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Prevalence of Spinal and Bony Structural Disorders in Saudi Adult Using MRI in Different Genders

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Abstract

Background: Magnetic resonance imaging is the primary imaging modality for the evaluation of spinal cord and spinal column disorder. **Aims:** to assess the prevalence of bony structure and spinal disorders in the Saudi population and to find a correlation between patient age and gender. **Material and Methods:** A retrospective study was conducted using magnetic resonance imaging in Al-Taif city from November 2020 to February 2021 at King Abdul-Aziz Specialist Hospital and King Faisal Hospital in Taif City, Kingdom of Saudi Arabia, to assess the prevalence of bony structure and spinal disorders in the Saudi population. The data was collected after gaining ethical approval from the directorate of health affairs in Taif's administration of research and studies, and then analyzed using SPSS version 25 to determine the frequency and percentage of disorder. To check if there was a significant difference between the two groups, the Pearson's chi square test was utilized. **Results:** One hundred young adults underwent MR examination of the spine. The results show that the most common age group affected by spinal disorders is over 50 years (53%), the most common bony structural spinal disorders are straightening 59%, followed by lordosis (20%), and the most common disc disorders are disc bulges (15%), and the most common degenerative changes are spondylo-degenerative changes (21%), and there is no significant correlation between genders and MRI findings (p-value). **Conclusion:** The study found that straightening is the most prevalent MRI-diagnosed spine disorder, followed by degenerative illnesses and that there is no significant association between gender and the type of MRI-diagnosed spinal disorders.

Keywords

MRI, Spinal, Disorders, Gender

1. Introduction

Spinal problems affect the vertebrae, intervertebral discs, facet joints, tendons, ligaments, muscles, spinal cord, and nerve roots, among other things [1]. The spine is the body's central support structure; it protects and conducts the spinal cord while also allowing for flexibility and shock absorption. The mechanical qualities and anatomic shape of the vertebrae, discs, and surrounding soft tissues are all affected by spinal degeneration [2].

X-rays were the only imaging tool available at the direct site of the spine just a few years ago. This test is valid and useful for analyzing vertebral curves, but it also demonstrates when measurements are required to avoid difficulties caused by the test's limitations or structural image overlap for disk structures. Magnetic resonance imaging (MRI) is the most comprehensive imaging technique available, correctly portraying soft tissue and skeletal structures and detecting subtle abnormalities with high sensitivity. MRI stands for magnetic resonance imaging [3].

Spine curvatures (kyphosis, lordosis, and scoliosis), disc diseases, and degenerative spondylitis alterations are among the types of degenerative spinal pathologies studied in this study. The prevalence of these diseases was also assessed based on gender.

Previous studies in Nigeria have reported a wide range of prevalence of low back pain of 38% to 73.5% in the literature [4] [5] [6] [7] in agreement with the reported figures in Western and African Countries [8]. In this study, the researcher evaluated the prevalence of spinal and bony structural disorders in Saudi population adults using MRI in different gender.

2. Materials and Methods

Between November 2020 and February 2021, a retrospective study was conducted at the MRI departments of King Faisal Specialist Hospital and King Abdul-Aziz Specialist Hospital to investigate the prevalence of spinal disorders in the Saudi population using MRI correlated to gender. With a serial number (RB Registration Number With KACST, KSA: HAP-02-T-067), a written ethical approval was obtained from King Faisal specialized hospital and King Abdul-Aziz specialist, then from the administration of research and studies in the directorate of health affairs in Taif.

Data was gathered using data collection sheet containing all the variables. A total of 100 MRI reports were included in the sample. All of the patients were imaged using a general electric MR machine 1.5 tesla. The following information was taken from the patient records: ages, gender, and MRI findings. The statistical package for the social sciences (SPSS) Version.25 was used to analyze the data. Mean descriptive statistics to summarize the data; the standard error was employed. The level of statistical significance for these correlations was set at $p = 0.05$ regarded as statistically significant for categorical data and then used the Pearson chi-square test to correlate between study variables.

MRI spine:

There are several types of medical imaging available, but we focused on the most frequent device in this study: the GE MRI 1.5 Tesla. The MRI of the lumbar spine, which is frequently used to examine lower back pain, does not require any preparation, but you should remove all metal objects and ask the patient to remain still to obtain the best MRI image. Imaging takes 30 - 60 minutes on average. The patient will lie supine on the examination table with a spine coil wrapped around him. The technician will then arrange the patient in the proper posture, with the longitudinal alignment light in the midline and the horizontal alignment light passing through the third lumbar vertebrae.

3. Results

The study found that spinal disorders are more common in males 54%, the older age are affected with spinal disorders than the younger age group, and more than half of the affected participants are in age more than 50 years (Table 1).

Concerning MRI finding the bony disorders are more than others, and the most common spinal bony disorders are straightening 59%, followed by lordosis 20%, then the disc disorders with disc bulge more than others 15% then the spondylo-degenerative changes 21% (Table 2).

The most affected region in the spine is lumber 57% and cervical 39% (Figure 1).
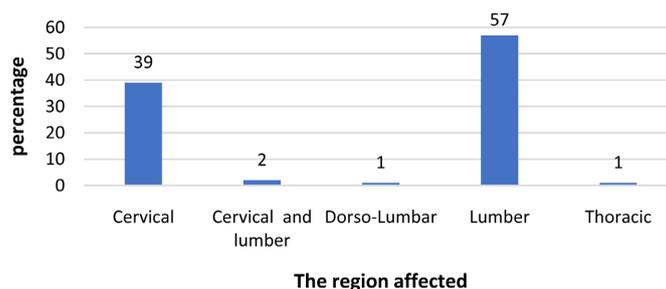
Figure 1. The region affected.

Table 1. Demographic data.

Demographic data	Frequency	Percent
Gender		
Female	46	46.0
Male	54	54.0
Total	100	100.0
Age group		
19 - 29	17	17.0
30 - 39	20	20.0
40 - 49	10	10.0
50 and more	53	53.0

No significant correlation was found between MRI final diagnosis and genders, with a p-value of more than 0.05, despite that straitening and lordosis are more common in males, while kyphosis and scoliosis are more in females, the degenerative disc diseases and spondylo-degenerative diseases are more common in females (Table 3).

Table 2. MRI finding.

MRI findings	Frequency	Percent
Bony disorders		
straightening	59	59.0
Lordosis	20	20.0
Kyphosis	8	8.0
Scoliosis	3	3.0
Kyphosis and fracture	1	1.0
Lordosis and scoliosis	1	1.0
Disc disorders		
degenerative disc disease	7	7.0
disc bulge	15	15.0
disc disease	1	1.0
disc herniation	1	1.0
Spondylo-degenerative disorders		
Spondylo-degenartive changes	21	21.0
Spondylo-degenartive changes and osteoporotic compression	1	1.0

Table 3. Cross tabulation between finding and gender.

MRI findings	Frequency	Percent	p values
Bony disorders			
Disorders	Male	Female	
Straightening	33	26	0.397
Lordosis	11	9	
Kyphosis	2	6	
Scoliosis	1	2	0.400
Kyphosis and fracture	1	0	
Lordosis and scoliosis	1	00	
Disc disorders			
degenerative disc disease	2	5	
disc bulge	8	7	0.466
disc disease	1	0	
disc herniation	1	0	
Spondylo-degenerative disorders			
Spondylo-degenartive changes	7	14	
Spondylo-degenartive changes and osteoporotic compression	1	0	0.073

p-value > 0.05.

4. Discussion

This study intended to assess the prevalence of spinal illnesses diagnosed by MRI, which is the imaging method of choice for the majority of spinal problems.

The study revealed that the spinal disorders are more common in males 54%, the older age are affected with spinal disorders than the younger age group, and more than half of the affected participants are in age more than 50 years. One study looked at the pathology of the lumber spine in back pain patients and found that roughly 53% of them were men, with 69 percent mentioning indications of nerve root compression. In 3% of the individuals, serious diseases were discovered. MRI findings were abnormal in 94 percent of the patients. [9] Of the 100 patients tested for all spinal column diseases in this study, around 54 percent were men.

Straightening and lordosis were identified to be the most common bone structural abnormalities in the spine in this investigation. Disc bulge is common in the asymptomatic population, and it's typically overlooked because it's not linked to low back pain. In asymptomatic populations, the prevalence of disc bulges ranges from 20% in young adults to >75% in patients over 70 years of age [10]. The prevalence of disc bulging was 15% in this study.

The bony disorders of the spinal column, such as straightening, are more common in males, whereas degenerative diseases are more common in females in this study. The degenerative diseases are more common in females in this study because estrogen levels are low in females 50 years or older, and more than half of the study samples are 50 years or older. The findings of this study support the findings of Parenteau, Chantal S, *et al.*, who found that females have a higher prevalence of spine degeneration than males. Despite the fact that straitening and lordosis are more common in males, kyphosis and scoliosis are more common in females, and degenerative disc diseases and spondylo-degenerative diseases are more common in females, no significant correlation was found between MRI final diagnoses and genders, p-value greater than 0.05.

As previously stated, the most common diseases of the cervical and lumbar spines were neck and lower back pain (LBP). Leboeuf-Yde *et al.* [11] and Elfering and Mannion [1] revealed that LBP was the most common, followed by neck pain, and finally thoracic discomfort, in a population-based study of 34,902 adult Danish twins. LBP was projected to have a lifetime prevalence of 75 - 85 percent, a 12-month prevalence of 15 - 45 percent, a 12-month incidence of up to 20 percent, and an annual recurrence rate of up to 60 percent [12]. According to a comprehensive study of the global prevalence of LBP, the point prevalence of LBP was 11.9 percent, and the one-month prevalence was 23.2 percent [6].

5. Conclusion

Straightening is the most prevalent MRI-diagnosed spine problem, followed by degenerative illnesses, according to the study. Despite the fact that degenerative diseases are more common in females than males, there was no significant link

between genders and the categories of MRI-diagnosed spinal abnormalities.

6. Limitations

Loss of sufficient information to support the search, difficulties acquiring enough information regarding spine illnesses, insufficient time to collect more data, and COVID-19 are all limitations of this study. More research should be done to recommend that clinical information be added.

Conflicts of Interest

The author said that no conflict of interest exists.

References

[1] Elfering, A. and Mannion, A.F. (2008) Epidemiology and Risk Factors of Spinal Disorders. In: Boos, N. and Aebi, M., Eds., *Spinal Disorders: Fundamentals of Diagnosis and Treatment,* Springer, Berlin.

[2] Parenteau, C.S., Lau, E.C., Campbell, I.C. and Courtney, A. (2021) Prevalence of Spine Degeneration Diagnosis by Type, Age, Gender, and Obesity Using Medicare Data. *Scientific Reports*, **11**, Article No. 5389.
https://doi.org/10.1038/s41598-021-84724-6

[3] Michelini, G., Corridore, A., Torlone, S., Bruno, F., Marsecano, C., Capasso, R., Caranci, F., Barile, A., Masciocchi, C. and Splendiani, A. (2018) Dynamic MRI in the Evaluation of the Spine: State of the Art. *Acta Biomedica*, **89**, 89-101.

[4] Omokhodion, F.O., Umar, U.S. and Ogunnowo, B.E. (2000) Prevalence of Low Back Pain among Staff in a Rural Hospital in Nigeria. *Occupational Medicine*, **50**,107-110.
https://doi.org/10.1093/occmed/50.2.107

[5] Rufa'I, A.A., Sa'idu, I.A., Ahmad, R.Y., Elmi, O.S., Umar Aliyu, S., Jajere, A.M. and Digil, A.A. (2015) Prevalence and Risk Factors for Low Back Pain Among Professional Drivers in Kano, Nigeria, *Archives of Environmental & Occupational Health*, **70**, 251-255. https://doi.org/10.1080/19338244.2013.845139

[6] Fabunmi, A.A., Aba, S.O. and Odunaiya, N.A. (2005) Prevalence of Low Back Pain among Peasant Farmers in a Rural Community in South West Nigeria. *African Journal of Medicine and Medical Sciences*, **34**, 259-262.

[7] Ogunbode, A.M., Adebusoye, L.A. and Alonge, T.O. (2013) Prevalence of Low Back Pain and Associated Risk Factors amongst Adult Patients Presenting to a Nigerian Family Practice Clinic, a Hospital-Based Study. *African Journal of Primary Health Care & Family Medicine*, **5**, Article 441. https://doi.org/10.4102/phcfm.v5i1.441

[8] Louw, Q.A., Morris, L.D. and Grimmer-Somers, K. (2007) The Prevalence of Low Back Pain in Africa: A Systematic Review. *BMC Musculoskeletal Disorders*, **8**, Article No. 105. https://doi.org/10.1186/1471-2474-8-105

[9] de Schepper, E.I., Koes, B.W., Veldhuizen, E.F.H., Oei, E.H.G., Bierma-Zeinstra, S.M.A. and Luijsterburg, P.A.J. (2016) Prevalence of Spinal Pathology in Patients Presenting for Lumbar MRI as Referred from General Practice. *Family Practice*, **33**, 51-56. https://doi.org/10.1093/fampra/cmv097

[10] Brinjikji, W., Diehn, F.E., Jarvik, J.G., Carr, C.M., Kallmes, D.F., Murad, M.H. and Luetmer, P.H. (2015) MRI Findings of Disc Degeneration are more Prevalent in Adults with Low Back Pain than in Asymptomatic Controls: A Systematic Review and Meta-Analysis. *American Journal of Neuroradiology*, **36**, 2394-2399.

https://doi.org/10.3174/ajnr.A4498

[11] Leboeuf-Yde, C., Nielsen, J., Kyvik, K.O., Fejer, R. and Hartvigsen, J. (2009) Pain in the Lumbar, Thoracic or Cervical Regions: Do Age and Gender Matter? A Population-Based Study of 34,902 Danish Twins 20-71 Years of Age. *BMC Musculoskeletal Disorders*, **10**, Article No. 39. https://doi.org/10.1186/1471-2474-10-39

[12] Hoy, D., Bain, C., Williams, G., March, L., Brooks, P., Blyth, F., *et al.* (2012) A Systematic Review of the Global Prevalence of Low Back Pain. *Arthritis & Rheumatis*, **64**, 2028-2037. https://doi.org/10.1002/art.34347