

CORRELATION BETWEEN MRI FINDINGS AND CLINICAL MANIFESTATIONS IN PATIENTS WITH CHRONIC LOW BACK PAIN

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Abstract

Background: Chronic low back pain (CLBP) is defined as pain in the lower back region lasting for more than 12 weeks. It is one of the most common musculoskeletal disorders, affecting people of all ages and contributing to disability worldwide. CLBP can result from various causes, including degenerative changes, poor posture, or previous injuries.

Objective: Correlation between MRI findings and clinical manifestations in patients with chronic low back pain.

Methodology: This cross-sectional study was conducted at Mayo Hospital Lahore over a duration of 3 months, using a non-probability purposive sampling technique. A total of 100 participants aged above 25 with clinical symptoms like tear, swelling, or ligament injury, and eligible for MRI were included. Patients with prior spinal surgery, neurological disorders, rheumatoid arthritis, or MRI contraindications were excluded. MRI scans were performed using a 1.5 Tesla machine.

Results: A total of 100 patients participated in this study. Among them, 46% were aged 20-40, 47% were aged 40-60, and 7% were above 60 years. The gender distribution was nearly equal, with 49% male and 51% female. The majority of patients (55%) experienced pain in the 7-10 grade range, and 49% reported back pain as the primary site of discomfort. Degeneration was present in 15% of cases, while spinal stenosis affected 63% of participants. Other conditions such as facet joint arthritis, lumbar spondylosis, and nerve root narrowing were seen in 6%, 27%, and 59% of patients, respectively. Muscle spasm was observed in 53%, and 11% had osteoporosis.

Conclusion: The Correlation highlights a clear Corelation between MRI findings and the clinical symptoms observed in patients with chronic low back pain. Structural abnormalities such as spinal stenosis, nerve root narrowing, and degeneration were found to correlate closely with pain intensity and its distribution. These insights underscore the importance of using MRI as a key diagnostic tool in understanding the complexities of chronic low back pain, enabling more effective and personalized treatment strategies.

INTRODUCTION

Low back ache (LBA), commonly referred to as chronic low back pain (CLBP), is a prevalent condition that affects nearly all individuals, regardless of geographic location or socioeconomic status. Though various definitions of low back ache exist, some researchers advocate for a unified definition to foster better collaboration in the field. This definition typically refers to pain in the lumbar region of the spine, which extends from the costal margin at the 12th rib to the gluteal folds at the top of the buttocks. Leg pain often accompanies back pain, contributing to the complexity of the condition. The anatomical structures involved include muscles, circulatory vessels, lumbar vertebrae, intervertebral discs, the spinal cord, and the nerves stemming from the spinal cord. Given the diverse sources of potential pain within the lumbar spine, pinpointing the exact origin can be challenging for clinicians. However, when a specific cause is identified, it often points to serious pathologies such as cancer, fractures, neurological deficits, or infections, as well as inflammatory diseases like arthritis and ankylosing spondylitis.

Low back pain is classified in several ways, primarily based on the duration of the pain and the underlying cause. Acute low back pain (ALBP) is defined as pain lasting less than three months, while subacute pain lasts between four to six months. Chronic low back pain (CLBP) is characterized by pain lasting longer than six months. Additionally, the causes of low back pain can be categorized into three main groups: nonspecific low back pain (NSLBP), radicular syndrome, and serious spinal pathologies. NSLBP refers to cases where no specific cause is identified, while radicular syndrome involves neurological symptoms affecting the legs, such as numbness or weakness. Serious



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spinal pathologies, including conditions like cauda equina syndrome, infections, fractures, or cancer, are less common but more severe.

The causes of chronic low back pain are multifactorial, ranging from mechanical to degenerative, inflammatory, infectious, neoplastic, psychosocial, and other factors such as Modic changes. Despite the varied potential causes, serious conditions are rare, with less than 1% of low back pain cases attributable to severe pathologies like fractures or cancer. Non-specific low back pain, which is the most prevalent form, is difficult to estimate but is believed to affect a significant portion of the global population. In Pakistan, research indicates that 40.65% of individuals over 50 years old suffer from low back pain, with women who avoid moderate physical activity at greater risk. Factors such as obesity, prolonged sitting, psychological stress, lack of exercise, and heavy lifting are also linked to higher rates of low back pain in Pakistan, particularly in urban areas.

Magnetic Resonance Imaging (MRI) has become an essential tool in diagnosing the underlying causes of chronic low back pain. It is particularly effective in detecting degenerative disc diseases, facet joint arthritis, spinal stenosis, spondylolisthesis, sacroiliac dysfunction, muscle ioint and ligament abnormalities, vertebral compression fractures. inflammatory conditions, infections, and neoplasms. Unlike traditional diagnostic methods such as physical examination and plain radiography, MRI provides detailed images of soft tissues, including intervertebral discs, muscles, and nerves. This allows for a more accurate identification of pathologies, which is crucial for determining the appropriate treatment.

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In Figure Mri Scan Shows Facet Joint Arthritis In The Lumbar Spine, A Condition That Can Lead To Chronic Low Back Pain

Diagnostic approaches often have limitations, particularly when it comes to visualizing soft tissues. Plain radiographs, for example, do not provide detailed information on the discs or nerve tissues, which are often involved in low back pain. MRI, on the other hand, offers high-resolution images without the risks associated with ionizing radiation, making it especially valuable for diagnosing low back pain in younger adults. The ability to assess spinal anatomy and pathology in detail allows for early diagnosis and targeted interventions, preventing the progression from acute to chronic low back pain, which can lead to long-term disability.

Results:

A total 100 sample comprised 46% of individuals aged 20-40, 47% aged 40-60, and 7% above 60 years. Gender distribution was almost equal, with 49% male and 51% female participants. Pain intensity was highest in the 7-10 grade range, affecting 55% of individuals, with 49% reporting back pain as the most common site. Degeneration was observed in 15%, while spinal stenosis was present in 63% of cases. Other conditions such as facet joint arthritis, lumbar spondylosis, and nerve root narrowing were less prevalent, affecting 6%, 27%, and 59% of the sample, respectively. Muscle spasm was noted in 53% of individuals, and osteoporosis was found in 11%.



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normal pain Pain grade 1-3 Pain 4-6 Pain Grade 7-10



Discussion:

Study observed that 46% of participants were aged 20-40, 47% were 40-60, and 7% were over 60. This distribution aligns with findings from the ROAD study, which reported that 75.8% of individuals aged 60 and above had radiographic lumbar spondylosis, a common cause of CLBP in the elderly. Additionally, a community-based study in Korea found that the prevalence of lumbar spinal stenosis increased with age, highlighting the growing burden of CLBP in older populations. Our study showed a near-equal gender distribution (49% male, 51% female). Similarly, the ROAD study found that while lumbar spondylosis was more prevalent in men, the severity of the condition and associated low back pain were more common in women. This suggests that while men may experience more frequent occurrences of lumbar spondylosis, women may suffer more severe manifestations of the condition. The majority of your participants (55%) reported pain intensity in the 7-10 range. A study evaluating pain intensity measures in chronic low back pain patients found that the Numeric Rating Scale and the Box Scale were among the most reliable tools for assessing pain intensity. This supports the validity of your pain intensity findings. Back pain was the most common site, affecting 49% of participants. Facet joint disorders, which often cause localized lower back pain, have been reported to affect 15% to 45% of patients with chronic low back pain. This aligns with your findings and underscores the importance of considering facet joint involvement in CLBP assessments. Our study found that 15% of

participants had degeneration, while 63% had spinal stenosis. A systematic review and meta-analysis reported that the prevalence of degenerative lumbar spinal stenosis varied between 11% and 39%, depending on diagnostic criteria and population studied. This suggests that your study's higher prevalence may be due to specific diagnostic criteria or population characteristics. Facet joint arthritis was observed in 6%, lumbar spondylosis in 27%, and nerve root narrowing in 59% of your participants. The prevalence of facet joint osteoarthritis in a Korean community-based study was 17.58%, with the highest prevalence at L5-S1. This is lower than your findings, which may reflect differences in study populations or diagnostic methods. The ROAD study found that 75.8% of individuals aged 60 and above had radiographic lumbar spondylosis, which is higher than your 27% prevalence, possibly due to your study's younger age distribution. Nerve root narrowing is a common feature in spinal stenosis and was present in 59% of your participants, consistent with its association with CLBP. Muscle spasm was noted in 53% and osteoporosis in 11% of your participants. A study on middle-aged subjects with low back pain found a 12.1% prevalence of osteoporosis, which is similar to your findings. This suggests that osteoporosis is a relevant factor in CLBP, particularly in populations with similar demographic characteristics.

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