

Research Paper

Exploring Back Pain Characteristics: Insights From Hilla, Iraq

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ABSTRACT

Objectives: The general concern about low back pain (LBP) necessitates thoroughly examining its various causes and feasible therapies. The current study investigated the causes and surgical treatments of back pain by tailoring treatments to the patient's specific needs.

Methods: Two hundred individuals with LBP have been enrolled in this cross-sectional research. The radiological, magnetic resonance imaging (MRI) images and clinical evaluations were completed by neurosurgeons and used to categorize the selected patients from those attending neurosurgical outpatient clinics. Multiple causes of LBP, including disk prolapse, spinal stenosis, and muscular spasms, were investigated. Detailed descriptions of surgical approaches for various stages of disk prolapse and stenosis were given to help decide the optimal surgical tactics. The data were compiled into an Excel sheet, and the percentages and numbers were sorted and computed appropriately.

Results: The data present an extensive overview of the distribution pattern of back pain causes, disk prolapse, and spinal stenosis in the study community, along with the surgical procedures employed. Muscle spasms, disk prolapse, and spinal stenosis are the main causes of back pain (20%, 40%, and 13%, respectively). L5 and S1 are the most commonly involved in single-level disk prolapse (10%). Different spinal levels may have varying percentages of multiple-level disk prolapse (20%). There are multiple lumbar levels where spinal stenosis can occur, but the most common are L4 and L5 (20%). Distinct surgical approaches are employed for disk prolapse and stenosis at various levels of the spine, and the most frequent intervention was laminectomy in about 39% of total participants.

Discussion: The study's results demonstrate the complexity of the etiologies of back pain and the need for advanced surgical techniques. Particular emphasis is concentrated on spinal stenosis, including single- and multiple-level disk prolapse, and the relationship between surgical methods and causes. The study's thorough comprehension is essential for tailored interventions based on patient traits, ultimately enhancing therapy and patient care.

Keywords:

Low back pain (LBP), Lumbar spine, Surgical outcomes, Disk prolapse, Surgical modalities

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Highlights

- The research underlines the complex characteristics of lower back pain (LBP) and highlights contributing factors like disk prolapse, muscular spasms, and prior surgeries.
- Targeted interventions are guided by extensive research that provides insights on spinal stenosis, single and multiple-level disk prolapse, and its relationships.
- A comprehensive analysis of surgical options for disk prolapses and stenosis discloses a variety of approaches that help practitioners tailor therapies.
- The most common cause, lumbar disk degeneration, affects men more often, highlighting the necessity for individualized treatment strategies.
- The results urge additional research for better results and reduced consequences by enabling professionals to tailor therapy based on patient characteristics.

Plain Language Summary

This study analyzes the underlying causes of LBP and presents successful treatment strategies. Several potential causes of lower back discomfort include disk issues, muscle spasms, and previous surgical procedures. After analyzing 200 people with disabilities, the study concluded that the most prevalent causes of back pain are disk problems, tense muscles, and previous surgical interventions. The analysis additionally offers thorough details on procedures for various spine disorders. It reveals that men frequently experience more lumbar disk troubles. The results improve physicians' comprehension of back pain and enable them to design individualized treatments for patients, contributing to better health outcomes.

Introduction

Low back pain (LBP) is a prevalent illness that often prompts people to seek health care, usually results in job loss, and can cause disability worldwide [1]. LBP is frequently accompanied by neuropathic manifestations, including nociceptive, non-specific, and other pain kinds [2, 3]. Though several diagnostic techniques are available, their usefulness is still debatable since there are numerous contributing factors to LBP and imaging and diagnostic injections are not particularly specific [2]. The intricacy of lower back pain, which influences both the pain's perception and the disability it causes, is influenced by biology, psychology, and society [4].

Non-specific LBP

Most cases of non-specific LBP lack a well-defined anatomical cause [5]. The hallmarks of non-specific pain are diminished physical function and pain. More severe cases are also linked to a marked decline in mental and physical health, in addition to a higher chance for the development of chronic illness and death from all causes [6].

Distinction of buttock region

The buttock region, which spans from both iliac crests down to the gluteal folds, is physiologically distinct from LBP, even though the two can occasionally coexist and be misdiagnosed. The iliac crest is the final anatomical marker in the lower back, starting from the 12th rib. Most people will suffer from severe LBP at certain times during the disease in their lives. This is usually a transient but often chronic disorder. Studies show that one year following the onset of mechanical lower back pain, more than 60% of persons with the condition would still be in pain or would experience it often [7].

A thorough analysis of the lower back pain situation would help clinicians better understand the heterogeneity in LBP and its implications [8]. Only a small number of cohorts have been performed on the general pattern of back pain patients in Iraq and the surgical management of these individuals.

Prognosis of LBP

The prognosis for LBP differs based on the patient and the particulars of the pain. The majority of people with

new LBP episodes recover in a few weeks, but recurrences are frequent, and people with chronic, long-term LBP typically have a more protracted course. The back pain episode, individual and psychological traits, and social and professional environments influence the prognosis of back pain. A small percentage of patients with acute LBP may become chronic, although the majority see quick improvements in pain and impairment within the first month. On the other hand, individuals with non-radicular persistent LBP that has recently started have a favorable prognosis and a good chance of improving [9-11].

Our objective in doing this study on Iraqi patients is to close a significant knowledge gap. Iraq has a high incidence of LBP cases; however, there has not been much thorough research on the patterns and surgical care of these patients. This study makes a valuable contribution by providing a distinct viewpoint on the intricacies of LBP etiologies exclusive to the Iraqi population. Secondly, we hope to offer Iraqi medical professionals insightful information to help them design efficient treatment plans. Additionally, by diversifying our understanding of back pain globally, the study guarantees that medical interventions are appropriate for various cultural and regional contexts.

Materials and Methods

Setting and participants

This cross-sectional study was piloted on 200 patients (90 females and 110 males) aged 30-50 years. They were selected randomly from those attending the outpatient clinic in Imam Alsadiq Teaching Hospital, Hilla, Iraq. The study took two years, from January 2017 to February 2019. The sample size of patients was chosen after careful evaluation of the goals of the investigation and the realistic limitations imposed by our research setting. This decision was made to balance the distinctiveness of our study population, logistical viability, and statistical robustness. A sample size of 200 patients is substantiated for several reasons. Firstly, to allow for a thorough analysis of the various etiologies of LBP common in our target demographic, given the extent of our inquiry into LBP patterns in a specific location. Secondly, to guarantee adequate statistical power, significant inferences must be made following accepted standards for cross-sectional research in comparable settings. Thirdly, to make it easier to characterize LBP cases in depth while considering our study environment's unique clinical and demographic details. Lastly, we aim to improve the study's valid-

ity and help make our findings more broadly applicable within the particular parameters of our inquiry.

Inclusion criteria

All patients in this study complained of (acute or chronic) lower back pain, whether it was associated with radicular pain. The study also included those who complained of back pain resulting from poor posture, muscle overuse, and sprains and strains with normal magnetic resonance imaging (MRI). Muscle spasms are diagnosed by normal MRI of the spine and by clinical examination [12, 13]. All patients were evaluated for clinical tests, radiological, and MRI scanning [14, 15].

Exclusion criteria

Thirteen patients provided inadequate demographic information, while 27 refused to cooperate and take part in the study, those who were not seen again after the first visit, those with previous spinal injuries, those who were poorly followed up, those with spinal congenital dysraphism, radiological and MRI data archives, and those with spinal tumors were excluded from this cohort [16].

Clinical and radiological evaluation

Experienced neurosurgeons, including the authors, performed a comprehensive assessment of the patients' neurological condition, clinical presentations, and medical histories [15, 16]. Moreover, MRI analyses, which are essential for precise anatomical understanding, were carried out by knowledgeable radiologists [14-16]. These experts followed prescribed study criteria and used cutting-edge imaging methods to obtain exact information pertinent to LBP etiologies. The synergy between radiologists and neurosurgeons guaranteed a comprehensive strategy, integrating radiological and clinical viewpoints in the case selection procedure. Our goal is to strengthen the validity and credibility of the study by enhancing the transparency and dependability of our data collection methods and offering clarification on the competence of the professionals participating and the standardized processes followed.

Surgical interventions

Under general anesthesia, a laminectomy was carried out in a prone posture. A lower midline skin incision was made at the level of the involved spine, a subperiosteal gauze dissection was carried out, and gel foam and coagulation cauterization were used to secure the hemostasis. After the spinous process was removed using spinal rongeurs and

punches, the involved vertebra underwent a bilateral laminectomy. The protruding disk material was then removed using pituitary forceps, and the surgical site was cleaned with gentamicin 80 mg mixed with normal saline [17]. The wound was then closed in layers, hemostasis was secured, the dressing was applied with antiseptics, and the redovac drain was left in for 24 hours after the procedure. Neurosurgery is indicated for definite conditions in our patient cohort, including single-level and multiple levels of disk prolapse, as well as spinal stenosis. A total of 40 patients (20 with L5S1 disk prolapse, 12 with L4, L10 disks prolapse, and 8 with L3, L8 disks prolapse) have single-level disk prolapse. Moreover, 20 patients (6 with L4, L5, S1 disk prolapse, 8 with L3, L4, L5 disks prolapse, and 6 with L2, L3, L4 disks prolapse) had several levels of disk prolapse. Additionally, there are 28 individuals with spinal stenosis (10 with L4, L5 stenoses, 8 with L3, L4, and L5 stenoses, and 10 with L5 S1 stenosis).

Statistical analyses

The study data were compiled into an Excel sheet, Microsoft Office (2017), and the percentages and numbers were sorted and computed appropriately.

Ethical clearance

The Hammurabi College of Medicine's Review Committee's ethical criteria were closely followed during the consenting process. Before giving written consent, the participants were guaranteed to be fully informed about the study's goals, methods, and possible dangers. The emphasis on ethical principles, autonomy, and confidentiality highlights the strong ethical integrity upheld throughout the study. We hope to provide transparency and assurance about the ethical standards maintained in our research by outlining these procedures.

Results

In the current study, patients were classified as follows:

1) Degenerative spinal disorders affect 88 people; 40 cases with isolated disk prolapse; 20 patients suffer from multiple-level disk prolapse; 12 patients have L4, L5 disks prolapse; 8 patients have L3, L4 disks prolapse; and 20 patients have L5S1 disk prolapse. There are 6 patients with L4, 5, and S1 disk prolapse, 8 with L3, 4, and 5 with prolapse, and 6 with L2, 3, and 4. Additionally, there are 28 patients with lumbar stenosis, 10 with L4, 5 stenoses, 8 with L3, 4, 5 stenoses, and 10 with L5, S1 stenosis.

2) Patients with mild disk prolapse make up 40.

3) Forty patients have normal lumbosacral spine MRIs but exhibit muscle spasms.

4) Twenty-six people experience back pain as a result of a laminectomy or a prior spinal operation.

A clear and organized presentation of the demographic data in Table 1 helps clarify possible factors linked to LBP in the group under study. The representation was broad in terms of age groups. The mean age displayed a narrow range of ages with slight variation. The gender distribution shows a higher percentage of men (63.5%), offering a fair assessment of the effects of LBP on both sexes. The distribution of residences between rural and urban areas provides information about possible lifestyle or environmental issues. The occupational distribution sheds light on potential factors contributing to LBP by highlighting a significant proportion of heavy job workers (55%). The awareness of LBP across various lifestyles is enhanced by the range of jobs, which includes homemakers, retirees, and official workers. The smoking rate among LBP patients reveals a notable percentage of smokers (62.5%). Comorbid conditions such as type 2 diabetes, bronchial asthma, chronic obstructive pulmonary disease (COPD), and hypertension are listed, giving a thorough picture of the population under study's health.

The numerous causes of back pain among the 200 study participants are briefly depicted in Table 2. It gives a useful overview of the distribution of back pain etiologies in the population under study. It clearly and concisely breaks down the number of patients and the associated percentages for each cause. A more nuanced knowledge of the various variables causing back pain is provided by including categories such as spinal stenosis, muscle spasm, disc prolapse at different levels, and prior spinal procedures. These additions improve the study. According to the results, single-level disk prolapses, mild disk prolapses, and multiple-level disk prolapses account for half of the disc-related LBP.

Additionally common, accounting for 20% and 14% of cases, respectively, are spinal stenosis and muscular spasms. Remarkably, 13% of individuals have a history of prior spine procedures, including laminectomy. In 3% of cases, albeit less common, spinal tumors are found.

A targeted and detailed analysis of the number of patients with single-level disk prolapse at various spinal levels may be found in Table 3. It effectively conveys the case distribution, showing that the L5, S1 level (20

Table 1. Demographic characteristics of the studied patients with LBP

Variables	No. (%)	Mean±SD	
Age groups (y)	30 – 34	30(15)	32.5±1.6
	35– 39	80(40)	37.5±2.9
	40– 44	55(27.5)	42.5±4.1
	45 – 50	35(17.5)	47.5±3.7
Gender	Males	127(63.5)	
	Females	73(36.5)	
Residence	Urban	118(59)	
	Rural	82(41)	
Occupation	Official workers	55(27.5)	
	Heavy jobs workers	110(55)	
	Retired, jobless, or housewives	35(17.5)	
Smoking	Smokers	125(62.5)	
	Nonsmokers	75(37.5)	
Hypertension	Positive	45(22.5)	
DM type 2	Positive	51(25.3)	
Hypertension & DM	Positive	38(19)	
Bronchial asthma or COPD	Positive	47(23.5)	

DM: Diabetes mellitus; COPD: Chronic obstructive pulmonary disease.

Iranian Rehabilitation Journal

patients) had the highest occurrence, followed by L4, L5 (12 patients), and L3, L4 (8 patients). There are forty individuals in total with single-level disk prolapse at all levels.

The number of patients with multiple-level disk prolapse at various spinal levels and the related percentages are effectively presented in Table 4. Six patients (3%) at L4, 5, S1, 8(4%) at L3, 4, 5, and 6(3%) at L2, 3, and 4 have disk prolapse, according to the distribution. Notably, 10% of the patients, or 20, lack a recognized spinal level.

The distribution of patients with spinal stenosis at various spinal levels is clearly shown in Table 5. It shows that spinal stenosis affects 10 patients (5%) at L4, 5, 8(4%) at L3, 4, 5, and 10(5%) at L5, S1. Of the total participants in the study, 28 cases of lumbar stenosis cumulatively occur throughout all indicated levels, accounting for 14% of the total.

A comprehensive summary of the surgical techniques used in the study, broken down by levels of stenosis and disk prolapse, may be found in Table 6. Specific spinal levels correspond to each surgical method. The table shows the number of patients and matching percentages for each category.

Many techniques are covered by the surgical modalities, such as laminectomy, discectomy, foraminotomy, and their combinations. The percentages show how each surgical technique is distributed compared to other disc prolapse and stenosis levels.

Discussion

The thorough examination of the etiologies of back pain, the distribution of disc prolapses, and the surgical techniques offered in this survey offer important new information about the features of the patient group under study. A detailed presentation of the demographic data in Table 1 helps clarify possible factors linked to LBP

Table 2. Distribution of back pain causes in the study population: A comprehensive analysis of 200 patients

Back Pain Causes	No. (%)
Disk prolapse single-level	40(20)
Muscular spasm	40(20)
Mild disk prolapses	40(20)
Spinal stenosis	28(14)
Previous spinal surgery laminectomy	26(13)
Multiple-level disc prolapse	20(10)
Spinal tumors	6(3)
Total number of patients	200(100)

Iranian Rehabilitation Journal

Table 3. Distribution of single-level disk prolapse across various spinal levels: A detailed patient analysis

Single-level Disc Prolapse	No. (%)
L5, S1	20(10)
L4, L5	12(6)
L3, 4	8(4)
Total number of patients	40(20)

Iranian Rehabilitation Journal

Table 4. Distribution of multiple-level disk prolapse across various spinal levels: A patient-based analysis

Multiple Level Disk Prolapse	No. (%)
L4, 5 S1	6(3)
L3, 4, 5	8(4)
L2, 3, 4	6(3)
Total number of patients	20(10)

Iranian Rehabilitation Journal

Table 5. Distribution of spinal stenosis across various lumbar levels: An in-depth patient analysis

Spinal Stenosis	No. (%)
L4, 5	10(5)
L3, 4, 5	8(4)
L5, S1	10(5)
Total cases of lumbar stenosis	28(14)

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Table 6. Surgical modalities employed for disk prolapse and stenosis at various spinal levels: Patient-specific analysis

Surgical Modalities	Disk Prolapse Level	Level of Stenosis	No. (%)
Laminectomy, discectomy, and foraminotomy	L5, S1		20(10)
	L3, 4, 5		8(4)
	L4, L 5		4(2)
Total cases			32(16)
Laminectomy plus discectomy	L4, L5		8(4)
	L3, L4		8(4)
	L4,L5, S1		6(3)
	L2, L3, L4		6(3)
Total cases			28(14)
Laminectomy plus foraminotomy		L4, 5	8(4)
		L5, S1	6(3)
		L3, L4, L5	6(3)
Total cases			20(10)
Laminectomy		L4, L5	2(1)
		L3, L4, L5	2(1)
		L5, S1	4(2)
Total cases			8(4)

Iranian Rehabilitation Journal

in the group under study. Table 2 lists the many reasons why people have back pain, with disk problems, muscle spasms, and laminectomy being the main culprits. Interestingly, many patients involve disk prolapse at a single level. Tables 3 and 4 provide detailed information on single-level and multiple-level disk prolapse, respectively, and the prevalence at various spine levels. Table 5 provides information on spinal stenosis incidence, highlighting differences across lumbar levels. Table 6 comprehensively analyzes the various surgical techniques used to treat disk prolapse and stenosis at different spine levels. The results highlight the intricacy of the etiologies of back pain and the sophisticated surgical methods used to treat these ailments. To personalize interventions based on the unique characteristics of patients, healthcare providers need to have this detailed understanding. This solution will help to improve therapy and patient care.

The annual incidence of disk prolapse is around 5-20/1000 adults [18], with a male/female ratio 2:1 [19]. However, other studies have reported female preponder-

ance [20]. Similar to our outcome, almost in all cases of lumbar disk herniation, the L4-L5 and L5-S1 disks were affected [21]. Of the total participants in the present study, 28 cases of lumbar stenosis cumulatively occur throughout all indicated levels, accounting for 14%. Other studies have suggested spinal lumbar stenosis ranges from 1.7% to 13.1% [22]. In the United States, lumbar spinal stenosis disturbs approximately 11% of older people. Studies have exposed that while 20% of people over 60 have spinal stenosis evident on imaging examinations, more than 80% do not cause manifestations and do not require therapy [23].

Similar to the findings of this study, many common comorbidities, including cerebrovascular, respiratory, and cardiovascular disorders among patients with LBP, were also reported. Research has indicated a higher likelihood of certain comorbidities in people with LBP than in people without back pain. Furthermore, comorbidities have been linked to subpar treatment for LBP. Comprehending the connection between comorbidities and back

pain is crucial for enhancing patient care and developing guidelines [24]. These results highlight how crucial it is to consider and manage comorbidities in LBP patients to provide thorough and efficient therapy.

Patients who report radicular discomfort associated with root compression and a single degree of disk prolapse are treated with decompressive laminectomy or discectomy combined with foraminotomy [12]. Viewing the spinal root intraoperatively is vital to assess the extent of root pressure from the bone (osteophyte) or disk material. This method was based on the intraoperative findings of root pressure from disk material or osteophytes. This procedure may be necessary to alleviate pressure on the roots and release the spinal root (de roofing) of the intervertebral foramina since some patients continue to experience radicular discomfort following surgery due to intraoperatively undetected root pressure. Through what is known as “neural foramina,” apertures in the spinal vertebrae allow a bundle of spinal nerves (spinal roots) to emerge from the spinal cord. Narrowing of the nerve root apertures may cause pressure on the nerve. This condition is known medically as foraminal spinal stenosis, and a foraminotomy is necessary to decompress it [13]. Foraminotomy surgery may be taken into consideration if symptoms are severe enough to interfere with daily activities [25]. Symptoms could be experienced as thigh, calf, or lower back pain. Deep and often persistent agony is experienced. Pain is experienced when using the body in a particular way or when carrying out specific actions—numbness, tingling, and weakening of the muscles. MRI to verify that the symptoms are caused by foraminal stenosis [26].

The cases of major lumbar disk herniation can be successfully treated non-surgically, despite a revision by U et al. [27]. However, care must be taken to ensure that subjects are checked for cauda equina syndrome and were fully informed about the necessity to seek medical attention immediately if red-flag symptoms appear. In the patient in our study, a lumbar disk herniation results in excruciating, uncontrollable pain and numbness in the leg, necessitating a discectomy and improvement of the patient’s condition. A small number of individuals in our study require a decompressive laminectomy, and these patients gradually recover from their surgery and experience improved health during follow-up monitoring. After a laminectomy and fusion, spinal stenosis may manifest directly above or below the operative site. More spinal stenosis surgeries raise the risk of complications and spinal instability [28, 29]. For those with spinal stenosis, most medical specialists recommend against surgery. Surgical intervention for lumbar spinal

stenosis usually reduces leg-specific discomfort, numbness, and weakness. Pain predominantly in the back may not respond well to surgery [30, 31]. Additionally, in this study, decompressive laminectomy, discectomy, and foraminotomy managed the disk material and foraminal stenosis more effectively than endoscopic minimally invasive surgery, which had limited access to the spinal canal and spinal root foramen [32].

The results of this investigation shed light on the complex causes of back pain, with particular attention to disk prolapses, spinal stenosis, and the surgical methods used. These insights are essential for healthcare professionals who want to tailor interventions to each patient’s needs. The frequency of disk prolapse in our research is consistent with previous findings, highlighting the importance of L4-L5 and L5-S1 disks, and is consistent with trends worldwide. Although significantly higher in our sample (14%), the incidence of lumbar stenosis is consistent with published estimates. When it comes to controlling disc material and foraminal stenosis, our surgical approach—which prioritizes decompressive laminectomy, discectomy, and foraminotomy—works better than minimally invasive surgery. These results, which come from a particular community in Iraq, highlight the necessity for region-specific knowledge in treatment and add to the understanding of the etiology of back pain. The study’s ramifications go beyond influencing treatment choices to include bettering patient care and directing future research efforts, especially in diverse healthcare settings.

Recommendations and applications

The variety of reasons for back pain and the advanced surgical methods this study uncovered should be considered by healthcare professionals when formulating treatment plans. Optimizing therapy and patient care requires customizing therapies depending on individual features, such as the particular spinal level afflicted. Subsequent investigations must examine the varied forms of back discomfort and enhance surgical techniques to enhance results and minimize problems.

Conclusion

The lumbar disk degeneration is the most common cause of lower back pain. Males are more typically influenced by disk degeneration than females. Various disk levels are observed to be implicated per individual. Friction arthropathy, compression of the neural foramen, annular disk rupture, disk extrusion, disk herniation, spinal canal narrowing, and ligamentum flavum thickening are

frequent at the L4 and L5 disk levels. Less usual conditions include spondylolisthesis and L1 and L2 disk involvement. MRI is the typical imaging method for identifying disk disorders because of its benefits, which include not requiring radioactivity, excellent spinal soft-tissue contrast, multiplanar imaging capability, and specific identification of intervertebral disc pathologies.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethical Committee of University of Babylon, Hammurabi College of Medicine Hammurabi (Code: IRB: HCM: 00231-21-AS-8/2019) criteria were closely followed during the consenting process.

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Authors' contributions

All authors equally contribute to preparing all parts of the research.

Conflict of interest

The authors declared no conflict of interests.

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