

TO DETERMINE THE FREQUENCY OF LOWER BACK PAIN IN DIFFERENT
LUMBAR SPINE DISEASES ON MRI AT TERCIARY CARE HOSPITAL IN
PESHAWAR

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Abstract

Background: Lower back pain is the most common symptom to visit hospital. Previous study shows that 75% of people have suffering from lower back pain it some stages in their life span. Therefore, this study was taken for the finding frequency of common pathologies that causes lower back pain on MRI. **Methods:** This is Descriptive cross-sectional study. the study duration was 04 to 06 months and convenience sampling technique were used for data

collection. **Result:** A total of 218 patients having low back pain participated in this study. In this study 114(52.3%) females and 104(47.7%) males were investigated. Herniated disc accounting for 107 (49.1%) patients was the most common cause. spinal stenosis, 48 (22%), Degeneration 23(10.6%) spondylosis 16(7.3%) and there were 24 (11%) normal

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patients that have no lumbar pathology. Most effected lumbar vertebral level was L4L5.

Conclusion: This study shows common pathologies that cause lower back pain. Females were more effected then males and patients with middle age was at high risk of having lower back pain. Disc Herniation 107 (49.1%) were the commonest pathology followed by spinal stenosis 48 (22%), Degeneration 23 (10.6%), spondylosis 16 (7.3%). Future research with long-term monitoring is necessary to assess the benefits of therapies.

Keywords: Lumbar pathologies, Discs, Magnetic Resonance Imaging.

INTRODUCTION:

One of the primary diagnostic and economical global health problems is low back pain (LBP). According to reports, LBP prevalence ranges from 60% to 80% over the course of a person's lifespan. LBP is a complex disorder with both physical and psychological elements as well as alterations in the brain. [1] Additionally, it is described as pain from the lowest rib down to the gluteal fold in the lower posterior trunk [2] LBP is one of the most common causes of physical disorders throughout the entire world extending for long time, resulting in tremendous medical and social costs. LBP is a highly widespread problem, but its risk of spreading becoming increasing with age. It ranges from 85% to 95% among adults aged 50 to 55 years [3] The US spends around \$50 billion on lower back pain annually [4] according to the studies lower back pain effects both genders equally and thirty percent teenagers worldwide had at least one episode of lower back pain [5]

Frequency and Epidemiology

LBP is a serious social and economic issue. LBP significantly reduces functional capacity because it interferes with daily activities and is a key factor in absences [6] According to how long it might take, lower back pain is classified into three categories: acute (lasting for less than four weeks), subacute (lasting between four and twelve weeks), and chronic (lasting for more than twelve weeks) [7] In the past ten years, the prevalence of acute and chronic LBP in adults has more than doubled and it is still rising sharply among the ageing population, impacting both men and women across all racial and ethnic groups [8] Those Patients who experiences LBP recorded for more than \$90 billion annually in health care expenditures in the US and \$9.17 billion in total expenses in Australia. But this cost of LBP is in the area of 1% to 2% of gross national product with National Health

Service (NHS) expenses alone of £251 million annually [9]. Around 4% of workers in the UK take time off from work owing to LBP, which results in the loss of 90 million working days and 8–12 million consultations with general practitioners [10].

Anatomy of lower back

The vertebral column, often known as the spine, is a bony structure that runs the length of the back from the head to the pelvis and protects the spinal cord. The spinal cord, which serves as the entire body's nerve supply and originates in the brain, is what the spine is most vital for protecting. The lumbar region of the spine connects the bottom of the thoracic spine to the beginning of the sacrum, where it is made up of five vertebrae (L1-L5) and five intervertebral discs. The lumbar spine's primary roles include supporting high loads, safeguarding the spinal cord during motion, and allowing the trunk to bend or twist while still maintaining vital mobility around the hips and pelvis [11].

Causes of lower back pain

The lumbosacral spine is a complicated biomechanical component that can react to a diversity of strains. Its passage of time can be boosted by the physiological load and numerous different pressures caused by pose and daily activities, therefore one of the most frequent causes of disability is lumbosacral spine erosion. Degenerative sickness genuinely refers to a broad class of diseases, from damaged discs to the pathology of yellow ligaments, all falling under this overarching framework [12].

Role of different imaging modalities

Diagnostic imaging is a fundamental and needful part of the physical therapy. In present primary care settings, the most common and high-quality spine imaging tests are plain radiography, computed radiography, magnetic resonance imaging (MRI) and bone scanning. These imaging techniques are helpful in diagnosis, prognosis, interventions and determination of some specific diseases of lumbar spines [13].

Radiograph (x-ray):

Plain radiograph is primary and essential imaging technique for uncertain and doubtful disorders and pain in the spines. Most often the doctors referred patients for x-ray with muscular and skeletal structural complaints. Plain radiograph can assess abnormal changes of soft tissues, vertebral body and disc space size, lumbar spines

alignment, bone space and alignment and as will evaluates lumbar spines fractures and dislocation and fractures healing[14].

Computed Tomography scan (CT scan):

CT scan is another imaging modality by providing best and detailed digital cross-sectional images of the body without superimposition of other tissues. Mostly CT scan is used as a primary source of diagnosis in the field of physiotherapy and can investigate composite trauma and other abnormalities of bony lumbar region, especially lumbar spines fractures, degenerative disc diseases, arthritis of lumbar spines and stenosis of lumbar vertebrae [15]

Magnetic resonance Imaging (MRI)

MRI is a gold standard imaging technique for diagnosis and prognosis of LBP and investigation of complex diseases of lumbar spines. Due to its most outstanding contrast and high spatial resolution, MRI used as a highest quality imaging technique for detail examination of LBP [16]. Lumbar spines MRI is noninvasive technique and it is more safe than conventional plan film radiography or other commonly used imaging modalities such as myelography, discography, computerized tomography and radio nuclear bone scanning. MRI is helpful in detection and investigation of disk herniation, tendons and ligaments tear of lumbar spines, tumor of the spinal cord and cauda equina, degenerative diseases of the lumbar spines [17] MRI is now the grab imaging method for evaluating lumbar spine degenerative disorders. The best way to assess the intervertebral disc, vertebra, ligaments, spinal canal, and neural foramina is presently offered MRI technology [18]. For the characterization of lesions, MR imaging offers multiplanar reconstruction and high contrast resolution. It is possible to see inflammatory, neoplastic, and most traumatic lesions on unenhanced and contrast-enhanced MR images, as well as anatomical information that is not seen on isotopic investigations. In evaluating spinal infections, MR imaging exhibits high sensitivity and specificity [19]. Soft tissue that may contribute to LBP, including as discs, nerves, and muscles, can be recognized by magnetic resonance imaging (MRI) [20].

Rationale: To find out the Frequency of lower back pain in certain lumbar spine diseases on MRI

Aims and Objectives

To determine the frequency of lower back pain in different lumbar spine diseases on MRI.

MATERIALS AND METHODS:

Study Design: Descriptive cross-sectional study.

Study Settings: Kuwait Teaching Hospital Peshawar.

Study Duration: 04 to 06 Months

Sample Size: Sample size was 218, Calculated by Rao soft calculator using following formula.

Sampling Technique: convenience sampling technique was used is the type of non-probability method.

Inclusion Criteria: All the lower back pain patients and patient's age 15 to 70 years.

Exclusion Criteria: All the patients which have unwilling to respond, patients with metallic implantation, Pregnant women and patient age less than 15 years.

Data collection procedure:

It is declared that the subsequent approval and NOC has granted from director academics after the formal request of the students of Department of Medical Imaging, Ahmad Medical Institute Peshawar. After that the letter is submitted to the concerned department of Kuwait Teaching Hospital (KTH) for the approval and after the permission, data was collected through close ended Questions, Questionnaire.

Statistical analysis

Statistical package for social science (SPSS) Version 29 is used for data analysis.

RESULT

From the study over a period of (04 to 06 months) a total number of 218 lower back pain patients who referred for lumbar spine MR imaging are included in this study. The unit of MRI at the Radiology Department of Kuwait teaching hospital was 0.35 T MRI machine. Out of 218 patients there was 114 (52.3%) were female and 104(47.7%) were male patients. The age of patients ranges from 15 to 70 years and divided into three categories; 15-30, 31-50, 51-70. The most effected age group was 31-50 (49.5%) followed by 51-70 (30.3%) and the least effected age group was 15-30 (20.2%) Shows in Table 1.

The most frequent pathology was Herniation 107 (49.1%) followed by spinal stenosis 48 (22%) and least common cause was spondyloses 16 (7.3%). As shown in table 2.

Lumbar vertebral level that affected the most were L4L5 78 (35.8%). L5S1 77 (35.3%) followed by L3L4 34 (15.6%) and the least effected vertebral level was L1L2, 5 (2.3%) and there were also 24 (11%) patients which was normal out of 218 total patients as shown in figure 4.

With respect to the profession there were 12 (5%) farmers, Drivers 3 (1.4%), Businessman 14 (6.4%) Other 189 (86.7%) that includes students, labors, Govt servants and House wives as shown in figure 5.

With respect to education there total 131(60.1) patients that have no education and 87 (39.9%) have an education as shown in figure 6.

Participants Age

Years	Frequency	Percent	Valid Percent	Cumulative Percent
15-30	44	20.2%	20.2%	20.2%
31-50	108	49.5%	49.5%	69.7%
51-70	66	30.3%	30.3%	100.0%
Total	218	100.0%	100.0%	

Table 1: Age of participants

This table show that the most effected age group are 31-50 (49.5%) 108 patients followed by 51-70 years (30.3%) 66 patients and the least effected age group are 15-30 years (20.2%) 44 patients.

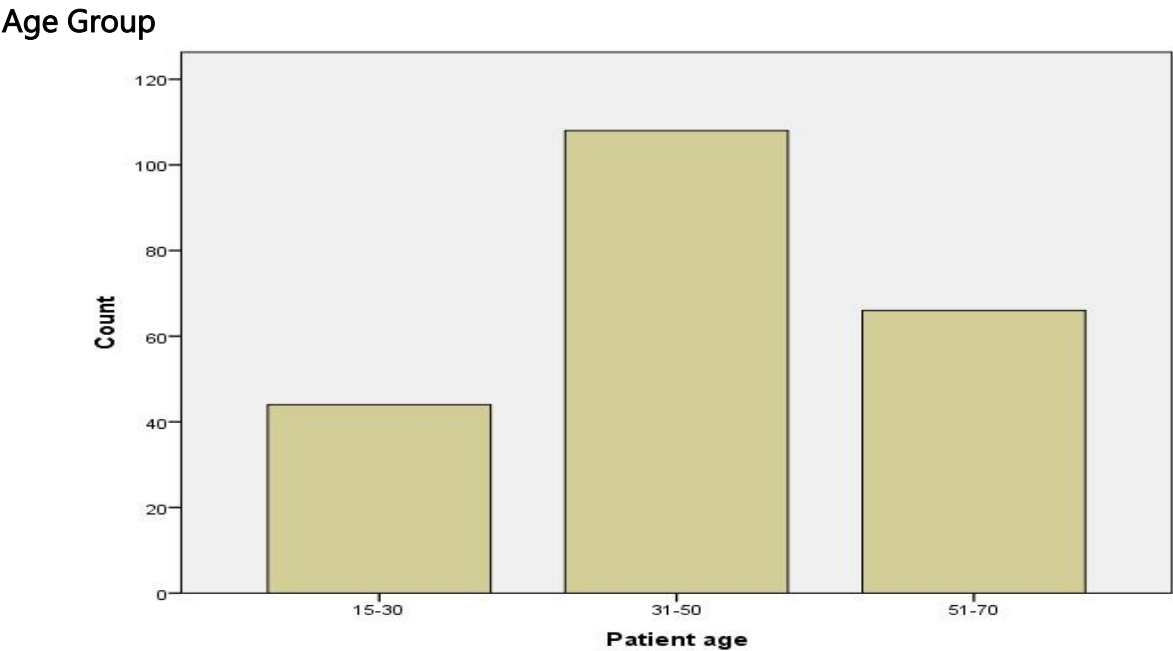


Figure 1: Age of participants

This graph shows that most effected age group is 31-50 years, followed by 51-70 years and the least affected age group are 15-30 years.

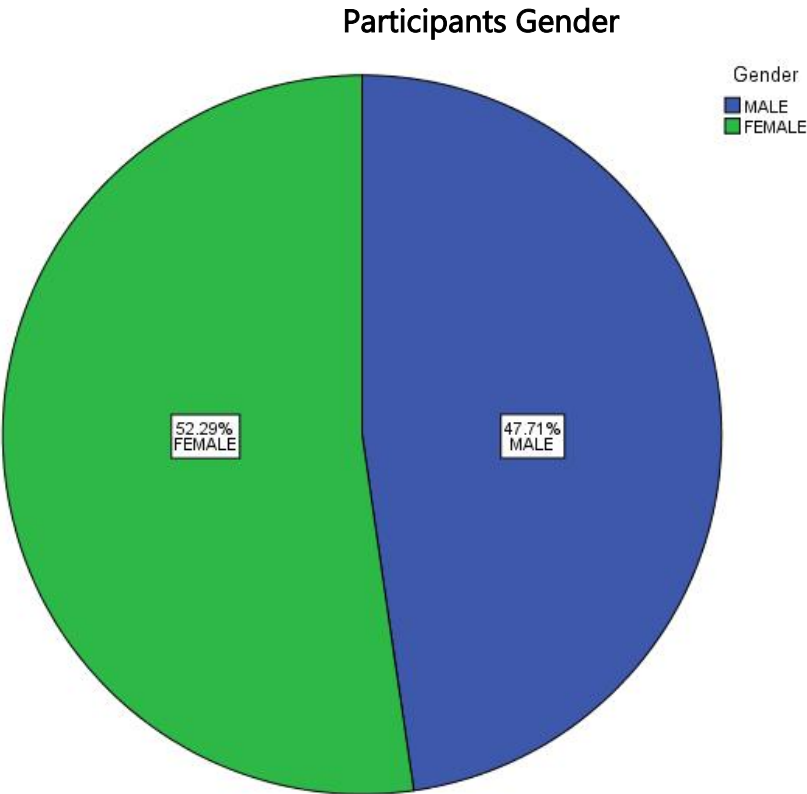


Figure 2: Gender Ratio

This figure shows that female 114 (52.29%) is more effected compare to male 104 (47.71%).

Pathologies of lower back

Pathologies	Frequency	Percent	Valid Percent	Cumulative Percent
Degeneration	23	10.6	10.6	10.6
Herniation	107	49.1	49.1	59.6
spondylosis	16	7.3	7.3	67.0
Spinal stenosis	48	22.0	22.0	89.0
Normal study	24	11.0	11.0	100.0
Total	218	100.0	100.0	

Table 2: Pathologies of lower back

This table shows the different pathologies of lower back Herniation 107 (49.1%) is the most common pathology responsible for lower back pain in this study. Followed by

spinal stenosis (48) 22%, Degeneration (23) 10.6% and the patient with Spondylosis (16) 7.3% were least common cause in this study. There were 24 (11%) Normal patients which have no specific cause of the pain.

Graphical presentation of causes of lower back pain Causes

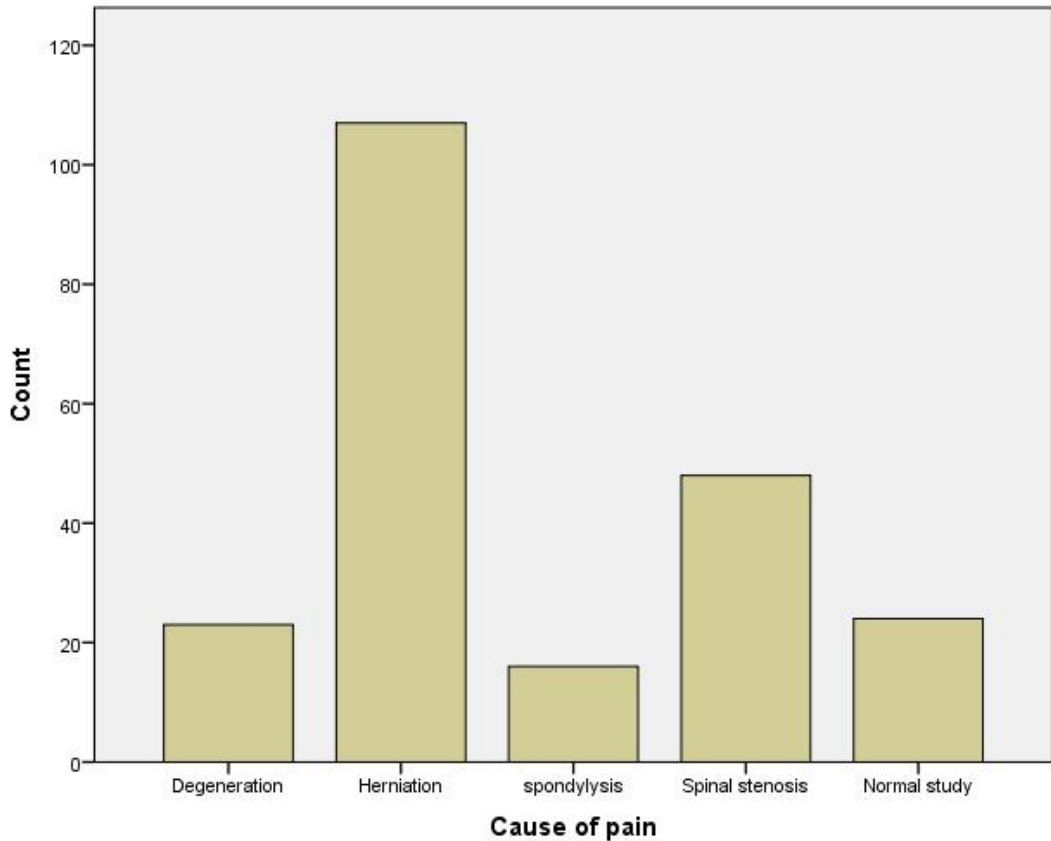


Figure 3: Causes of lower back pain

This figure shows that the most frequent pathology is Herniation followed by Spinal stenosis, Degeneration and the least Common pathology is spondylosis.

Frequency of the most effected disc in patient of lower back pain

Lumbar spine Discs	Frequency	Percent	Valid Percent	Cumulative Percent
L1L2	5	2.3	2.3	2.3
L3L4	34	15.6	15.6	17.9
L4L5	78	35.8	35.8	53.7
L5S1	77	35.3	35.3	89.0

Normal	24	11.0	11.0	100.0
Total	218	100.0	100.0	

Table 3: Frequency of the most effected lumbar vertebral level

This table shows that the most frequent effected lumbar vertebral level is L4L5, 78(35.8%) followed by L5S1, 77(35.3%), L3L4, 34(15.6%) and patients with least effected vertebral level are L1L2, 5(2.3%). There are also 24(11%) normal patients.

Frequency of participants profession

profession				
Profession	Frequency	Percent	Valid Percent	Cumulative Percent
Farmer	12	5.5%	5.5%	5.5%
Driver	3	1.4%	1.4%	6.9%
Businessman	14	6.4%	6.4%	13.3%
other	189	86.7%	86.7%	100.0%
Total	218	100.0%	100.0%	

Table 4. Frequency of participants Profession

This table shows that profession of participants includes farmers 12 (5.5%), Drivers 3(1.4%), Businessman 14 (6.4%) and the others that include students, Govt servants 189 (86.7%).

DISCUSSION

This study was conducted to determine the different lumbar spines diseases in patients associated with LBP detected and investigate at the radiology department of Kuwait teaching hospital Peshawar. A total number 218 patients were examined at MRI section. The frequency of all conditions has been determined in both gender male and female and different age groups.

According to numerous studies, LBP is among the most frequent reasons for hospital visits, as well as the main reason for activity restrictions and missed work in many regions of the world. The person, family, workplace, and society are all seriously economically threatened by LBP [21]. A kind of spinal degeneration is the most frequent cause of lumbar discomfort. Cell-mediated compositional alterations and structural

disturbance are both factors in disc degeneration. Genetic, dietary, mechanical, and traumatic factors may all contribute to the progression of disc degeneration [22].

In our study the frequent disease of lumbar spine is Disc herniation. Disc herniation is most often the result of gradual aging related of wear and tear, and herniated disc can also cause by an injury. In our study disc herniation is contributing to 107 (49.1%) cases of LPB. Other pathologies that is found in our study is Spondylosis, Disc degeneration, and spinal stenosis [23].

In this study social and demographic attributions of the participant included: age, sex, educational status, Marital status and profession. The medical record achieved from the patients include period of Lower Back pain, patients ranking of pain (Mild, Moderate, and Severe), minimizing of pain with bed rest, pain during weight lifting, presence of numbness and previous record of any surgery on back [24].

CONCLUSION

This study was a short attempt to know about the different types of lumbar spines disease in patients with lower back pain. Females 114(52.3%) were more effected compare to male 104(47.7%) and patients with middle age were at high risk to have a lower back pain. Herniation 107(49.1%) were the frequent disease followed by spinal stenosis, degeneration and spondylosis. The most commonly effected lumbar vertebral level is L4L5 78(35.8%) and L5S1 77 (35.3%).

Future research with long-term follow-up is necessary to assess the benefits of treatments based on MRI.

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