
EFFECTIVENESS OF PHYSIOTHERAPY IN CHRONIC LOW BACK PAIN

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ABSTRACT

Chronic low back pain (CLBP) is one of the most common musculoskeletal disorders affecting people across all age groups and is a leading cause of disability worldwide. It has a significant impact on an individual's physical functioning, psychological well-being, work productivity, and overall quality of life. Physiotherapy has emerged as a widely accepted non-invasive treatment approach that focuses on reducing pain, restoring functional ability, improving mobility, and preventing recurrence through evidence-based therapeutic interventions. The present study aims to evaluate the effectiveness of physiotherapy in the management of chronic low back pain. The study examines the impact of various physiotherapy interventions, including therapeutic exercises, manual therapy, stretching, strengthening programmes, posture correction, and electrotherapy, on pain reduction and functional improvement among patients with chronic low back pain. Data were collected from individuals undergoing physiotherapy treatment, and outcomes were assessed using standardized pain and disability measures before and after the intervention.

The findings indicate that physiotherapy significantly reduces pain intensity, improves spinal mobility, enhances muscle strength and flexibility, and increases the ability of patients to perform daily activities. Regular participation in physiotherapy sessions also contributes to improved posture, greater physical independence, and enhanced quality of life while reducing the likelihood of recurrence. Furthermore, patient education regarding ergonomic practices and home exercise programmes plays an important role in maintaining long-term treatment outcomes. The study concludes that physiotherapy is a safe, cost-effective, and evidence-based intervention for managing chronic low back pain. Early diagnosis, individualized

treatment planning, and patient adherence to prescribed exercise programmes can substantially improve clinical outcomes. These findings support the integration of physiotherapy as a primary component of multidisciplinary management strategies for chronic low back pain and highlight its role in promoting long-term musculoskeletal health.

KEYWORDS: Chronic low back pain, Physiotherapy, Therapeutic exercise, Manual therapy, Pain management, Functional recovery, Rehabilitation, Quality of life.

INTRODUCTION

Chronic low back pain (CLBP) is one of the most common and disabling musculoskeletal conditions affecting people worldwide. It is considered a major public health problem because of its high prevalence, long-term impact on physical and mental health, and the economic burden it places on individuals and healthcare systems. Chronic low back pain is generally defined as pain or discomfort in the lower back region that persists for more than twelve weeks. Unlike acute back pain, which often resolves within a short period, CLBP can continue for months or even years, significantly interfering with daily activities, work performance, and overall quality of life. Individuals suffering from chronic low back pain frequently experience limitations in mobility, reduced muscle strength, poor posture, sleep disturbances, emotional stress, anxiety, and depression. These effects can lead to decreased social participation and long-term disability if not managed appropriately.

The causes of chronic low back pain are multifactorial and complex. Several biomechanical, occupational, psychological, and lifestyle-related factors contribute to its development and persistence. Poor posture, prolonged sitting, obesity, heavy lifting, repetitive movements, lack of physical activity, muscle weakness, spinal degeneration, and work-related stress are among the most common risk factors associated with CLBP. In many cases, psychological factors such as fear of movement, depression, stress, and anxiety further aggravate the condition by increasing pain perception and reducing motivation to participate in rehabilitation programs. Age-related degenerative changes in the spine, including disc degeneration, facet joint dysfunction, and ligament stiffness, also play a significant role in chronic low back pain. Because of these multiple contributing factors, the management of CLBP requires a comprehensive and multidisciplinary approach rather than relying solely on medication or surgical intervention.

Among the various conservative treatment methods available, physiotherapy has become one of the most effective and widely recommended approaches for managing chronic low back

pain. Physiotherapy focuses on restoring movement, improving physical function, reducing pain, and preventing future recurrence through evidence-based rehabilitation techniques. Unlike pharmacological treatments that mainly provide temporary pain relief, physiotherapy addresses the underlying physical impairments and functional limitations associated with chronic low back pain. It promotes long-term recovery by improving flexibility, muscle strength, posture, spinal stability, and overall physical conditioning. Exercise therapy is considered the cornerstone of physiotherapy management for chronic low back pain. Different forms of exercise programs, including stretching exercises, strengthening exercises, aerobic conditioning, stabilization exercises, and flexibility training, have shown significant effectiveness in reducing pain and improving functional ability. Core stabilization exercises, in particular, are highly beneficial because they strengthen the deep muscles of the abdomen, pelvis, and lower back that support spinal stability. Research evidence suggests that patients who regularly participate in individualized exercise programs experience greater improvements in pain reduction, mobility, endurance, and quality of life compared to those who remain physically inactive. Exercise therapy also helps reduce fear of movement and encourages patients to return to normal daily activities with greater confidence.

Manual therapy is another important physiotherapy intervention used in the management of chronic low back pain. It includes techniques such as joint mobilization, spinal manipulation, soft tissue massage, and myofascial release. These techniques aim to improve joint mobility, reduce muscle tension, increase blood circulation, and relieve pain. When combined with exercise therapy, manual therapy can enhance treatment outcomes and accelerate functional recovery. Physiotherapists also emphasize posture correction and ergonomic education to prevent excessive strain on the spine during sitting, standing, lifting, and other daily activities. Educating patients about proper body mechanics and healthy lifestyle habits is essential for long-term pain management and recurrence prevention.

Electrotherapy modalities such as transcutaneous electrical nerve stimulation (TENS), ultrasound therapy, interferential therapy, and heat therapy are sometimes used as supportive treatments in physiotherapy. Although these modalities may provide short-term pain relief and muscle relaxation, they are generally most effective when combined with active rehabilitation exercises. Modern physiotherapy approaches increasingly focus on active patient participation rather than passive treatment techniques alone. In the past few years, significant advancements have been made in physiotherapy rehabilitation for chronic low back pain. Newer approaches such as motor control training, cognitive functional therapy, virtual rehabilitation, and technology-assisted exercise programs are gaining popularity in

clinical practice. Motor control training focuses on improving the coordination and activation of deep spinal muscles responsible for maintaining spinal stability. Cognitive functional therapy addresses both physical and psychological factors contributing to chronic pain by helping patients modify negative beliefs, fear-avoidance behaviours, and maladaptive movement patterns. Virtual rehabilitation and tele-physiotherapy programs have also become valuable tools, especially after the COVID-19 pandemic, as they allow patients to continue guided exercise programs from home using digital platforms and mobile applications.

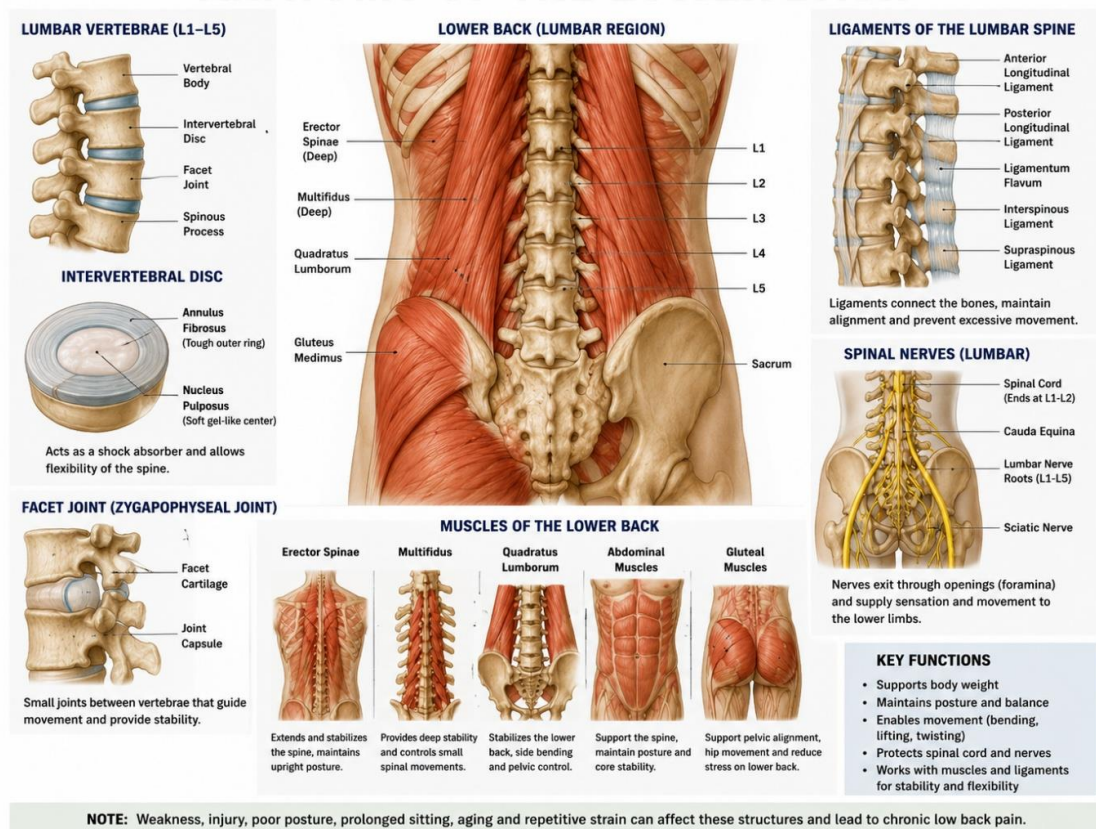
Scientific evidence from systematic reviews, randomized controlled trials, and clinical studies strongly supports the effectiveness of physiotherapy interventions in chronic low back pain management. Studies consistently report that physiotherapy significantly reduces pain intensity, improves spinal flexibility, increases muscular strength and endurance, enhances balance and coordination, and restores functional independence. Patients receiving physiotherapy often demonstrate better long-term outcomes and lower recurrence rates compared to those relying solely on medication or rest. Furthermore, physiotherapy contributes positively to mental health by reducing stress, anxiety, and depression associated with chronic pain conditions. Despite its many benefits, physiotherapy management for chronic low back pain also faces several challenges and limitations. Patient non-compliance with exercise programs remains a major issue, as many individuals discontinue therapy once symptoms improve temporarily. Limited access to rehabilitation services, especially in rural and low-resource areas, can also prevent patients from receiving adequate physiotherapy care. In addition, variations in treatment protocols, lack of standardized exercise guidelines, and socioeconomic barriers may influence treatment outcomes. Some patients may require prolonged rehabilitation programs, which can increase financial burden and reduce adherence to therapy.

Anatomy of the Lower Back

The lower back (lumbar region) consists of five lumbar vertebrae (L1–L5), intervertebral discs, facet joints, ligaments, muscles, and spinal nerves that work together to provide stability, support body weight, and enable movement. Intervertebral discs absorb shock, while ligaments and facet joints maintain spinal alignment and flexibility. The spinal nerves transmit sensory and motor signals to the lower limbs, and their compression may cause pain, numbness, or sciatica. The major muscles of the lower back include the erector spinae, multifidus, quadratus lumborum, abdominal muscles, and gluteal muscles. These muscles stabilize the spine, maintain posture, and control movement. Weakness or dysfunction of

these structures can lead to chronic low back pain. Understanding the anatomy of the lower back is essential for accurate diagnosis and effective physiotherapy rehabilitation.

ANATOMY OF THE LOWER BACK



Causes of Chronic Low Back Pain

Chronic low back pain (CLBP) is a complex condition that develops due to multiple physical, lifestyle, and psychological factors. It is one of the most common musculoskeletal disorders worldwide and affects people of all ages. In many cases, chronic low back pain results from gradual wear and tear of spinal structures combined with poor daily habits and occupational stress.

One of the most common causes of chronic low back pain is muscle strain. Repetitive lifting, sudden twisting movements, prolonged bending, or overuse of back muscles can lead to muscle fatigue and injury. Similarly, ligament injuries may occur when the supporting ligaments of the spine are overstretched or torn, resulting in pain, stiffness, and instability.

Degenerative disc disease is another major cause of chronic low back pain, particularly among older adults. Intervertebral discs gradually lose their elasticity and water content with aging, reducing their ability to absorb shock effectively. This degeneration may lead to pain, reduced flexibility, and spinal stiffness. In some individuals, the disc may bulge or rupture,

causing a herniated disc. A herniated disc can compress nearby spinal nerves and produce symptoms such as radiating pain, numbness, or weakness in the legs.

Spinal stenosis, which refers to narrowing of the spinal canal, can also contribute to chronic low back pain. This condition places pressure on the spinal cord and nerves, often causing pain during standing or walking. Osteoarthritis of the spine is another common factor, where degeneration of the facet joints leads to inflammation, stiffness, and restricted movement.

Lifestyle-related factors play a significant role in the development of chronic low back pain. Poor posture during sitting, standing, or lifting places excessive stress on the lumbar spine and surrounding muscles. Obesity increases the load on the lower back, accelerating spinal degeneration and muscle fatigue. A sedentary lifestyle and lack of regular exercise weaken the muscles supporting the spine, reducing stability and increasing the risk of chronic pain.

Psychological stress and emotional factors such as anxiety and depression may also worsen chronic low back pain by increasing muscle tension and pain sensitivity. Occupational overload, especially in jobs involving repetitive lifting, prolonged sitting, bending, or vibration exposure, further contributes to spinal strain and injury.

Risk Factors of Chronic Low Back Pain

Chronic low back pain (CLBP) is influenced by several physical, lifestyle, occupational, and psychological risk factors. These factors increase stress on the lumbar spine and contribute to the development and persistence of pain. Understanding these risk factors is essential for prevention, early intervention, and effective rehabilitation.

One of the most significant risk factors is prolonged sitting, especially with poor posture. Many individuals spend long hours working on computers or using mobile devices, which places continuous pressure on the lower back muscles and intervertebral discs. Lack of physical activity further weakens the muscles that support the spine, reducing flexibility, endurance, and spinal stability.

Obesity is another major contributor to chronic low back pain. Excess body weight increases mechanical stress on the lumbar spine and accelerates degenerative changes in spinal structures. Similarly, weak core muscles fail to provide adequate support to the spine, making individuals more vulnerable to injury and chronic pain.

Repetitive lifting and physically demanding work also increase the risk of developing chronic low back pain. Improper lifting techniques, bending, twisting, and occupational overload can strain muscles, ligaments, and spinal discs over time. Poor ergonomics at the workplace, such

as unsuitable chairs, improper desk height, and awkward body positioning, may further aggravate spinal stress and discomfort.

Aging is another unavoidable risk factor, as natural degenerative changes occur in the spine with advancing age. Intervertebral discs lose elasticity and joint structures become less flexible, increasing the likelihood of pain and stiffness.

Lifestyle habits such as smoking negatively affect blood circulation to spinal tissues and may delay healing processes. In addition, psychological factors including anxiety, depression, and chronic stress can increase muscle tension and pain perception, worsening symptoms.

Pathophysiology of Chronic Low Back Pain

The pathophysiology of chronic low back pain (CLBP) is complex and involves a combination of physical, neurological, and psychological mechanisms. Unlike acute pain, which usually occurs as a direct response to tissue injury and resolves with healing, chronic low back pain persists for more than twelve weeks and often continues even after the original injury has healed. This persistence of pain results from long-term changes in both the musculoskeletal system and the nervous system. Several structural changes within the lumbar spine contribute to chronic low back pain. One of the most common changes is disc degeneration, where the intervertebral discs gradually lose water content, elasticity, and shock-absorbing capacity. Degenerated discs may become painful and place additional stress on surrounding joints and tissues. Muscle imbalance is another important factor, as weakness in the core and stabilizing muscles of the spine reduces spinal support and alters normal movement patterns. At the same time, certain muscles may become tight or overactive, leading to poor posture and mechanical strain. Joint stiffness, particularly in the facet joints of the spine, can limit mobility and increase pain during movement. In some cases, nerve irritation or compression caused by disc herniation, inflammation, or spinal narrowing may result in radiating pain, numbness, or weakness in the lower limbs.

Clinical Features of Chronic Low Back Pain

Chronic low back pain (CLBP) presents with a wide range of physical and psychological symptoms that can significantly affect an individual's daily life and overall well-being. The severity and nature of symptoms may vary from person to person depending on the underlying cause, duration of pain, physical condition, and emotional health. In most cases, symptoms develop gradually and persist for more than twelve weeks.

The most common clinical feature of chronic low back pain is persistent pain or discomfort in the lumbar region. The pain may be dull, aching, sharp, or burning in nature and can remain constant or fluctuate throughout the day. Many patients report increased pain after prolonged sitting, standing, bending, or physical activity. Morning stiffness is another frequent complaint, where individuals experience difficulty moving the lower back after waking up or after long periods of inactivity.

Reduced flexibility and restricted spinal movement are also commonly observed. Patients often find it difficult to bend forward, twist, or perform routine activities comfortably. Muscle tightness, particularly in the lower back, hamstrings, and hip muscles, contributes to stiffness and movement limitation. Due to pain and muscle weakness, many individuals experience difficulty walking, climbing stairs, lifting objects, or maintaining prolonged postures.

Chronic low back pain may also cause fatigue and reduced functional ability. Persistent pain can interfere with normal physical activity, resulting in decreased endurance and reduced participation in work, exercise, and social activities. Over time, muscle weakness and physical deconditioning may further worsen mobility and independence.

In addition to physical symptoms, chronic low back pain often affects mental and emotional health. Many patients experience anxiety, depression, irritability, and fear of movement due to ongoing pain and functional limitations. Sleep disturbances are also common, as pain may make it difficult to find a comfortable sleeping position or maintain uninterrupted sleep.

Diagnosis and Assessment of Chronic Low Back Pain

The diagnosis and assessment of chronic low back pain (CLBP) require a comprehensive and systematic approach to identify its underlying causes and evaluate its impact on the patient's physical function and quality of life. Accurate assessment enables clinicians to develop individualized and effective physiotherapy treatment plans.

The assessment begins with a detailed patient history, including the onset, duration, location, and characteristics of pain, along with aggravating and relieving factors. Information regarding previous injuries, occupational demands, lifestyle habits, medical history, and psychosocial factors is also collected.

Pain intensity is commonly measured using validated tools such as the Visual Analog Scale (VAS) or Numeric Rating Scale (NRS) to establish baseline pain levels and monitor treatment outcomes.

A thorough physical examination is then performed to evaluate posture, spinal alignment, gait, muscle tenderness, and joint mobility. Postural assessment helps identify abnormalities

such as excessive lumbar lordosis, pelvic tilt, or poor sitting and standing posture that may contribute to chronic pain.

Muscle strength and endurance of the core, lumbar, abdominal, and lower limb muscles are assessed, as weakness in these muscle groups can compromise spinal stability. Range of motion (ROM) testing is also conducted to determine limitations in lumbar flexion, extension, lateral flexion, and rotation.

Functional assessment evaluates the patient's ability to perform everyday activities, including walking, sitting, standing, bending, and lifting. Standardized questionnaires, such as the Oswestry Disability Index (ODI) and the Roland–Morris Disability Questionnaire (RMDQ), are widely used to measure disability and monitor functional improvement during rehabilitation.

DIAGNOSIS AND ASSESSMENT OF CHRONIC LOW BACK PAIN

A Systematic Approach for Accurate Diagnosis and Effective Treatment Planning



A comprehensive assessment ensures accurate diagnosis and forms the basis for effective physiotherapy rehabilitation and long-term management of chronic low back pain.

When clinically indicated, imaging investigations such as X-rays, Magnetic Resonance Imaging (MRI), or Computed Tomography (CT) scans may be performed to identify structural abnormalities, including disc herniation, spinal stenosis, fractures, or degenerative changes. However, imaging is generally recommended only when serious pathology is suspected or when symptoms persist despite conservative treatment.

A comprehensive diagnosis combining clinical history, physical examination, functional assessment, and appropriate diagnostic investigations provides the foundation for effective management and successful physiotherapy rehabilitation of chronic low back pain.

Estimated Number of People Living with Chronic Low Back Pain in India (2020–2025).

Year	Estimated Population of India (billion)	Estimated People with Chronic Low Back Pain (millions)
2020	1.38	103.5
2021	1.39	104.3
2022	1.41	105.8
2023	1.43	107.3
2024	1.44	108.0
2025	1.46	109.5

Key findings

- Approximately 100–110 million Indians are estimated to be living with chronic low back pain each year during 2020–2025.
- The burden has gradually increased due to population growth, ageing, sedentary lifestyles, obesity, and occupational risk factors.
- A large Indian systematic review found that low back pain (overall, not only chronic) is extremely common, with pooled point prevalence of 48%, annual prevalence of 51%, and lifetime prevalence of 66%.

Note: These figures are estimates for chronic low back pain based on prevalence modelling because India does not publish official year-wise national counts of CLBP patients.

CONCLUSION

Chronic low back pain is a major health problem that affects millions of people worldwide and has a strong impact on physical function, mental health, daily activities, and overall quality of life. Patients often experience pain, reduced mobility, muscle weakness, stress, anxiety, and limitations in work and social participation. Physiotherapy plays an important role in the conservative management of chronic low back pain and is widely considered one

of the most effective non-surgical treatment approaches. Different physiotherapy interventions such as exercise therapy, manual therapy, posture correction, stretching, strengthening exercises, and patient education help reduce pain and improve flexibility, muscle strength, posture, and functional independence. Research evidence strongly supports structured physiotherapy programs as a first line treatment because they provide safe, cost effective, and long-term benefits without heavy dependence on medication. Early physiotherapy intervention can also prevent disability and improve recovery outcomes. Individualized rehabilitation plans based on patient condition, lifestyle, and functional limitations produce better clinical results. A multidisciplinary approach involving physiotherapists, physicians, psychologists, and rehabilitation specialists further enhance recovery and long-term management. Overall, physiotherapy remains a key component in improving health, mobility, and quality of life in patients with chronic low back pain.

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