

Frequency of Disc Degeneration at Different Levels of Lumbar Vertebrae in Adult Patients with Backache on Magnetic Resonance Imaging

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Abstract

Objective: To Determine the Frequency of Disc Degeneration at Different Levels of lumbar Vertebrae in Adult Patients with lower back Pain on Magnetic Resonance Imaging.

Study Design: An analytical cross-sectional descriptive study was performed.

Settings: The study was performed in Bashir Neurospine Institute and Al-Razi Healthcare center, Lahore.

Period: An Analytical cross sectional study was conducted from 15 October, 2020 to 15 January 2021.

Material and Methods: In our study, all those adult patients with lower back pain, obese, dull ache, numbness, tingling, pins and needle sensations, muscles spasms were included. And those patients who were not giving consent, spondylosis, lumbar spine stenosis, cervical and thoracic abnormalities, paedes, and those who were uncooperative were excluded. Data was tabulated and analyze with the help of statistical package for the social science (SPSS version 24). The data was reported using cross sectional descriptive statistics.

Results: In our research out of 160 patients 89 females and 51 males were those who diagnosed with disc degeneration and 10 females and 10 male in which disc degeneration was absent. 10 patients out of 160 patients were those who diagnosed with disc degeneration at the level of L1 - L2 between the age of 24 to 87, 8 patients were those in which disc degeneration present at the level of L2- L3 between the age of 43 to 87, 31 patients were those in which disc degeneration present at the level of L3-L4 and 96 patients diagnosed with disc degeneration present at the level of L4- L5 which is the lowest lumbar vertebra between the age of 55 to 80 years.

Overall out of 160 patients only 3 patients were those who represent with mild pain (25yrs) and 102 were those who came with moderate pain (27-90yrs) and 55 patients who represent with severe backache (30 to 89yrs).

In this research out of 160(100%) patients only 102 patients (63%) are those who present with moderate pain and 55 patients (34%) with severe pain. At L1-L2 disc degeneration only 5 patients (50%) were those who came with moderate and 5(50%) with severe pain. At L2-L3 disc degeneration two patients (25%) with moderate and six patients (75%) with severe pain. At L3-L4 disc degeneration 11 patients (35.4%) with moderate and 20(64.5%) with severe pain. At L4-L5 disc degeneration 51 patients (53%) with moderate pain and 45 patients (46.8%) with severe pain. Our study also revealed that elevated BMI patients had high frequency of disc degeneration.

Conclusion: This study conclude that lumbar disc degeneration was approximately in women than men who were represented with lower back pain. Minority of patients had normal lumbar MRI findings. Most of the degeneration occurs at the lowest lumbar vertebrae i.e. L4- L5 and patients who were presented with elevated BMI have increased risk of disc degeneration.

Keywords: Lumbar vertebrae, Magnetic resonance imaging, lower back pain. Degenerative disc disease.

DOI: 10.7176/JHMN/90-17

Publication date: June 30th 2021

1.Introduction

Degenerative disc disease (DDD) is a medical condition in which there are anatomic changes at different levels of vertebrae and a loss of function of one or more intervertebral discs of the spine.¹ Disc disease simply refers to severe backache mainly due to wear and tear of spinal disc, causes radicular pain that radiates to legs.² In America 2015 disc degeneration of whole spine was approximately in women than men with mean average of 77% and 71% respectively, mostly L4 and L5 level occurred almost 75.8% in women and 69.1% in men.³ prevalence of lower back pain among office workers of KEMU Lahore, Pakistan 29.20% and 69.20%.⁴

Between each vertebral body of the spine are pads of fibrocartilage based structure that provides support, flexibility and minor load shearing known as intervertebral disc.⁵ Unique structure of the spine allows flexion, extension, and rotation and bending. Intervertebral disc distribute the load of weight and work as a shock absorber.⁶

The number of people were increased who suffered from lower back pain and its related diseases.⁶ It is considerably a significant reduction in dehydration consequence is fall in the disc matrix proteoglycans and loss of water molecule which makes the disc stiff, compact and more susceptible to sprint in the exterior.⁷

Due to degeneration vertebral disc have inferior susceptibility for sustaining pressure, they bulge and loss heights. If single disc is degenerated, it can change structure and mechanism of lumbar spine.⁸ Most commonly disc degeneration is occurred in young man than in woman and very noticeably in elderly women than in men, due to estrogen deficiency. Approximately 1/3rd of young females is affected by disc degeneration.⁹

Number of mechanical factors such as traumatic, genetics, aging and inflammation can highly affect the integrity of vertebral discs.¹⁰ Low back pain (LBP) is usually an expensive and problematic diagnostic and therapeutic challenge. Approximately 50-85% of adults are affected during their life time.¹¹ In clinical practice MRI is most preferable modality for evaluation of vertebral disc degeneration.¹² In T2 weighted image normal vertebral disc appear as hyper intense (the nucleus) which is surround by a dark ring (the annulus) although degenerative vertebral disc appears as dark, on T2 weighted images in which nucleus is not clearly differentiated from annulus.¹² T1 weighted sequences are typically used for morphological assessment of spinal structures.¹³ A hypointense signals on MRI does not means that it is symptomatic disc.¹⁴

Ravi raj Durganand Walwante et.al. (2017), researched on a descriptive cross-sectional Study on lumbar spine by using magnetic resonance imaging (MRI) with special recommendations to Modic changes and disc degeneration in rural area. A research study was conducted by Him on 165 patients; the age range was from 20 to 80 years whereby 82 of them were females. On lumbar Magnetic resonance imaging (MRI), overall prevalence of lumbar degenerative findings was 91%. Disc degeneration is the most persistent finding seen in 91% patients and Modic changes in 38%. Minority of participants (9%) had normal lumbar MRI findings. Most of the degenerative findings were seen at lower lumbar levels i.e. L4/L5.¹⁵

Simo Sääksjärvi, et.al (2020), conducted a prospective follow up study disc degeneration of young low back pain patients. He conducted a research on 75 conscripts aged 20 years with LBP had their lumbar spine examined by MRI. At a follow-up of 30 years, the subjects were contacted; 35 of 69 filled a pain and disability questionnaire, and 26 of 35 were also reexamined clinically and by MRI. The images were evaluated for decreased SI and other degenerative changes. The total number of lumbar discs with decreased SI increased from 23 of 130 (18%) to 92 of 130 (71%)—from 0.9 to 3.5 per subject during the follow-up. Distribution of DD changed from being mostly in L4–L5 and L5–S1 discs to being almost even between the four lowermost discs. Discs that had even slightly decreased SI at baseline were more likely to have severely decreased SI at follow-up, compared to healthy discs (57% vs. 11%, $P < 0.001$). Other degenerative changes were also more common in these discs. Severity of DD at baseline did not have a significant association with current pain or disability.¹⁶

The aim of this study is to observe lumbar vertebral disc degeneration in adult symptomatic patients to provide data on frequency of lumbar disc degeneration at different levels of lumbar vertebrae. This categorized data will help medical participator's to correlate the backache with intervertebral disc issue and provide the higher authority to manage it at a society level.

1.1 Material and Methods

In our study, all those adult patients with lower back pain, obese, dull ache, numbness, tingling, pins and needle sensations, muscles spasms were included. And those patients who were not giving consent, spondylosis, lumbar spine stenosis, cervical and thoracic abnormalities, paedes, and those who were uncooperative were excluded. Data was tabulated and analyze with the help of statistical package for the social science (SPSS version 24). The data was reported using cross sectional descriptive statistics.

2. Results

In our research out of 160 patients 89 females and 51 males were those who diagnosed with disc degeneration and 10 females and 10 male in which disc degeneration was absent. 10 patients out of 160 patients were those who diagnosed with disc degeneration at the level of L1 - L2 between the age of 24 to 87, 8 patients were those in which disc degeneration present at the level of L2- L3 between the age of 43 to 87, 31 patients were those in which

disc degeneration present at the level of L3-L4 and 96 patients diagnosed with disc degeneration present at the level of L4- L5 which is the lowest lumbar vertebra between the age of 55 to 80 years.

Overall out of 160 patients only 3 patients were those who represent with mild pain (25yrs) and 102 were those who came with moderate pain (27-90yrs) and 55 patients who represent with severe backache (30 to 89yrs).

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3. Discussion

Our study was designed to determine the frequency of disc degeneration in adults who represented with complain of back pain on MRI. On the basis of diagnostic performance and sensitivity for the detection of even minor degenerative changes MRI is the most preferable modality for assessing patient having history of back pain. Current study data was collected according to variables like age ,Gender, BMI ,level of vertebrae and level of pain. MRI was performed in those patients who present with different level of pain like (mild, moderate and severe).

In this research data of 160 patients were collected in which total number of males were 61 with 38.1 % and female were 99 with 61.9 % out of 160 patients 140 patients were those who diagnosed with lumbar disc degeneration (87.5 %)but in minority of patients 20 (12.5%) lumbar disc degeneration was absent. Range of patient's age was between 20-91.

In another study Raviraj Durganand Walwante et.al. (2017), conducted a hospital based cross-sectional descriptive Study on lumbar spine by MRI with special reference to disc degeneration and Modic changes in rural area. He conducted a research on 165 patients; the age range was from 20 to 80 years whereby 82 of them were females. On MRI, overall prevalence of lumbar degenerative findings was 91%. Disc degeneration was the most frequent finding seen in 91% patients and Modic changes in 38%. Minority of participants (9%) had normal lumbar MRI findings. The greater part of the degenerative findings were seen at lower lumbar levels for example L4/L5.¹⁵ And in our research out of 160 patients 89 females and 51 males were those who diagnosed with disc degeneration and 10 females and 10 male in which disc degeneration was absent . 10 patients out of 160 patients were those who diagnosed with disc degeneration at the level of L1 - L2 between the age of 24 to 87, 8 patients were those in which disc degeneration present at the level of L2- L3 between the age of 43 to 87, 31 patients were those in which disc degeneration present at the level of L3-L4 and 96 patients diagnosed with disc degeneration present at the level of L4- L5 which is the lowest lumbar vertebra between the age of 55 to 80 years.

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Conclusion

This study conclude that lumbar disc degeneration was approximately in women than men who were represented with lower back pain. Minority of patients had normal lumbar MRI findings. Most of the degeneration occurs at the lowest lumbar vertebrae i.e. L4- L5 and patients who were presented with elevated BMI had increased risk of disc degeneration.

Conflict if interest

There is no conflict of interest in this research.

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Cross Tabulation

Gender

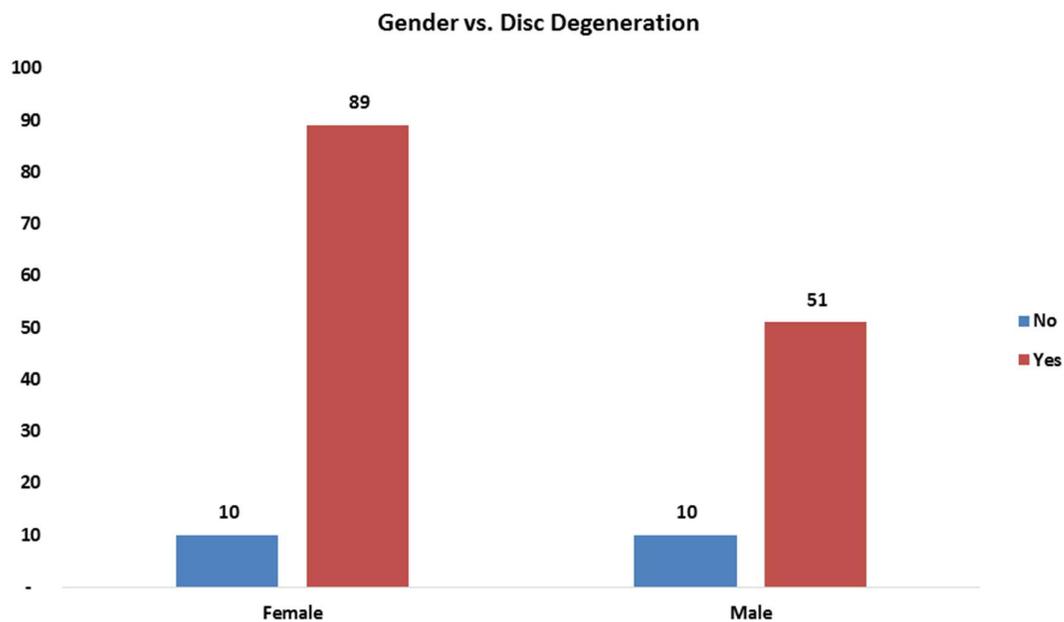
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	99	61.9	61.9	61.9
	Male	61	38.1	38.1	100.0
	Total	160	100.0	100.0	

		Disc Degeneration			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	NO	20	12.5	12.5	12.5
	YES	140	87.5	87.5	100.0
	Total	160	100.0	100.0	

Gender * Disc Degeneration Cross tabulation

Count		Disc Degeneration		Total
		NO	YES	
Gender	Female	10	89	99
	Male	10	51	61
Total		20	140	160

Graph 1:



Graph 2:

