Medical Science Journal for Advance Research

Vol. 4 , No. 1, April 2023
e-ISSN: 2774-4892

MRI Diagnosis of Patients Presenting with Low Back Pain

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ABSTRACT

Background: *The spine acts as a protective mechanism and houses and guards the vital and fragile spinal cord. MRI has the advantages of nonionizing radiation and excellent visual skills, especially for soft tissues.* ***Objective:*** *To utilize MRI to diagnose lumbar spine sufferers and determine what's causing their low back discomfort.* ***Material and methodology:*** *The study was a cross-sectional one conducted in a Sialkot, Pakistan, private hospital. A sample size of 83 was considered, and the convenient sampling method was used. Data were considered for six months, from October 2022 to March 2023, with informed consent and by the ethical standards outlined by the university's research council. A 0.35T Neusoft MRI scanner was used. Data were analysed using SPSS version 26.* ***Results:*** *In the current study, 69 (83.1%) were male and 14 (16.9%) were female. More men than women are impacted. The best method for identifying the causes of back pain is the sagittal and axial approach. The most effective method is sagittal and axial for confirming low back pain in around 76 (91.6%) individuals. In this study, 76 (91.6%) individuals had bulging discs. The most common patient complaint is lower back pain.* ***Conclusion:*** *An MRI is the most accurate way to diagnose lumbar-vertebral causes of back pain. The sagittal and axial approach is the most effective way to identify the causes of low backache. The most common patient complaint is lower back pain.*

Keywords: Spine, SpineMRI, MRIParavertebral myospasm, Paravertebral myospasmLumbar, LumbarLow back pain, Low back pain.

Article Information
Received: February 03, 2023; Revised: February 28, 2023; Online: April, 2023

INTRODUCTION

The spinal column consists of elegantly stacked 33 vertebrae.[1, 2] The crucial and delicate spinal cord is housed and protected by the spine, which serves as a protective mechanism.[3, 4] An intervertebral disc separates the thirty-three vertebrae that make up this structure.[5] European guidelines for the therapy of low backache describe it as "pain and discomfort" that is located below the costal border and above the inferior gluteal folds, with or without leg pain. [6] It is an issue that affects all of us. In 1952, Hirsch and Schajowicz made the following observation i.e: in many clinical examinations, people can seek problems of backache with or without pathology.[7] It has long been assumed that disc disease is the main cause of low back pain symptoms.[8] Many imaging methods can be used to confirm the diagnosis.[9] One of these is magnetic resonance imaging (MRI), which is considered the most efficient approach to detecting spinal cancers, infections, and nerve root issues.[10, 11] As a result, it is recognized as the most effective technique for identifying disc abnormalities, spinal tumors, infections, and nerve root diseases.[12, 13] MRI is safe for patients because of non-ionizing radiation.[14]

https://doi.org/10.46966/msjar.v4i1.106

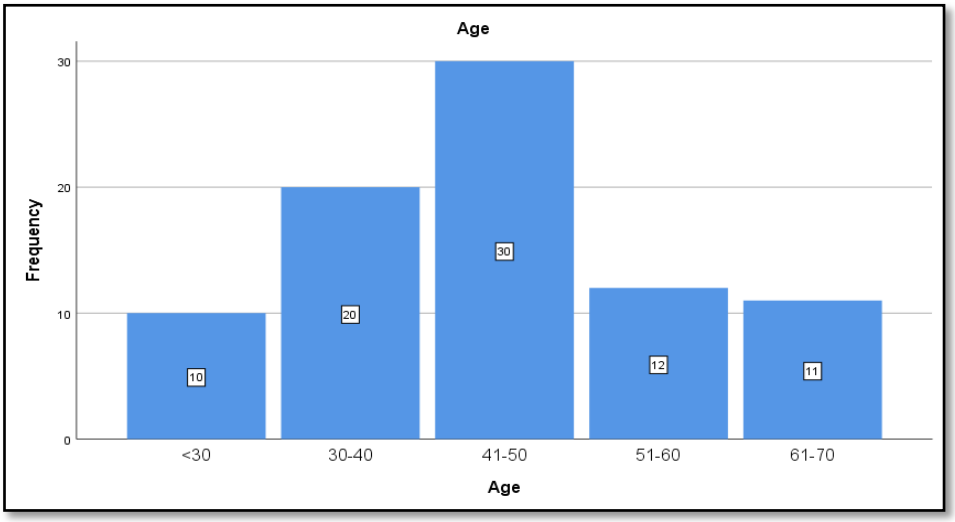
Back discomfort frequently results from illness or harm to the spine's muscles, bones, or nerves.[15] Back pain may also result from disorders of the organs in the pelvis, chest, or abdomen.[16] The main causes are conditions like spinal disc herniation, disc prolapse, and fractures; inflammatory conditions like rheumatoid arthritis and spondylarthritis; and infectious conditions like osteomyelitis or epidural abscesses.[17, 18] To avoid spinal issues, your body position when sleeping has to be in a natural alignment.[19] Put a cushion between your legs if you prefer to sleep on your back. The spinal column might be comfortable because of the little elevation levels.[20] The most reassuring advice for avoiding spine issues is to sometimes have a massage.[21, 22] With a proper massage, the blood flow to the back is also stimulated. Also, do regular exercise to avoid spine issues.[23, 24.] Every one to two years, the Global Burden of Disease (GBD) Study is revised.[25] The GBD research included low back pain as one of the musculoskeletal diseases; the most recent publication that went into great depth about the worldwide burden of LBP was based on the GBD 2010 analysis.[26] The age standardized point prevalence of LBP was 8.20% globally in 1990, and it was 7.50% in 201727. The frequency for females was 8.86% in 1990 and 8.01% in 2017, while for men it was 7.47% in 1990 and 6.94% in 2017.[27] The study's objectives included using MRI to identify disc diseases, developing the best sequences for detecting spine disorders, finding a relationship between patient age and the spinal disc, and identifying the afflicted gender. With the help of this study, physicians can timely identify and treat low back pain and prevent serious problems. It can also help raise awareness about low back pain in people who are not familiar with this issue.

MATERIAL AND METHODOLOGY

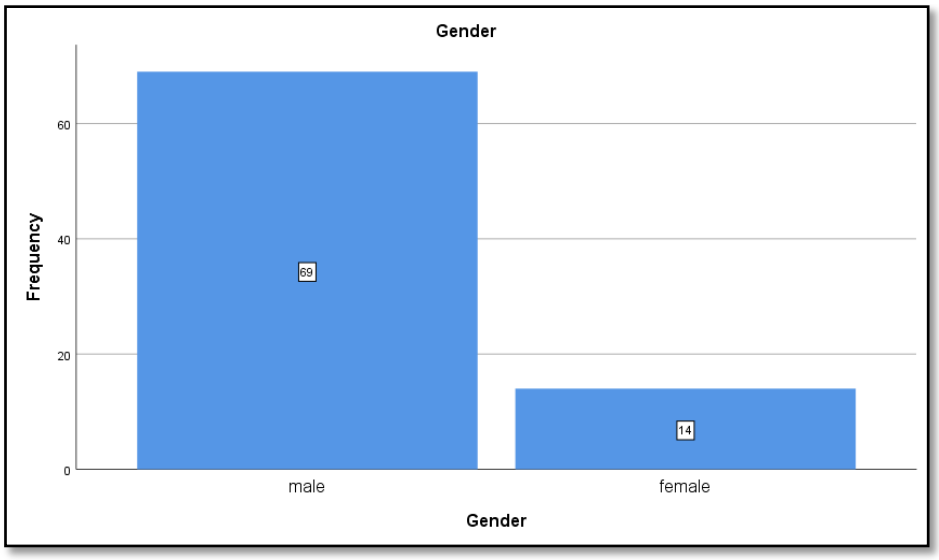
It is a retrospective cross-sectional study conducted in a private-sector hospital in Sialkot, Pakistan. A sample size of 83 was considered from a relevant published study.[28] In this study, the convenient sampling technique is used. This research comprised patients who visited the MRI department with low back discomfort. Data were gathered over six months, from October 2022 to March 2023, with informed permission and in accordance with the university's research committee's ethical guidelines. Patients' names, ages, genders, types of examinations, and procedure details were to be recorded. A Neusoft 0.35T MRI scanner was used. Data were analysed using SPSS version 26. Graphs and tables were used for data summarization.

RESULTS

Most people will experience lower back discomfort at some point in their lives. Back pain is caused by mechanical issues. The success of the specific treatment chosen for each patient will be maximized with careful, early attention to acquiring an accurate diagnosis. Age, gender, technique, and findings employed were all examined on the MR images of 83 patients. **Graph 1** displays the frequency distribution of age groups. There were 10 patients (12.0%) whose ages were less than 30, 20 patients (24.1%) had ages between 30-40, 30 patients (36.1%) had ages between 41- 50, 12 patients (14.5%) had ages between 51- 60, and 11 patients (13.3%) had ages between 61-70. **Graph 2** shows the frequency of the gender of patients. According to graph 2, 69(83.1 %) patients were males and 14(16.9 %) were females. According to **Table 1,** 7(8.4 %), patients were scanned using the coronal plane, and 76(91.6 %) patients were scanned using the axial and sagittal planes. **Table 2** displays that the majority of the 58 patients 58(69.9%) with paravertebral myospasm issues and the 25 patients (30.1%) with no paravertebral myospasm issues have LBP. **Table 3** displays the frequency and percentage of findings from patients. According to Table 3, 2(2.4%) patients were normal, 5(6.0%) patients had degenerative changes, and 76(91.6%) patients were suffering from disc bulging.



Graph 1: the frequency distribution of age groups



Graph 2: Frequency and percentage of Gender of patients

Table 1: Protocol used in MRI scan

Protocol			
		Frequency	Percent
Valid	sagittal and axial	76	91.6
	coronal	7	8.4
	Total	83	100.0

Table 2: Frequencies of Paravertebral Myospasm

Paravertebral Myospasm			
		Frequency	Percent
Valid	yes	58	69.9
	no	25	30.1
	Total	83	100.0

Table 3: Frequencies of findings

Findings			
		Frequency	Percent
Valid	normal	2	2.4
	degenerative changes	5	6.0
	LV4-LV5(disc bulge)	76	91.6
	Total	83	100.0

DISCUSSION

This descriptive, retrospective, cross-sectional hospital-based study examined the function of the lumbar MRI scan in the diagnosis of lower backache. Patients had to be registered, including their age, gender, examination type, and procedure. In the current study, there were 10 patients (12.0%) under the age of 30, 20 patients (24.1%) between the ages of 30 and 40, 30 patients (36.1%) between the ages of 41 and 50, 12 patients (14.5%) between the ages of 51 and 60, and 11 patients (13.3%) between the ages of 61 and 70. Similar findings from a prior study by Saad et al. published in 2018 indicate that individuals between the ages of 41 and 50 are more likely to experience low backache.[29] The number of spinal injuries is higher in elderly and younger patients. In the current study, 14 (16.9%) patients were female, and 69 (83.1%) patients were men. In the current study, 76 patients (91.6%) and 7 patients (8.4%) had axial and sagittal plane scanning, respectively. According to earlier investigations by Saad et al. published in 2018, the sagittal and axial approach is the best for determining the reasons for back pain.[13, 29] The present study shows that patients 58(69.9%) suffer from paravertebral myospasm. In the current study, there were 2 patients (2.4%) with normal, 5 patients (6.0) with degenerative changes, and 76 patients (91.6%) with disc bulges. D. Lee Bennett, in a 2006 publication, said mild degenerative disc disease was the most prevalent abnormality.[30] Thus, males are more likely to experience it than females. The therapeutic implications of the findings should be taken into consideration when assessing their significance. In this study, 76(91.6%) patients were suffered from disc bulging. The role of magnetic resonance imaging data in clinical choices about the therapy of low backache and it's prognosis depends greatly on the efficacy of MRI in diagnosing lumbar spinal disease.[31]

CONCLUSION

MRI is a powerful method for identifying the lumbar vertebral causes of back pain. MRI has developed into a fascinating method that is risk-free and incredibly accurate. The sagittal and axial technique is the most effective strategy for finding the causes of low back pain. The importance of MRI results in clinical choices on the therapy of low back pain heavily influences the efficacy of MRI in diagnosing lumbar spinal disease.

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