



PROPORTIONS OF SYMPTOMS AND SIGNS LUMBOSACRAL RADICULOPATHY AMONG PATIENTS WITH MECHANICAL LOW BACK PAIN IN MOSUL, IRAQ

*¹Dr. Waleed Khalid Mohammad Alhamoud, ²Dr. Muayad Fathi Mahmood and ³Dr. Mohammed Assi Jasim

¹M.B.Ch.B, C.A.B.M. Nineveh Health Directorate, Iraq.

^{2,3}MBCbB. FICMS/CM Public Health Specialist, Public Health Department/Nineveh Health Directorate, Iraq.

Article Received date: 21 November 2023

Article Revised date: 11 December 2023

Article Accepted date: 31 December 2023



*Corresponding Author: Dr. Waleed Khalid Mohammad Alhamoud

M.B.Ch.B, C.A.B.M. Nineveh Health Directorate, Iraq.

ABSTRACT

Background: lumbosacral radiculopathy is a condition in which low back pain affects the function of one or more of the lumbosacral nerve roots leading to dysfunction of one or both motor and sensory systems. **Aim of the study:** is to estimate the prevalence of radiculopathy symptoms and signs among mechanical low back pain patients in Mosul city. **Methods:** A descriptive cross sectional study is conducted from March 2023 till end of July 2023 on mechanical low back pain patients who were attending rheumatology consultation units in Ibn Senna and Mosul General Hospitals in Mosul city. A non-randomized convenient sample of 350 patients were collected. Including all adult patients with mechanical low back pain and excluding patients who were younger than 18 years and patients with low back pain that was not mechanical in nature. The data was collected by clinical examination performed by the researcher and rheumatology senior followed by a questionnaire filling. The data then was analyzed statistically by the use of Microsoft Excel and SPSS ver25. **Results:** Radicular pain was reported in 72% of study population. women had a higher prevalence of radicular pain than men (78% compared to 64%). It is also found in 79% of cases of middle age group (40-59 years). The next group in prevalence was in elderly group being 74%. While the least in prevalence is young adult group (18-39 years) with about 64%. The two main risk factors were multiple pregnancy and a previous history of back pain. It is also found that radicular pain (sciatica) was mostly prevalent in patients presenting with pain duration that exceeded 12 weeks (chronic cases) as it was estimated to be about 82%. Followed by subacute cases where the prevalence was 73% and finally, acute cases had a prevalence of 63%. When sciatica prevalence is estimated using patients who have radicular pain in addition to a positive neurological test, the figure would be 45% of study population. This figure represents patients who can be diagnosed as actually having radiculopathy (sciatica). **Conclusion:** The prevalence of sciatica was 45% of the cases. Radiculopathy has also been more prevalent in females as compared to males. The most prevalent risk factors for radiculopathy found in patients complaining of radicular pain in the study population were multiple pregnancies and a previous history of back pain. Radicular pain is more prevalent in middle aged group, followed by elderly age group and lastly by young adults. Also Prevalence of radiculopathy symptoms is more prominent in chronic cases when compared to acute cases.

INTRODUCTION

Low back pain is pain in the area between the lower rib cage and gluteal folds. It can be mechanical or nonspecific.^[1] Mechanical low back pain arises intrinsically from the spine, intervertebral disks, or surrounding soft tissues. it includes lumbosacral muscle strain or sprain, disk herniation, lumbar spondylosis, spondylolisthesis, spondylolysis, vertebral compression fractures, and acute or chronic traumatic injury⁷. While pain that's radiating to anterior thigh, knee, foot or ankle is defined as radicular pain (root pain).^[2]

When the low back pain affects the function of one or more of the lumbosacral nerve roots is known as lumbosacral radiculopathy or sciatica. It usually cause dysfunction of one or both motor and sensory systems.^[3] Lumbosacral radiculopathy is often the result of mechanical compressing forces on the spinal nerve roots with the most common reason being a disc herniation or spondylosis, which is narrowing caused by degenerative arthritis affecting the intraspinal canal, the lateral recess or the neural foramen. While other causes such as congenital abnormalities of the bony spine or any of its contents, congenital narrowing of spinal canal, tethered cord and spina bifida being relatively rare.^[4,5,6]

Incidence of low back pain symptom is 13- 30% with 95% of cases being mechanical in nature and lifetime prevalence 60-90%. Incidence of radiculopathy symptoms is anywhere about 12% to 40%, and the lumbosacral radiculopathy lifetime prevalence among adults is not exceeding 5% according to most reports with equal rates between males and females.^[3,7] Chronic low back pain (lasting longer than 12 weeks) affects about 23% of worldwide population with a rate of recurrence at one-year of about 24%-80%.^[2]

Risk factors for developing lumbosacral radiculopathy include Age (which is the primary risk factor due to the adversity of degenerative changes in the spinal column), risky occupations (such as frequent heavy lifting specially if with twisting back motion, prolonged driving, operating vibratory machinery and heavy industrial work), history of trauma to back, previous history of low back pain, taller height, obesity (BMI equals to or higher than 30), sedentary lifestyle, multiparity and smoking.^[8]

The clinical presentations of lumbosacral radiculopathies depend on the level of nerve root or roots involved. With the most frequent one being the L5-S1 radiculopathy. Leading to a dysfunction of the nerve root involved that is either sensory or motor or both.

Concerning severity of radiculopathy, Acute lumbosacral radiculopathy can be divided into three main categories from least to most severe:

- Pure sensory: characterized by the presence of a radicular pain with or without a dermatomal pattern of sensory dysfunction but no other neurological or motor deficits.
- Mild motor deficit: characterized by radicular pain, sensory deficit in addition to mild but not progressive segmental motor dysfunction that is segmental with or without change of reflex.
- Marked motor deficit: characterized by radicular pain and sensory deficit with marked or progressive motor dysfunction.^[9,10,11]

The approach to a mechanical low back pain patient with suspected radiculopathy relies heavily on history taking and clinical examination alone, as most of the etiologies leading to radiculopathy are self-limited and not in need of investigations or imaging studies in a neurologically intact patient. However, it is extremely prudent to first exclude the presence of identifiable red flags (Significant trauma, Prolonged glucocorticoid use, Age >50 yr, History of cancer, Unexplained weight loss, immunosuppression injection, drug use, nocturnal pain, Urinary retention, overflow incontinence, Fecal incontinence, Bilateral or progressive motor deficit, Saddle anesthesia, Severe morning stiffness, Pain improves with exercise, not rest, Pain during second half of night, Alternating buttock pain, Age <40 yr) and those cases of low back pain that are caused by non-

mechanical etiologies such as systemic disease, infection or neoplasm.

In obtaining history, the focus should be on motor and or sensory symptoms such as pain, paresthesia, dysesthesia or hyperesthesia in any given lumbosacral myotome or dermatome respectively. History of difficulty raising from a sitting position, sudden onset knee buckling and foot dragging can aid in diagnosing motor radiculopathy. Also, a history of onset following trauma or an inciting event such as lifting heavy objects, twisting or bending is also helpful in directing the diagnosis towards a mechanical origin of radiculopathy. Triggering and relieving factors are also helpful in differentiating a mechanical cause from other causes, as the mechanical pain is typically aggravated by physical activity and upright posture is often relieved by rest and lying down.

While physical examination might not lead to a specific diagnosis but it helps in excluding cases of low back pain caused by non-mechanical factors as well as it helps with identifying the level and severity of neurological involvement. Also a thorough neurological examination is necessary to exclude other neurological diseases leading to radiculopathy.

Back examination may include inspection for loss of lordosis (normal posterior curvature of the cervical and lumbar spine in the sagittal plane) and presence of scoliosis (an abnormal lateral curvature of the spine) that could be structural or functional caused by paravertebral muscle spasm. With forward flexion of the spine, functional scoliosis usually disappears. In contrast, structural scoliosis persists. Palpation for tenderness and examination of limited range of back motion (flexion, extension, lateral bending and rotation) is not specific for mechanical low back pain as any back pathology can lead to it. Hip examination is also of significant importance because hip pain may radiate to low back. Lower extremities neurological examination in a patient with radicular pain should include motor exam for myotomal deficits as well as sensory exam for dermatomal neurological deficits. Identification of muscle atrophy in advanced cases can be made by the measurements of calf and thigh circumferences at the same level bilaterally.

LBP can also be classified as acute, subacute or chronic; LBP is considered acute if the symptom was present for less than 6 weeks, while sub-acute and chronic would be considered if the pain lasts from 6 to 12 weeks and more than 12 weeks respectively.^[12,13,14,15,16]

Special Maneuvers:^[17,18,19,20] Special tests which are used routinely for detecting radiculopathy associated with mechanical low back pain include straight leg raising test, crossed straight leg raising test and reverse straight leg raising test (also known as femoral stretch test). **The straight leg raising test (SLRT)** is performed with the patient lying supine and the patient's heel is

placed in the examiner's palm who is going to progressively elevate the leg with the knee fully extended. This maneuver will cause tension on sciatic nerves (from L4 to S3) leading mainly to stretching of L5, S1 and 2. Clinically, the test is considered positive if the patient experiences radicular pain radiating below the knee when the symptomatic leg is elevated from 30 to less than 70 degrees. The ankle should be placed in a dorsiflexed position while the leg is raised to maximize the sensitivity of straight leg raising test. The test has a sensitivity of 0.80 and specificity of 0.40. **The crossed straight leg raising test** is performed in a similar manner to straight leg raising test but the leg to be raised is the asymptomatic one in order to reproduce radicular pain in the symptomatic leg. It is relatively specific for radiculopathy caused by disc herniation, but has poor sensitivity. The test has a sensitivity of 0.35 and a specificity of 0.90. **The femoral stretch test (FST)** is performed while the patient is lying prone with the arms at the sides by extending the hip and leg passively up from the surface of the examination table. This test is most aiding in assessing nerve root compression at L2 to L4 level. There is no adequate data to estimate the sensitivity and specificity for this test yet.

Investigation methods: Imaging studies: Generally, mechanical low back pain with or without radiculopathy is a clinical diagnosis. Thus, imaging studies are not indicated in most cases of mechanical low back pain even if it is associated with radiculopathy. The indication for performing imaging studies are when there is a significant suspicion of cauda equine syndrome, infection, fracture, malignancy, progressive neurological deficit and no improvement of symptoms despite medical and physical treatment for 6 weeks. If indicated, lumbosacral Plane radiography and MRI are the most frequently used while other modalities such as CT, CT myelography, EMG and NCS are rarely needed and for specific conditions only.^[21,22,23,24]

Management: Management includes patient education on the importance of staying active and performing usual daily activities as the pain permits. Activity modification is as important as medical therapy in management of acute radicular back pain.

Pharmacological treatment mainly aims at relieving symptoms rather than healing or speeding recovery. Acetaminophen and NSAIDs are the most frequently used medications despite limited efficacy with opioids being a reasonable option in selected severe acute cases. If the initial management plan fails to resolve symptoms, the addition of physical therapy can be considered along with other adjunctive management plans. Physical therapy is usually indicated if symptoms persist after 3 weeks of symptom onset in cases of mild to moderate severity. Back exercises are mandatory but after the resolution of the acute phase. These exercises should be individually fashioned and include core muscles

strengthening and muscle stretching exercises among others.

For chronic mechanical low back pain cases with or without radiculopathy, a proper reassessment might be needed including the use of further investigation and advanced neuroimaging studies such as MRI or CT myelography to identify the precise pathology and then the management plan is aimed at treating the specific underlying cause.^[15,16,17,25,26,27,28]

Prognosis: Despite the fact that lumbosacral radiculopathy can be extremely painful and temporarily disabling to some extent. The prognosis is often excellent as spontaneous resolution of symptoms is highly possible specially if the cause is disc herniation or spinal stenosis. But recurrence of acute attacks is also highly anticipated.^[29]

MATERIALS AND METHODS

Ethical & Administrative Considerations: An official administrative agreement on conducting this study has been obtained from the Iraqi ministry of health \ Nineveh Directorate of Health after reviewing the study proposal. Verbal consents have also been granted from the patients participating in the study after a brief but informative explanation of its nature and objective.

Study Setting: The study was conducted in Mosul city in the north of Iraq. Patients were collected from attendants to the rheumatology consultation units in two major hospitals within the city; Ibn Senna Teaching Hospital in the left bank and Mosul General Hospital in the right bank of the city.

Study Period: The study was carried out through the period from March 1st till July 31st 2023 after obtaining the ethical approval from Nineveh Directorate of Health. The cases were collected during the first 4 months by making 2 visits to the rheumatology consultation units per week, while analyzing the data and writing the study was done throughout the following month.

Study Design: A descriptive cross sectional study design was chosen in order to fulfill the aim of this research.

Study Population: The study required collecting cases of adult patients of both genders who were diagnosed by the senior rheumatologist with mechanical low back pain with or without radiculopathy. A sample of 350 patients was obtained through a non-randomized convenient technique and the data was collected by clinical evaluation of the patients and through the use of a questionnaire that was constructed to cover epidemiological data, risk factors and clinical presentation including signs and symptoms. The questionnaire was filled by the researcher and the examination was performed under the supervision of a senior rheumatologist. The Patients were selected after

exclusion of non-mechanical causes of low back pain based on their clinical evaluation.

Inclusion Criteria: Adult patients (≥ 18 years) from both sexes presenting with typical features of mechanical low back pain with or without radicular symptoms and signs.

Exclusion Criteria: Patients younger than 18 years and patients who have symptoms and signs suggestive of having an inflammatory, neoplastic or infectious cause of low back pain. **Study Procedure:** A questionnaire was constructed to include risk factors (such as obesity, risky occupations, multiparity, trauma, smoking, sedentary lifestyle, etc.) as well as clinical features of both low back pain alone and low back pain with radiculopathy (radiating pain, sensory and/or motor deficits and cauda equine symptoms and signs). The patients with mechanical low back pain were clinically evaluated by the investigator under the supervision of a senior rheumatologist in the consultation unit. The questionnaire for each selected patient was then filled by the investigator as an interview with the patient. The data

collected by the questionnaire was finally evaluated to estimate the prevalence of lumbosacral radiculopathy and to fulfil other parts of the objectives.

Data Analysis: Descriptive data analysis was performed using Microsoft Excel and SPSS (ver. 25) to describe the statistical features of the obtained data. The prevalence of radiculopathy symptoms and signs has as well been calculated to fulfill the aim of the study.

RESULTS

Gender and age characteristics of the patients: The study included 200 (57%) female patients and 150 (43%) male patients. As for radicular pain complaint, Females had a higher prevalence of radicular pain which was 78% as compared to 64% for male patients. Approximately, 43% of the 350 patients were young adults (18-39 years old), 43% were middle aged (40-59 years old) and only 13% were old (≥ 60 years). Of the young adults, 64% have complained of radicular pain. While it was 79% for middle aged group and 74% for elderlies.

Table 1: Frequency of lumbosacral radiculopathy symptoms by age and gender.

Gender distribution of study sample	Number of patients	Percentage of patients
Gender		
Male	150	43%
Female	200	57%
Gender distribution in patients who complained of radicular pain		
Radicular pain in males	96 of 150	64%
Radicular pain in females	156 of 200	78%
Total patients with radicular pain	252 of 350	72%
Age categories in study sample (in years)		
Young Adults (18-39)	152	43%
Middle Aged (40-59)	152	43%
Old (≥ 60)	46	13%
Age distribution in patients who complained of radicular pain		
Radicular pain in young adults	98 of 152	64%
Radicular pain in middle aged	120 of 152	79%
Radicular pain in elderlies	34 of 46	74%

Prevalence of risk factors among patients who complained of radicular pain: As found in data analysis; among the risk factors, the most prevalent one was multiple pregnancy which was found in 82% (128 of 156) of female patients presenting with radicular pain.

The second most prevalent risk factor was a history of a previous low back pain which was found in 72% (182 of 252) of patients presenting with radicular pain. The rest of the risk factors and their prevalence is shown in the table 2.

Table 2: Risk factors of mechanical low back among studied sample.

Risk Factor of radicular pain	Number	Percentage
Multiple pregnancies	128 of 156	82%
Previous history of low back pain	182 of 252	72%
Obesity (BMI > 30)	58	17%
History of trauma to back	44	13%
Sedentary lifestyle	38	11%
Risky occupation	38	11%
Smoking	36	10%

Categorizing the patients according the duration of mechanical low back pain onset

About 63% (106 of 168) of patients with acute presentation had radicular pain and about 73% (34 of 46)

of patients with subacute duration had radicular pain. While patients with chronic mechanical low back pain had the highest radicular pain prevalence of about 82% (112 of 136).

Table 3: Duration of mechanical low back pain among studied sample.

Duration	Number	Percentage
Acute (<6 weeks)	168	48%
Subacute (6-12 weeks)	46	13%
Chronic (>12 weeks)	136	39%
Duration in relation to radicular pain		
Radicular pain in acute cases	106	63%
Radicular pain in subacute cases	34	73%
Radicular pain in chronic cases	112	82%

Prevalence of variable lumbosacral radiculopathy symptoms: The most common radiculopathy symptom is radicular pain which is defined as low back pain that radiates to anterior thigh, knee, foot or ankle. 72% of all study population complained of radicular pain with or without other radiculopathy symptoms and it was more prevalent in females than in males (78% as compared to

64%). Paresthesia was found in 45% while transient muscle weakness was found in 32% of the study sample. Muscle weakness such as foot drop was not found in any of the selected cases. Other nonspecific symptoms that were important in aiding the diagnosis of mechanical low back pain versus other non-mechanical causes and their prevalence are also illustrated in the table 4.

Table 4: Symptoms of radiculopathy among study sample.

Symptoms	Number	Percentage
Symptoms suggestive of non-specific mechanical low back pain		
Relation of back pain to physical activity	310	89%
Presence of aggravating factors such as back extension	252	72%
Presence of relieving factors such as back flexion and lying flat.	186	53%
Presence of pain continuity	286	82%
Symptoms suggestive of disc herniation		
Electric shock like back pain	94	27%
Pain aggravated by sneezing or coughing	128	37%
Radiculopathy Symptoms		
Radicular pain	252	72%
Dermatomal Paresthesia / Numbness	158	45%
Transient mobility weakness	112	32%
Muscle weakness	0	0
Cauda Equina symptoms (urinary retention or incontinence, fecal incontinence, saddle anesthesia and sexual dysfunction)	0	0
No radiculopathy symptoms (only low back pain)	88	25%

Special examination maneuvers and the prevalence of positive results: The three maneuvers of Straight leg raising test, crossed straight leg raising test and femoral stretch test have been performed on all patients enrolled

in the study. A positive result in both SLRT and crossed SLRT increases the specificity for both tests in detecting nerve root compression. The results of these maneuvers are demonstrated in table 5,6,7 and 8.

Table 5: Comparison between rates of positive SLRT when performed alone versus when performed in combination with Crossed SLRT.

Special Maneuvers	Number	Percentage
positive SLRT alone	176	50%
Positive SLRT + positive crossed SLRT	84	24%

Table 6: The prevalence rates of positive neurological maneuvers in patients who had radicular pain (sciatica).

Special Maneuvers	Number	Percentage
Positive Straight Leg Raising Test + sciatica	146	42%
Positive SLRT + radiating pain in males	64	18%
Positive SLRT + radiating pain in females	82	23%
Positive Crossed SLRT	74	21%

Positive crossed SLRT + radiating pain in males	26	7%
Positive crossed SLRT + radiating pain in females	48	14%
Positive Femoral Stretch Test	104	30%
Positive femoral stretch + radiating pain in males	44	13%
Positive femoral stretch + radiating pain in females	60	17%

Table 7: comparison between the three age groups of study sample in regard to rates of positive results of neurological maneuvers.

Special Maneuvers	Number	Percentage
Young Adults		
Positive SLRT	78	51%
Positive SLRT + crossed SLRT	38	25%
Positive FST	56	37%
Middle Aged		
Positive SLRT	80	53%
Positive SLRT + crossed SLRT	36	24%
Positive FST	50	33%
Elderly		
Positive SLRT	18	39%
Positive SLRT + crossed SLRT	10	22%
Positive FST	10	22%

Table 8: Comparison between durations of low back pain in regard to positive maneuvers rates.

Special Maneuvers	Number	Percentage
Acute (<6 weeks)		
Positive SLRT	70	42%
Positive SLRT + crossed SLRT	24	14%
Positive FST	48	29%
Subacute (6-12 weeks)		
Positive SLRT	32	70%
Positive SLRT + crossed SLRT	16	53%
Positive FST	18	39%
Chronic (>12 weeks)		
Positive SLRT	74	54%
Positive SLRT + crossed SLRT	44	32%
Positive FST	50	37%

DISCUSSION

Mechanical Low backache in its acute or chronic form is one of the commonest complaints in both primary health care facilities and in rheumatology units. The pathophysiological processes behind it can be difficult to point out in the first evaluation as there are several etiologies mimicking each other in clinical presentation. However, it is of great importance to perform a proper clinical evaluation for all patients in order to separate those whose backache is caused by mechanical processes from those with rare systemic disorders who need an extensive workup plan.^[31] Mechanical low backache has several possible benign pathologies that all are usually amenable to conservative management and the symptoms will abate within 2-8 weeks. The primary aim of treatment is to reduce the length of disability duration and prevent chronicity and its associated psychological and physical burden. As for mechanical low backache with radiculopathy, it's a more serious form of low backache where it still can be effectively treated in a conservative manner but it often requires more efforts into clinical re-evaluation and reassessment to ensure

that the condition is actually improving with management rather than worsening. As negligence of the condition can lead to irreversible nerve root damage leading to muscular weakness and thus disability.^[32]

The evaluation of patients with mechanical low back pain relies heavily on clinical skills rather than on imaging studies. For this reason, this study focused in prevalence of only clinical symptoms and signs to evaluate the patients for presence of radiculopathy.

Radiculopathy symptoms prevalence: As for epidemiological data obtained from participants in this study; radicular pain was reported in 72% of study population (252 of 350 patients complaining of mechanical low back pain), women had a higher prevalence of radicular pain than men (78% as compared to 64%). Dermatomal paresthesia or numbness have been reported by 45% of the patients while transient mobility weakness had a prevalence of 32%. In general, the prevalence rates of radiculopathy symptoms in study population is noticeably high as compared to

international studies. Also, females in this study sample had a higher prevalence rate than males. Whereas the studies performed by Christopher E. et al in 2022 and Patrick N. et al in 2014 found that the incidence of radiculopathy symptoms among patients with mechanical low back pain is anywhere about 12% to 40% and lumbosacral radiculopathy lifetime prevalence among adults is found to be not exceeding 3% to 5% according to most reports with equal rates between males and females.^[3,7]

Sciatic pain prevalence from a review study done on different epidemiological studies,^[33] was found to be ranging from 1.2% to 43%. Thus, the review study suggested that the reason why prevalence rates vary considerably between epidemiological studies is that it might be caused by differences in definitions of radiculopathy, methods of data collection as well as the populations and age groups being studied.

Prevalence of radiculopathy in relation to age: This study showed that the prevalence of radicular pain is commonest in middle age group (40-59 years) as it was present in 79% of cases. The next group in prevalence is in elderly group being 74%. While the least in prevalence is young adult group (18-39 years) with about 64%. This is consistent with a study done by Mostofi K et al in 2019,^[34] which showed that sciatica (radicular pain) is most prevalent in 3555 years and declines thereafter. However, sciatica in elderly takes a different clinical course than in younger populations as it becomes less severe but more persistent and resistant to management. Thus, surgery rates are higher in elderly than in younger populations.

Prevalence of risk factors for developing radiculopathy: In this study, the two main risk factors were a previous history of back pain and multiple pregnancy. Only one study performed by Schoenfeld, AJ. et al in 2012^[35] looked into the highly prevalent risk factors among patients with radiculopathy and found that the most significantly frequent risk factors were “female sex, white race, senior positions within the rank structure, and service in the Army, Navy, or Air Force”. However, this study included a population from the defense ministry only. And no other recent studies have looked into this matter for general population yet.

For this reason, it is suggested that further research should be done to identify the reasons behind the high prevalence of radiculopathy in multiparous females and patients with previous history of back pain in our locality which constituted the first and second most common risk factors in this study. Perhaps the improper management and negligence of focus on the importance of lifestyle modification in preventing recurrent attacks is the reason why patients in our locality tend to have more frequent backache attacks and hence, developing radiculopathy.

Lumbosacral radicular symptoms and their relation to low pain duration: In this study, it was found that radicular pain (sciatica) was mostly prevalent in patients presenting with pain onset that exceeded 12 weeks (chronic cases) as it was estimated to be about 82%. Followed by subacute cases where the prevalence was 73% and finally, acute cases had a prevalence of 63%. This result leads to the conclusion that radiculopathy risk increases as the duration of backache lengthens. This could also lead to another conclusion; the earlier proper management of acute cases is achieved, the better the prognosis. No recent studies about this relation to compare the results mentioned above have been found.

Prevalence of variable lumbosacral radiculopathy symptoms: The prevalence of symptoms that are typical for mechanical low back pain caused by strain & sprain in patients complaining of low back pain with or without sciatica are relatively high when measured alone (relation to physical activity: 89%, aggravated by extension: 72%, relieved by rest: 53%, pain continuity: 82%). However, if measured together after exclusion of symptoms that are suggestive of lumbar disc herniation; the collective prevalence would be ranging from 20% for typical cases to 47% of patients not reporting all the typical symptoms of sprain and strain. In addition, the prevalence of symptoms suggesting disc herniation in patients with sciatica is as follows: electric shock like pain: 21% and pain aggravated by sneezing or coughing is 30%. But these estimated rates cannot be relied on, as disc herniation is not diagnosed based on history alone.

In international studies, it's estimated that about 90% of cases of radicular mechanical low back pain are caused by disc herniation.^[36]

Special examination maneuvers and the prevalence of positive results: As sciatica (radicular pain) is mainly a clinical diagnosis relying on history and physical exam, special maneuvers are used to test for nerve root irritation such as SLRT (to test tension on sciatic nerves from L4 to S3 leading mainly to stretching of L5, S1 and 2), Crossed SLRT and femoral stretch test (to test mainly L2-L4 nerve root irritation).

Generally, if a patient complains of typical radiating pain in one leg in addition to a positive result of one or more neurological maneuvers indicating nerve root irritation or neurological deficit the diagnosis of sciatica will be justified.^[36]

In this study, SLRT was positive in 42% of enrolled patients who had radicular pain. 18% of those were males and 23% were females. As for crossed SLRT, the prevalence rates dropped down from 18% to 7% for males and from 23% to 14% for females. Meaning only about half of the cases who were positive with SLRT remained positive when crossed SLRT was added. Femoral stretch test was positive in 30% of patients (13% of males and 17% of females). When sciatica

prevalence is estimated using patients who have radicular pain + either SLRT or FST or both, the figure would be 45% of study population. This figure represents patients who can be diagnosed as actually having radiculopathy (sciatica) according to Koes BW *et al.*^[36] Lastly, a positive SLRT is an important physical examination finding during primary care in order to assess the need for imaging studies such as X-rays and MRI and to guide the need for a referral from primary care to a spine specialist if the primary management plan did not lead to symptoms resolution in 6 weeks.^[37]

CONCLUSIONS

This study showed a noticeable high prevalence of radiculopathy symptoms among the study sample. As the prevalence of radicular pain was 72% compared to the figure estimated from a review study that showed the prevalence of this symptom to be ranging between 1.2-43%. Also the prevalence of sciatica (diagnosed clinically as typical radiating pain + one or more positive neurological maneuver) was 45% of the cases which is remarkably higher than the figures estimated in epidemiological studies which range between 3-5%. Radiculopathy has also been more prevalent in females as compared to males and the most prevalent risk factors for radiculopathy found in patients complaining of radicular pain in the study sample were multiple pregnancies and a previous history of back pain.

Radicular pain was more prevalent in middle aged group, followed by elderly age group and lastly by young adults. But the prevalence of positive SLRT is less in this elderly age group (because the most common reason for radiculopathy in elderly is spinal stenosis rather than disc herniation).

Additionally, rates of positive neurological maneuvers were highest in subacute group followed by acute group and lastly by chronic group. While The addition of a positive crossed SLRT to SLRT which is more specific leads to substantial reduction of figures of rates of positive SLRT to almost the half in most of the cases. Lastly, the prevalence of radiculopathy symptoms is more prominent in chronic cases when compared to acute cases.

REFERENCES

- Dixit R. Low back pain. In: Firestein G., Budd R., Gabriel S., McInnes I., O'Dell J., editors. *Kelley & Firestein's Textbook of Rheumatology*. Tenth edition, Elsevier, 2017; 696-716.
- Will JS, Bury DC, Miller JA. Mechanical Low Back Pain. *Am Fam Physician*, 2018 Oct 1; 98(7): 421-428. PMID: 30252425.
- Tarulli AW, Raynor EM. Lumbosacral radiculopathy. *Neurol Clin*, 2007 May; 25(2): 387-405. doi: 10.1016/j.ncl.2007.01.008. PMID: 17445735.
- Shelerud RA, Paynter KS. Rarer causes of radiculopathy: spinal tumors, infections, and other unusual causes. *Phys Med Rehabil Clin N Am*, 2002 Aug; 13(3): 645-96. doi: 10.1016/s10479651(02)00012-8. PMID: 12380553.
- Keim HA, Kirkaldy-Willis WH. Low back pain. *Clin Symp*, 1980; 32(6): 1-35. PMID: 6454528.
- Chin CH, Chew KC. Lumbosacral nerve root avulsion. *Injury*, 1997 Nov-Dec; 28(9-10): 674-doi: 10.1016/s0020-1383(97)00080-6. PMID: 9624350.
- Alexander CE, Varacallo M. Lumbosacral Radiculopathy, 2022 Nov 21. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. PMID: 28613587.
- Berry JA, Elia C, Saini HS, Miulli DE. A Review of Lumbar Radiculopathy, Diagnosis, and Treatment. *Cureus*, 2019 Oct 17; 11(10): e5934. doi: 10.7759/cureus.5934. PMID: 31788391; PMCID: PMC6858271.
- Patrick N, Emanski E, Knaub MA. Acute and chronic low back pain. *Med Clin North Am*. 2014 Jul; 98(4): 777-89, xii. doi: 10.1016/j.mcna.2014.03.005. PMID: 24994051.
- Weinstein PR. Anatomy of the lumbar spine. In: *Lumbar Disc Disease*, 2nd ed, Hardy RW (Ed), Raven Press, New York 1993. p.5.
- Deyo RA, Weinstein JN. Low back pain. *N Engl J Med*, 2001 Feb 1; 344(5): 363-70. doi: 10.1056/NEJM200102013440508. PMID: 11172169.
- Suri P, Hunter DJ, Jouve C, Hartigan C, Limke J, Pena E, Swaim B, Li L, Rainville J. Inciting events associated with lumbar disc herniation. *Spine J.*, 2010 May; 10(5): 388-95. doi: 10.1016/j.spinee.2010.02.003. Epub 2010 Mar 29. PMID: 20347617; PMCID: PMC2919742.
- Engle AM, Chen Y, Marascalchi B, Wilkinson I, Abrams WB, He C, Yao AL, Adekoya P, Cohen ZO, Cohen SP. Lumbosacral Radiculopathy: Inciting Events and Their Association with Epidural Steroid Injection Outcomes. *Pain Med*, 2019 Dec 1; 20(12): 2360-2370. doi: 10.1093/pm/pnz097. PMID: 31099846.
- Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. *Ann Intern Med*. 2002 Oct 1; 137(7): 586-97. doi: 10.7326/0003-4819-137-7-20021001000010. PMID: 12353946.
- Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians; American College of Physicians; American Pain Society Low Back Pain Guidelines Panel. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med*, 2007 Oct 2; 147(7): 478-91. doi: 10.7326/0003-4819-147-7-200710020-00006. Erratum in: *Ann Intern Med*. 2008 Feb 5; 148(3): 247-8. PMID: 17909209.
- Dixit RK: Approach to the patient with low back pain. In Imboden J, Hellmann D, Stone J, editors:

- Current diagnosis and treatment in rheumatology*, ed 2, New York, 2007, McGrawHill, pp 100–110.
17. Deyo RA, Weinstein JN. Low back pain. *N Engl J Med*, 2001 Feb 1; 344(5): 363-70. doi: 10.1056/NEJM200102013440508. PMID: 11172169.
 18. van der Windt DA, Simons E, Riphagen II, Ammendolia C, Verhagen AP, Laslett M, Devillé W, Deyo RA, Bouter LM, de Vet HC, Aertgeerts B. Physical examination for lumbar radiculopathy due to disc herniation in patients with low-back pain. *Cochrane Database Syst Rev.*, 2010 Feb 17; (2): CD007431. doi: 10.1002/14651858. CD007431.pub2. PMID: 20166095.
 19. Deyo RA, Rainville J, Kent DL. What can the history and physical examination tell us about low back pain? *JAMA*, 1992 Aug 12; 268(6): 760-5. PMID: 1386391.
 20. Vroomen PC, de Krom MC, Knottnerus JA. Diagnostic value of history and physical examination in patients suspected of sciatica due to disc herniation: a systematic review. *J Neurol*, 1999 Oct; 246(10): 899-906. doi: 10.1007/s004150050480. PMID: 10552236.
 21. Patel ND, Broderick DF, Burns J, Deshmukh TK, Fries IB, Harvey HB, Holly L, Hunt CH, Jagadeesan BD, Kennedy TA, O'Toole JE, Perlmutter JS, Policeni B, Rosenow JM, Schroeder JW, Whitehead MT, Cornelius RS, Corey AS. ACR Appropriateness Criteria Low Back Pain. *J Am Coll Radiol*, 2016 Sep; 13(9): 1069-78. doi: 10.1016/j.jacr.2016.06.008. Epub 2016 Aug 3. PMID: 27496288.
 22. Chou R, Qaseem A, Owens DK, Shekelle P; Clinical Guidelines Committee of the American College of Physicians. Diagnostic imaging for low back pain: advice for high-value health care from the American College of Physicians. *Ann Intern Med*, 2011 Feb 1; 154(3): 1819. doi: 10.7326/0003-4819-154-3-201102010-00008. Erratum in: *Ann Intern Med*, 2012 Jan 3; 156(1 Pt 1): 71. PMID: 21282698.
 23. Deyo RA, Jarvik JG, Chou R. Low back pain in primary care. *BMJ.*, 2014 Jul 16; 349: g4266. doi: 10.1136/bmj.g4266. PMID: 25030632.
 24. Jarvik JG, Hollingworth W, Martin B, Emerson SS, Gray DT, Overman S, Robinson D, Staiger T, Wessbecher F, Sullivan SD, Kreuter W, Deyo RA. Rapid magnetic resonance imaging vs radiographs for patients with low back pain: a randomized controlled trial. *JAMA*, 2003 Jun 4; 289(21): 2810-8. doi: 10.1001/jama.289.21.2810. PMID: 12783911.
 25. Malmivaara A, Häkkinen U, Aro T, Heinrichs ML, Koskeniemi L, Kuosma E, Lappi S, Paloheimo R, Servo C, Vaaranen V, et al. The treatment of acute low back pain--bed rest, exercises, or ordinary activity? *N Engl J Med*, 1995 Feb 9; 332(6): 351-5. doi: 10.1056/NEJM199502093320602. PMID: 7823996.
 26. Vroomen PC, de Krom MC, Wilminck JT, Kester AD, Knottnerus JA. Lack of effectiveness of bed rest for sciatica. *N Engl J Med*, 1999 Feb 11; 340(6): 418-23. doi: 10.1056/NEJM199902113400602. PMID: 9971865.
 27. Hagen KB, Hilde G, Jamtvedt G, Winnem M. Bed rest for acute low-back pain and sciatica. *Cochrane Database Syst Rev.* 2004 Oct 18; (4): CD001254. doi: 10.1002/14651858.CD001254.pub2. Update in: *Cochrane Database Syst Rev.*, 2010; (6): CD001254. PMID: 15495012.
 28. Chou R. Pharmacological management of low back pain. *Drugs*. 2010 Mar 5; 70(4): 387402. doi: 10.2165/11318690-000000000-00000. PMID: 20205483.
 29. Kreiner DS, Hwang SW, Easa JE, Resnick DK, Baisden JL, Bess S, Cho CH, DePalma MJ, Dougherty P 2nd, Fernand R, Ghiselli G, Hanna AS, Lamer T, Lisi AJ, Mazanec DJ, Meagher RJ, Nucci RC, Patel RD, Sembrano JN, Sharma AK, Summers JT, Taleghani CK, Tontz WL Jr, Toton JF; North American Spine Society. An evidence-based clinical guideline for the diagnosis and treatment of lumbar disc herniation with radiculopathy. *Spine J.*, 2014 Jan; 14(1): 180-91. doi: 10.1016/j.spinee.2013.08.003. Epub 2013 Nov 14. PMID: 24239490.
 30. Dixit RK, Schwab JH: Low back and neck pain. In Stone JH, editor: *A clinician's pearls and myths in rheumatology*, New York, 2009.
 31. Borenstein D. Mechanical low back pain—a rheumatologist's view. *Nature Reviews Rheumatology*, 2013 Nov; 9(11): 643-53.
 32. Jenkins H. Classification of low back pain. *Australasian Chiropractic & Osteopathy*, 2002 Nov; 10(2): 91.
 33. Konstantinou, Kika PhD; Dunn, Kate M. PhD. Sciatica: Review of Epidemiological Studies and Prevalence Estimates. *Spine* 33(22): 2464-2472, October 15, 2008. | DOI: 10.1097/BRS.0b013e318183a4a2.
 34. Mostofi K, Peyravi M, Moghaddam BG. A comparison of sciatica in young subjects and elderly person. *J Clin Orthop Trauma*, 2020 Sep-Oct; 11(5): 889-890. doi: 10.1016/j.jcot.2019.07.011. Epub 2019 Jul 24. PMID: 32879576; PMCID: PMC7452267.
 35. Schoenfeld AJ, Laughlin M, Bader JO, Bono CM. Characterization of the incidence and risk factors for the development of lumbar radiculopathy. *Clinical Spine Surgery*, 2012 May 1; 25(3): 163-7.
 36. Koes BW, Van Tulder MW, Peul WC. Diagnosis and treatment of sciatica. *Bmj*. 2007 Jun 21; 334(7607): 1313-7.
 37. Willhuber GO, Piuze NS. Straight Leg Raise Test. *InStatPearls [Internet]*, 2023 Feb 5. StatPearls Publishing.