

EVALUATING THE FREQUENCY OF LUMBER SPONDYLOSIS FEATURES ON X-RAY IN PATIENTS WITH LOWER BACK PAIN

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ABSTRACT

Background: Lower back pain (LBP) is a common musculoskeletal condition with significant global impact. Lumbar spondylosis, a degenerative spinal disorder, is frequently seen in LBP patients and is identifiable on X-rays through features like osteophyte formation, disc space narrowing, and sclerosis. However, the frequency and pattern of these findings vary across populations. Evaluating their prevalence can enhance diagnosis and guide effective management. **Objective:** To evaluate the frequency of lumbar spondylosis features on x ray in patients with lower back pain. **Methodology:** A descriptive cross-sectional research was carried out, with data from 30 patients collected. The information was gathered from Alpha Diagnostic Centre Radiology Department, Lahore. Data was acquired using I care X ray DR machine (500mA) after informed permission. **Results:** In this descriptive study through Non-Convenient sampling technique, we have selected total 30 patients in which 13 patients was females and 17 was male, the minimum age of the patients included in the study was about 24 and maximum age was around 78 and also calculated the mean of age which was 48.0 . When we analyzed the risk factors of lumbar spondylosis pain radiating to legs, we have seen that 5 patients having history of trauma (16.67%) and 16 over weighted patients (53.3%). Further more 15 patients having Diabetes (50%) and 22 patients having Inactive Life Style (73.3%). additionally 16 patients having HTN (53.3%). When these patients undergo the lumbar spine x ray it has been found out that many patients have multiple cause of lumbar spondylosis for example, 26 patients having osteophytes (86.67%) in which 17 patients having Sclerosis (56.67%), 6 patients having vertebral body changes (20%) and 14 patients having loss of lordosis (46.67%). 17 patients having sciatica (56.67%), 13 patients having Spinal Stenosis (43.3%). In total 30 patients, there were only 5 patients having disc space narrowing (16.67%). Almost all 30 patients has effected L5 spine in which 23 patients have L5-S1 spine but L1 and S2 was well preserved in patients representing with lumbar spondylosis. **Conclusion:** Based on the results of this study, we concluded that lumbar spondylosis predominantly arises from conditions such as osteophytes, sclerosis, and sciatica. Evidently, its clinical manifestations encompass lower back discomfort accompanied by radiating pain extending to either one or both lower extremities. Furthermore, x ray has been established as a valuable diagnostic modality for the assessment of lumbar spondylosis.

Key words: Lumbar spondylosis, Lower back pain, Pain radiating to legs, x-ray

INTRODUCTION

Chapter 1

Lower back pain (LBP) stays one of the most widespread and disabling musculoskeletal complaints

all over the world, with considerable socioeconomic and public health consequences. Affecting individuals of all age groups, lower back pain is

among the main reasons of health issues and workplace limitations globally.^[1] It is approximated that up to 80% of adults will undergo at least one episode of LBP in their life span. In both developed and developing countries, the increasing aging population, sedentary lifestyle, occupational strain, and physical inactivity have resulted into the increasing load of this condition.^[2]

Multiple causes have been implicated in the pathogenesis of lower back pain, including mechanical, degenerative, inflammatory, infectious, and neoplastic causes. Among the degenerative disorders, **lumbar spondylosis** is a frequent diagnosis, specifically in middle-aged and older adults.^[3] Lumbar spondylosis refers to the age-related degenerative changes affecting the lumbar spine, including the intervertebral discs, facet joints, vertebral bodies, and nearby soft tissues. These changes may lead to clinical indications such as chronic pain, stiffness, radiculopathy, and in some cases, spinal stenosis.

Radiographic imaging, especially plain **X-rays**, stays one of the most available and cost-effective modalities for assessing degenerative changes in the lumbar spine. Although more advanced imaging techniques such as magnetic resonance imaging (MRI) and computed tomography (CT) provide superior soft tissue and three-dimensional detail, X-rays are often the first-line diagnostic tool in many clinical settings due to their accessibility, low cost, and ability to demonstrate bony impairments.^[4] Typical radiographic features of lumbar spondylosis include **osteophyte formation, disc space narrowing, vertebral endplate sclerosis, and facet joint arthropathy**. Recognizing these features assists clinicians evaluate the intensity of degeneration, develop a probable diagnosis, and guide suitable management strategies.^[5]

While lumbar spondylosis is a frequent radiographic finding, particularly in older adults, its association with lower back pain remains complex and interconnected. This research seeks to bridge the gap between radiographic findings and clinical symptoms by providing a detailed assessment of the frequency of lumbar spondylosis features on X-rays in patients with lower back pain. The findings are expected to inform clinical decision-making, improve diagnostic accuracy, and improve the quality of care provided to individuals suffering from this widespread condition.^[6]

The Rationale of this study is to evaluate the frequency of radiographic features of lumbar spondylosis in patients presenting with lower back pain using plain X-ray imaging. By systematically analyzing these features, we seek to establish patterns of degenerative changes across different age groups, genders, and clinical presentations.^[7] Understanding the prevalence and distribution of these features can help clinicians in the betterment diagnostic approaches, prioritizing patients for advanced imaging when necessary, and adopting appropriate non-surgical or surgical interventions based on intensity and clinical presentation.

Furthermore, the study holds importance in regions where evaluate to specialized care and imaging is restricted. In such contexts, plain radiography plays a vital tool for initial evaluation and prioritization. Producing baseline data on the frequency of lumbar spondylosis features may also help in public health interventions focused on prevention, lifestyle modification, and early management of spinal degeneration. It can also support future research into the natural history of lumbar degenerative disease and its progression.^[8]

CHAPTER 2 LITERATURE REVIEW

A study was conducted by Maha Munir Mir et al. In 2021 on Prevalence and Radiological Evaluation of Lumbar Spondylosis on Magnetic Resonance Imaging. It was aimed to estimate the association of lower back pain with lumbar spondylosis in determination to the patterns of lumbar disc degeneration on Magnetic Resonance Imaging. A cross sectional and observational study of 80 patients with low back pain who were prescribed lumbosacral MRI was held. Majority of the patients had low back pain 87.7%. Different lumbar spondylosis patterns evaluated on MRI were lumbar disk degeneration 80.2%, disc dehydration 51.9% while endplate changes were 28.4%. Other patterns such as anterior osteophytes hypertrophy of ligament flavum, facet joint arthrosis and disc bulges were evaluated. Spondylolisthesis was rare while herniation of disk and disk bulges were frequently seen at lumbar spine level of L4-L5 (50.6%). Lower back pain with progressing age of 45 years and above is common in lumbar spondylosis.^[9]

A study was conducted by Maham Nasir et al. In 2025 on Correlation of MRI findings of lumbar spondylosis with age and gender. Using magnetic resonance imaging, a total of 67 individuals with

lumbar spondylosis were assessed in this cross-sectional and observational investigation. Patients between age 41-60 years had the highest frequency of lumbar spondylosis whereas, patients between age 61-80 years were second most affected population. Lumbar spondylosis was more common among females who were 40 (57.1%) than males who were 27 and makes 38.6% of total population. LBP is 34.3%. Lumbar disc degenerative was 12.9%. Anterior osteophytes were present in 24(34.3%) patients. Hypertrophy of ligamentum flavum was 14.3%. Facet joint arthrosis was about in 14 patients (20%). Lumbar lordosis curvature presents in 38(54.3%) patients. Intervertebral level L4/L5 was the most frequent site (34.3%). of disc degeneration and disc bulges. Second most affected site was L5/S1 level present in 14 (20%) individuals. Whereas, at L1/L2, L2/L3 and L3/L4 level were common among 2(2.9%), 4(5.7%) and 6(8.6%). Disc bulge was 75.7%. Disc tear and herniation was present only 5(7.1%) patients. Disc desiccation presents in 37(52.9%) patients. Hence concluded that there is association between MRI findings and age of patient but gender is not associated with these findings.^[10]

A study was conducted by Iyaza Ogon et al. In 2022 on Factors associated with low back pain in patients with lumbar spinal stenosis. This cross-sectional study included consecutive patients with SLSS aged between 51 and 79 years who had symptoms in one or both the legs, with and without LBP. Multivariate logistic regression analysis revealed that the sagittal vertical axis (SVA; +10 mm; odds ratio, 1.331; 95% confidence interval, 1.051–1.660) and pelvic incidence-lumbar lordosis (PI-LL; +1°; odds ratio, 1.065; 95% confidence interval, 1.019–1.168) were significantly associated with LBP. A receiver operating characteristic analysis revealed cut-of values of 47.0 mm of SVA and 30.5° of PI-LL, respectively. Our results indicated that SVA and PI-LL were significant predictors for LBP in SLSS.^[11]

A study was conducted by Zunaira Rafaqat et al. 2024 on Evaluation of Lumbar Spine on MRI in Young Adults with Chronic Backaches. This study aimed to establish a correlation between clinical symptoms and MRI findings in individuals with chronic back pain. A cohort of 135 young adults were assessed through a consecutive sampling method and underwent lumbar spine MRI examinations. The pool of participants in the study encompassed 42.2% males and 57.8% females, aged between 18 and 40 years, with an average age of 31.5 years and a standard deviation of 6.06. There were four prominent MRI findings:

Lumbar Spondylosis (46%, Disc Degeneration (25%, Disc Bulge (10%), and Disc Desiccation (9%). The study also found significant correlations between these findings and clinical characteristics, with Lumbar Spondylosis linked to lower limb numbness and mobility difficulties, and Disc Bulge correlated with pain duration. The findings underscore the effectiveness of MRI scans in identifying underlying causes of chronic back pain in young adults in Pakistan.^[12]

A study was conducted by Mohammad Fraiwan et al. 2022 on Using deep transfer learning to detect scoliosis and spondylolisthesis from x-ray images. In this paper, we utilize advances in deep transfer learning to diagnose spondylolisthesis and scoliosis from X-ray images without the need for any measurements. We collected raw data from real X-ray images of 338 subjects (i.e., 188 scoliosis, 79 spondylolisthesis, and 71 healthy). Deep transfer learning models were developed to perform three-class classification as well as pair-wise binary classifications among the three classes. The highest mean accuracy and maximum accuracy for three-class classification was 96.73% and 98.02%, respectively. Regarding pair-wise binary classification, high accuracy values were achieved for most of the models (i.e., >98%). These results and other performance metrics reflect a robust ability to diagnose the subjects' vertebral column disorders from standard X-ray images. The current study provides a supporting tool that can reasonably help the physicians make the correct early diagnosis with less effort and errors, and reduce the need for surgical interventions.^[13]

CHAPTER 3

OBJECTIVE

To evaluate the frequency of lumbar spondylosis features on X-ray in patients with lower back pain.

PROBLEM STATEMENT

In spite of the frequent use of X-rays in evaluating patients with LBP, there stays limited localized data on how often specific features of lumbar spondylosis appear on these radiographs. Without accessing the frequency and distribution of these findings in patients presenting with LBP, clinicians risk either over-relying on or less approximating the value of X-rays in diagnosis and treatment planning. This study will systematically access X-ray images of patients

presenting with LBP to identify and quantify the frequency of lumbar spondylosis features. By analyzing patterns across age, sex, and symptom intensity, the research has goal to develop a clearer relationship between radiographic findings and clinical presentations, thereby improving diagnostic accuracy and guiding suitable patient management. This study aims to evaluate the prevalence of different causative factors related to lumber spondylosis in patients presenting with LBP using x-ray. The purpose of this research is to recognixe and categorize the most frequent underlying factors of lumber spondylosis in patients with LBP. By increasing our evaluation this will ultimately improve our diagnosis and treatment strategies for affected individual.

OPERATIONAL DEFINITIONS

Lumbar Spondylosis

A degenerative condition of the lumbar spine identified on X-ray by the presence of one or more of the following features: osteophyte formation, disc space narrowing, endplate sclerosis, or facet joint degeneration.

Lower Back Pain:

Self-reported pain or discomfort localized between the lower rib margin and the gluteal fold, lasting for at least 1 week, as recorded in the patient's medical history or clinical notes.

X-ray Imaging

Standard lumbar spine radiographs (anteroposterior and lateral views) interpreted by a radiologist or qualified clinician to identify structural changes associated with lumbar spondylosis.

Frequency

The number or percentage of patients with lower back pain who exhibit one or more radiological features of lumbar spondylosis on X-ray, calculated out of the total number of patients included in the study.

Spondylosis Features

Radiographic indicators of degeneration in the lumbar spine, specifically including any of the following:

Osteophytes: bony outgrowths at vertebral margins

Disc Space Narrowing: reduced intervertebral disc height

Endplate Sclerosis: increased bone density at vertebral endplates

Facet Joint Changes: degeneration or hypertrophy of the facet joints

CHAPTER 4

MATERIAL AND METHODS

4.1 Study Design: Observational

Descriptive study

4.2 Settings: Alpha Diagnostic Centre, Radiology Department, Lahore.

4.3 Duration of Study: The study duration was 4 months from April 2025 to June 2025

4.4 Sample Size: 30

4.5 Sampling Technique:

Non-Convenient sampling Technique

4.6 Sample Selection:

4.6.1 Inclusion Criteria:

- Male and female patients (adults aged 18 years and above) who have undergone lumbar spine X-ray
- Backache Pain
- Pain radiating to one leg/both legs
- Numbness

4.6.2 Exclusion Criteria:

- Patients with congenital spinal deformities
- Pregnancy

4.7 Equipment:

- X-ray Machine

4.8 ETHICAL CONSIDERATIONS

The rules and regulations set by the ethical committee of Ali Fatima Hospital will be followed while conducting the research and the rights of the research participants will be respected.

- Written informed consent (attached) will be taken from all the participants.
- All information and data collection will be kept confidential.
- Participants will remain anonymous throughout the study.
- The subjects will be informed that there are no disadvantages or risks on the procedure of the study.
- They will also be informed that they will be free to withdraw at any time during the process of the study.
- We will do everything we can to protect your privacy. Your identity will not be revealed in any publication resulting from this study.

- Your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate any time. You will not be penalized in any way should you decide not you participate or to withdraw from this study.

4.9 DATA COLLECTION PROCEDURE

This is an retrospective Observational study to evaluate the frequency of lumber spondylosis feature. All patients were informed about the nature, objective of the study, and written informed consent were taken, and Institutional Ethics Committee approval was be taken in advance. Patients with the clinical symptoms such as lower back pain, stiffness in lower back, numbness etc. were included in this study. All examinations was done in AP and lateral view of lumber spine on x ray necessary to adequately visualize spine. After taking inform written consent, data was collected by the researcher with the help of data collection sheets. Data was collected according to variables of a questionnaire which are given as follows. History/complaints/clinical diagnosis was taken from participants. Variables such as age, gender, and the scan were asked from the individuals directly.

4.10 DATA ANALYSIS Procedure

Data was analyzed on statistical software SPSS which means Statistical Package for Social Sciences. Paired T test was used to analysis the categorical data such as degree of satisfaction among nurses from the training program. This study used a significance level of 0.01

($p < 0.01$) to indicate the statistical significance. This shows that the statistical significance p-value is less than 0.05 consequently results with the value below 0.05 are deemed to be statistically significant.

CHAPTER 5 RESULTS

In this descriptive study through Non-Convenient sampling technique, we have selected total 30 patients in which 13 patients was females and 17 was male, the minimum age of the patients included in the study was about 24 and maximum age was around 78 and also calculated the mean of age which was 48.0 . When we analyzed the risk factors of lumber spondylosis pain radiating to legs, we have seen that 5 patients having history of trauma (16.67%) and 16 over weighted patients (53.3%). Further more 15 patients having Diabetes (50%) and 22 patients having Inactive Life Style (73.3%). additionally 16 patients having HTN (53.3%). When these patients undergo the lumber spine x ray it has been found out that many patients have multiple cause of lumber spondylosis for example, 26 patients having osteophytes (86.67%) in which 17 patients having Sclerosis(56.67%), 6 patients having vertebral body changes (20%) and 14 patients having loss of lordosis (46.67%). 17 patients having sciatica (56.67%), 13 patients having Spinal Stenosis (43.3%). In total 30 patients, there were only 5 patients having disc space narrowing (16.67%). Almost all 30 patients has effected L5 spine in which 23 patients have L5-S1 spine but L1 and S2 was well preserved in patients representing with lumber spondylosis.

AGE

Descriptive Statistics							
	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Age	30	24	78	48.40	1.996	15.070	227.102
Valid N (list wise)	30						

Table:1 Shows the statistics of age

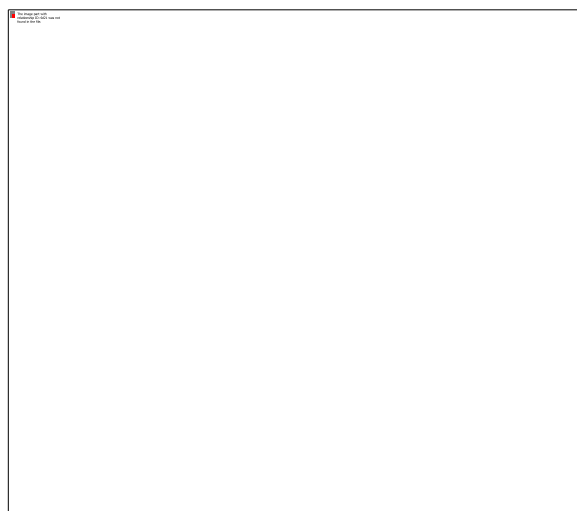
The mean age of 30 patients representing with lumber spondylosis was 48 year, the minimum age was 24 and 78 was the maximum age

Gender

	Frequency	percent	Cumulative percent
Female	13	43.33	43.33
Male	17	56.67	100
Total	30	100	100

Table 2 shows the percentage of gender in the study

In total 30 patients, there was 13 females (43.3%) and 17 males (56.67).



Graph 1. Shows the Gender Distribution present in the Study

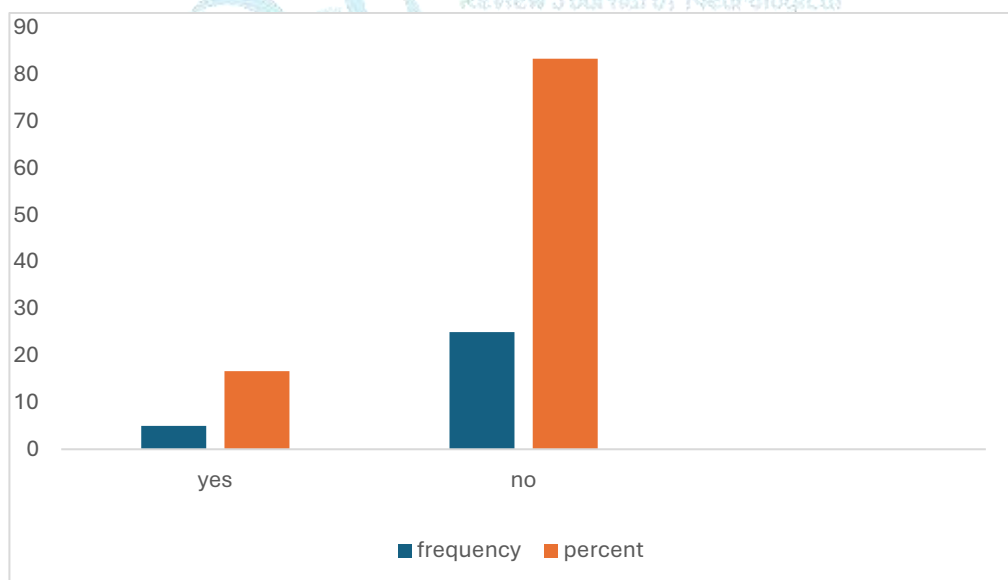
Risk Factors

Trauma

	frequency	percent	Cumulative percent
yes	5	16.67	16.67
no	25	83.33	100
Total	30	100	100

Table 3 shows the percentage of trauma for the patients in the study

In total 30 patients, there were 25 patients without Trauma (83.33%) and 5 patients having Trauma (16.67%).



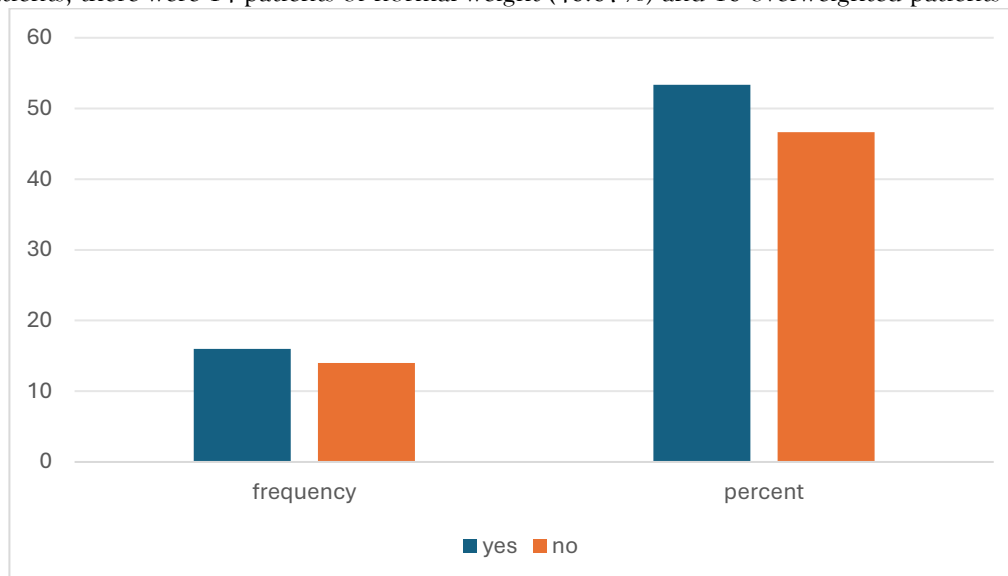
Graph 2. Shows the Trauma present in the study

Overweight

	frequency	percent	Cumulative percent
yes	16	53.33	53.33
no	14	46.46	100
total	30	100	100

Table 4 shows the percentage of overweighted patients in the study

In total 30 patients, there were 14 patients of normal weight (46.67%) and 16 overweighted patients (53.33%).



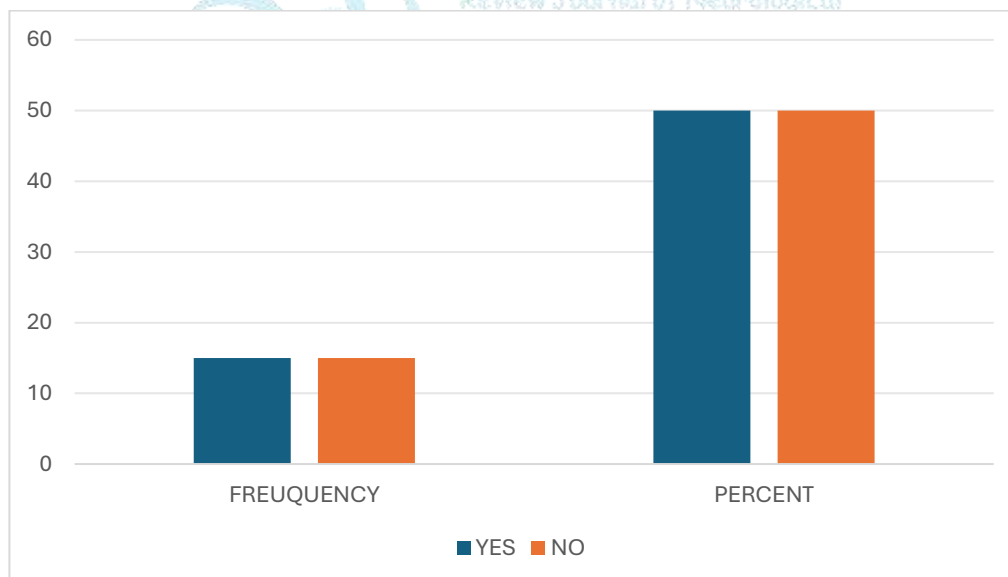
Graph 3. Shows the overweighted patients present in the study

Diabetes

	frequency	percent	Cumulative percent
yes	15	50	50
no	15	50	100
total	30	100	100

Table 5 shows the percentage of diabetic patients in the study

In the total 30 patients, there were 15 patients with no Diabetes (50%) and 15 patients having diabetes (50%).



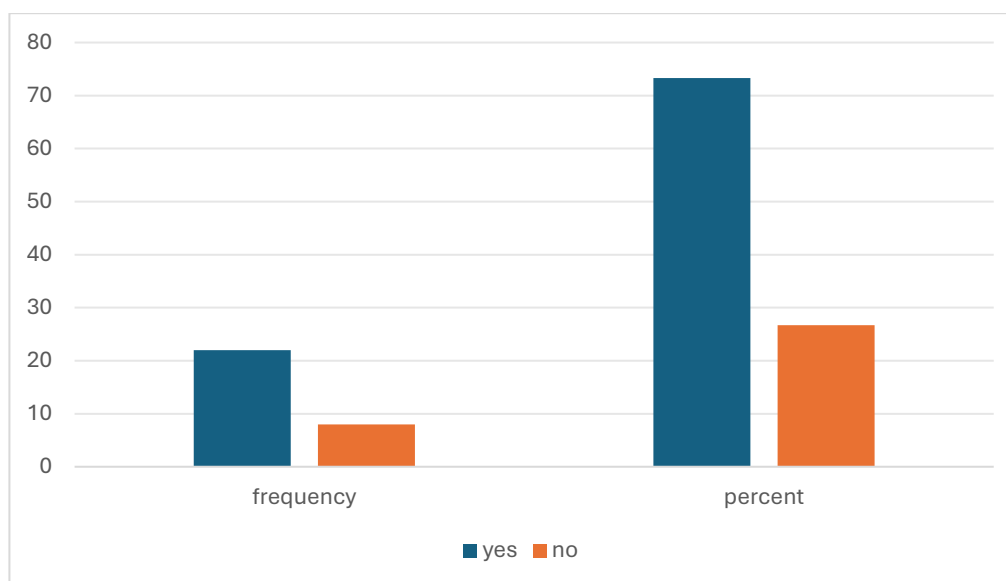
Graph 4. Shows the DM patients used in study

Inactive life style

	frequency	percent	Cumulative percent
yes	22	73.3	73.3
no	8	26.67	100
total	30	100	100

Table 6 shows the percentage of inactive life style of patients in the study

In total 30 patient, there were 8 patients having Active Life Style (26.67%) and 22 patients having Inactive (73.3%).



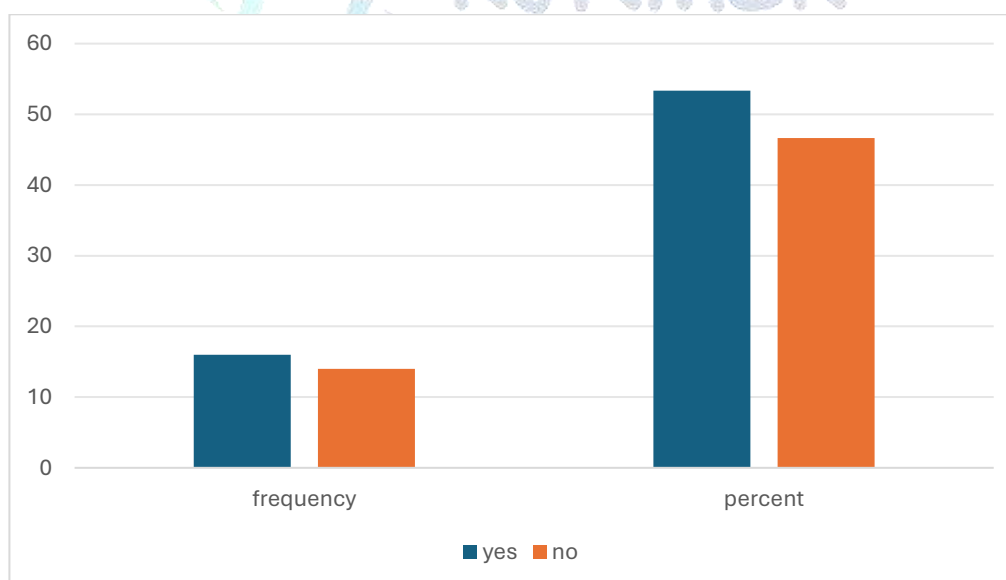
Graph 5. Shows the Inactive Life style of patients present in the study

Hypertension

	frequency	percent	Cumulative percent
yes	16	53.33	53.33
no	14	46.67	100
total	30	100	100

Table 7 shows the percentage of hypertensive patients in the study

In total 30 patients, there were 14 patients with no HTN (46.67%) and 16 patients having HTN (53.33%).



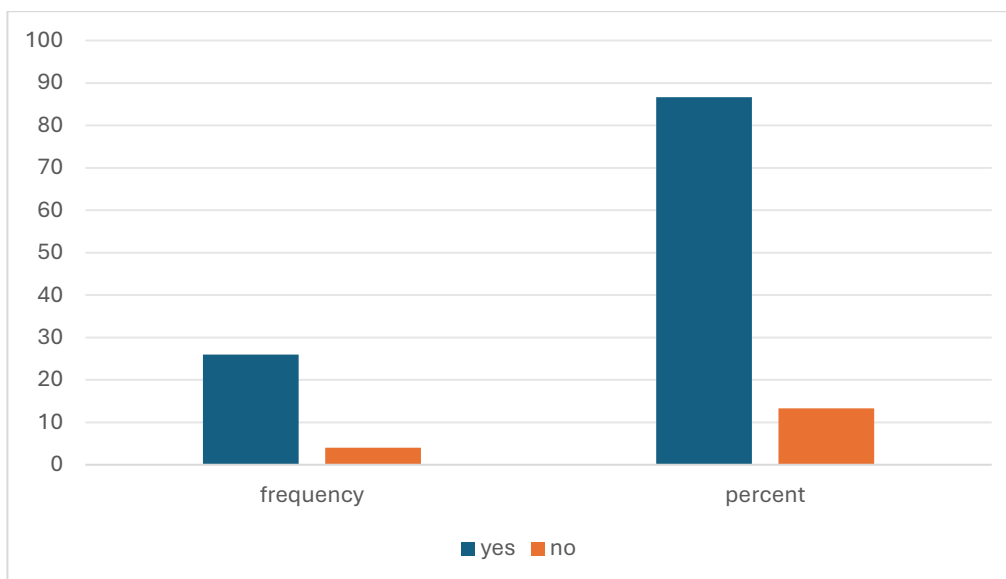
Graph 6. Shows the HTN patients used in study

Osteophytes

	frequency	percent	Cumulative percent
yes	26	86.67	86.67
no	4	13.33	100
total	30	100	100

Table 8 shows the percentage of osteophytes patients in the study

In total 30 Patients, there were 4 patients with no osteophytes (13.33%) and 26 patients having osteophytes (86.67%).



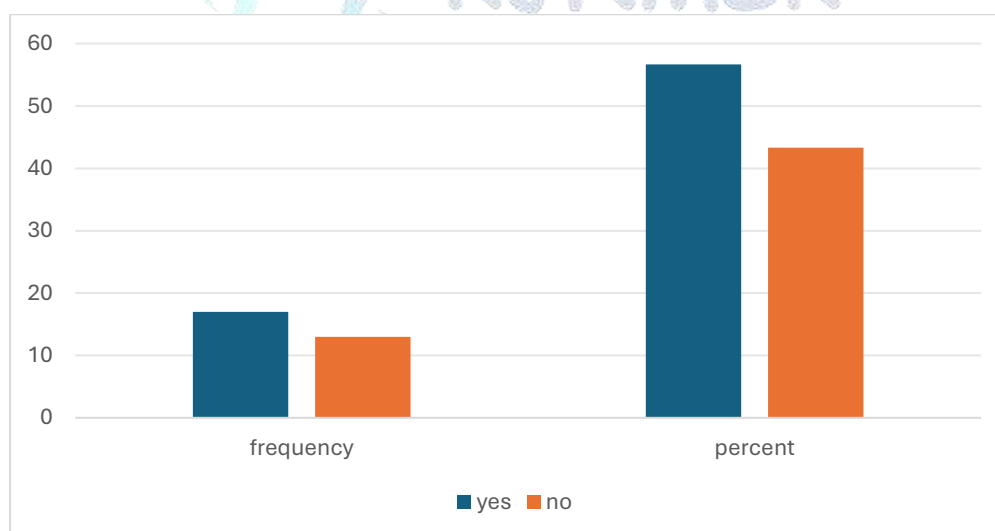
Graph 7. Shows the percentage of osteophytes present in the study.

Sclerosis

	frequency	percent	Cumulative percent
yes	17	56.67	56.67
no	13	43.33	100
total	30	100	100

Table 9 shows the percentage of patients with sclerosis in the study

In total 30 patients, there were 13 patients with no sclerosis (43.3%) and 17 56.67) patients having sclerosis.



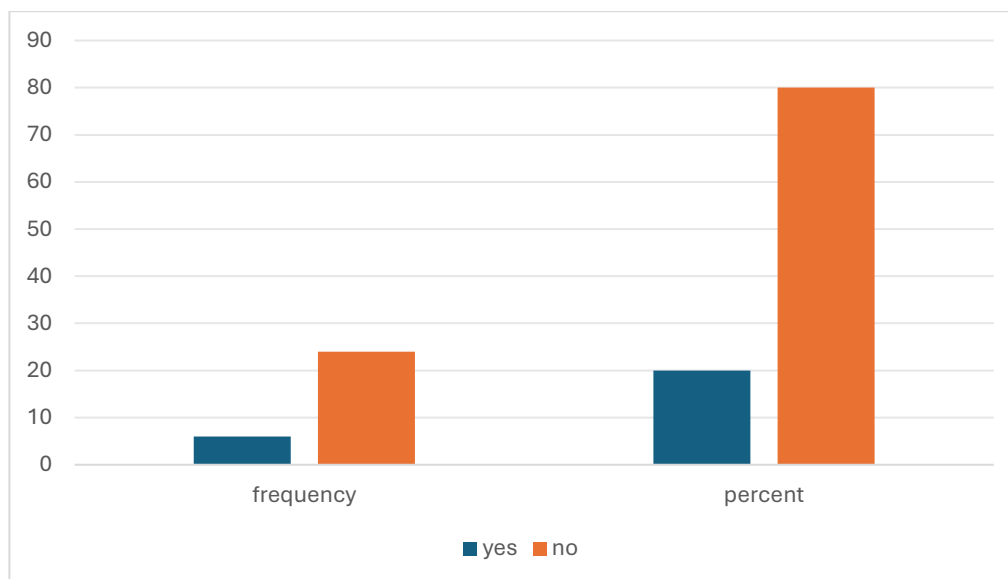
Graph 8. Shows the percentage of sclerosis patients present in the study

Vetebral body changes

	frequency	percent	Cumulative percent
yes	6	20	20
no	24	80	100
total	30	100	100

Table 10 shows the percentage of vertebral body changes patients present in the body

In total 30 patients, there were 24 patients with no vertebral body changes (80%) and 6 patients having vertebral body changes (20%).



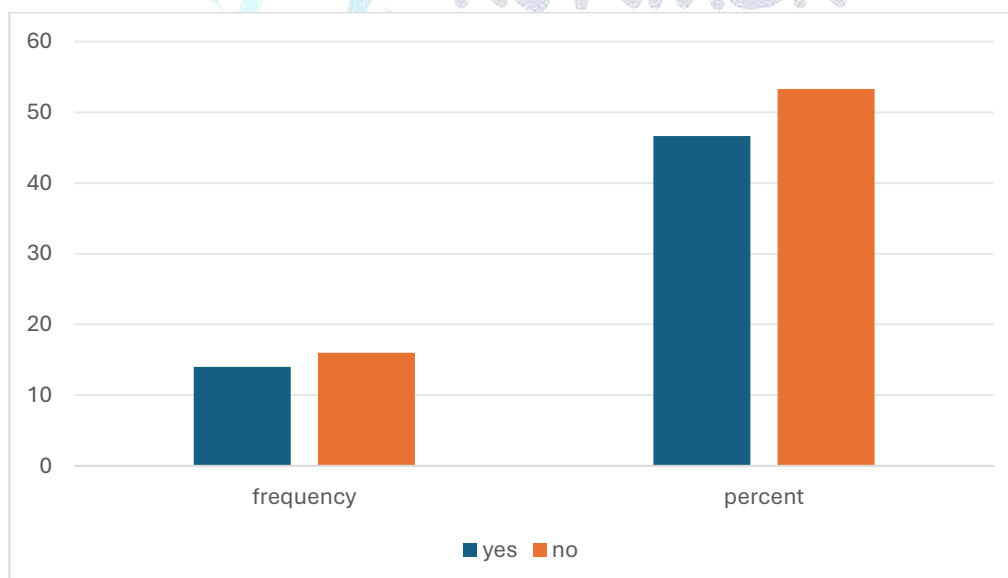
Graph 9. Shows the percentage of vertebral body changes patients present in the study.

Loss of Lordosis

	frequency	percent	Cumulative percent
yes	14	46.67	46.67
no	16	53.3	100
total	30	100	100

Table 11 shows the percentage of loss of lordosis patients present in the study

In total 30 patients, there were 16 patients with no loss of lordosis (53.3%) and 14 patients having loss of lordosis (46.67%).



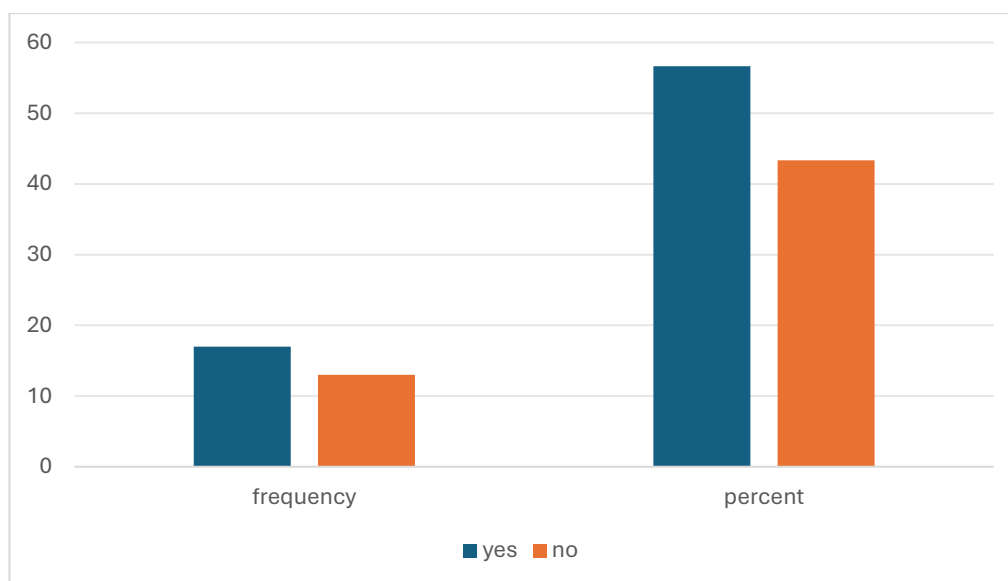
Graph 10. Shows the patients of loss of lordosis patients present in study

Sciatica

	frequency	percent	Cumulative percent
yes	17	56.67	56.67
no	13	43.33	100
total	30	100	100

Table 12 shows the percentage of sciatica patients present in study

In total 30 patients, there were 13 patients with no sciatica (43.3%) and 17 patients having sciatica (56.67%)



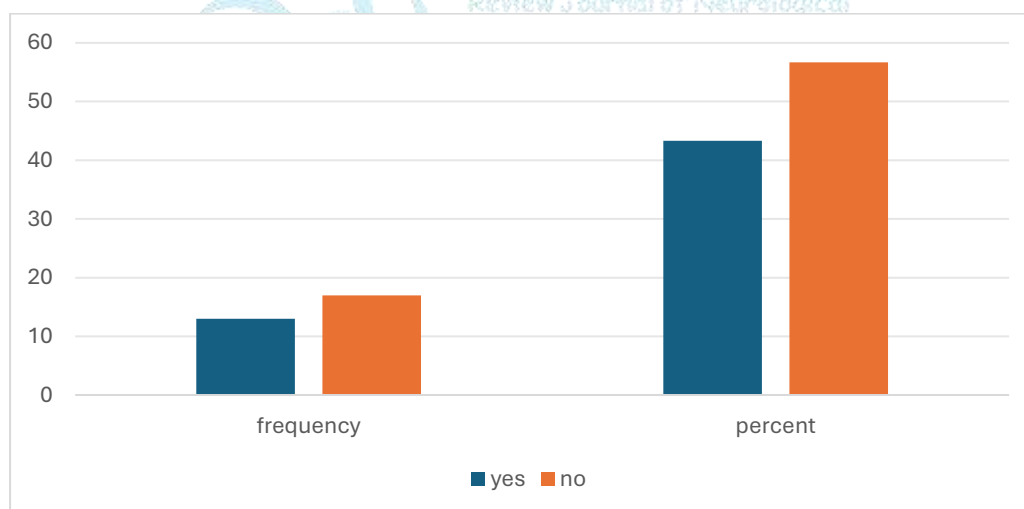
Graph 11. Shows the percentage of sciatica patients present in the Study

Spinal Stenosis

	frequency	percent	Cumulative percent
yes	13	43.3	43.3
no	17	56.67	100
total	30	100	100

Table 13 shows the percentage of spinal stenosis patients present in the study

In total 30 patients, there were 17 patients with no Spinal Stenosis (56.67%) and 13 patients having Spinal Stenosis (43.3%).



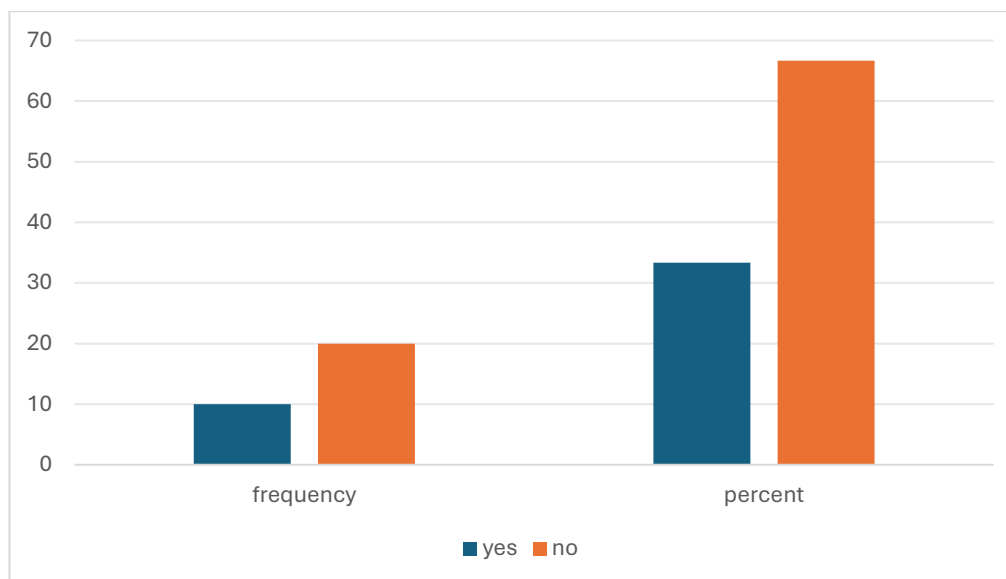
Graph 12. Shows the percentage of Spinal Stenosis patients present in the Study

Disc Space Narrowing

	frequency	percent	Cumulative percent
yes	5	16.67	33.33
no	25	83.33	100
total	30	100	100

Table 14 shows the percentage of disc space narrowing patients present in the study

In total 30 patients, there were 20 patients with no disc space narrowing (66.67%) and 10 patients having disc space narrowing (33.33%).



Graph 13. Shows the percentage of disc space narrowing patients present in the study

Effected Spine

L2 * L3 Cross tabulation				
Count				
		L3		Total
		no	Yes	
L2	No	20	6	26
	Yes	1	3	4
Total		21	9	30

Table 15. Shows the Effected spine of L2*L3 used in Study

L3 * L4 Cross tabulation				
Count				
		L4		Total
		No	Yes	
L3	No	3	18	21
	Yes	1	8	9
Total		4	26	30

Table 16. Shows the Effected spine of L3*L4 used in Study

L4 * L5 Cross tabulation				
Count				
		L5		Total
		No	Yes	
L4	No	0	4	4
	Yes	0	26	26
Total		0	30	30

Table 17: shows the effected spine of L4*L5 used in study

L3 * L4 Cross tabulation				
Count				
		S1		Total
		No	Yes	
L5	No	0	0	0
	Yes	23	7	30
Total		23	7	30

Table 18: shows the L5*S1 effected spine used in the study

CHAPTER 6 DISCUSSION

In this descriptive study through Non-Convenient sampling technique, we have selected total 30 patients in which 13 patients was females and 17 was male, the minimum age of the patients included in the study was about 24 and maximum age was around 78 and also calculated the mean of age which was 48.0 . When we analyzed the risk factors of lumber spondylosis pain radiating to legs, we have seen that 5 patients having history of trauma (16.67%) and 16 over weighted patients (53.3%). Further more 15 patients having Diabetes (50%) and 22 patients having Inactive Life Style (73.3%). additionally 16 patients having HTN (53.3%).When these patients undergo the lumber spine x ray it has been found out that many patients have multiple cause of lumber spondylosis for example, 26 patients having osteophytes (86.67%) in which 17 patients having Sclerosis(56.67%), 6 patients having vertebral body changes (20%) and 14 patients having loss of lordosis (46.67%). 17 patients having sciatica (56.67%), 13 patients having Spinal Stenosis (43.3%). In total 30 patients, there were only 5 patients having disc space narrowing (16.67%).

A notable study (retrospective cross-sectional review) of **384 adult patients** with back pain at primary care centers in Riyadh, Saudi Arabia, researchers found that **32.8%** of lumbar spine X-rays were normal, while **45.3%** showed degenerative changes—including spondylosis and foraminal narrowing. However, the study concluded that **most abnormal findings on plain lumbosacral X-rays did not correlate with patients' clinical presentation**, arguing that such imaging may not be justified for nonspecific low back pain in primary care. This underscores the limited clinical relevance of radiographic spondylosis findings alone in guiding treatment decisions, particularly in settings where advanced imaging is unavailable.^[14]

In a population-based cross-sectional study of **490 Japanese women aged 40 and above**, researchers

assessed lumbar spine X-rays using the Kellgren-Lawrence grading system ($KL \geq 2$ or $KL \geq 3$) and surveyed participants for low back pain. The study found high radiographic prevalence of lumbar spondylosis—**76.7% ($KL \geq 2$)** and **38.8% ($KL \geq 3$)**—with **20%** reporting low back pain. Notably, **severe spondylosis ($KL \geq 3$) at L3/4, L4/5, and L5/S1 was independently associated with low back pain**, even after adjusting for age, BMI, and bone stiffness. This confirms that higher-grade spondylotic changes on X-ray are clinically significant and aligned with symptomatic presentation.^[15]

CHAPTER 7

Conclusion

Based on the results of this study, we concluded that lumber spondylosis predominantly arises from conditions such as osteophytes, sclerosis, and sciatica. Evidently, its clinical manifestations encompass lower back discomfort accompanied by radiating pain extending to either one or both lower extremities. Furthermore, x ray has been established as a valuable diagnostic modality for the assessment of lumber spondylosis.

RECOMMENDATIONS:

- For furthermore, accurate results large sample size should be included.
- In order to verify the results and create standardized reference values for cause of lumber spondylosis, it is crucial to use a multi-centered approach to the investigation.

7.3 LIMITATIONS

While X-rays are useful for visualizing bony changes, they cannot detect soft tissue abnormalities Such as disc herniation or ligament injuries, which are also common causes of lower back pain.

Interpretation of X-ray images can vary between radiologists or clinicians, potentially affecting the consistency of data collection. Standardized reading criteria can help minimize this.

The study is cross-sectional, it will show frequency at a single point in time and may not reflect how lumbar spondylosis features change over time or relate to pain progression.

CHAPTER 8

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