Evaluation of Magnetic Resonance Imaging Findings in Adult Patients with Non-Traumatic Low Back Pain

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***Abstract* – Low back pain a musculoskeletal problem that affects about 50 to 80 percent of adults in the world at some time caused by a problem in the muscle, ligaments, discs, joints or nerves of the spine. Despite the prevailing cases in Nigeria, there is no currently published data on assessment of MRI findings of patients with lower back pain in this region. A retrospective cross-sectional study using secondary data was carried out to sort out the causal effect of various MRI findings/investigations upon non-traumatic low back pain at the radiology department, of one of Nigerian Teaching Hospitals in Jos. 200MRI images comprising 108 males and 92 female of the lumbar spine for three years (2012-2014) of adults aged 18 – 80 years were used in the study and were evaluated according to age, sex, occupation and region on lumbar spine. Data was analysed for descriptive statistics such as percentage and mean using SPSS version 19.0. Results show that, patients with non-traumatic low back pain are mostly prone to have Lumbar Spondylosis and Disc Prolapse which is the most common pattern of MRI findings mostly affecting farmers and civil servants within 31 – 50 years of age at the L4/L5 region of the spine. While, Lumbar Spondylosis was more prevalence among civil servants affecting mostly male than female, Disc Prolapse was more in farmers affecting mostly females than male. The MRI findings will assist the radiologist, radiographers and other medical personnel to understand the common MRI findings pattern of patients with low back pain so as to help in communication between surgeons and radiologists for medical decisions and optimal management of the patient's clinical issues.**

***Keywords* – Magnetic Resonance, Imaging, Adult Patients, Non-Traumatic, Law Back Pain**

I. INTRODUCTION

Diagnostic imaging is an essential component of Nigerian health care which contribute enormously to patient management. Common forms of imaging currently include magnetic resonance imaging (MRI), computed tomography (CT), angiography, ultrasound scan and conventional x-rays. Wise [1] had pointed out that advances in technology have allowed for earlier, less invasive and more accurate diagnosis of diseases and have improved patient health outcomes in many cases. At the same time, the proliferation of advanced technology has led to substantial perceived need for these technologies, thereby increasing the utilization of imaging services. According to Chou *et al.* [2] there is a 30% increase in the number of CT scans and a 25% increase in the number of MRI scans these days. Studies have revealed that nowadays a number of the world's population suffer from low back pain [1], [3]. Similarly high incidence of low back pain has been noted in Nigeria [4]. According to Chou *et al.* [2], imaging of the lumbar spine accounts for approximately one-third of all MRI procedures in some states, such as Plateau where 300 lumbar spine MRIs were done in the fiscal year. However, there is no currently published data on evaluation of MRI findings of patients presenting with lower back pain in this region.

Pain is an unpleasant sensation ranging from mild discomfort to agonized distress; it is associated with real or potential tissue damage [5]. Low-back pain is a musculoskeletal problem that can originate from many spinal structures including ligaments, disc herniation, facet joints, and vertebral periosteum [4]. According to Secer *et al.* [3], low-back pain (LBP) is a very common disorder that affects 60% - 80% of the whole population but is frequently observed in patients of 30 - 50 years of age, and exhibits particular importance as a cause of significant workday loss. In line with this, Polansky [6] explained that the pain can be severe enough to cause physical or mental weakness leading to loss of productivity. There has been considerable research on low back pain [3], [6], [4], [2], [7]. Studies of Polansky [6] have classified low back pain into three categories: acute low back pain as pain lasting 6 weeks or less with activity intolerance and related leg symptoms, Sub-acute low back pain as pain that has been present between 6 – 12 weeks, and chronic low back pain as pain persisting longer than 12 weeks.

According to Polansky [6], aetiologies of low back pain however include; mechanical injury, arthritis, sciatica, spinal fracture, malignancy, connective tissue disease, infection, caudal equine syndrome, metabolic causes, abdominal or retroperitoneal visceral or vascular process. Studies by Davidson [7] has also shown that small percentage of patients with low back pain have pathologically definable problems which can be classified as mechanical pain usually affecting people aged 20 – 55 years with acute onset, associated with lifting of objects or bending and confined to lumbosacral region. Non-mechanical pain, which is constant, has a little variation in intensity or with activity. Davidson [7] explains that inflammatory pain have a more gradual onset and often occurs before the age of 30 years. Radicular (nerve root) pain has a severe sharp radiating quality and has high prevalence among males [7].

The investigative management of low back pain ranges from plain radiographs, CT, MRI, Myelography and

radionuclide imaging. MRI utilises proton resonance technology to obtain soft tissue cross-sectional representations of the spine [2]. The quality of these images allows the diagnostician to make more detailed and accurate assessments of the intervertebral disc and its relation to the neural structures. MRI is sensitive in detecting spinal pathologies [2]. In this regard, the research question this paper presents is what is the MRI finding pattern of patients presenting with low back pain at Jos, Nigeria?

In view of the above, this paper evaluates the magnetic resonance imaging findings in adult patients aged between 18 – 80 years with non-traumatic low back pain in north central, Nigeria. The research include all MRI lumbosacral spine reports for three years from 2012 – 2014 at the Radiology department, of one amongst the biggest Hospitals in Jos, Nigeria. The MRI findings will be analysed to assess the level of distribution of common MRI findings alongside the demographics of the patients as well as locations on Lumber spine. This study will enable radiologist, radiographers and other medical personnel to know the common MRI findings of patients presenting with low back pain in relation to age, sex, location on spine and occupational distribution in this locality. Consequently the study will also help doctors and health care team in better planning, treatment and management of their patients.

This paper is organized as follows: the next section presents the theoretical background, followed by the research methodology. Then, we present the experimental design and data collection method, followed by the empirical analysis and findings. Finally, the interpretation of the findings and both theoretical and practical implications are described. The paper concludes by presenting the research limitations and proposing avenues for future research.

II. REVIEW OF PREVIEW STUDIES

Chou *et al.* [2] in their work tittle "Appropriateness of Spinal Imaging Use in Canada" had reported that magnetic resonance imaging of the lower back is common investigation. Similarly results from other studies show that, many people experience low back pain with reported cases of disability and absence from work. Similarly, Davidson [7] reported that about 30% of the adult population present with cases of low back pains in Nigeria, and also estimated that 70% - 80% of adult population will have low back pain sometime in their lives, with 20% - 50% of the population having symptoms.

Deyo [8] carried out a work on the effectiveness of MRI in detecting soft tissue pathologies and found MRI to be a highly sensitive imaging modality for lumbar spinal conditions. For example, high sensitivity ranging between 89% – 100% for disc herniation has been described in their previous studies. The lower specificity, 43% – 97% for disc herniation has been highlighted in literature and relates to the prevalence of asymptomatic disc degeneration and protrusions resulting in a large number of false positives in a group of 57 patients with unilateral lower limb radiculopathy, only 30% of these patients had MRI findings of disc herniation and nerve root compression at the same level as the clinical prediction. Therefore, when reviewing the imaging, one must exert a degree of care when attributing the patient's symptoms to the appearance of their lumbar spine. Wheeler [9] also reported that 600 – 800 of MRI lumbosacral spine are taken each year, or approximately 4 investigations per 1000 inhabitants in Norway. Atual and Abana [10] discovered MRI to been found to better demonstrate abnormalities in normal asymptomatic people and can best demonstrate problems like disc bulges or prolapse, disc herniation, spondylosis causing nerve root irritation that may lead to surgery. Igbinedion and Akhigbe [4] put an average life time prevalence of low back pain among the adolescent to be 35% and that of adult 70%, while the mean low back pain point prevalence is 12% for adolescent and 32% for adults in Africa.

Harris *et al.* [11] worked on causes of low back pain and found out that more than 85% of patients who present to primary care have low back pain that cannot reliably be attributed to a specific disease or spinal abnormality (nonspecific low back pain). Attempts to identify specific anatomical sources of low back pain in such patients have not been validated in rigorous studies, and classification scheme frequently conflict with one another. Moreover, no evidence suggests that labelling most patients with low back pain by using specific anatomical diagnoses improves outcomes. In a minority of patients presenting for initial evaluation in a hospital setting, low back pain is caused by a specific disorder, such as cancer (approximately 0.7% of cases), compression fracture (4%), or spinal infection (0.01%). Estimates for prevalence of ankylosing spondylitis in hospital care patients' ranges from 0.3% (22) to 5% (23). Spinal stenosis and symptomatic herniated disc are present in about 3% and 4% of patients, respectively. The cauda equina syndrome is most commonly associated with massive midline disc herniation but is rare, with an estimated prevalence of 0.04% among patients with low back pain.

Jarvik [12] identified specific causes of low back pain to include; Spondylolisthesis; is where a defect causes slippage of a vertebra on the one below. This may be congenital, post-traumatic or degenerative. It rarely results from metastatic destruction of the posterior elements. Uncomplicated Spondylosis does not associate with symptoms but Spondylolisthesis can variably associate with low back pain aggravated by standing and walking. Slovin [13] classified Spondylolisthesis by noting the degree of anterior translation (forward slippage) of the top vertebral body in relationship to the bottom vertebral body. Slippage from 0 - 25% is called grade 1 Spondylolisthesis, 26 - 50% is called grade 2, 51 - 75% is called grade 3, from 76 - 100% is called grade 4 and anything greater than 100% is called grade 5 Spondylolisthesis.

Wise [1] Reported in their study that 57% of patients with lumbar radiculopathy were diagnosed with polyneuropathy of the lower extremities. Patient reports of bilateral neuropathic symptoms with findings of 30% bilateral distal muscle weakness, 50% distal decreased sensation to sharp pain, and ankle 20% reflex diminishment were the most consistent indicators of a polyneuropathy in addition to the lumbar radiculopathy. Chou *et al.* [2] found that Lumbar MRI imaging revealed varying severity and locations of lumbar pathology to associate with the radiculopathy. Foraminal stenosiss and disc displacements were present in nearly all the patients. Central stenosis being present in only 57% of patients strengthens the concept of bilateral signs and symptoms being viable indicators of additional polyneuropathy. Some of the bilateral symptoms could be due to central stenosis. However, the central stenosis could only account for around half of the bilateral symptoms, assuming all incidents of central stenosis caused bilateral symptoms. Overall, literature agrees that the most accurate imaging study to assess neural structures within the lumbar spine is MRI scanning. Correlation of the abnormal lumbar MRI, clinical symptoms and signs, and findings from electro diagnostic studies is ideal in the diagnosis of lumbar radiculopathy and polyneuropathy.

In their study assessment of common MRI findings, Cassazza [14] reported that Low back pain is a common disorder involving the muscles and bones of the back. It affects about 50% of people at some point in their lives. Low back pain may be classified by duration as acute (pain lasting less than 6 weeks), sub-chronic (6 to 12 weeks), or chronic (more than 12 weeks). The condition may be further classified by the underlying cause as mechanical, non-mechanical, or pain. In most cases of low back pain, a specific underlying cause is not identified or even looked for, with the pain believed to be due to mechanical problems such as muscle or joint strain. If the pain does not go away with conservative treatment or if it is accompanied by "red flags" such as unexplained weight loss, fever, or significant problems with feeling or movement, further testing may be needed to look for a serious underlying problem. In most cases, imaging tools such as X-ray computed tomography are not useful and carry their own risks. Despite this, the use of imaging in low back pain has increased. Some low back pain is caused by damaged intervertebral discs and the straight leg raise test is useful to identify this cause. In those with chronic pain, the pain processing system may malfunction, causing large amounts of pain in response to non-serious events.

Bach and Holten [15] said, acute low back pain radiculopathy is one of the most common health problems in Nigeria and is the leading cause of disability for persons younger than age 45. The cost of evaluating and treating acute LBP runs into billions of naira annually, not including time lost from work. It is now clear that uncomplicated acute LBP or radiculopathy is a benign, self-limited condition that does not warrant any imaging studies. Guidelines from the American College of Physicians and the American Pain Society emphasize a focused history and physical examination, reassurance, initial pain management medications if necessary (acetaminophen or nonsteroidal anti-inflammatory drugs), and consideration of physical therapies without routine imaging in patients with nonspecific LBP. Imaging is considered for those without improvement after 6 weeks and for those with red flags as listed below, generally in categories of cauda equina syndrome, cancer, fracture, progressive or severe neurologic deficit(s), ankylosing spondylitis, symptomatic spinal stenosis, or infection. Adding to this controversy is the fact that nonspecific lumbar disc abnormalities are common in asymptomatic patients and can be demonstrated readily on myelography, computed tomography, and magnetic resonance imaging.

Pease *et al.* [16] indicated that verves root abnormalities, sural sensory abnormalities, disc herniation, spinal stenosis, lumber spondylosis data are the best indicators of low back pain. These findings are consistent Electro diagnostic studies with MRI studies are essential for the definite diagnosis of both the polyneuropathy and low back pain. Two recent multicentre studies have shown that MRI studies of Para spinal muscles with six to eight other properly chosen muscles in each region of lumber spine increases the detection of low back pain from 96% to 100%. The findings of MRI are described to have a higher level of specificity and are considered to be the best diagnostic study for low back pain.

III. MATERIALS AND METHOD

A retrospective cross-sectional study using secondary data was carried out in order to sort out the existence and causal effect of one or more independent variables upon a dependent variable within a given time. In this case non-traumatic low back pain is the dependent variable while the various MRI findings/investigations are the independent variables. Data was collected at the Radiology Department of one of the biggest Hospitals in Jos, Nigeria from the data capture sheet of all the MRI reports of the lumbar spine for three years (2012-2014) of adults aged 18 – 80 years presented with non-traumatic low back pain. The data collected comprisis of patient's demographic, clinical history/indication and MRI findings. Patient imaging were done by use of Siemen Concerto 0.2 Tesla permanent magnetic German 2003 resonance imaging system. The data collected was organized according to the MRI findings and classified according to the demographics including age, sex, location on the lumbar spine and occupation of patients. Data collected was presented and analyzed using the relevant statistical procedure. However, descriptive statistics such as frequency distribution and simple percentage was carried out using SPSS version 19.0. Since the study did not involve any human participants, the Ethical Requirement of Research Ethics Board approval for this project was formally waived by the institution.

A. Area of the study

Jos, popularly called "J-Town", is a city in the Middle Belt of Nigeria. Since 1975 the city has been the administrative capital of Plateau State. Plateau State is known in Nigeria as the "home of pace and tourism". Jos city has a population of about 900,000 residents based on 2006 census [17]. The city is located at $09^0 55' 00'' N\ 08^0 53' 25'' E$, located at the Jos Plateau at about 1,238 m (4,062 ft) above sea level. Average monthly temperature ranges from $21 - 25℃\ (70 - 77\ °F)$, and from mid-November to late January, night-time temperature drops as low as $11℃\ (52°F)$. The major ethnic groups are Berom, Mwaghavul, Jarawa, Anaguta, Ngas, Tiv, Jukun and Idoma ethnic groups [18]. Jos is also known as the "Tin City" due to the discovery of Tin and Columbite by the British which led to the influx of other ethnic groups such as the Hausa, Igbo, Yoruba, and Europeans thus making Jos a cosmopolitan city. According to Wikipedia [18] the city is divided in 3 local government areas of Jos north, Jos south and Jos east. Jos east houses the prestigious National Center for Remote Sensing [18]. Jos north is the state capital and the area where the commercial activities of the state take place. The Governor's office is located in an area in Jos north called "Jise" in Berom Language, "Gise" in Afizere (Jarawa) Language or "Tudun-Wada" in Hausa Language [18]. Jos south is the seat of the Deputy Governor i.e. the old Government House in Rayfield and the industrial center of Plateau State due to presence of industries like NASCO groups, Standard Biscuits, Grand Cereals and Oil Mills, Zuma Steel West Africa, Aluminium Roofing Industries, Jos International Breweries etc. Jos south also houses prestigious institutions like the National Institute of Policy and Strategic Studies (NIPSS), the highest academic awarding institute in Nigeria, the National Veterinary Research Institute, the Police Staff College, the NTA Television College and the Nigerian Film Corporation [18].

B. Data Collection

Source of data was from the records of MRI registration books of patients associated with lumber spine that had undergone MRI examination at the radiology department of one amongst the biggest Hospitals in Jos, Nigeria. Table I shows the demographics of the data collected from the data capture sheet, a total of 200 MRI data was collected for a period of three years that is 2012 – 2014. Of the 200 MIR data collected, 54 percent of the patients are male and 46 percent from female. The age of the patients ranges from 11 – 80, with 19.5 percent in the age range of 11-30, 52.0 percent 31-50, 22.0 percent 51-70, and 6.5 percent 71 or older. Majority of the patients were farmers (35.0 percent), followed by civil servants (21.0 percent) and business men (10.0 percent), while the least were clergy men (3.3 percent).

TABLE I

DEMOGRAPHICS STATISTICS OF PATIENTS

Categories	Percentage	Categories	Percentage
Gender		Occupation	
Male	54.0	House wife	8.0
Female	46.0	Farmers	35.0
Age (Range 18-80)		Clergy men	3.5
11-30	19.5	Trading	9.0
31-50	52.0	Students	7.5
51-70	22.0	Civil servant	21.0
71-Above	6.5	Business men	10.0
		Non specific	6.0

IV. RESULTS AND DISCUSSION

A. MRI Findings

In this study the MRI findings have been divided into two. First is the common MRI examination type as presented in Table II. The next is the region or location on the lumber spine where the MRI examination occurs, presented in Table III. From Table II, majority of the patients have lumber spondylosis (55.0 percent), followed by disc prolapse (12.0 percent) while the least was the faciet joint (1.0 percent). Potts disease was also fairly high (8.0 percent), followed by spinal cord injury and disc herniation (7.5 percent and 6.0 percent respectively). Other MRI examinations were very low like spondylolithesis and normal scan with same frequency (3.0 percent), followed by osteoarthritis (2.5 percent) and metastasis disease (2.0 percent). The percentage distribution of the common MRI findings can be shown in Figure I.

TABLE II DISTRIBUTION OF COMMON MRI FINDINGS

Common MRI Findings	Percentage
Lumber spondylosis	55.0
Disc prolapse	12.0
Pott's disease	8.0
Spinal cord injury	7.5
Spondylolithesis	3.0
Facet joint	1.0
Normal	3.0
Metastasis diseases	2.0
Disc herniation	6.0
Osteoarthritis	2.5

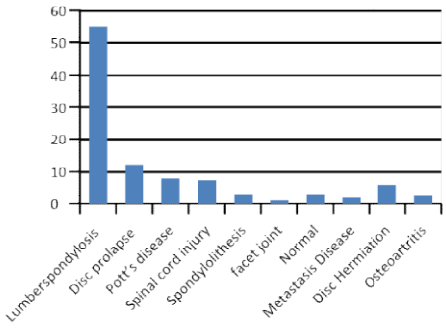

Fig. I Percentage Distribution of common MRI findings

From Tables III, L1, L2, L3, L4 and L5 are called lumber nerves which are also called Lumber vertebrae and S1 and S2 are called Sacrums or coccyxs. L1/L2 is the region or location between L1 and L2 Lumber nerves (Lumber Vertebraes). L2/L3 is the region between L2 and L3 lumber nerves, L3/L4 is the region between L3 and L4 lumber nerves, L4/L5 is the region between L4 and L5 lumber nerves, L5/S1 is the region between L5 lumber nerve and S1 sacrum (coccyx) and S1/S2 is the region between S1and S2 sacrum's. Table III also reveals that majority of the MRI examination was on region L4/L5 (40.5 percent), followed by L5/S1 (18.0 percent), while the least was on region S1/S2 (1.5 percent). Others were on regions L3/L4 (17.5 percent), L2/L3 (12.5 percent) and L1/L2 (10.0 percent) respectively. The frequency distribution of MRI findings on the different regions of the lumber spine can be shown in Figure II.

TABLE III DISTRIBUTION OF MRI FINDINGS ON SPINE

Region of MRI Findings	Percentage
L1/L2	10.0
L2/L3	12.5
L3/L4	17.5
L4/L5	40.5
L5/S1	18.0
S1/S2	1.5

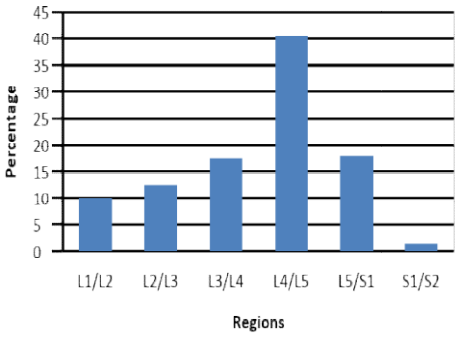

Fig. II Percentage distribution of MRI findings on the different regions

B. MRI Findings and Demographics

In this section the MRI finding will be presented alongside with the demographics of the patients. This is divided into three. First, the MRI findings with age of the patients as presented in Table IV. Second, the MRI findings with gender as presented in Table V. Finally, the MRI findings with occupation as respected in Table VI.

From Table IV it shows that lumber spondylosis occurs among all age categories except for the old age 71 and above and it is more pronounced in the age 31-50 (29.5 percent), followed by age 51-70 (16 percent) and 11-30 (9.5 percent). Similar situation is observed with disc prolapse, Spinal cord injury and Pott's disease as they also occur in all age categories with exception for the old age 70 and above, occurring mostly in the age 31-50 (9.5 percent, 4.0 percent and 3.5 percent respectively). Spondylolithesis and Faciet Joint seem not to occur in the young and youthful ages 11-30 and 31-50 but occur only in the old age 51 and above. Spondylolithesis is more prevailing in the age 51-70 (2.0 percent) than 71 and above (1.0 percent), while for Faciet Joint has same frequency (0.5 percent). The normal scan occur only in the age 31-50 (3.0 percent). Metastasis disease and Osteoarthritis occurs only in the old age 71 and above (2.0 percent and 2.5 percent respectively). Disc herniation also occur in all age categories except for age 51-70 and is more pronounced in the age 11-30 (3 percent) against 31-50 and 71 above (2.5 percent and 0.5 percent respectively).

Figure III shows the distribution of the MRI Findings and Age of patients, of which the MRI examination that mostly occurs in the age 11-30 are mostly lumber spondylosis, Disc prolapse, Pott's disease, spinal cord injury and Disc herniation while those that occur in the active youthful age 30-50 are lumberspondylosis, Disc prolapse, pott's disease, spinal cord injury, normal scan, and disc herniation. MRI examinations that mostly occur in the elderly persons age 51-70 are lumber spondylosis, Disc prolapse, Pott's disease, spinal cord injury, spondylolithesis and Faciet Joint, while those that occur in the old age 71 and above are spondylolithesis, Faciet Joint, metastasis disease, Disc herniation and osteoarthritis.

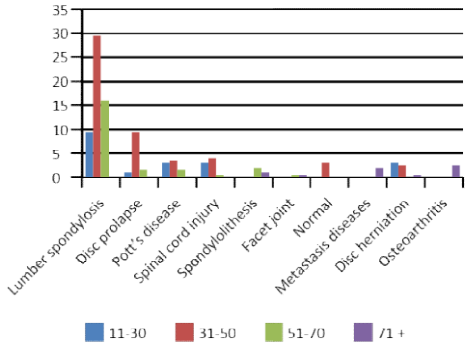

Fig. III Distribution of the MRI findings according to age of patients

From Table V, lumber Spondylosis occurs more in male (29.5 percent) than female (25.5 percent). Disc prolapse occurs more in female (6.5 percent) than male (5.5 percent). Pott's disease occurs more in male than female (5.5 percent against 3.0 percent). Spinal cord injury occurs with similar frequency in male and female (3.5 percent and 4.0 percent). Spondylolithesis occurs more in male than female (2.0 percent against 1.0 percent). Faciet Joint occurs with same rate in male and female as observed by their same percentage occurrence though with a negligible percentage (0.5 percent). Normal scan is more experienced in male than female (2.5 percent against 0.5 percent). Metastasis disease occurs only in male (2.0 percent).

Disc herniation occurs with same rate in male and female as observed by their same percentage occurrence (3.0 percent). Osteoarthritis occurs more in female than male (2.0 percent against 0.5 percent).

Figure IV shows the distribution of MRI findings according to gender of patients, of which the MRI examination that occur more in male patients are lumber Spondylosis, pott's disease, normal scan, and metastasis disease, while MRI examinations that occurs more in female patients are disc prolapse, spinal cord injury, and osteoarthritis.

TABLE IV MRI FINDING AND AGE OF PATIENTS

Common MRI Findings	11-30	31-50	51-70	71 +
Lumber spondylosis	9.5	29.5	16.0	0.0
Disc prolapse	1.0	9.5	1.5	0.0
Pott's disease	3.0	3.5	1.5	0.0
Spinal cord injury	3.0	4.0	0.5	0.0
Spondylolithesis	0.0	0.0	2.0	1.0
Facet joint	0.0	0.0	0.5	0.5
Normal	0.0	3.0	0.0	0.0
Metastasis diseases	0.0	0.0	0.0	2.0
Disc herniation	3.0	2.5	0.0	0.5
Osteoarthritis	0.0	0.0	0.0	2.5

TABLE V MRI FINDINGS AND GENDER OF PATIENTS

Common MRI Findings	Male	Female
Lumber spondylosis	29.5	25.5
Disc prolapse	5.5	6.5
Pott's disease	5.0	3.0
Spinal cord injury	3.5	4.0
Spondylolithesis	2.0	2.0
Facet joint	0.5	0.5
Normal	2.5	0.5
Metastasis diseases	2.0	0.0
Disc herniation	3.0	3.0
Osteoarthritis	0.5	2.0

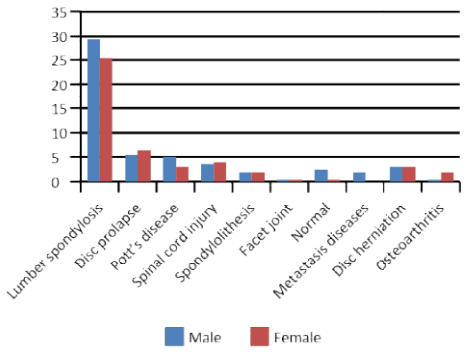

Fig. IV Distribution of MRI findings according to gender of patients

From Table VI, lumber spondylosis occurs in all the occupation categories but highest in civil servants (19.0 percent), followed by Traders (9.0 percent), while the least was clergy men (3.5 percent). Disc prolapse was seen to occur mostly among farmers (8.5 percent), followed by civil servants (2.5 percent), while for house wives and business men there was negligible percent (1.0 percent and 0.5 percent). Pott's diseases was found to occur mostly in farmers (5.5 percent), followed by house wives and business men with same rate as show by the same percentage (1.0 percent). Spinal cord injury was seen to occur more in farmers (5.0 percent), followed by the non-specified patients (1.5 percent) and business men (1.0 percent). Spondylolithesis was found to occur mostly in farmers, non-specified patients and business men with same rate as observed by same percentage (1.0 percent). Faciet Joint disease was found to occur only in farmers and non-specified patients with a negotiable percentage (0.5 percent). Normal scan and Metastasis disease were found to occur only in farmers (2.5 percent and 2.0 percent respectively). Disc herniation was found to occur mostly in farmers (4.5 percent) and non-specified patients (1.5 percent) only. Osteoarthritis occurs mostly in farmers (1.5 percent), followed by students and non-specific patients with same rate as observed by same percentage (0.5 percent).

TABLE VI CROSS TABULATION OF MRI FINDINGS AND OCCUPATION OF THE PATIENTS

Common MRI Findings	House wife	Farmers	Clergy men	Traders	Students	Civil servants	Non specific	Business men
Lumber spondylosis	5.5	4.0	3.5	9.0	6.5	19.0	0.5	7.0
Disc prolapse	1.0	8.5	0.0	0.0	0.0	2.0	0.0	0.5
Pott's disease	1.0	5.5	0.0	0.0	0.0	0.0	0.5	1.0
Spinal cord injury	0.5	5.0	0.0	0.0	0.0	0.0	1.5	1.0
Spondylolithesis	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0
Facet joint	0.0	0.5	0.0	0.0	0.0	0.0	0.5	0.0
Normal	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
Metastasis diseases	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Disc herniation	0.0	4.5	0.0	0.0	0.0	0.0	1.5	0.0
Osteoarthritis	0.0	1.5	0.0	0.0	0.5	0.0	0.5	0.0

However, in general those that engage in farming and public service jobs were found to have the highest frequency of MRI examinations (35.0 percent) and (24.0 percent) respectively. This might be due to some predisposition factor such as heavy workloads, and prolong working periods, while clergymen had the least frequency of (3.5 percent).

Figure V shows the distribution of MRI findings according to the occupation of the patients, of which the MRI examinations that mostly house wives undergo were lumber Spondylosis, disc prolapse, pott's disease and Spinal cord injury. Farmers were observed to undergo all the MRI examinations with varying frequencies. Similarly, the non-specified patients were also observed to undergo all the MRI examinations with variably low frequencies except for disc prolapse, normal scan and Metastasis diseases. The MRI examination that was observed for clergy men and traders was lumber Spondylosis only. Students undergo lumber Spondylosis and Osteoarthritis. The MRI examinations that were observed for civil servants were lumber Spondylosis and disc prolapse. The MRI examination observed for business men were mostly lumber Spondylosis, Disc prolapse, pott's disease, spinal cord injury and spondylolithesis.

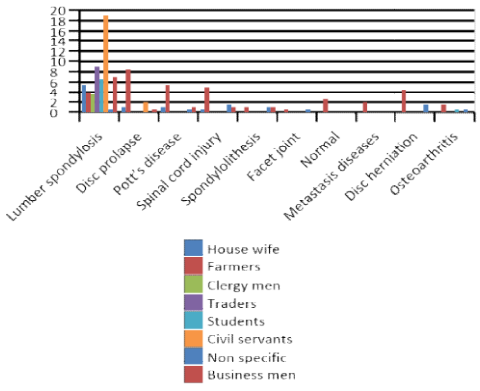

Fig. V Distribution of MRI findings according to occupation of patients

V. THEORETICAL IMPLICATIONS

Magnetic resonance imaging is the modality that best demonstrate soft tissue pathologies, and is one of the modern Neuro-imaging modalities for patients presented with low back pain [2]. Evidence from the analysis have shown that lumbar Spondylosis and Disc Prolapse are the most common pattern of MRI findings for patients with non-traumatic low back pain in Jos, Nigeria which is mostly common in civil servants and farmers. This is probably because for civil servants, they are mostly confined in the office sitting down for many hours probably at one particular position for a very long time and for farmers it follows their occupational behavior where they have to bend for a very long time to till the land and lifting of heavy loads on the farm. This is in accordance with findings of Secer *et al.* [3], who reported high incidence of Lumber Spondylosis. In the present study, magnetic resonance findings of low back pain are higher in males than females. This finding is similar to that of Davidson, [7] who reported higher prevalence of low back pain among the sex male. Findings of this study have reported the high prevalence of Lumbar Spondylosis in males than females (54 percent against 46 percent) which is in line with the findings of Muraki *et al.* [19], Fishly *et al.* [20] and Harris *et al.* [11] who also reported high prevalence of Lumbar Spondylosis resulting from low back pain, but contradicts the findings of Igbinedion and Akhigbe [4] who found disc degeneration as the most common pattern of patient with low back pain. This is probably because majority of the males were farmers and are also engaged in multiple activities and sedative life styles. Findings of this study has revealed that Lumber Spondylosis are commonly seen at L4/L5 vertebral and this correlates with the study of Muraki *et al.* [19], who reported that Lumber Spondylosis was remarkably prevalent at L4/L5 and also similar to that of Wise [1] who also reported that most of the patterns were between L4-L5 and L5-S1. Findings of this study also revealed that farming occupation had the highest frequency of MRI examination (35.0 percent). This group is believed to be people engaged in constantly

stretching and stressing of their back due to multiple activities on the farm. This finding agree with that of Wise [1], who reported that increased back pain is associated with multiple activities. Finally, findings of this study have revealed that low back pain is frequently observed in patient within 31 – 50 years of age (29 percent) which is in line with Secer *et al.* [3] who found low-back pain associated mostly with patients of 30 – 50 years of age. Also similar to Davidson [7] who recorded 20 – 55 years with acute onset, associated with lifting of objects or bending and confined to lumbosacral region.

VI. Conclusion

Low back pain a musculoskeletal problem that a lot of people are suffering in the world these days. About 60% - 80% of the whole population suffers from this pain especially in Nigeria. However, an evaluation of the magnetic resonance imaging findings in adult patients with non-traumatic low back pain shows that MRI provides valuable information regarding the underlying causes of LBP. MRI of the lumbar spine has become the initial imaging modality of choice in complicated LBP, displacing myelography and CT in recent years. The MRI findings evaluated according to age, sex, occupation and region of the spine in this study have revealed that Lumbar Spondylosis and Disc Prolapse are the most common pattern of MRI findings for the patients mostly affecting ages within 31 – 50 years of age, especially farmers and civil servants associated with lifting of objects or bending and confined to lumbosacral region and exhibits particular importance as a cause of significant workday loss. This common disorder often does not have a definable cause even when the imaging findings are abnormal. Thus, MRI is the most ideal diagnostic tool for explaining basic anatomical abnormalities. However, an understanding of the various causes of back pain and the needs of the surgeon is vital for patient treatment. Understanding of the benefits and limitations of MRI in evaluating low back pain and improved communication between surgeons and radiologists, should allow for optimal management of the patient's clinical issues. However, the MRI findings in this study is very vital as it will assist the radiologist, radiographers and other medical personnel to understand the common MRI findings pattern of patients with low back pain so as to help in effective medical assistance.

VII. Limitations and Recommendations

Some limitations of this study could be worth mentioning. First, the population was a highly selected cohort of patients who could afford an MRI excluding many poor patients who may have had the other patterns. Second, difficulty in obtaining data from the hospital due to unnecessary bureaucracy that slowed down the research procedure. We recommend that an awareness campaign should be created on the risk factors of low back pain and the age group mostly affected. More research work should be done in this area to reveal risk factors of low back pain specifically among those in the active youthful age (31 – 40 years of age) with a comparative study between hospitals.

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