

## ORIGINAL RESEARCH

# Investigating the Incidence and Etiology of Low Back Pain within a Defined Population at a Tertiary Care Hospital: A Comprehensive Analysis

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### ABSTRACT

**Background:**Low back pain (LBP) poses a substantial health concern across developing nations and stands as the most commonly addressed health issue within the healthcare sector. Therefore, this current study aims to evaluate both the prevalence and underlying causes of low back pain within a well-defined population. **Methods:**Two hundred and fifty patients presenting at the Department of Orthopaedics were included in the study. Comprehensive demographic information for all participants was collected. A meticulous evaluation of the clinical and medical history of each patient was conducted, documenting their chief complaints. Additionally, radiographic examinations were performed for all participants. The diagnosis of low back pain was established, and the prevalence of chronic low back pain (CLB) was recorded. A standardized Performa was created to systematically assess various etiological factors contributing to CLB. **Results:**The study revealed an overall prevalence of low back pain (LBP) at 42.6 percent among the participants. Specifically, lumbar herniated disc was identified in 11.59 percent of the patients, while degenerative disc disease was present in 13.88 percent. Spinal stenosis and osteoarthritis were observed in 16.02 percent and 13.21 percent of the patients, respectively. Tumor-related conditions and compression fractures were identified in 10.58 percent and 8.29 percent of the patients, highlighting the diverse range of factors contributing to low back pain in the studied population. **Conclusion:**Low back pain (LBP) constitutes a noteworthy health concern affecting a substantial proportion of the global population. The primary contributors to its occurrence are identified as degenerative disc disease, spinal stenosis, and osteoarthritis. These factors play a pivotal role in the prevalence of LBP worldwide.

**Keywords:**Low Back Pain, Prevalence

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### INTRODUCTION

Pain, an intricate and multifaceted phenomenon, commences with the intricate network of receptors known as nociceptors responding to noxious stimuli. These receptors, strategically distributed throughout the body, exhibit sensitivity to a range of stimuli, including pressure, temperature, and chemical changes. Upon stimulation by noxious stimuli of sufficient intensity, these nociceptors generate electrical signals that traverse nerve fibers, embarking on a journey from the peripheral nervous system to the spinal cord and ultimately reaching the brain. Within the brain, the signals undergo a complex process of interpretation and integration<sup>1</sup>. Different regions, such as the somatosensory cortex, thalamus, and limbic system, collaborate to construct the

subjective experience of pain. This intricate dance involves not only the direct sensory input from the noxious stimuli but also incorporates information from memory, emotional states, and various cognitive processes. The subjectivity of pain is a defining characteristic, shaped by individual factors like pain thresholds, psychological well-being, and cultural influences. Additionally, the cognitive aspects of pain perception, including attention, expectation, and fear, contribute to the nuanced nature of the experience. Emotional factors, such as anxiety and stress, further modulate the perception of pain, underscoring the interconnectedness of physical and emotional well-being. Evolutionarily, pain serves as a crucial adaptive mechanism. It acts as a warning signal, prompting swift and protective responses to potential harm. For

instance, the immediate withdrawal of a hand from a hot surface exemplifies the rapid and automatic reflex triggered by pain. This adaptive function highlights the role of pain in promoting survival by preventing further injury. However, the transition from acute to chronic pain introduces additional layers of complexity. Chronic pain involves persistent discomfort that outlasts the initial injury or insult. This transition is associated with intricate neurobiological changes, blurring the distinction between tissue damage and pain perception. The distinction becomes less clear-cut, and the experience of pain can become more challenging to manage and treat effectively. Understanding pain at these diverse levels—sensory, neural, cognitive, emotional, and evolutionary—is paramount for developing comprehensive approaches to pain management. It requires an appreciation of the intricate interplay of biological, psychological, and social factors. This holistic understanding is not only instrumental in enhancing the quality of life for individuals grappling with pain but also in advancing our broader comprehension of the intricate relationship between mind and body<sup>2</sup>. Low back pain (LBP) emerges as a formidable health challenge in the developing nations, casting a pervasive impact on the well-being of individuals and constituting a focal point within the healthcare sector. Its prevalence underscores the need for a comprehensive understanding of the intricacies involved in both its origins and clinical presentations. LBP, often at the forefront of healthcare interventions, manifests primarily through the twin burdens of pain and disability.

The clinical picture of non-specific low back pain unfolds in a diverse manner, with signs emanating from a plethora of structures, both locally and distantly related to the lumbar region. The complexity lies in the fact that low back pain can be attributed to a spectrum of factors, ranging from muscular and skeletal issues to nerve-related problems. This intricate interplay of various structures contributes to the multifaceted nature of LBP. Moreover, delving into the clinical presentation reveals nuances beyond the conventional understanding of nociceptive pain. Beyond the typical nociceptive LBP, there exists a subset characterized by abnormal neurogenic pain perception, termed neuropathic LBP. This form introduces an additional layer of complexity, involving disturbances in the nervous system's response to pain stimuli. Neuropathic LBP can be associated with abnormal sensations, such as tingling or burning, reflecting an altered neurophysiological response to pain. Recognizing these diverse dimensions of LBP is crucial for accurate diagnosis and effective management. Tailoring interventions to address both the nociceptive and neuropathic components ensures a more holistic approach to alleviating pain and restoring functionality. Additionally, understanding the varied clinical presentations allows for the development of targeted

treatment strategies, ranging from therapeutic exercises and physical interventions to pharmacological approaches that consider the specific nature of the pain experienced<sup>3</sup>. In conclusion, LBP represents not only a widespread health issue but also a complex one, demanding a nuanced understanding of its multifactorial origins and clinical manifestations. By acknowledging the spectrum of factors contributing to LBP and recognizing the existence of neuropathic elements, healthcare professionals can refine their diagnostic and treatment approaches, thereby enhancing the efficacy of interventions and ultimately improving the quality of life for individuals grappling with this prevalent health concern. The diagnostic evaluation of individuals experiencing low back pain (LBP) is a complex and meticulous process that demands intricate decision-making skills. The fundamental significance lies in discerning the underlying causes of the pain, a crucial factor that profoundly influences the choice and effectiveness of treatment approaches. Recognizing the multifaceted nature of LBP, it becomes imperative for physicians to navigate beyond purely physical factors and consider the potential influence of psycho-somatic variables.

In the realm of clinical analysis, it becomes apparent that LBP is not solely confined to structural or biomechanical issues but can also be intricately linked to psychological factors such as stress, depression, and anxiety. Therefore, a comprehensive assessment must extend beyond the traditional parameters, encompassing a holistic understanding of the individual's well-being. This involves delving into the patient's clinical profile and medical history with a discerning eye on psychosocial factors that may contribute to the experience and perpetuation of low back pain. Crucially, the assessment process should encompass a thorough exploration of drug abuse history, habits, and psychiatric variables. These elements, often interwoven with the fabric of an individual's health, can significantly impact the manifestation and progression of low back pain. Incorporating this nuanced approach not only ensures a more comprehensive understanding of the patient's condition but also paves the way for tailored treatment plans that address both the physical and psychological aspects of LBP<sup>4</sup>. The rationale behind the present study lies in the recognition of this intricate interplay between physical and psychosocial factors in the context of low back pain. By undertaking a detailed assessment within a known population, the study aims to shed light on the prevalence and diverse causes of LBP. This, in turn, will contribute to the development of a more nuanced and effective approach to the diagnosis and management of low back pain, considering the individualized nature of each patient's experience and the multitude of factors that may contribute to their condition.

## MATERIALS AND METHODS

The current research endeavor was initiated with the primary objective of comprehensively assessing the prevalence and underlying causes of low back pain within a specifically identified population. To achieve this, a cohort of 250 patients seeking care at the Department of Orthopedics was meticulously enrolled in the study. A systematic approach was employed, starting with the acquisition of complete demographic data for all participants<sup>5,6</sup>. This foundational information laid the groundwork for a thorough investigation into the clinical and medical history of each patient. The process extended to recording the chief complaints articulated by the patients, providing valuable insights into the subjective aspects of their low back pain experiences. Furthermore, a critical component of the assessment involved the implementation of radiographic examinations for all participants, enabling a detailed analysis of structural factors contributing to low back pain. The diagnosis of low back pain was subsequently established, and particular attention was directed toward identifying cases of Chronic Low Back (CLB) pain<sup>7-9</sup>. The prevalence of CLB pain within the studied population was meticulously recorded. To systematically organize the data and capture various etiologic factors contributing to CLB, a structured Performa was devised. To facilitate a rigorous and statistical analysis of the findings, all results were meticulously documented in a Microsoft Excel sheet. The statistical software SPSS was employed for a comprehensive analysis, with the Chi-square test serving as a robust tool for the evaluation of significance levels. A p-value of less than 0.05 was established as the threshold for significance, ensuring that observed associations and differences were considered meaningful. In essence, this methodically designed research employed a combination of demographic data, clinical evaluations, radiographic assessments, and statistical analyses to unravel the prevalence and diverse etiological factors of low back pain within the specified population. The meticulous approach to data collection and analysis enhances the reliability and validity of the findings, providing valuable insights into the complex landscape of chronic low back pain.

## RESULTS

In the comprehensive analysis of 250 patients, the presence of low back pain (LBP) was identified in 106 individuals, reflecting an overall prevalence of 42.6 percent within the studied population. A closer examination of this subset of patients revealed intriguing demographic patterns. Among those with LBP, 42.92 percent were aged over 50 years, indicating a higher incidence in the elderly population. Furthermore, 37.26 percent fell within the age range of 30 to 50 years, while 19.82 percent were below 30 years of age, suggesting a notable distribution across different age groups. Gender distribution among LBP patients demonstrated a slight predominance of males, constituting 53.31 percent of the cases, while females accounted for the remaining 46.69 percent. This gender-related variance adds a layer of complexity to the understanding of LBP prevalence, potentially reflecting biological, lifestyle, or occupational factors. Moving beyond demographic factors, specific pathological conditions contributing to LBP were identified. Lumbar herniated disc was found in 11.59 percent of the patients, emphasizing the role of disc-related issues in the etiology of LBP. Degenerative disc disease, a common age-related condition, was present in 13.88 percent of the cases, highlighting the significance of age-related changes in spinal structures. Spinal stenosis and osteoarthritis were observed in 16.02 percent and 13.21 percent of the patients, respectively, shedding light on the impact of structural changes in the spine. Tumors, although less frequent, were identified in 10.58 percent of cases, underscoring the importance of considering neoplastic conditions in the assessment of LBP. Compression fractures, accounting for 8.29 percent of cases, added another dimension to the spectrum of pathological factors contributing to LBP. In essence, this comprehensive analysis not only quantifies the prevalence of LBP within the cohort but also unravels intricate patterns within demographic characteristics and identifies specific pathological conditions associated with LBP. These findings provide a valuable foundation for tailoring targeted interventions and improving the understanding of the multifactorial nature of low back pain within this particular patient population.

**Table 1: Age and gender-wise distribution of patients with LBP**

Parameter		Number of patients
Age group (years)	Less than 30	21
	30 to 50	39
	More than 50	46
Gender	Males	56
	Females	50

**Table 2: Causes of LBP**

Causes	Number of patients	Percentage
Lumbar herniated disc	12	11.79
Degenerative disc disease	15	13.68
Spinal stenosis	17	16.04

Osteoarthritis	14	13.21
Tumour	11	10.38
Compression fracture	9	8.49
Others	28	26.42

Table 2 presents a detailed breakdown of the causes of Low Back Pain (LBP) along with the corresponding number of patients and percentages for each specific cause. The data reveals that spinal stenosis is the most prevalent cause, accounting for 17 cases, representing 16.04% of the total LBP cases. Following closely is degenerative disc disease with 15 cases (13.68%), and lumbar herniated disc with 12 cases (11.79%). Other notable contributors include osteoarthritis (13.21%), tumor-related causes (10.38%), and compression fractures (8.49%). Additionally, a diverse range of other causes collectively makes up 26.42% of the cases categorized under "Others." This comprehensive breakdown offers valuable insights into the distribution of LBP cases based on their underlying causes, aiding healthcare professionals and researchers in understanding the prevalence and significance of each factor in the patient population.

**DISCUSSION**

The hypothesis that virtually every individual will encounter Low Back Pain (LBP) at some point in their life underscores the pervasive nature of this condition<sup>10</sup>. While LBP is often perceived as a common and, in many cases, transient issue, its association with a significant proportion of morbidity cannot be overlooked. The impact of LBP extends beyond mere discomfort, exerting a tangible effect on the overall quality of life for those affected. One noteworthy characteristic of LBP is its tendency to manifest suddenly, with an onset that can be both unexpected and abrupt. Individuals experiencing LBP often find themselves grappling with the condition for a duration ranging from a few days to several weeks. This transient yet impactful nature adds to the complexity of managing LBP effectively. One of the challenges in addressing LBP lies in the elusive nature of identifying a precise etiological parameter. Unlike certain medical conditions with well-defined causes, LBP often lacks a singular, easily identifiable trigger<sup>11,12</sup>. The multifactorial nature of LBP suggests that it may result from a combination of various factors, including lifestyle, genetics, occupational considerations, and underlying health conditions. Moreover, traditional approaches to managing LBP, such as diagnostic imaging, medication, injections, and surgical interventions, often provide only limited relief. This underscores the need for a more nuanced understanding of the condition and the development of comprehensive strategies that go beyond conventional treatments. The ongoing exploration and research into LBP aim to unravel its complexities, identify potential risk factors, and enhance our ability to prevent, manage, and alleviate its impact on individuals. As our understanding of the intricacies of LBP advances, it is

anticipated that more effective and targeted interventions will emerge, ultimately improving the overall prognosis and quality of life for those affected by this prevalent condition. Low Back Pain (LBP) primarily involves the lumbar region of the spine and, in some instances, the pain may radiate down to one or both legs. Achieving an effective therapy for LBP hinges on a precise and accurate diagnosis. The etiology of LBP is complex, influenced by various pathophysiologic mechanisms that impact the lower spine and adjacent structures<sup>13</sup>. Given this complexity, diagnosing LBP requires a comprehensive approach, encompassing the patient's medical history, physical and neurologic examinations, and, when necessary, relevant diagnostic studies.

The diagnostic process is critical in identifying potential "red flag" conditions associated with LBP, which may include tumors, infections, fractures, and significant nerve root compression. By pinpointing these serious underlying issues, clinicians can guide appropriate therapeutic interventions and prevent potential complications. It is important to note that diagnosing LBP poses a considerable challenge, even with extensive investigation. Approximately 15% of patients with LBP receive a definitive diagnosis despite thorough evaluation<sup>14</sup>. This highlights the intricate nature of LBP and the need for a nuanced understanding of its diverse causes. Consequently, the present study was initiated to assess both the prevalence and the specific causes of low back pain within a defined population. Understanding the multifaceted nature of LBP and the limitations in achieving a definitive diagnosis emphasizes the importance of ongoing research and clinical investigations. By further elucidating the factors contributing to LBP and refining diagnostic approaches, clinicians and researchers can enhance the management and treatment strategies for individuals grappling with this prevalent and often challenging condition.

**CONCLUSION**

Low Back Pain (LBP) represents a significant and widespread health issue affecting a substantial portion of the world's population. Among the prominent factors contributing to its occurrence, Degenerative Disc Disease, Spinal Stenosis, and Osteoarthritis stand out as major players. Degenerative Disc Disease involves the gradual breakdown of intervertebral discs, diminishing their ability to cushion the spine. Spinal Stenosis, characterized by the narrowing of the spinal canal, can exert pressure on spinal nerves, resulting in lumbar pain. Osteoarthritis, a degenerative joint disease, commonly affects spinal joints, contributing to pain and reduced mobility in the lower back. The interplay of these conditions underscores

the complexity of LBP, with individual experiences influenced by factors such as age, genetics, and lifestyle. Understanding the specific factors contributing to LBP is pivotal for developing targeted interventions that address its multifaceted nature, aiming to alleviate the burden of this prevalent health issue on individuals and global healthcare systems. Ongoing research in this area holds promise for advancing our comprehension of LBP and refining strategies for prevention and treatment.

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