

## The Role of MRI in the Diagnosis of Spinal Disorders among Construction Workers in Al Nasiryah City

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**Abstract:** The objective of this study is to ascertain the role of magnetic resonance imaging (MRI) in the diagnosis of spinal disorders among construction workers in Al Nasiryah City. To this end, data on the age, height, and weight of 140 Iraqi patients with spinal disorders from various hospitals were collected between September 2022 and February 2023. The primary causes and symptoms of these disorders were identified through MRI, thus allowing for a comprehensive understanding of their condition. The study employed the statistical software package SPSS Version 25 to analyse a number of variables, including age, gender, and the findings of the MRI scans from the 140 reports. The mean and standard deviation were used to gain insights, with a p-value of 0.05 applied to identify any significant differences, and a Pearson chi-square test was used to examine the relationship between the review factors and the study period, which ran from 3 September 2022 to 1 February 2023 where MRI results found the distribution of patients according to MRI results was as follows: Bony disorders with 50 % and for 70 patients, Disc disorders for 40 patients with %28.57, Spondylo-degenerative disorders for 30 patients with % 21.43 with a direct relationship was found between Spinal disorder and MRI diagnosis.

**Keywords:** MRI, Patients, Spinal Disorders, Disc disorders, BMI.

### INTRODUCTION

Chronic spinal disorders represent a significant proportion of the caseload in daily practice. This is becoming increasingly prevalent due to alterations in health and nutritional habits, most notably the posture adopted during work, participation in sports that exert a direct influence on the spine, a traumatic history (especially in the context of injury) [van Den Hauwe, L. S. P. *et al.*, 2020; Shabani, S. *et al.*, 2019; Goldman, L. W. *et al.*, 2007], weight gain and daily tasks that result in microtraumas to the structures of the cervical spine. Static magnetic resonance imaging (MRI) has certain limitations in demonstrating the underlying cause of painful symptoms, whether radiculopathy or myelopathy [Goldberg, A. L. *et al.*, 2010]. This is because, in the supine position, the force of gravity applied to the spine exerts direct pressure on the ventral face of the vertebral bodies, leading to an increase in the opening of the intervertebral spaces and, in some cases, the correction of cervical lordosis. This can result in the concealment of disc diseases such as herniation, spondylolisthesis, or vertebral body instability [Riedel, C. H. *et al.*, 2012]. However, in the flexion position, the force of gravity is modified, increasing the weight and force of gravity in the axial direction on the cervical spine. This leads to increased intradiscal pressure, which simulates the situation in which the symptoms and

disc deformities of the patient become more pronounced. Magnetic resonance imaging (MRI) is a non-invasive imaging method that is widely used for the diagnosis of a variety of conditions. The use of an MRI machine allows medical professionals to determine whether an injury or disease is affecting soft tissues or organs in the body. Magnetic resonance imaging (MRI) is a medical imaging procedure that can, among other uses, assist in the diagnosis of spinal disorders. [Daffner, R. H. *et al.*, 2007; Tahvonen, P. *et al.*, 2013; McMaster, M. J. *et al.*, 2006]

Magnetic resonance imaging (MRI) machines contain a large, powerful magnet that generates an intense magnetic field. The magnetic field exerts a force on the particles within the body's organs and tissues, causing them to orientate themselves in a specific direction. Subsequently, a computer transmits radio waves into the magnetic field, which are then directed towards the aligned particles. Upon reaching the aligned particles, the radio waves interact with them, resulting in a recorded signal on the sensors; subsequently, the computer transforms these signals into images [Trenka, A. P. *et al.*, 2016; Wang, Y. X. J. *et al.*, 2017; McMaster, M. J. *et al.*, 1999]

Spine tumors are classified into extradural, intradural-extramedullary, and intramedullary

categories. Most metastases are found in the extradural compartment, often in vertebral bodies. The most affected segments are the thoracic spine (70%), lumbar (20%), cervical, and sacral segments (10%). The most common route of dissemination is hematogenous, with the venous route being more important. Arterial metastases are usually near vertebral endplates [Chaturvedi, A. et al., 2018; Silberstein, M. et al., 1992; Yamashita, Y. et al., 1991].

## PATIENTS AND METHOD

A data collection for 140 patients process was undertaken on Iraqi patients suffering from spinal disorders from several different hospitals in Iraq, with a study period of one year ranging from 3rd September 2022 to 1st February 2023. In this study, a specific age group comprising individuals between the ages of 30 and 50 years was the focus of investigation. They underwent magnetic resonance imaging (MRI) for the purpose of diagnosing spinal disorders. In this study, preliminary data pertaining to the patients was gathered, comprising information on age, height, and weight. Furthermore, the primary causes of the patient's spinal disorders were identified, as were the principal symptoms, which included:

The symptoms included back pain, numbness or tingling, weakness, difficulty walking, changes in

bladder or bowel function, and limited range of motion.

Using SPSS Version 25, the study analyzed variables like age, gender, and MRI findings from 140 reports. Mean enlightening insights and standard blunders were utilized, with a p-worth of 0.05 for unmitigated information and Pearson chi-square test for a relationship between review factors.

This study centers around the GE X-ray 1.5 Tesla, a typical clinical imaging gadget for lumbar spine torment assessment. The technique requires the expulsion of metal articles and patient rest to get the best picture. A spine coil wrap is used in the MRI, which takes 30 to 60 minutes.

## Contraindications

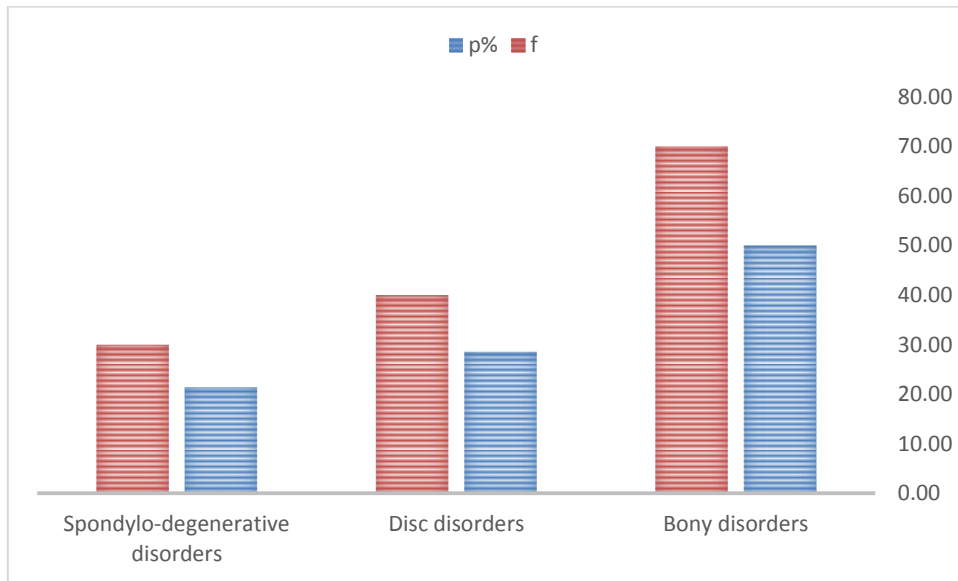
- Patients with pacemakers
- Those who have undergone surgery for an artificial heart valve of unknown material
- Cochlear implants,
- Metal fragments remaining in the eye socket
- Metal foreign bodies or surgical implants in the head and neck
- Women in early pregnancy
- Patients with room phobia

## RESULTS

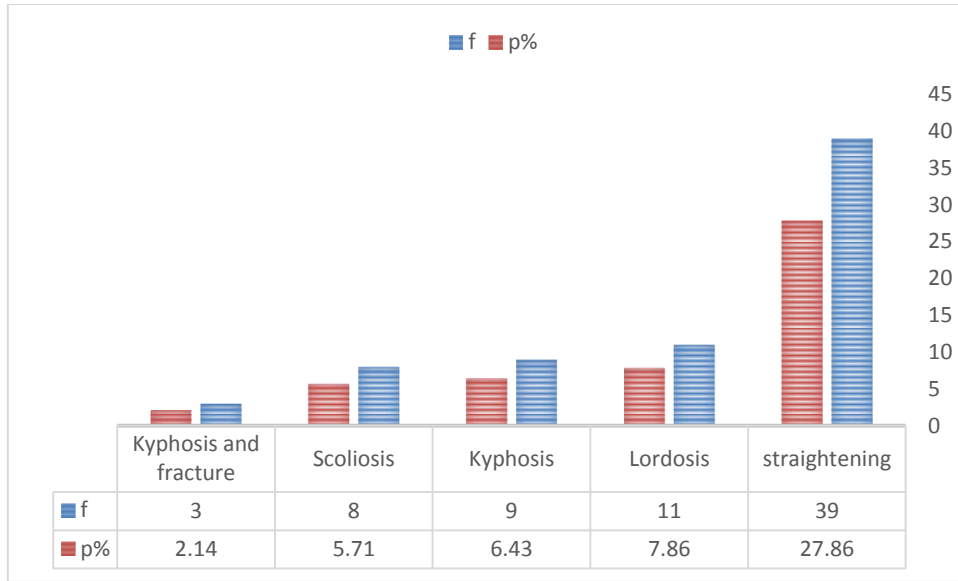
**Table 1:** General characteristics of patients with spinal disorders

Variable	Details
<b>Age</b>	
Mean and SD	<b>38.1±4.4</b>
<b>Sex, f (p%)</b>	
Male	<b>77 (55)</b>
Female	<b>63 (45)</b>
<b>BMI</b>	
MEAN AND SD	<b>29.9±2.77</b>
<b>The reasons f (p%)</b>	
Poor posture and ergonomics	29 (20.71)
Degenerative disc disease	31 (22.14)
Herniated discs	20 (14.29)
Spinal stenosis	19 (13.57)
Trauma	28 (20)
Genetics and family history	13 (9.29)
<b>Symptoms f (p%)</b>	
Back pain	44 (31.4)
Numbness or tingling	21 (15)
Weakness	19 (13.5)
Difficulty walking	19 (13.5)
Changes in bladder or bowel function	20 (14.2)
Limited range of motion	17 (12.1)
<b>Educational level f (p%)</b>	

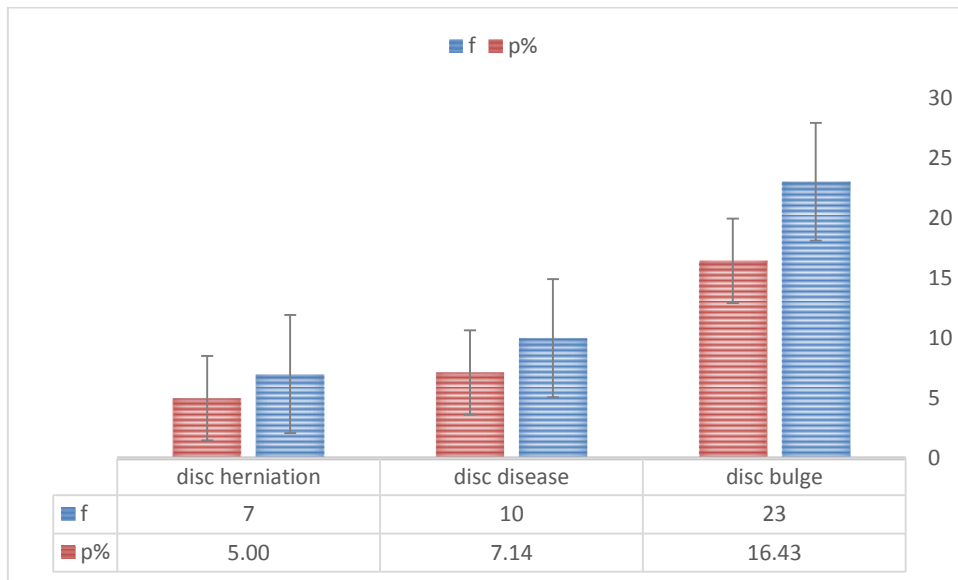
<b>Primary</b>	19 (13.57)
<b>Secondary</b>	33 (23.5)
<b>College</b>	71 (50.71)
<b>High education</b>	17 (12.14)
<b>Outcomes f (p%)</b>	
300 to 600 \$	44 (31.4)
700 to 1000\$	80 (57.1)
Larger than 1000	16 (11.4)
<b>Comorbidities f (p%)</b>	
hypertension	37 (26.43)
diabetes	33 (23.57)
cardiovascular disease	22 (15.71)
chronic kidney disease	17 (12.14)
obesity	30 (22.14)
<b>Smoking f (p%)</b>	
Yes	<b>45 (32.1)</b>
No	<b>95 (67.8)</b>
<b>Genetic factors f (p%)</b>	
Yes	<b>13 (9.29)</b>
No	<b>127 (90.7)</b>
<b>Evaluation of motor activity results</b>	
Activity count/min	
Mean and SD	231 ± 90



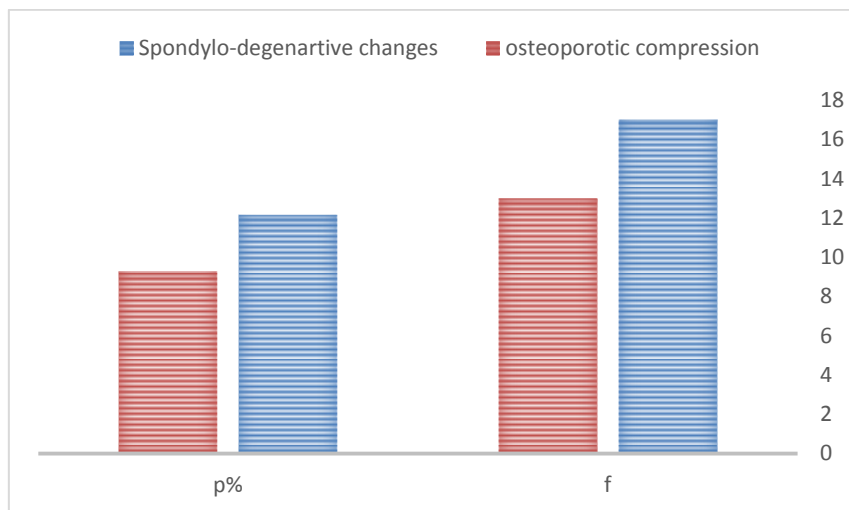
**Fig 1:** Distribution of patients according to MRI results



**Fig 2:** Distribution of patients according to Bony disorders



**Fig 3:** MRI results of Disc disorders



**Fig 4:** MRI results of Spondylo-degenerative disorders

**Table 2:** Logistic regression to assess risk factors for spinal disorder

v	OR	95% CI	P VALUE
Laziness and lack of physical activity	2.1	(1.823-4.177)	0.023
Obesity	2.7	(1.6-5.44)	0.005
Improper lifting of heavy loads	4.3	(1.326-6.9)	0.001
Chronic diseases	1.87	(1.5432-3.884)	0.093
Age	1.23	(0.89-1.66)	0.23
Sex	1.432	(1.3-2.2)	0.7734

**Table 5:** Person correlation to assessment strong of the relationship between Spinal disorder and MRI diagnosis

	MRI
R correlation	0.928
Sig	0.004
Diagnostic Accuracy	97.7%
Sensitivity	91.2%
Specificity	83.1%

## DISCUSSION

The present study examined the role of magnetic resonance imaging (MRI) in the diagnosis of spinal disorders in patients from Iraq. In this study, a total of 140 patients were recruited from multiple medical facilities, with a mean age range of 30 to 50 years. It was observed that the body mass index of Iraqi patients was elevated, which is indicative of a lack of physical activity throughout the week. Consequently, a spinal disorder is produced.

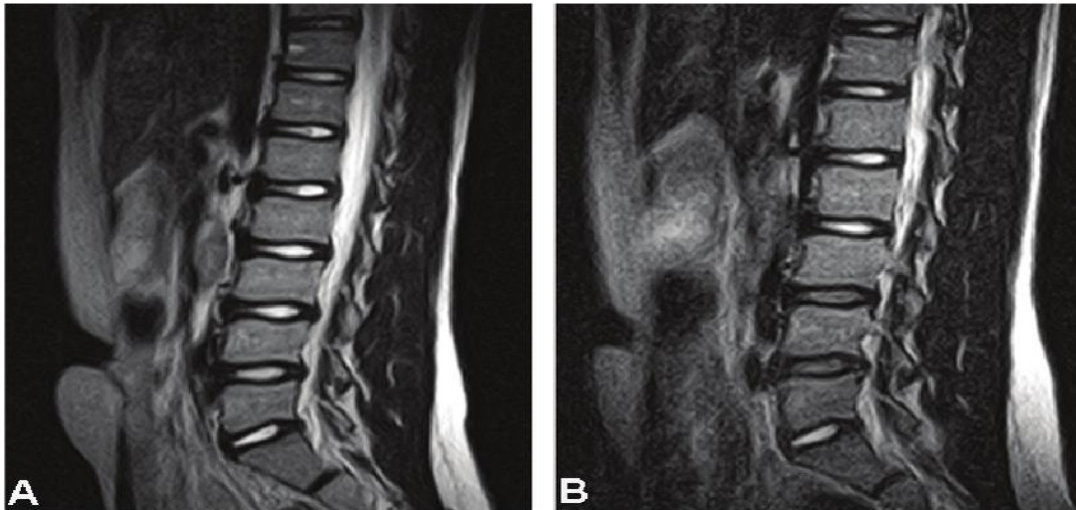
Complex spinal disorders are defined as conditions that alter the structure and stability of the spine. Such conditions affect the bones (vertebrae), the intervertebral discs, the joints, and the soft tissues. Such disorders may affect the lumbar (lower back), thoracic (upper back), or cervical (neck) regions of the spine.

Complex spinal disorders are associated with a range of symptoms, including pain, as well as potential impairments in walking, balance, coordination, breathing, sphincter control, and sexual function. Complex spinal disorders are caused by a number of factors, including infections in the spine or the fluid surrounding the spinal cord, fractures, and tumours. Herniated discs are defined as those in which the discs between the vertebrae rupture, bulge, or bulge. Degenerative

disc disease is a condition characterized by the deterioration of the discs between the vertebrae. This deterioration may be due to a number of factors, including ageing, stress, or normal 'wear and tear.'

Additionally, abnormal wear and tear of the cartilage in the joints and vertebrae may also contribute to this condition. Spondylolisthesis and spinal stenosis are other conditions that may be encountered in the context of spinal disorders where the symptoms of spinal disorders include lower back pain, which may extend to the legs or feet, and an inability to stand without experiencing pain. Additionally, there is often a reduction in range of motion and ability to bend [Silberstein, M. *et al.*, 1993; Demaerel, P. *et al.*, 2006; Andreoli, C. *et al.*, 2005]. These symptoms are typically caused by stress or bad habits and are usually temporary, lasting for a few days or weeks, and the most common symptom distributed was Back pain for 44 patients with (31.4%).

In this study, the distribution of patients according to MRI results was as follows: Bony disorders with 50 % and for 70 patients, Disc disorders for 40 patients with %28.57, Spondylo-degenerative disorders for 30 patients with % 21.43



**Fig 5:** MRI results of patients

The discs between the vertebrae in the spine serve to absorb shock and provide cushioning between each vertebra when they are in a healthy state. As the discs undergo deterioration and lose their functionality, they may result in the onset of pain and a multitude of other symptoms [Flanders, A. E. *et al.*, 1999; Selden, N. R. *et al.*, 1999]. The lack of cushioning for the vertebrae results in a reduction in shock absorption. As the discs lack a blood supply, they are unable to regenerate once they begin to deteriorate. Although osteological disorders are a natural consequence of the ageing process, there are other factors that contribute to their occurrence. Dehydration is another potential cause. The discs of the spine are primarily composed of water.

As a consequence of the natural ageing process, the discs gradually lose moisture, which results in a reduction in both thickness and height. Consequently, the discs provide less cushioning and absorb less shock. Furthermore, they may also fracture. The spine provides the structural support for all movements of the body [Shepard, M. J. *et al.*, 1999]. Consequently, the spinal cord is an astonishing example of resilience. However, such movements exact a toll.

Table 2 presents the results of a logistic regression analysis conducted to identify potential risk factors for spinal disorders. The analysis revealed that the most significant risk factors in this study were: The results indicated that improper lifting of heavy loads (OR 95% CI 4.3 (1.326- 6.9)) and obesity (OR 95% CI 2.7 (1.6- 5.44), P VALUE 0.005) were significant risk factors. Additionally, laziness and lack of physical activity (OR 95% CI 2.1 (1.823 4.177)) were identified as contributing factors with a P value of 0.023.

## CONCLUSION

MRI scans are easy and safe, and no health risks have been associated with the magnetic field or low-energy radio waves used in the test. The procedure can be repeated without side effects, where in this study, a direct relationship was found between Spinal disorder and MRI diagnosis.

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