment modalities, healthcare providers can create comprehensive management plans that address the multifaceted nature of chronic pain.

In summary, the integration of CBT into chronic pain treatment represents a significant advancement in understanding and managing this complex condition. As healthcare systems continue to evolve and adapt to meet the needs of patients, prioritizing psychological well-being alongside physical rehabilitation will be crucial for improving outcomes and fostering resilience among individuals living with chronic pain. Continued research and collaboration among healthcare professionals will further enhance the effectiveness of these interventions, ultimately leading to better patient care and quality of life.

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