

# Assessment of Individual Radiographic Features of Lumbar Disc Degeneration Influenced by Age, Gender and Vertebral Level

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## Abstract

**Background:** There are few data on the occurrence of lumbar degenerative disc disease, while its epidemiology is poorly understood.

**Objectives:** To study the occurrence of radiographic features of lumbar disc degeneration include Osteophytes, end-plate sclerosis and disc space narrowing and to determine whether these observed findings influenced by Age, Gender through the vertebral level.

**Subjects and Methods:** Men and Women aged  $\geq 50$  years (whether are diseased or accompanied their ill relatives) were recruited in cross-section descriptive study from Fallujah Hospital and Ramadi Teaching Hospital, Rheumatology Clinics, Anbar, Iraq, from April 2011 to March 2012. Participants had lateral spinal radiographs performed according to a standard protocol. The intervertebral disc spaces L1/2 -L5/S1 were evaluated for the presence of Anterior Osteophytes, end-plate sclerosis and disc space narrowing, using a graded semi quantitative score [Grade 0-3]. Lumbar disc degenerative findings were analyzed, frequency distribution rates were calculated, performance of comparison between males and females, in addition to comparison with other studies.

**Results:** In all 491 participants, 241 men (49.1%), mean age 60.1 years SD  $\pm 6.3$ , range from 50-80 years, and 250 women (51.9%), mean age 54 years SD  $\pm 3.2$ , range from 50-78 years, were studied. Over all, Osteophytes were the most frequent radiographic feature (41.9%), and Sclerosis the least frequent (27.4%). Compared women to men, Osteophytes (51.3% vs 40.2%), Sclerosis (30.8% vs 24%), and disc space narrowing (30.5% vs 25.9%). There was no significant increase in the frequency of all three Individual Radiographic Features [IRFs] with Age in women and men. In relation to distribution in the spine, Osteophytes were most frequent at L2/3 (11.8%) in women, and at L4/5, L5/S1 (5.9%, 5.8%) respectively in men, Sclerosis at L4/5 (3%) in women and (2.4%) at L4/5 and L5/S1 in men, whereas disc spaces narrowing were most frequent at L5/S1 (8.4%) in women and at L5/S1 (9.3%) in men.

**Conclusion:** There is variation of radiographic features of lumbar disc degeneration, particularly in regard to gender. These findings provide an important groundwork of the future explanations. Understanding the explanations provide useful clues as to etiology.

**Keywords:** disc degeneration, vertebral level, radiographic features.

## Introduction:

Lumbar degenerative disc disease is known by lots of different names, they include: spinal disc degeneration, lumbar spondylosis, changes of age, facet syndrome or arthropathy and wear and tear. However, lumbar degenerative disc disease and changes of age in your spine are very common in fact nearly all of us will in time get these changes in our spine<sup>(1)</sup>.

Degenerative Disc Disease [DDD] is part of the natural process of growing older. Unfortunately, as we age. Our intervertebral discs lose their flexibility, elasticity and shock absorbing characteristics<sup>(2)</sup>. The disc may lose water and become less flexible. Small tears in the tough ring of cartilage that makes up the outer disc [annulus fibrosis] may allow the Jelly-like material of the [nucleus pulposus] to protrude from the disc space [herniated] and compress the nerve root. Bone spurs [osteophyte] grow slowly over time and the spinal canal may narrow and compress the nerves that run through it<sup>(3)</sup>.

The lumbar spine is in the low back between the thoracic spine and the sacrum, it consists of 5 vertebrae, lumbar 1 (L1) through lumbar 5 (L5). Greater than 90% of the lumbar disc degeneration occur between the fourth and fifth lumbar vertebrae or between the fifth and first sacral vertebrae<sup>(4)</sup>. Intervertebral disc degeneration, especially in the lumbar spine begins most commonly in people in their third and fourth decades of life<sup>(5)</sup>. Peripheral joint osteoarthritis is characterized radiologically by the presence of osteophyte, subchondral sclerosis

and joint space narrowing. Joint space narrowing is due to cartilage loss, whereas both subchondral sclerosis and osteophyte are hypertrophic responses of bone thought to arise directly either to cartilage loss or to biomechanical stress<sup>(6)</sup>. Lumbar disc degeneration is characterized radiologically by the presence of osteophyte end-plate sclerosis and disc space narrowing<sup>(7)</sup>. Lumbar spondylosis appears to be a non specific aging phenomenon. The effects of heavy physical activities are controversial, as is a purported relationship to disc degeneration<sup>(8)</sup>. A study following progressive radiographic changes in lumbar disc degeneration did not find significant association with the extent of physical activity, noting only age, back pain, hip osteoarthritis [OA], to be predictive of DDD and osteophyte changes<sup>(9)</sup>. Genetic factors, likely influence the formation of osteophytes and disc degeneration. Spector and MacGregor<sup>(10)</sup> proposed that 50% of the variability found in osteoarthritis can be attributed to heritable factors. Biochemical research exploring osteophyte formation, osteophyte lipping is believed to form at periostum<sup>(11)</sup>. Changing weight mechanics and pressure forces as well as alteration in Oxygen tension and dynamic fluid pressure appear to be influential factor in osteophyte formation<sup>(12)</sup>. If degenerative disc disease is present, the X-Rays will often show narrowing of the spaces between the vertebral bodies, which indicates that the disc has become very thin or has collapsed. Bone spurs begin to form around the edges of the vertebral bodies and also around the edges of the facet joints in the spine.

These bone spurs can be seen on an X-Ray, where they are called osteophytes<sup>(2)</sup>. X-Ray can identify loss of disc height, osteophyte formation and facet hypertrophy<sup>(13)</sup>.

Plain X-Ray will show the narrowing of the disc space and osteophyte formation on the vertebral bodies. Further testing is not indicated unless there are signs of spinal nerve irritation or systemic disease<sup>(14)</sup>. Although, it is generally agreed that disc degeneration is common, the prevalence of specific findings is unclear.

A review of epidemiology of disc degeneration reveals wide-ranging prevalence estimates for various signs of disc degeneration in sample of general population<sup>(15)</sup>.

These extreme variations in prevalence rates are likely due to inconsistencies in the definitions and measurements of disc degeneration<sup>(16)</sup>. However, some individuals demonstrate atypical patterns of degeneration. Increased age and BMI and female sex may be related to posterior degeneration in these individuals<sup>(17)</sup>.

The lumbar osteophyte, disc degeneration, degenerative disc disease and spondylosis are used in the literature to describe anatomical changes to the vertebral bodies and intervertebral disc spaces that may be associated with clinical pain syndromes<sup>(18)</sup>. However, not everyone who has degenerative changes in their lumbar spine has pain. Many people who have normal backs have imaging show degenerative changes.

Every patient is different, and it is important to realize that not everyone develop symptoms as a result of degenerative disc disease<sup>(19)</sup>. Numerous studies confirm the progression of disc degenerative changes in the increasing age<sup>(20)</sup>. The aims of the present study were to determine the occurrence of the radiographic features of lumbar disc degeneration include osteophytes end-plate sclerosis and disc space narrowing in the population sample, and to determine whether these observed findings influenced by the Age and Gender through the vertebral level.

### Subjects and Methods:-

In a cross-sectional study, degenerative lumbar spine changes were evaluated. Men and Women aged 50 years and above (whether are diseased or accompanied ill relatives) were recruited from Hospital-based health index. The study was carried out over the period from (April 2011) through (March 2012) in Fallujah Hospital and Ramadi Teaching Hospital-Rheumatology Outpatients Clinics, Anbar, Iraq. Stratified random sampling was used with the aim of recruiting of Men and Women in each of four 5-year age bands: 50-54, 55-59, 60-64 and >65 years. Participants had lateral spinal Radiographs performed to a standard protocol. The films were evaluated by the single observer and each vertebral body from (L1-L5 )

were scored for the presence of the following individual radiographic findings (IRFs): anterior osteophytes, end-plate sclerosis and intervertebral disc space narrowing, using a semi-quantitative score (grade): 0=none, 1=mild, 2=moderate, 3=severe.

For the purpose of this analysis an individual was scored positive for an IRFs given the presence of any vertebra with a score of 2 or more.

The Research Ethical Approval Committee of the Medical College, AL-Anbar University, Iraq, approved the research. Data were analyzed using the Epi-Info version, 3.5.1, 2008 statistical package. Frequency distribution rates were calculated and compared between Men and Women participants in addition to comparison with other studies.

### Results:-

In all 491 participants ,241 Men [49.1% ,mean age 60.1 +SD 6.3 years , range from 50 to 80 years ] and 250 Women [51.9% ,mean age 54 +SD 3.2 years , range from 50 to 78 years ] were included in the analysis of this study ,giving a Women to Men ratio of 1.03 .In total,[2455]individual vertebral levels were assessed . table[1] shows the prevalence of Radiographic Degenerative changes of each Grade of severity at each lumbar intervertebral disc level ,which demonstrates the higher rate of changes through the Grade-1[28.76%] ,followed by Grade-2[19.9%] and Grade-3[8.14%] .Grade-1 was more often involved the whole lumbar spine levels .while Grade-2 was most frequent at lower lumbar vertebral levels [L5/S1] of [6.15%], then [5.7% ,5% and 3% ] of [L4/5, L3/4 and L2/3 ] levels respectively. On the other hand, Grade-3 was the least frequent, mostly rated of [2.42% and 3.29%] at [L5/S1 and L4/5] levels respectively. Table [2] illustrated the Degenerative findings Radio graphically of lumbar spine among 50 or over year's old Men participants of 241 individuals with 1205 assessed intervertebral levels. Osteophytes [anterior lipping] were mostly frequent [40.2%], followed by intervertebral disc space narrowing [25.9%] and end-plate sclerosis was the least frequent [24%]. However Osteophytes were mostly frequent at L4/5[56%] L5/S1[49.7% and L3/4 [46.8%], while disc space narrowing was mostly frequent at L5/S1 [67.6%] and L4/5 [32.7%]. Furthermore, [34.4%] of vertebral levels had sclerotic changes at L4/5 levels followed by [31.5%] and [29.8%] at L3/4 and L5/S1 levels respectively.

Table[3] ,demonstrates the radiographic features for 50 or over years old Women participants, of 250 individuals with 1250 assessed intervertebral levels which shows that Osteophytes were of higher rate[80.8%] at L2/3 level ,followed by [59.2% 57.2% and 48.4%] at L5/S1, L4/5 and L3/4 levels respectively. Whereas end-plate sclerosis was [30.8%] mostly frequent at L4/5[46%] L3/4 [44%] and L5/S1 [31.6%]. Intervertebral disc spaces narrowing were found in [30.5%] of Women

participants, mainly in the lower lumbar vertebral levels at L5/S1 [67.6%] and L4/5[32.7%].

Table [4]:- revealed Age categories by Radiographic Degenerative Features among [491] Men and Women participants, showing Osteophytes of [46%] found in [26.3%] Women and [19.75%] Men individuals, which was mostly frequent in [50-54] age group [13.23%] Women and [10.22%] Men participants, followed by disc space narrowing [28.3%], which was found in [15.6%] of Women and [12.7%] of Men participants particularly demonstrated in [50-54] age group [8.14%] in Women and [7.33%] in Men. The end-plate sclerosis was least frequent [26.4%], which was [15.6%] in Women and [11.8%] in Men, mostly frequent in [50-54] age group of [4.9%] and [4.35%] in Women and Men respectively.

Table [5] :- Also shows Age categories by lumbar intervertebral disc levels among Men participants with Radiographic Degenerative Features [251] vertebral levels [20.8%], out of total

Men vertebral levels [1205] assessed, showed that Osteophytes mostly at L4/5 [5.9%], L5/S1 [5.8%] and L3/4 [4.8%]. Disc spaces narrowing also frequent in [50-54] age group, which were found in [180] vertebral levels [14.93%], mostly at L5/S1 [9.3%] and L4/5 [3.4%], While Sclerosis was found in [50-54] age group of Men, particularly at L4/5 [2.4%] and L3/4 [2.4%] vertebral levels.

The Radiographic changes of lumbar spine among Women participants were showed by table [6], which reveals a high rate of Osteophytes in [50-54] age group of [352] [28.16%] vertebral levels out of [1250] intervertebral levels for Women participants, mostly demonstrated at L2/3 [11.8%] L5/S1 [5.6%], L4/5 [5.44%] and L3/4 [4.5%] vertebral levels. Narrowed disc spaces were mostly frequent in [50-54] age group [16%] with [8.4%] and [4.2%] at L5/S1 and L4/5 respectively, while Sclerotic changes [9.7%] were found among [50-54] age group particularly at L4/5 [3%] and L3/4 [2.88%] vertebral levels.

**Table (1):** prevalence of radiographic degenerative changes of each grade of severity at each lumbar intervertebral disc level among 491 participants [2455 assessed levels].

Vertebral level	Grade 1		Grade 2		Grade 3	
	NO	%	NO	%	NO	%
L 1/2	79	3.2	14	0.5	1	0.04
L 2/3	166	6.76	74	3	9	0.36
L 3/4	155	6.3	123	5	25	1
L 4/5	132	5.3	127	5.17	81	3.29
L 5/S1	177	7.2	151	6.15	84	3.42
<b>Total</b>	<b>709</b>	<b>28.76</b>	<b>489</b>	<b>19.9</b>	<b>200</b>	<b>8.14</b>

**Table (2):** Radiographic degenerative changes of lumbar spine among 50 or over years old male participants N=241 (1205 vertebral levels).

Vertebral level	L 1/L 2		L2/L3		L3/L4		L4/L5		L5/S1		Total	
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
Osteophyte (anterior lipping)	31	12.8	85	35.2	113	46.8	136	56	120	49.7	485	40.2
Sclerosis (end-plate)	11	4.5	48	19.9	76	31.5	83	34.4	72	29.8	290	24
Narrow (intervertbral disc space)	17	7	25	10.3	29	12	79	32.7	163	67.6	313	25.9

**Table (3):** Radiographic degenerative findings of lumbar spine among 50 or over years old female individual N=250 (1250 vertebral levels).

Degenerative changes	L1/2		L2/3		L3/4		L4/5		L5/S1		Total	
	NO	%	NO	%	NO	%	NO	%	NO	%	No	%
Osteophytes (anterior lipping)	32	12.8	202	80.8	121	48.4	143	57.2	148	59.2	646	51.7
Sclerosis (end-plate)	18	7.2	63	25.2	110	44	115	46	79	31.6	385	30.8
Narrowing (intervertbral disc space)	16	6.4	37	14.8	53	21.2	103	41.2	173	69.2	382	30.5

**Table (4):** Age categories by Radiographic degenerative features among (491 men & women participants [2455 assessed levels].

Age category	Osteophyte				Sclerosis				Narrowing			
	Male		female		Male		female		Male		female	
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
<b>50 - 54</b>	251	10.22	352	13.23	107	4.3	122	4.9	180	7.3	200	8.14
<b>55 - 59</b>	103	4.1	139	5.66	68	2.7	94	3.8	46	1.8	91	3.7
<b>60 - 64</b>	58	2.3	83	3.3	43	1.7	94	3.8	36	1.4	50	2
<b>65 and over</b>	73	2.9	72	2.9	72	2.9	75	3	51	2	42	1.7
<b>Total</b>	485	19.75	646	26.3	290	11.8	385	15.6	313	12.7	383	15.6

**Table (5) :** Age categories by lumbar intervertebral levels among men with Radiographic degenerative finding (RDFs) [1205 assessed levels].

Age category	L1/2			L2/3			L3/4			L4/5			L5/S1			Total		
	O	S	N	O	S	N	O	S	N	O	S	N	O	S	N	O	S	N
<b>50 - 54</b>	9	4	7	42	20	11	58	29	7	72	30	42	70	24	113	251	107	180
	0.7%	0.3%	0.5%	3.4%	1.6%	0.9%	4.8%	2.4%	0.5%	5.9%	2.4%	3.4%	5.8%	1.9%	9.3%	20.8%	8.8%	4.9%
<b>55 - 59</b>	7	1	4	18	8	2	25	20	3	31	20	11	22	19	26	103	68	46
	0.5%	0.08%	.33%	1.5%	0.66%	.16%	2%	1.65%	0.2%	2.5%	1.6%	0.9%	1.8%	1.5%	2.15%	8.5%	5.6%	3.8%
<b>60 - 64</b>	3	0	2	11	6	3	15	12	7	16	15	12	13	10	12	58	43	36
	0.2%	0%	.16%	0.9%	0.49%	0.2%	1.5%	0.9%	0.5%	1.3%	1.2%	0.9%	1.0%	0.8%	0.9%	4.8%	3.5%	2.9%
<b>65 and over</b>	12	6	4	14	14	9	15	15	12	17	18	14	15	19	12	73	72	51
	0.9%	0.49%	0.33%	1.16%	1.16%	0.7%	1.2%	1.2%	0.9%	1.4%	1.4%	1.16%	1.2%	1.5%	0.9%	6.0%	5.9%	4.2%
<b>Total</b>	31	11	17	85	48	25	113	76	29	136	83	79	120	72	163			
	2.5%	0.9%	1.9%	70%	3.9%	2.0%	9.3%	6.3%	2.4%	11.28%	6.8%	6.5%	9.9%	5.9%	13.5%			

**O=** Osteophytes (anterior lipping), **S=** Sclerosis (end-plate), **N=** Narrowing (intervertebral disc space)

**Table (6):** Age categories by lumbar intervertebral levels among women with Radiographic degenerative finding (RDFs) NO =250 [1205 assessed levels].

Age category	L1/2			L2/3			L3/4			L4/5			L5/S1			Total		
	O	S	N	O	S	N	O	S	N	O	S	N	O	S	N	O	S	N
50 - 54	9	3	6	148	21	14	57	36	18	68	38	75	70	24	105	352	122	200
	0.7%	0.2%	0.4%	11.84%	1.6%	1.12%	4.56%	2.88%	1.44%	5.44%	3%	4.5%	5.6%	1.9%	8.4%	28.16%	9.7%	16%
55 - 59	8	4	5	27	11	11	33	28	18	34	30	20	37	21	37	139	94	91
	0.8%	0.3%	0.4%	2.16%	0.88%	0.88%	2.6%	2.24%	1.44%	2.7%	2.4%	1.6%	2.9%	1.6%	2.9%	11.12%	7.5%	7.2%
60 - 64	6	4	2	15	16	8	17	27	6	23	28	14	22	19	20	83	94	50
	0.4%	0.3%	0.16%	1.2%	1.2%	0.8%	1.36%	2.16%	0.4%	1.8%	2.2%	1.12%	1.7%	1.5%	1.6%	6.6%	7.5%	4.0%
65 and over	9	7	4	12	15	4	14	19	11	18	19	12	19	15	11	72	75	42
	0.7%	0.5%	0.3%	0.9%	1.2%	0.3%	1.12%	1.5%	0.8%	1.44%	1.5%	0.9%	1.5%	1.2%	0.8%	5.7%	6.0%	3.3%
Total	32	18	16	202	63	37	121	110	53	143	115	103	148	79	173			
	2.5%	1.44%	1.2%	16.6%	5.0%	2.9%	9.6%	8.8%	4.2%	11.44%	9.2%	8.2%	11.8%	6.3%	13.8%			

O= Osteophytes (anterior lipping), S= Sclerosis (end-plate), N= Narrowing (intervertebral disc space)

### Discussion:-

In most people, the spine or vertebral column is composed of 33 interlocking bodies or vertebrae, which are connected by fibrous bands called ligaments. The vertebral column provides support for the upper body as well as protection for the spinal cord and furnishes attachment points for the ribs and muscles of the back [21].

This study demonstrated that the severity grading of disc degenerative changes were mostly frequent of Grade-1[28.76%], followed by Grade-2[19.9%] and Grade-3[8.14%].

The overall findings indicated that Osteophytes were prevalent in [41.9%], disc space narrowing in [28.3%] and end-plate sclerosis in[27.2%]. Results of this study indicate that the Osteophyte formation was highly among female subjects of [51.7%] mostly at L2/3 vertebral level of [80.8%] and [40.2%] in male subjects involving mostly the whole lower vertebral levels ,while the end-plate

sclerosis was the least frequent degenerative finding in male subjects[24%] and the disc space narrowing was[25.9%] table[2].

On the other hand, disc space narrowing was the least frequent degenerative feature in female subjects [30.5%], while the end-plate sclerosis was rated in [30.8%] as shown by table [3].

These results differ from general clinical perception that males are more likely to have intervertebral disc degeneration [IVDD] [22].

As in our findings ,Manson et al [23], reported that although disc degenerative changes are observed in both sexes , women seem to be more susceptible to instability , mal alignments and structural deterioration .Although disc degenerative disease may occur anywhere with spine, it commonly affects the low back and neck [24]. Lumbar spondylosis is present in 27-37% of the asymptomatic population .Approximately 84% of men and 74% of women have vertebral

Osteophytes., frequently at T9-T10 and L3 levels [25]. Initially, disc space narrowing was perhaps, the most commonly used specific finding to indicate disc degenerative including imaging. Severe disc space narrowing is an obvious sign of degeneration in the disc, and single-level narrowing is more likely to reflect a trauma or biochemical origin than systemic origin [26]. The prevalence rate of disc degenerative and unknown risk factors contributes to some of the variation in prevalence rate reported [27].

In this study, we observed that age was not correlated or an imperfect risk factor for disc degenerative findings. However, Osteophytes were most frequent in 50-54 age group both in males and females subjects of [10.22%] and [13.23%], followed by disc space narrowing [7.3%] and [8.14%], and lastly, the sclerotic changes of [4.3%] and [4.9%] respectively. We found that the frequencies of most disc degenerative findings were of low rates in older age participants [55-59, 60-64, and 60 year or over], when compared with the younger age participants [50-54] year old, as illustrated in table [4]. Large studies of osteoarthritis have long recognized the aging process to be the strongest risk factor of bony degeneration, particularly within the spine [28]. Similarly noted an increase in disc degeneration from 16% at age 20, about 98% at age 70 years, based on macroscopic degenerative grades of 600 specimen. Other studies correlate this findings [29,30]. Our findings were in agreement with the results found by Kramer, which illustrated that the associations are nevertheless imperfect, Kramer [31] found increasing age to be significantly associated with osteophytes formation but not predictive of the degree of disc space narrowing observed in retrospective review of radiographs of women. She observed significant variability, noting although few younger women had high average scores, some older women have no radiographic sign of osteoarthritis, while others are severely affected. Multiple studies have also demonstrated the presence of significant lumbar degeneration to be evident even within the first two decades [30]. Such variability within member of the same age category suggests the influence of other contributing factors [18]. Dissimilarities between the factors in males and females and the correlation of body mass index (BMI) to osteophytes severity, exclusively in females provides evidence for different biochemical processes influencing osteophytes development [32]. The inconsistency of the findings shown by this study with some studies concerning the changes in the younger participants, whatever, need to be interpreted, that may reflect a lot of factors, such reporting quality, health access, eating pattern, physical activity and early menopausal changes for females. Joint osteoarthritis is characterized radiologically by the presence of osteophytes,

Subchondral sclerosis and joint space narrowing. Joint space narrowing is due to cartilage loss, whereas subchondral sclerosis and osteophytes are hypertrophic responses of bone, thought to arise directly either to cartilage loss or to biomechanical stress [7].

Lumbar spondylosis may happen due to any external injury or osteophytes (bone spurs). This disease often occurs in people aging above (40 – 45) and is found in women rather than men [33]. This study showed that degenerative changes through lumbar intervertebral levels related to age categories, that most of these degenerative changes frequent in (50-54) age group at L4/5 (5.9%), L5/S1 (5.8%) and L3/4 (4.8%) vertebral levels for men subjects, while older men participated in this study had considerable low rate of degenerative changes within the intervertebral levels (table 5). Results of female participants for degenerative changes related to age grouping revealed that most changes identified among [50-54] age group mostly frequent at L2/3 [11.8%], L5/S1 [5.6%], L4/5 [5.4%] and L3/4 [4.5%] vertebral levels (table 6). As in males, older female subjects had considerable low rates of changes within the lumbar intervertebral levels. O'Neill et al, [29], explored osteophytosis within a UK adults population over age 50 years, finding [84% of men and 74% of women]. Men appear to have more significant degenerative changes than women, both with regard to number and severity of osteophytes formation. Biochemical research exploring that osteophyte lipping is believed to form at periostum [34], through the proliferation of peripheral articular cartilage [35]. Changing weight mechanics and pressure forces as well as alteration in oxygen tension and dynamic fluid pressure appear to be influential factors in osteophyte formation [36]. A study reported that disc related imaging findings [e.g disc degeneration, bulges and disc herniation] were concurrent with certain life style factors such high physical work, high body mass index and heavy smoking [37]. While a study following progressive radiographic changes in lumbar disc degenerative disease [DDD], didn't find significant association with the extent of physical activity, noting only age, back pain and hip osteoarthritis to be predictors of DDD and osteophyte changes [38]. Spector and MacGregor [10], proposed that 50% of the variability found in osteoarthritis can be attributed to heritable factors. Disc degeneration has been shown to be related to an aggrecan gene polymorphism, a vitamin D receptor and Matrix metalloproteinase-3 gene alleles [39]. Forty percent of individuals under 30 year of age had lumbar intervertebral disc degeneration [LDD].

The prevalence of LDD increasing to over 90% by 50-55 years of age, L5/S1 and L4/5 were the most affected levels [40]. The factor analysis provides evidence for extensive correlation of vertebral body margin osteophyte development in [L1-L5] in males

and [L1-L4 ] in females . The exclusion found a significant association between body weight and the prevalence and severity of osteophytes development throughout the body. BMI necessarily impacts loading and therefore osteophytes development in females more than in males. However, the association between osteophyte development and lumbar lordosis need to be explained further. Some observed males to exhibit more lumbar curvature than females, other studies have found the reverse to be true <sup>[41]</sup>. So, these findings reflect different patterns represent important biological differences between the sexes in vertebral morphology, weight transmission and degenerative responses .

The use of X-Ray radiography may be perceived as a limitation of this study .Although X-Ray allows excellent characteristics of degenerative findings, X-Ray is insensitive to early changes of disc degeneration which may be present without substantial loss of disc height or sclerosis or obvious osteophytosis, in addition to the insensitivity to early

changes is therefore unlikely to explain many findings.

Precise incidence of lumbar disc degeneration is unknown because of the large number of asymptomatic cases that go unreported, so we recommend a further, more in depth studies using a more sensitive imaging [which is not easy accessible or available in our province and Iraq country due to the ware and invasion and their sequelae], taking into consideration the assessment of important contributing factors for disc degenerative causes.

In conclusion, the obtained results for disc degenerative findings mostly frequent among female subjects than male subjects.

The study showed that degenerative features were more prevalent in younger age participants [50-54] years old at L2/3 vertebral level for women and L4/5, L5/S1 vertebral level for men. When compared with other studies; the findings were in consistence with findings obtained by multiple studies.

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