Low back pain at Neurological Emergency Department University Hospital of Split

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LOW BACK PAIN AT THE NEUROLOGICAL EMERGENCY DEPARTMENT UNIVERSITY HOSPITAL SPLIT

Diploma thesis

Academic year:

2023./2024.

Mentor:

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Split, July 2024

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ACKNOWLEDGEMENT

First, I would like to express my appreciation to my mentor, Prof. Ivica Bilić, MD, PhD, for his valuable advice and guidance in writing my diploma thesis. His dedication to his work will continue to inspire me as I start my professional career.

I would also like to thank my father, mother, and grandparents for their endless support and encouragement throughout Medical School.

To my dearest friends and girlfriend, I am deeply grateful for the unforgettable memories we have created together in Split during the best six years of my life.

LIST OF ABBREVIATIONS

CT - Computed tomography
ED - Emergency Department
GBD - Global burden disease
IQR - Interquartile range
LBP - Low Back Pain
LOS - Length of stay
MISS - Minimal invasive spine surgery
MRI - Magnetic resonance imaging
NSAIDS - Non steroidal anti inflammatory drugs
NSLBP - Non-specific lower back pain
SI - Sacroiliac

1. INTRODUCTION

1.1. Problem Statement

Low back pain (LBP) presents a significant health challenge in the modern society. As our population ages and sedentary lifestyles become increasingly prevalent due to advanced technology, the incidence of LBP is reaching new peaks.

Highlighting the magnitude of LBP, it stands out as the leading cause of work-related disability, surpassing other health factors in contribution to lost workdays (1,2).

Moreover, it holds the second position as the primary reason for doctor visits, just after the common cold (1,3).

The importance to address LBP is further underlined by the fact that around 75% of the population will experience it at some point in their life. Projections indicate a potential 25% increase in the number of cases by 2050 (4).

The economic burden of LBP is huge, with an estimated $200 billion spent annually on its management (5). This emphasizes the critical need for effective prevention and management strategies. Factors contributing to this burden include not only loss of work productivity and treatment costs but also expenses related to disability benefits, rehabilitation services, and the impact on overall quality of life and well-being. Disability and other costs related to LBP are also expected to rise in the near future (6).

Identifying a specific cause for LBP is uncommon, leading to the characterization of most cases as non-specific (7). LBP is affected by a range of biophysical, psychological, and social factors, impacting functionality, societal engagement, and personal financial stability.

In cases of acute presentation, the prognosis for LBP and its associated disability is generally favorable, with a majority of patients experiencing positive outcomes within a three-month period (8). Despite this, pain and disability often persist, and recurrent episodes are frequent (9).

The observation that such a comparatively mild and self-restricting physical condition can produce such thorough socioeconomic and medico-legal challenges shows the need for evidence-based methods in both ist diagnosis and treatment.

Despite a rising LBP burden, there exists a crucial gap in our understanding of its diverse origins, optimal diagnostic approaches, and effective long-term management, which is essential for improving outcomes both at the individual and healthcare system levels.

1.2. Epidemiology

619 million people were affected worldwide by LBP in 2020, and this number is expected to increase to 843 million in 2050, driven mainly by population growth and the increased life expectancy (4). LBP stands as the primary cause of years lived with disability globally, surpassing the impact of conditions like diabetes and chronic obstructive pulmonary diseases in 2017 (4).

The global burden of years lived with disability due to LBP increased by 54% from 1990 to 2015, with 67% of cases occurring among people in their working years (1). Notably, financially weaker countries, especially in Africa and South America, witnessed the most significant rise in cases for LBP (10).

LBP is shown to have an effect on performance at work, as well as on social and family duties, leading to decreased productivity, increased absenteeism, and a lower quality of life for those affected.

A global study dealing with the prevalence of LBP the showed its point prevalence to be around 12%, with a one-month prevalence of 23%, a one-year prevalence of 38%, and a lifetime prevalence of nearly 84% (11,12).

The economic impact of LBP rivals that of conditions like headache, heart disease, depression, and diabetes, with a significant portion of costs attributed to a small percentage of chronic LBP patients (13,14).

Gender specific patterns in the epidemiology of LBP were observed, with a bigger prevalence reported among females with around 65.5% of women affected compared to 57.5% of men (6,10).

Research suggests that the occurrence of LBP reaches its peak during the third decade of life, with incidents progressively increasing with age until the age group of 60-65 years, after which it gradually diminishes (15). In contrast, lumbar radicular pain increases further with increased age (16).

Elderly individuals are disproportionately affected by LBP, facing heightened risks of mobility loss and decreased independence, leading to reduced engagement in social and familial activities (10).

Risk factors for LBP include lower educational level, physical demanding profession, smoking heightened stress levels, anxiety, depression, obesity, dissatisfaction and limited access to social support at work (15-17).

1.3. Pathogenesis

Figure 1 illustrates the lumbar spine, which includes structures such as muscles, fascia, ligaments, tendons, facet joints, neurovascular components, vertebrae, and intervertebral discs. These structures are all vulnerable to biochemical, degenerative, and traumatic stressors.

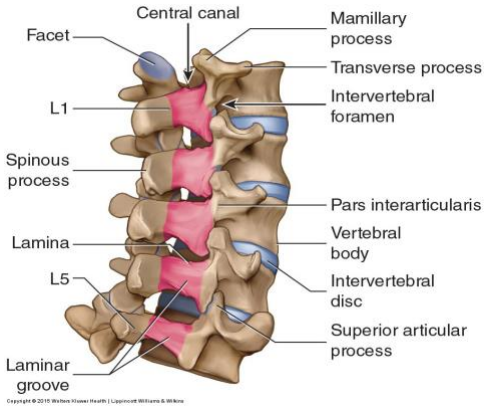

Figure 1. Lumbar Spine Anatomy

Source: Right posterolateral view of the lumbar spine. Prominent bony landmarks are labeled. Courtesy Joseph E. Muscolino. Manual Therapy for the Low Back and Pelvis – A Clinical Orthopedic Approach (2015).

Radicular pain is characterized by LBP extending into the leg, usually below the knee and arises from mechanical compression of nerve roots and chemical irritation caused by inflammatory mediators leaking from degenerated discs (18,19).

The primary cause is mostly a herniated nucleus pulposus, though after the age of 60, spinal stenosis becomes the predominant factor (20). Spinal stenosis, frequently observed at the L4/L5 level, can have many different causes such as osteoarthritis, age-related changes of the spine, hypertrophy of the facet joints, congenital conditions, and spondylolisthesis (21). Chronic mechanical compression in spinal stenosis leads to injury of the axons or nerve root ischemia. It is essential to note not all individuals with these conditions experience pain.

Absolute central lumbar stenosis is defined by a diameter of the spinal canal of less than 10mm in the anteroposterior direction, while foraminal stenosis is characterized by a neuroforaminal diameter of less than 3mm (22). A herniated disc occurs when all or part of a disc is forced through a weakened part of the spine, affecting less than 25% of the disc's circumference (23). Spinal stenosis frequently occurs alongside other health states, such as hypertrophied facet joints that cause a narrowing of the foramen and can include herniation of discs (24). Given that most herniated discs are significantly degenerated and the causes of spinal

stenosis can also lead to axial pain, it is important to note that lumbar radicular pain usually, but not always, coincides with back pain (24).

The role of muscle pathology as a reason for LBP is frequently underestimated. It often arises as a secondary condition resulting from other underlying pathologies. Myofascial pain can be attributed to various factors, including overuse, acute stretching injuries or tears, and the presence of spreaded or localized muscle spasms, such as trigger points (25). The multifidus muscles, running longitudinally along the spine, play a crucial role in sustaining spinal alignment during routine activities like sitting, walking, and lifting (26). Chronic LBP often correlates with improper utilization of these muscles, as individuals adapt movement patterns to mitigate pain (27).

Lumbar muscle dysfunction due to pain may be associated with altered muscle structure, characterized by macroscopic changes such as a reduced cross-sectional area and increased fat infiltration in the lumbar paraspinal muscles. Microscopically, alterations in fiber distribution may also occur. Understanding these structural muscle alterations is crucial for the prevention and management of non-specific LBP (28).

The IV discs, composed of 70–80% aqueous material and featuring an outer annulus fibrosus and inner nucleus pulposus, serve essential functions such as shock absorption, preservation of spinal movements, and distribution of axial and torsional forces (29). In an uninjured state, the disc's interior lacks direct circulatory and nervous system supply, relying on specialized cells capable of surviving without direct blood flow (30).

With time, discs experience diminished ability to absorb physical forces, leading to increased stress on the spine. This may lead to thickening of spinal ligaments and the development of bony growths on vertebrae, ultimately reducing space for the spinal cord and nerve roots (31). Disc degeneration, resulting from injury or disease, can manifest as blood vessel and nerve ingrowth into the disc's interior or herniation of disc material, potentially causing back pain (30,32). Like other sources of mechanical pain, discogenic pain can radiate into the upper and sometimes lower legs in a pattern that doesn’t follow the dermatomes.

Facet joints, also referred to as zygapophyseal joints, link neighboring vertebrae and are crucial in restricting spinal movements (33). As intervertebral discs age and degenerate, these joints increasingly bear loads. They are particularly vulnerable to degenerative conditions, especially osteoarthritis (34).

Sacroiliac joint pain typically manifests in the buttocks, lumbar pain is reported by over two-thirds of individuals, with approximately 50% experiencing radiating pain to the leg (35). In older people, intra-articular pathology is more prevalent, while for younger people who

exhibit significant tenderness and have a history of trauma, it is more probable to suffer from extra-articular pathology (36).

Spondyloarthropathies refer to a category of inflammatory rheumatic diseases originating from a systemic inflammatory condition, often referred to as axial spondyloarthritis.

Ankylosing spondylitis represents a form of chronic inflammatory LBP typically seen in men with an early onset, typically around the age of 24 years (37). Spondyloarthritis often coexists with additional rheumatic or autoimmune conditions, like rheumatoid arthritis, inflammatory bowel disease, and psoriasis (37,38).

Nociplastic pain in lower back pain involves altered nociception without clear evidence of tissue damage or disease, emphasizing the role of central sensitization in contributing to the perception of pain (39). It will be further discussed in the following text.

1.4. Classification and prognosis

Characteristics of LBP include pain, stiffened or tensed muscles typically situated between the lower ribs and buttock creases, with or without sciatica (40).

An important categorization of LBP is based on its time course. Pain of an acute nature is typically defined temporally, lasting for a duration of less than three months.

Back pain can be further categorized into four specific groups: acute (0-6 weeks), subacute (6-12 weeks), chronic (>12 weeks), and recurrent (41).

The natural course of acute LBP demonstrates a favorable course (42,43). Approximately 40% of cases exhibit recovery within the initial week, and a substantial 80% experience resolution within three weeks. By the sixth week, an impressive 90% of cases demonstrate recovery, and prolonged symptoms persist in only 7–10% of cases beyond the six-week mark (42-44). Surgical intervention is necessitated in only 1.2% of cases (44).

Another distinguishing factor in classifying LBP, according to common literature, primarily lies in specificity This classification essentially refers to the cause of pain.

Mechanical causes are responsible for the the biggest share (90%) of cases of LBP while systemic diseases are responsible for only 10% of cases (45). Common mechanical causes are the former mentioned back sprains, disc herniations, osteoarthritis, spondylosis, trauma or other non-specific (46).

Systemic diseases range from inflammatory and neoplastic conditions to infections, metabolic disorders, hematologic issues, referred pain from other organs, and miscellaneous

factors such as abdominal aneurysm rupture, postural issues, aortic dissection, and psychosomatic or malingering conditions (47).

Nonspecific lower back pain (NSLBP) is characterized by the absence of signs indicating serious underlying conditions like cancer, infection, cauda equina syndrome, spinal stenosis, radiculopathy, vertebral compression fracture, or ankylosing spondylitis, stands as the most prevalent cause of mechanical LBP (45,48). NSLBP is a complex condition with various dimensions that must be evaluated and addressed (nociceptive, neuropathic, and nociplastic pain mechanisms, psychosocial factors) as they are crucial for effective management (49).

Systemic or/and serious diseases can be suspected in the case of LBP occurring with any red flags like fever and weight loss, bladder dysfunction, localized pain, morning stiffness, visceral pain or morning stiffness, hypotension (50).

1.5. Clinical presentation

LBP presents with a spectrum of clinical features that vary in intensity and duration. Patients commonly describe localized discomfort in the lumbar region, often aggravated by movement or prolonged periods of sitting or standing (51).

Individuals with LBP may also experience stiffness, muscle spasms, and reduced range of motion in the lumbar spine. Clinical assessments often reveal tenderness over specific spinal structures, and there may be associated neurological signs such as numbness or tingling (52).

Radicular pain is characterized by severe discomfort that follows the path of a lumbar nerve root, extending from the buttock down to the thigh and calf (53,54). Patients with sciatica resulting from spinal stenosis may also show a wide-based gait and neurological deficits (55). In contrast to pain referred from joints, muscles, and discs, radicular pain follows a dermatomal pattern (56).

Mechanical pain from intervertebral discs usually has an insidious onset and affects older individuals, characterized by LBP that worsens with sitting, midline tenderness, and limited range of motion (57). Clinical indicators of facet joint-related pain include unilateral axial low back pain with paraspinal tenderness and restricted back movement (58).

Musculoskeletal pain arises from strenuous activities or sudden movements, presenting as acute or gradual axial LBP, with clinical signs such as muscle guarding, spasms, or atrophy (59).

Sacroiliac (SI) joint pain typically manifests as buttock pain and LBP radiating to the leg or groin, with tenderness near the posterior superior iliac spine and worsening pain when rising from a seated position (36,60).

More than half of individuals experiencing LBP undergo recurrent episodes, which tend to be more painful than the initial occurrence (61,62).

In addition to experiencing LBP, individuals may encounter other related issues as it often leads to sleep disturbances (prolonged sleep onset, disrupted sleep patterns, shortened sleep duration, and diminished sleep satisfaction) (63). Furthermore, a significant proportion of individuals suffering from chronic LBP also exhibit symptoms of depression or anxiety (64,65). Studies have shown that these psychological symptoms can further exacerbate the perception of pain and hinder recovery (66).

1.6. Diagnosis

The misdiagnosis and overdiagnosis of back pain contribute significantly to a substantial healthcare burden, with chronic LBP leading to higher direct medical costs due to inefficient resource utilization compared to acute cases (43). Research indicates that 5% of people with LBP related disabilities are responsible for 75% of the resulting diagnostic and management costs (67,68). These costs primarily stem from factors such as lost work productivity, diagnostic testing, and treatment (69).

The individual nature of LBP presents a challenge to quantify it and its diagnosis can be a challenging process. Despite a weak correlation between LBP symptoms and imaging results and limited associations with anatomical or physiological changes, doctors often persist in employing diagnostic testing, which, according to evidence, often fails to provide a definitive diagnosis or improve patient outcomes (70,71).

In most instances, LBP is self-limiting, and spontaneous recovery is the norm, making pinpointing the precise cause unlikely to yield successful results (8,72). There are several diagnostic recommendations according to the guidelines from the American College of Physicians and the American Pain Society (70).

Doctors should take a thorough medical history and conduct a physical examination to categorize patients with LBP into one of three categories: non-specific LBP, back pain potentially related to radiculopathy or spinal stenosis, or back pain possibly linked to another specific spinal cause (70,73). Psychosocial risk factors should also be evaluated, which can indicate the likelihood of developing chronic disabling back pain (74). Conditions such as disc herniation with radiculopathy can be identified using specific manual muscle tests, the supine

straight leg raise, Lasègue sign, and the crossed Lasègue sign (18). A detailed history and physical examination are essential for identifying patients for which the imaging would have the biggest advantage.

Recognizing the red flags for serious causes of LBP was considered vital for promptly diagnosing and starting appropriate treatment (75). However, the accuracy of traditional "red flag" signs and symptoms in detecting serious abnormalities has been questioned recently, with most "red flags" having low specificity (76). For a detailed list of these red flags, please refer to Table 1.

Table 1. Red flags in the diagnosis of LBP

Malignancy, Infection	
	Unexplained weight loss Previous history of cancer Night pain Fever IV drug abuse Rheumatological Difficulties with micturition
Trauma	
	Back sprain Major Trauma Use of steroids or use of immunosupressors Osteoporosis
Cauda equina syndrome	
	Saddle anaesthesia Incontinence Difficulties with micturition Progressive neurology

To obtain imaging or other tests in patients with NSLBP is not recommended. The reason for this is that degenerative changes for NSLBP observed with imaging are typically deemed nonspecific, as they often show weak correlation with symptoms (45).

After the age of 50, nearly two-thirds of healthy persons show degenerative changes and almost two thirds patients with radiographic evidence of lumbar disc degeneration are without symptoms (77). Moreover, a meta-analysis of six randomized trials indicates that routine

imaging fails to enhance clinical outcomes but potentially exposes patients to unnecessary harms (78,79).

Practice guidelines issued by the Board of Internal Medicine's Choosing Wisely campaign and recommendations from prominent medical associations, such as the American Academy of Family Physicians, the American Association of Neurological Surgeons, and the Congress of Neurological Surgeons, mention the requirement for selective and cautious use of magnetic resonance imaging (MRI) and computed tomography (CT) imaging in LBP cases.

Diagnostic imaging is advised only for patients identified as candidates for intervention, who have experienced LBP persisting for more than 6 weeks despite undergoing conservative management and exhibiting persistent radiculopathic symptoms or for affected people with serious, progressive neurologic deficits (red flags) or with suspected serious underlying conditions (80,81).

While MRI is mostly preferred due to its ability to provide detailed images of soft tissues, neural structures, and lack of exposure to radiation, its availability is often limited. It is useful in differentiating benign from malignant lesions (82,83).

Radiculopathy in patients with persistent LBP can be effectively evaluated using MRI, particularly when surgical intervention or epidural steroid injection for suspected radiculopathy is being considered. MRI is able to distinguish different structures within the IV disk, visualize ligaments, assess bone marrow composition, and evaluate the contents of the spinal canal (84,85).

J. Martel Villagrán *et al*. demonstrated that CT is comparably sensitive to MRI for most analyzed aspects, except for Modic changes, degenerative changes, signal of the disc, and disc herniation (86). With the increasing use of diagnostic medical imaging and improved image quality, there's an opportunity to reconsider CT scans to identify causes of LBP, potentially averting unnecessary imaging and reducing MRI waiting lists to prioritize patients with more concerning conditions than LBP (86).

However, it is essential to exercise caution and cautiously use imaging modalities, as the previously mentioned overutilization can contribute to escalating healthcare costs and may also lead to unnecessary interventions.

1.7. Risk factors and prevention

Understanding the risk factors linked to LBP is important, particularly in high-risk groups, to prevent the onset of LBP and reduce the significant healthcare expenses related to treatment and rehabilitation.

The main findings of a systematic review by Nieminen and colleauges state various prognostic risk factors for LBP, including an elevated pain intensity, difficult working positions, depression, maladaptive behavior patterns, general anxiety, functional limitation during a pain period, and smoking (87). Other contributors to LBP encompass lifestyle-related elements like poor posture, sedentary habits, and obesity, along with specific conditions such as herniated discs, spinal stenosis, and sciatica (88). Occupational factors like heavy lifting and repetitive movements further add to the complexity of LBP development (87,89).

Protective factors identified include physical exercise, working often in a standing position, absolute resting time and higher blood pressure (90). Core strengthening and mixed exercise routines are considered the most beneficial for alleviating LBP symptoms (91,92). An ideal exercise regimen involves engaging in aerobic activities for 12 hours over an 8-week period (92).

The biopsychosocial model states that LBP results from a dynamic interplay among social, psychological, and biological factors, predisposing individuals to injury and arising as a consequence thereof (24). Fear of LBP often prompts anxious patients to avoid painful movements or activities, trapping them in a relentless cycle of anxiety, avoidance, increased disability, and worsening pain (93,94). Elevated fear or pain levels, anxiety, and believing in fear-avoidance were consistently linked to heightened levels of pain and increased disability in a comprehensive meta-analysis involving patients with chronic musculoskeletal pain, including chronic LBP (95). While avoidance may be helpful in the short term, its prolonged or unnecessary use can have harmful consequences in the long term.

Recommendations emphasize the importance of staying active, avoiding activities that exacerbate pain, and mastering self-care techniques for symptom management (96). Engaging in strength training for the muscles experiencing pain also appears to be beneficial in reducing fear-related avoidance beliefs (97).

In recent times there has also been a growing focus on understanding the genetic factors of LBP, with the potential for integration into precision medicine algorithms (98). Heritability plays a significant role, contributing to the probability of developing LBP, functional restrictions, and pain levels in twin studies (99).

1.8. Treatment

Current treatments usually target one cause of LBP, but the complexity of the condition calls for a more comprehensive approach that involves different disciplines working together (24). There have been improvements but there's still space to make LBP treatments better.

For mild to moderate acute pain, the aim is to get things back to normal, help the person return to work, and reduce pain (100). Individuals experiencing sub-chronic or chronic LBP may benefit from multidisciplinary treatment programs (101).

It is also important to mention that majority of individuals experiencing acute or subacute LBP demonstrate improvement over time, regardless of the treatment they receive.

The initial approach involves non-medication-based treatments, if these prove insufficient, medical therapy or surgery is advised (see Figure 2 for treatment options)(102).

Figure 2. LBP Treatment options.

Source: Spine Health [Internet]. Hochschuler. "Sciatica Treatment; 2019. How is sciatica treated; 2019." Available from: https://www.spine-health.com/conditions/sciatica/sciatica-treatment

1.8.1. Non-pharmacological treatment

Convincing evidence indicates that education can be instrumental in alleviating low back pain. A 2.5-hour teaching seminar has demonstrated greater efficacy compared to standard care, particularly in facilitating the return to work for individuals experiencing both short-term and long-term effects (103).

The suggested guidelines advocate for maintaining an active lifestyle, avoiding activities that exacerbate pain and gaining an understanding of self-care techniques to manage

symptoms. There is shift in treatment guidelines for acute and chronic LBP, favoring exercise and early ambulation over previous protocols focused on protection and immobilization (104).

Physiotherapy involving stabilizing the lumbar spine, along with manual therapy, has demonstrated a reduction in pain severity among patients (105).

Both manual therapy and stabilization techniques exhibit comparable efficacy in alleviating LBP, surpassing the effects of exercising in general. Additionally, distress stemming from LBP substantially affects the general pain level and disability. Consequently, treatment approaches targeting belief and behavior modification, such as cognitive-behavioral therapy, can prove beneficial (106).

Other options that can be added to education, physical therapy or to pharmacological treatment include superficial heat, massage, aquatic therapy, yoga, pilates, acupuncture, movement control exercise or spinal manipulation (107-111).

Peripheral nerve stimulation, a minimally might offer relief for chronic LBP resistant to other interventions. However, the supporting evidence remains inconclusive (112).

1.8.2. Pharmacological treatment and surgery

Pharmacological interventions may be used for individuals suffering from pain across multiple areas and who are having diverse contributors to LBP. This approach is particularly suitable for those who prefer to avoid procedures or are at an increased risk of complications. It also seems beneficial for individuals experiencing nociplastic pain.

In adherence to the latest guidelines, pharmacologic treatment for acute LBP is recommended as a secondary option, following nonpharmacologic measures. This involves using of nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants (102).

The effectiveness of selective versus non-selective NSAIDs in treating LBP shows no significant difference, as indicated by the Cochrane review (113). According to recommendations from the American College of Physicians, tramadol or duloxetine is advised as a second-line treatment, with opioids reserved as the final option for addressing chronic low back pain (102). Most organizations recommend the use of gabapentinoids or tricyclic antidepressants for the management of neuropathic pain (114).

Various non-surgical options, such as epidural steroid injections, spinal cord stimulation for neuropathic pain, radiofrequency ablation, and intra-articular steroid injections for mechanical pain are available.

Surgery in the form of interventions, including decompression for neuropathic pain, disc replacement, and fusion for mechanical causes, are also viable options, contingent upon careful patient selection (24,115).

Despite extensive reviews, no evidence supports surgery for LBP without serious neurologic deficits (116).

Minimal invasive spine surgery (MISS) aims to reduce muscle injuries and hospital stays while improving postoperative recovery. Its cost-effectiveness is promising, but outcomes depend on factors such as patient comorbidities and complications (117).

To treat low back pain effectively, we can consider practical solutions. This includes adopting best practices, redesigning how healthcare is provided, integrating health and work-related interventions, making changes to compensation and disability policies, and implementing public health and prevention strategies. These steps form a comprehensive approach to address the various aspects of low back pain for better management (118).

2. OBJECTIVES

LBP is one of the most common medical conditions in Neurology Emergency Departments (ED) worldwide. Despite this fact, modern health care systems still face huge challenges in handling this relatively simple condition.

This thesis aims to comprehensively analyze the demographic distribution, diagnostic and therapeutic approaches, and outcomes of patients presenting with LBP in the Neurology Emergency Department of the University Hospital Split over a six-month period with a particular focus on those who required hospitalization.

Additionally, the thesis will explore the association between pre-hospitalization interventions such as medical therapy and urgent CT scans, and their impact on subsequent hospital outcomes, including surgeries and mortality.

The findings will contribute to a better understanding of the patterns and implications of LBP presentations and to improve diagnostic and therapeutic measures in the Neurology emergency setting, aiding to improve patient care and informing future clinical practices.

Hypothesis:

-LBP is not a medical emergency in a vast majority of cases.

-Most patients with LBP should seek care in primary care settings rather than the ED.

-It is necessary to improve primary care services and redirect patients to appropriate care settings to alleviate strain on the ED and optimize healthcare resource utilization.

-The presentation of patients with LBP to the ED is weekday and daytime dependant and follows a temporal pattern.

-The hospitalization rate for LBP is low and is mostly due to comorbidities.

- Advanced imaging modalities (CT, MR) are crucial for the evaluation and management of hospitalized patients with LBP, providing insights into the underlying spinal pathologies and guiding treatment decisions to optimize patient care and outcomes.

3. MATERIALS AND METHODS

3.1. Study design

The research was conducted as a retrospective cross-sectional study at the Neurology Emergency Department of the University Hospital in Split.

The following data were collected for each patient: sex, age, arrival date, arrival time, therapy received, urgent CT, and whether the patient was hospitalized.

Further and more precise research was done for the hospitalised patients.

Included participants were persons aged 18 years of age or older.

3.2. Study population

Out of 4545 people presenting to the Neurology Emergency Department, the study population comprised a total of 548 patients who sought medical attention for LBP in the Neurology Emergency Department of the University Hospital of Split over a period of six months, starting from the 1st of January to the the 30th of June 2023.

3.3. Methods of Data Collection and process

The data was collected from the study protocol which was provided by the Neurology ED of the University Hospital of Split. Further research was done on hospitalised patients for which the data were collected from central electronic hospital records. The data were acquired by reviewing the study protocols and medical records. Subsequently, the data underwent analysis using Microsoft Excel for Windows Version 11.0 (Microsoft Corporation) and SPSS 24.0 (IBM Corp, Armonk, NY) software applications.

A descriptive analysis was performed, presenting outcomes in frequencies and percentages for dichotomous variables, and as means with standard deviations (SD) for continuous variables. The normality of continuous variables was assessed using the Kolmogorov-Smirnov test, and those found to be normally distributed were included in the analysis. Statistical significance was determined at $P < 0.05$.

3.4. Description of research

Patients with LBP symptoms seeking care at the Neurological Emergency Department of the University Hospital of Split underwent a diagnostic algorithm and were assessed through various neurological tests. Patients were either discharged without getting medical therapy or an urgent CT scan or were held for further treatment and diagnostic measures.

Some of these patients received medical therapy, which was administered parenterally. The medications included Voltaren ampoule i.m., Tramal ampoule i.m., Naklofen ampoule i.m., Dexamethasone ampoule i.m., and Normalbel ampoule i.m.

Urgent CT scans were employed for certain patients. Subsequently, patients were either discharged or admitted for hospitalization.

3.5. Compliance with ethical standards

All procedures performed in studies involving human participants were in accordance with ethical standards of the institution and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Approval for this study was granted by the Ethics Review Board of University Hospital of Split with reference Number 2181-147/01-06/LJ.Z.-24-02 from January 29th 2024. The research adhered to the principles of the World Medical Association Declaration of Helsinki.

4. RESULTS

4.1. Demograhic and clinical data

4.1.1. Demographic and clinical data of all patients

During the period from 1st of January 2023 to the 30th of June 2023, 548 patients with LBP presented to the ED of the University Hospital Split to seek medical care (Table 2). This represents 12.05% of the total amount of patients presenting to the ED, which was 4545.

Table 2. Demographic and clinical data of all patients presenting with LBP

Demographic/ Clinical data	Value
Patients; n	548
Age (years); median (IQR)	55 (21, 88)
Gender; n (%)	
Male	247 (45.1)
Female	301 (54.9)
Medical therapy received; n (%)	211 (38.5)
Urgent CT received; n (%)	7 (1.3)
Hospitalized; n (%)	17 (3.1)

IQR - Interquartile range; CT- Computed Tomography; n- Number of patients

301 patients were female (55%) and 247 were male (45%) (Figure 3).

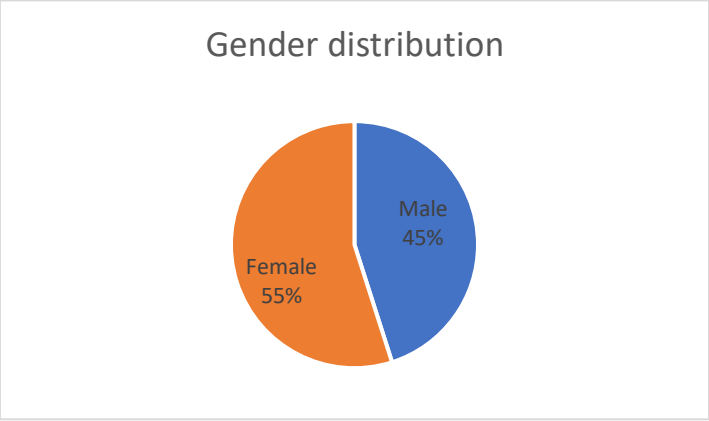

Figure 3. Gender distribution among patients

Patients arriving at the ED with LBP were aged between 21 and 88 years with the median age being 55 years. The age distribution specifically is shown in Figure 4 with 50 patients being being aged between 21 and 30 years old (9.1%), 88 patients in the group from 31 to 40 years (16.1%), 94 patients between 41 and 50 years (17.2%), 100 patients in between 51 and 60 years (18.2%), 103 patients between 61 and 70 years (18.8%) and 113 patients over 70 years old (20.9%)

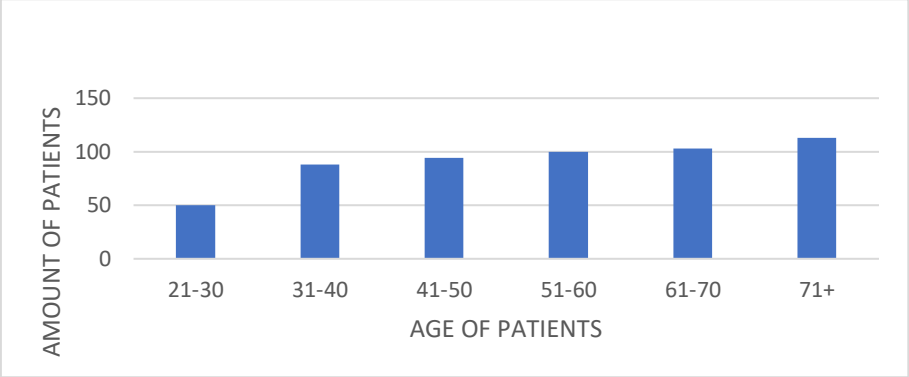

Figure 4. Age distribution among patients presenting to Neurological Emergency department due to LBP

211 patients received medical therapy (38.5%) and 7 patients received an urgent CT (1.3%) as shown in Figure 5. The median for people receiving medical therapy is 54. Correlation coefficient between age and medical therapy is 0.05. The median for getting an urgent CT is 67. None of the patients both underwent urgent CT and received medical therapy.

17 patients were hospitalized (3.1%) of which 7 patients received medical therapy and 2 had an urgent CT before being hospitalized.

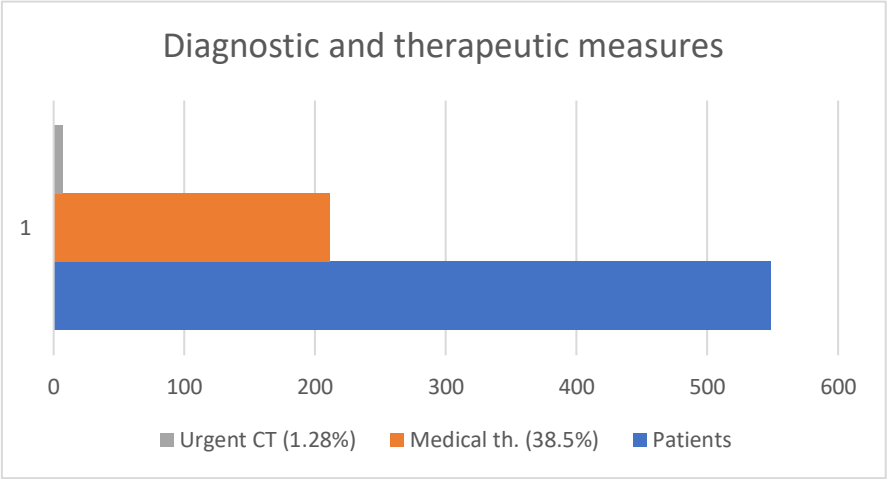

Figure 5. Diagnostic and therapeutic measures for LBP

During the six-month period of our study specific temporal trends emerged in the ED concerning LBP cases. Noteworthy dates with no reported instances of LBP presentations include 14th of January, 14th of February, 7th of April, and 13rd of May, collectively accounting for 2.21% of the total cases.

Examining daily occurrences, the maximum percentage of patients with LBP on a given day occurred on the 4th of April, constituting 40.75% of cases. Other notable peaks include 15th of March (25.00%), 20th of April (29.16%) and 2nd of January (25.53%).

In the course of our study, we recorded and examined the daily variations in reported pain levels. In our investigation, it was recorded that 113 patients came on Mondays (20.6%), 95 on Tuesdays (17.3%), 86 on Wednesdays (15.7%), 73 on Thursdays (13.3%), 85 on Fridays (15.6%), 44 on Saturdays (8.0%) and 52 on Sundays (9.5%).

For a visual representation, refer to Figure 6, showing the weekly fluctuations in reported low back pain.

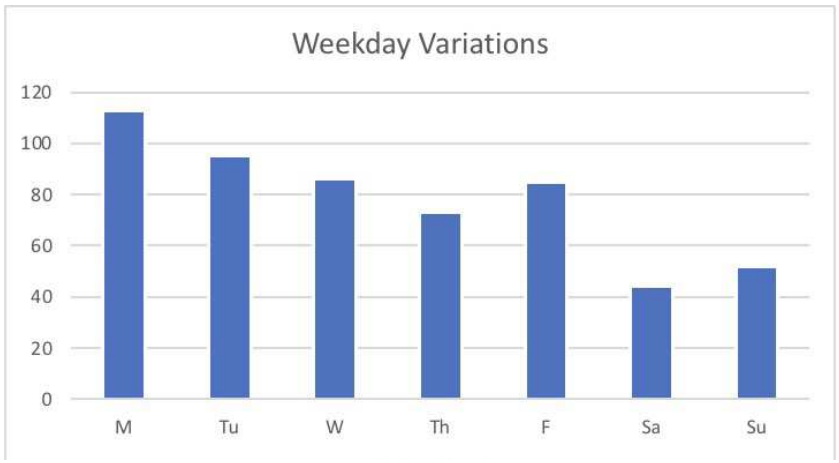

Figure 6. Weekday variations of LBP

M=Monday; Tu=Tuesday; W=Wednesday; Th= Thursday; F=Friday; Sa= Saturday; Su=Sunday

We also noticed distinct patterns in the distribution of cases throughout the day. Patients sought medical attention during specific time intervals with 273 patients coming in between 6AM to 2PM (49.8%), 262 patients coming between 2PM and 10PM (47.8%) and 12 patients coming between 10PM and 6 AM (2.2%). Furthermore, the most frequent daytime of patients arriving to the emergency department was between 10AM and 11AM.

Figure 7 visually represents the distribution of patient visits across these time intervals. The graphic provides a clear insight into the varying influx of patients during different hours of

the day by structuring the day into 3 time intervals, consisting of the morning hours (6AM-2PM), the afternoon hours (2PM-10PM) and the night hours (10PM-6AM).

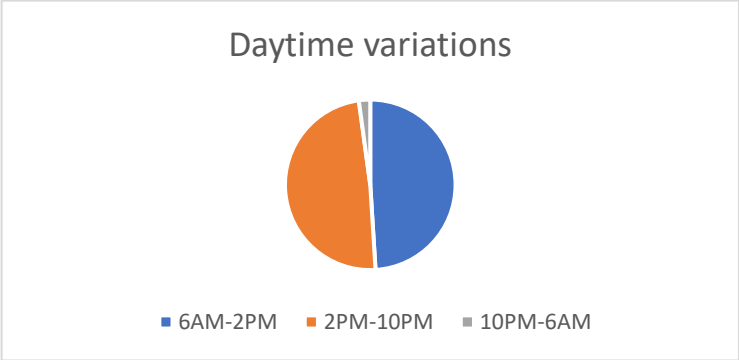

Figure 7. Daytime presentation of patients presenting with LBP

4.1.2. Demographic and clinical data of hospitalized patients

In our studies of LBP cases, 17 (3.1%) out of 548 patients were admitted to the hospital, including 9 males (52.9%) and 8 females (47.1%). The average length of hospital stay (LOS) was 11 days, ranging from 1 to 34 days. The hospitalized patients' ages averaged 56.4 years, with an age range spanning from 33 to 88 years. As previously mentioned, regarding medical interventions, 7 patients received medical therapy, while 2 patients underwent urgent CT scans in the ED before the hospitalization. None of the patients received both medical therapy and an urgent CT scan.

Table 3. Demographic and clinical data of the hospitalized patients for LBP

Demographic/ Clinical data	Value
Hospitalized patients; n	17
Length of stay (D); median (IQR)	11 (1,34)
Age (years); median (IQR)	56.4 (33, 88)
Gender; n (%)	
Male	9 (52.9)
Female	8 (47.1)
Death; n	3
Surgery; n (%)	2
Medical and/or physical therapy; n	11

IQR - Interquartile range; CT- Computed Tomography; n- Number of patients; ED- Emergency Department, D- days

4.2. Clinical symptoms of hospitalized patients in the ED

The investigation of the clinical presentation of the 17 hospitalized patients with LBP showed that a predominant symptom observed in 15 cases (88.2%) was a combination of both LBP radiating to the leg together with weakness the lower back and legs. This was accompanied by one or more red flag symptoms in all cases, such as difficulties in walking or being verticalized in 12 of 17 cases, loss of appetite in 2 cases, urinary incontinence, loss of consciousness and severe weight loss.

Pain management played a significant role with 12 patients (70.6%) reporting taking painkillers or injections in their recent past.

Acute LBP (<6 weeks) was observed in 6 patients (35.2%), while subacute LBP (6-12 weeks) was reported in 1 patient (5.9%). Chronic LBP (>6 weeks) affected 9 patients (53%), and for 1 patient the temporal course wasn't taken. Refer to Figure 8 for a visual presentation.

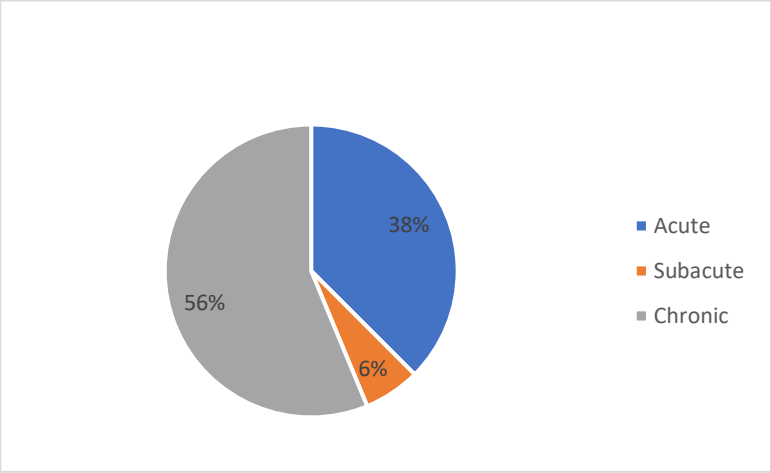

Figure 8. Temporal distribution of LBP duration among hospitalized patients

Acute exacerbations were noted in 9 cases (53%). In 4 cases the LBP resulted from a specific movement like lifting an object or other physical activity.

While lumboischialgia was a common diagnosis in 9 patients (53%), specific cases were identified with conditions such as perineal nerve paresis, lumbar spine disease with radiculopathy, IV disk disorders, polyneuropathy, Guillain-Barre syndrome. This diversity underscores the complex and varied nature of LBP and its potential underlying causes.

4.3. Other diagnoses besides LBP

In our study, we observed a diverse range of other diagnoses next to LBP among 11 of the 17 hospitalized patients. Most of these comorbidities can be considered as serious and are conditions such as metastatic colon cancer, thrombocytopenia, emphysema, alcohol addiction, para- or tetraplegia, streptococcal sepsis, chronic pain syndrome, chronic diseases like diabetes and heart attack, polyneuropathy, Guillain-Barre syndrome, posttraumatic stress disorder, alcohol addiction and others. Patients with comorbidities tended to have longer hospital stays (average LOS: 16.9 days) and more complex management needs compared to the 4 patients without comorbidities (average LOS: 4.67 days).

4.4. Diagnostic procedures and findings

Analyzing 17 cases within the ED for the diagnosis of LBP, trends emerge regarding the utilization of CT scan and MR scans, unveiling specific pathologies that they discover.

CT scans were employed in 13 cases (76.5%), proving to be a significant tool for initial assessments. MR scans, used slightly more frequently in 14 cases (82.4%) showed their superiority in detailed imaging of soft tissue structures.

The combined use of CT and MR in 10 cases (58.8%) underscores the complexity of diagnosing LBP and the need for a multifaceted imaging approach in certain cases. Refer to Figure 9 for a visual depiction of the diagnostic modalities used for the hospitalized patients.

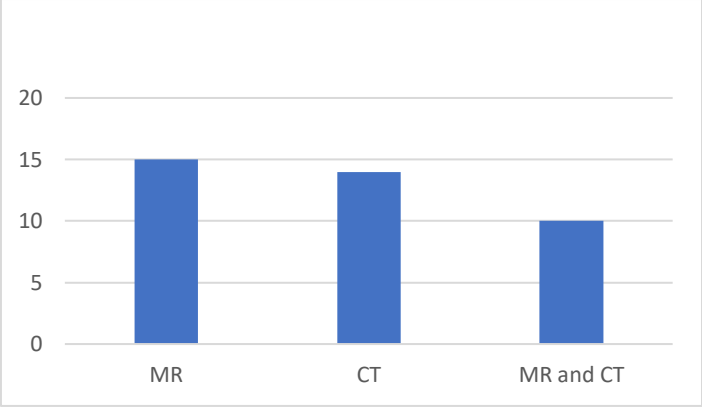

Figure 9. Utilization of imaging in hospitalized LBP cases

CT imaging findings revealed a spectrum of spinal conditions. The most common was disk protrusion in the L1-L4 region, identified in 8 cases. This was followed by 2 cases of disk extrusions at the L5/S1 level, each associated with nerve compression at the same level, indicating an impact on spinal nerve function. In addition to these, two instances of spinal stenosis were observed. The CT scans also discovered lumbar paravertebral inflammatory

collections in one case. Furthermore, a single case of a spinal cyst and meningocele was detected, pointing to the presence of abnormal fluid-filled sacs in or around the spinal cord.

MR imaging further expanded the understanding of spinal abnormalities in these patients. It confirmed the CT findings with five instances of disk protrusions, underlining their prevalence in low back pain. Additionally, MR imaging uniquely identified two cases of lumbar spondylodiscitis. Degenerative changes were also evident in the MR scans. The scans provided critical insights into more serious conditions, such as spinal cord metastases in one case and a medullary infarction. Osteochondritic changes were noted. The detection of a spinal tumor further emphasized the range of potential underlying causes of LBP. MR imaging also revealed spinal stenosis, nerve compression at the L5/S1 level, and a disc hernia, aligning with some of the CT findings but providing additional detail and context.

These results from both CT and MR imaging offer a detailed overview of the diverse and often complex spinal pathologies, ranging from common degenerative and protrusion-related issues to more critical conditions like spinal tumors and metastases.

4.5. Surgery and other outcomes

Among the 17 hospitalized patients in our study, a variety of outcomes were observed ranging from an approach of only conservative or analgesic therapy to surgery or even death.

2 patients received surgery due to disk extrusion during their hospital stay and experienced improved outcomes after, while for 4 other patients surgery was indicated as an option if other options don’t result in any improvements. 3 patients unfortunately passed away during their hospital stay. All of them were referred before to a different department due to other health conditions, more significant than their neurological conditions. However, 8 patients also exhibited signs of improvement during their hospital stay by conservative treatments or alternative therapies, including pain management, physical therapy, rehabilitative medicine.

5. DISCUSSION

Considering all chronic pain and spinal problems, LBP emerges as the most prevalent and critical clinical, social, economic, and public health challenge globally (51). Projections based on the observed trend over the last two decades are even more alarming, suggesting a rise in the yearly incidence, prevalence, and overall cases of LBP. This worrying trend emphasizes the urgent need for better efforts in prevention and care. This includes increased research aimed at identifying potential predictive and prognostic factors. Moreover, enhancing public awareness of the clinical, psychological, societal, and economic impacts of living with LBP is crucial.

Examining the daily variations in the arrival of LBP to the ED, our study revealed interesting temporal patterns that underline the importance of patients exploring other options before overloading the ED.

The majority of patients sought care towards the beginning of the week with the patient number slightly decreasing towards the end of the week. Remarkably, the most common daytime for patient presentations was in the mornings to noon and to be more specific between 10 and 11 AM.

In line with our study, a similar descriptive study set in the Charles V. Keating Emergency Centre, Halifax, Canada, in which 12,908 patients presenting with LBP over a 6-year period were analyzed, showed Mondays as the most prevalent days for LBP patient visits (20.6%). Additionally, the most common daytime being 9-11 AM aligned with the results of our study (119). In another similar retrospective study, which included 1,388,078 ED visits for LBP across Australia between January 2005 and September 2014, Anderson *et al*. found out that Monday had the highest attendance rate overall, with the most common timeslot being between 08:00 and 11:59, as well similar to our findings (120).

Understanding the reasons behind the increased frequency of LBP presentations at the beginning of the week and during morning hours is important for crucial for healthcare organizations and resource distribution.

Primarily, there could be a correlation with the "weekend effect," where individuals postpone seeking medical attention during the weekend in anticipation of symptom improvement. As the workweek starts, the severity of discomfort may escalate, necessitating medical intervention or a need for sick leave. Returning to occupational activities on Monday, often involving prolonged periods of sitting or physical exertion, could further aggravate symptoms.

Studies have also shown that psychosocial elements, such as stress and fatigue associated with the beginning of an exhausting workweek, is associated with an increased risk for developing LBP and therefore might also contribute to the observed trend (121-123).

Lastly, circadian rhythms may play a role, with pain levels typically peaking in the morning due to fluctuations in body temperature and cortisol levels.

Even more important is understanding why individuals choose ED over primary care despite the availability of primary care services in the most frequent hours of ED presentations (beginning of week and morning). In Croatia, several factors contribute to the preference for the ED over primary care for LBP.

Firstly, individuals do not need appointments to visit the ED, providing a quick and convenient option for seeking medical care.

Additionally, patients may perceive that they will receive better pain relief and diagnostics in the hospital setting compared to primary care. Moreover, the cost factor plays a role, as accessing the ED does not incur direct expenses for patients.

Lastly, inadequate availability of primary care services may drive patients towards the ED as their primary source of healthcare. Most patients seeking care in the ED for non-urgent LBP often do so due to a lack of awareness of alternative care options.

A study from Brazil identified patients' perception of urgency and the convenience of easy access as primary reasons for choosing the ED (124). Similarly, qualitative studies highlighted convenience, relief from pain, disability, and anxiety as significant factors influencing the decision to visit the ED (124). These findings also reveal that a majority of patients with LBP expressed extreme worry (78.5%) about their condition, considering the ED as the preferred choice due to concerns about pain and the department's accessibility without the need for an appointment (125).

In the majority of cases, routine acute LBP is a self-limiting, benign condition that doesn't require assessment in a hospital ED setting, which is underlined by our finding about temporal pattern and by the low hospitalisation rate.

Increased financial support for primary care physicians, education and training remains essential to enhance their role as effective gatekeepers against unnecessary ED visits. Only in cases of red flags patients should be referred to the ED.

This approach, recommended by a study in the US aims to ensure that patients with non-urgent conditions visit the ED only when their primary care providers are unavailable or during out-of-business hours (126).

Implementing measures to guide patients to more appropriate levels of care not only enhances the overall health system's efficiency and reduces ED overcrowding but also aids patients in managing LBP more effectively, potentially preventing recurrences. This targeted approach ensures that patients with urgent needs receive priority and greater attention in the ED.

Our research findings state a gender distribution of 55% females and 45% males in LBP cases. Those align significantly with existing literature, supporting a higher prevalence of LBP in females (127,128). The potential reasons for this phenomenon are diverse and could include a mix of biological, psychological, and sociocultural factors (129). Moreover, studies have proven gender-specific aspects of pain experiences, with women exhibiting a lower pain perception threshold and different pain responses (130). Heuch *et al.* found that prolonged systemic menopausal hormone therapy use, especially estrogen-based therapy alone, correlates with a higher likelihood of chronic LBP. Conversely, the use of oral contraceptives is likely to result in only a slight elevation in risk (131).

Our results regarding age distribution show a median age of 55 and an increase of the prevalence with higher ages while the 70+ years group is the biggest. The prevalence trends by age observed in the Global Burden of Disease study from 2017 are similar to our results as they demonstrate consistently high rates across all age groups from 18 years onwards and peaking around 80–89 years old (4). Various factors, including the association of aging with pain and its impact on social and physical function, contribute to the increased prevalence with age (132).

Hospital admissions for LBP are on the rise. For instance, according to data from the Sydney Local Health District Targeted Activity and Reporting System in 2017, there were 2590 ED presentations with LBP and 450 patients required admission (17%) (133).

When it comes to hospital admission rates from the ED due to LBP, our data show 3.1% of all patients being hospitalised versus 6.8% in a similar Canada (119). A recent systematic review with meta analysis dealing with hospital admissions due to LBP worldwide shows 9.6% of patients presenting to the ED with LBP being hospitalised which is more than 3 times than in our study (134).

Factors such as the previously already mentioned healthcare infrastructure, access to primary care, admission criteria and severity of cases may contribute to these global variations for hospital admissions.

Another important contributing factor for this phenomenon might be that that in Split hospital, patients often get the recommendation to go to the daily hospital and perform all the necessary tests for the assessment of LBP there within one day. Another reason for the

difference in hospitalization rates between Split and the world is that there is a not enough guidance regarding LBP in the ED and what qualifies as a suitable hospital admission for it. As previously mentioned in the results section, all of the 17 hospitalized patients in our study had one or more red flags which can be considered as a reason for a hospital admission. In general, available evidence informing the management of LBP in this setting primarily stems from research conducted in primary care and largely lacks information on hospital admissions (135). Considering the global variations in hospitalization rates for LBP, the lack of guidance in ED settings, and the presence of red flags indicating the need for hospitalization, the need for more specific guidelines on hospital admissions becomes evident.

In our study we discovered that admitted patients to the hospital stayed a median of 11 days, ranging from 1 to 34 days. This contrasts with the findings from an Australian study, which included 1982 inpatients admissions from the ED, where the median inpatient length of stay for NSLBP was reported as 4 days, with an interquartile range of 2 to 7 days (134).

Besides the different sample size, a possible reason for the longer average hospital stay observed in our study is the need for a multidisciplinary approach involving different specialties. As mentioned in the results section, a majority of the hospitalized patients in University Hospital in Split had several comorbodities and required input from various different specialities. Coordinating care between these specialties and conducting comprehensive assessments might have taken additional time, contributing to the prolonged hospitalizations. Many hospitals in other countries also have short-stay units which enable shorter stays.

Additionally, differences in patient populations, healthcare resources, and clinical management protocols between the two settings may have also played a role in the variation in hospitalization durations. In the majority of cases, routine acute LBP is a self-limiting, benign condition that doesn't require assessment through imaging. Nevertheless, in situations where conservative management proves ineffective for radiculopathy, myelopathy, neurogenic claudication, or when patients present with red flag symptoms, the use of advanced imaging modalities such as CT and MRI can provide valuable clinical information (80).

Practice guidelines emphasize the importance of refraining from imaging, particularly within the first 6 weeks of symptom onset, unless specific clinical "red flags" are present, highlighting the value of a thorough clinical evaluation before using advanced imaging. Imaging significantly contributes to the costs associated with managing LBP, not just due to the direct expenses of the imaging procedures, but also due to the subsequent consequences. Unwarranted imaging can trigger further tests, subsequent follow-ups, referrals, and potentially unnecessary invasive procedures with limited or uncertain benefits. Our study underscores the

significance of advanced imaging modalities, particularly CT and MR scans, in cases where conservative treatments prove ineffective or when red flag signs are present. In our study of 17 cases within the ED for the diagnosis of LBP, the utilization of CT scan for bony abnormalities and MR scans proved to be important in identifying various spinal pathologies, especially soft tissue structures and nerve compression, by providing insights into conditions that may require surgical intervention and helped differentiate between different underlying causes of symptoms.

The most important limitations of our study, aside from the small sample size, include the lack of information on key factors like patients' socioeconomic status and comorbidities. Additionally, the six-month data collection period might not reflect seasonal variations in LBP. We also did not track long-term patient outcomes or whether patients arrived at the ED by themselves or via an emergency vehicle.

6. CONCLUSION

Our study findings prove our first hypothesis which states that the majority of LBP presentations in the ED do not constitute real medical emergencies.

We found out that patients with LBP should seek help rather in primary care settings than in the ED, thereby confirming our second hypothesis.

Primary care settings have to be improved in order to alleviate the burden on the ED, coniífirming our third hypothesis.

Our research confirms our fourth hypothesis that LBP cases follow a distinct temporal pattern, with increased occurrences during morning and working hours, as well as early weekdays.

Our finding support our hypothesis that the hospitalization rate for LBP is low and that comorbidities are the main driving forces for complications during hospital stays.

Our last hypothesis, stating that imaging modalities such as CT and MRI scans play a pivotal role in guiding treatment decisions, is confirmed as well.

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8. ENGLISH SUMMARY

Thesis title: Low back pain in the Neurology Emergency Department of the University Hospital Split

Objectives: The aim of this study was to analyze and compare the demographic distribution, temporal patterns, diagnostic and therapeutic approaches, and outcomes of patients presenting with LBP in the Neurology ED of the University Hospital Split with a particular focus on those who required hospitalization.

Patients and Methods: Out of 4,545 individuals who visited the Neurology ED, our study focused on 548 patients seeking medical help for LBP at the University Hospital of Split from January 1st to June 30th, 2023. Data including sex, age, arrival date and time, received therapy, urgent CT scans, and hospitalization status were collected for each patient.

Results: The median age was 55 years (IQR 21, 88). A slight female predominance 54.9% (n=301) was recorded. 38.5% (n=211) received medical therapy and 1.3% (n=7) an urgent CT. The study revealed that the majority of patients presented to the ED at the beginning of the week and in terms of daily time intervals, 49.8% (n=273) came between 6AM to 2PM, 47.8% (n=262) between 2PM and 10PM and 2.2% (n=12) between 10PM and 6AM. 3.1% (n=17) were hospitalized. We found out that those hospitalizations were mostly due to other comorbodities and not due to LBP itself. CT was used in 76.5% (n=13) and MR in 82.4% (n=14) of cases in hospitalized patients, revealing a spectrum of spinal disorders.

Conclusion: Most LBP cases at the ED aren't emergencies, so sending patients to primary care could ease the strain on hospitals. We also noticed specific times when more people came in with LBP, highlighting the need for proactive management during these periods. It's crucial to note that primary care services remain available even during peak times, emphasizing the importance of directing patients there for appropriate care. Understanding why patients prefer the ED over primary care is essential for improvement. Additionally, we found that other health issues often lead to hospitalizations for LBP cases. Advanced imaging techniques like CT and MR scans play a vital role in guiding treatment decisions. Encouraging primary care utilization over the ED could help optimize healthcare resources.

9. CROATIAN SUMMARY

Naslov: Bol u donjem dijelu leđa u neurološkom hitnom odjelu Sveučilišne bolnice Split
Ciljevi: Cilj ovog istraživanja bio je analizirati i usporediti demografsku distribuciju, temporalne obrasce, dijagnostičke i terapijske pristupe te ishode pacijenata s bolovima u donjem dijelu leđa koji se predstavljaju na neurološkom hitnom odjelu Sveučilišne bolnice Split, s posebnim naglaskom na one koji zahtijevaju hospitalizaciju.
Materijali i metode: Od 4.545 osoba koje su posjetile neurološki hitni odjel, naše istraživanje usmjereno je na 548 pacijenata koji su potražili medicinsku pomoć zbog bolova u donjem dijelu leđa na Sveučilišnoj bolnici Split od 1. siječnja do 30. lipnja 2023. Prikupljeni su podaci, uključujući spol, dob, datum i vrijeme dolaska, primljenu terapiju, hitne CT snimke i status hospitalizacije za svakog pacijenta.
Rezultati: Medijan dobi je bio 55 godina (IQR 21, 88). Zabilježena je blaga prevlast ženskog spola 54,9% (n = 301). 38,5% (n = 211) primilo je medicinsku terapiju, a 1,3% (n = 7) hitan CT. Studija je otkrila da je većina pacijenata stigla u hitni odjel početkom tjedna, a u smislu dnevnih vremenskih intervala, 49,8% (n = 273) došlo je između 6.00 i 14.00 sati, 47,8% (n = 262) između 14.00 i 22.00 sata i 2,2% (n = 12) između 22.00 i 6.00 sati. Hospitalizirano je 3,1% (n = 17). Otkrili smo da su te hospitalizacije uglavnom bile uzrokovane drugim komorbiditetima, a ne samim bolovima u donjem dijelu leđa. CT je korišten u 76,5% (n = 13), a MR u 82,4% (n = 14) slučajeva u hospitaliziranih pacijenata, otkrivajući spektar poremećaja kralježnice.
Zaključi: Većina slučajeva bolova u donjem dijelu leđa na hitnom odjelu nisu hitni, pa upućivanje pacijenata u primarnu zdravstvenu zaštitu može olakšati teret na bolnicama. Primijetili smo i specifična vremena kada više ljudi dolazi s bolovima u donjem dijelu leđa, što naglašava potrebu za proaktivnim upravljanjem tijekom tih razdoblja. Važno je napomenuti da primarna zdravstvena zaštita ostaje dostupna čak i tijekom vrhunskih vremenskih intervala, što naglašava važnost usmjeravanja pacijenata tamo radi odgovarajuće skrbi. Razumijevanje zašto pacijenti preferiraju hitni odjel nad primarnom zdravstvenom zaštitom ključno je za poboljšanje. Varijacije u stopama hospitalizacije diljem svijeta za bolove u donjem dijelu leđa ukazuju na potrebu za standardiziranim protokolima. Također, otkrili smo da drugi zdravstveni problemi često dovode do hospitalizacija zbog bolova u donjem dijelu leđa. Napredne slikovne tehnike poput CT i MR skeniranja igraju ključnu ulogu u vođenju odluka o liječenju. Poticanje korištenja primarne zdravstvene zaštite u odnosu na hitnom odjelu moglo bi pomoći u optimizaciji resursa zdravstvene skrbi.