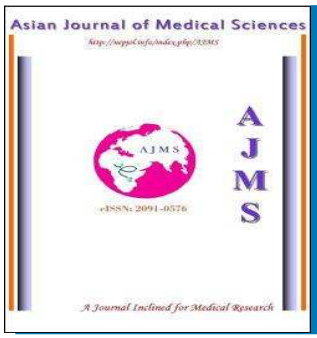

ROENTGENOLOGIC APPRAISAL OF LOW BACK PAINS IN UYO, NIGERIA

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"Is low back pain ubiquitous?"

ABSTRACT

Background: Low back pain is one of the commonest indices for referral to radiological evaluation of lumbo-sacral spine. The underlying pathology may be divulged by the exploit of conventional lumbo-sacral radiography.
Purpose: By collating and analysing the lumbo-sacral radiographs of patients with low back pain, we hope to give an account of the accompaniments of low back pain and where possible, to deduce its causes in our local environ.
Study design/Setting: A cross-sectional prospective study.
Patient Sample: Two hundred and forty patients were enrolled in the study
Outcome Measures: Pathologies were evaluated based on features seen on the paired lumbo-sacral radiographs of anterior-posterior and lateral.
Methods: Anterior-posterior and lateral plain radiographs were done under standardized conditions after recording of patient's biodata. Radiographs were analysed using SSPS 13 statistical computer package.
Results: A total of 240 patients aged 10-89years with mean age of 48.9 and standard deviations of 25.4 were studied. Males were 130 while females were 110. The number of identifiable pathologies (n= 257) outweighed the number of patients (n=240). The commonest pathology was degenerative disc disease. This was seen in 67.5% of studied population. 15.83% had either normal radiographs,loss of lumbar lordosis or scoliosis.
Conclusions: Degenerative disc disease is the commonest pathology seen in patients with low back pain in Uyo, Nigeria.

Key Words- Low back pain, Lumbo-sacral radiographs, Degenerative

INTRODUCTION

Low back pain is a pain mostly experienced in the lumbo-sacral region, though it could be referred to vicinities like lower limbs. Besides pain, most low back pain(LBP) patients report a variety of motor and sensory deficits[1]. LBP is ubiquitous and probably plagues almost everyone in all cultures and ethnic groups at some time in their life [2,3]. About 20% of a population will have LBP in a year and up to 50% of these will have LBP at least once a year[2]. The burden of LBP disability has increased steadily over the last few decades in western countries[4].Worldwide, LBP is an extremely common, seriously disabling, non-fatal public health problem[1]. In fact it has been identified as perhaps the major cause of disability and absenteeism from the workplace worldwide [2].

Low back pain is a common but poorly understood entity [5]. Be that as it may, it is an indicator of a possible underlying pathology. This pathology could be musculo-skeletal, neurologic or could even be systemic in origin. Specific causes for back pain, such as infections, tumors, osteoporosis, spondylo-arthropathies, and trauma, actually represent a minority of such pain syndromes [2]. Other causes of LBP are radiculopathy, cental spinal canal stenosis, rupture of the interspinous ligament(s), neoarthrosis of the interspinous space with perispinous cyst formation, posterior spinal facet (zygapophyseal joint) arthrosis, spondylolisthesis, perispinal muscle rupture/degeneration, myofascial syndrome and lumbar instability [1,7,8]. In children, causes of LBP are spondylosis, spondylolisthesis, osteomyelitis, diskitis, leukaemia, histiocytosis and osteoid osteoma [9].

Imaging used to be an integral part of the clinical examination of the patient with back pain; however, it is often used excessively and without consideration of underlying literature [8]. This is worrisome as it adds to medical cost of patients and naturally reduces the life span of X-ray machines since high exposures are required to achieve meaningful readable lumbo-sacral radiographs. Besides, imaging findings may be unrelated to the aetio-genesis of low back pain. In general, there is strong evidence that routine back imaging does not improve patient outcomes, exposes patients to unnecessary harms, and increases costs[10].

Therefore, how can we in a resource restricted setting like ours evaluate patients with low back pains beyond the limited yield of clinical examinations [7]. The closet choice will be employing a radiological tool that is affordable and readily available in our local nooks and crannies. Conventional radiography regardless of its shortcomings fits in.

Purpose:

To audit the common accompaniments of low back pain and where possible to deduce its causes in our local environ, hence creating our own statistics.

MATERIALS AND METHODS

A prospective cross-sectional study which commenced from 1st May 2011 to 8th June, 2012. Patients recruited in this study were consecutive patients who were referred to do plain lumbo-sacral radiographs in the Radiology Department of University of Uyo Teaching Hospital, Akwa Ibom State, Nigeria. Their bio-data were documented and the presenting clinical history must first and foremost include low back pains. No bench mark was attached to the pain. Anterior-posterior and lateral radiographs of the lumbo-sacral spine were obtained under standardized conditions from each patient. Lumbar spine radiographs were taken according to a standard protocol with the film centered at L2. Individual radiographic features of either the vertebrae or disc spaces or combination of both were subsequently evaluated by a single observer using the paired radiographs. Patient consent was sought before any radiograph was

shot. Inclusive criteria were compulsory history of low back pains and reportable pair of radiographs. Exclusive criteria were absence of low back pain as integral part of the history and non-standard films. Degenerative disc disease is to be diagnosed using the parameters of disc space narrowing, osteophytosis, end-plate sclerosis and vacuum phenomenon. Spondylolisthesis will be diagnosed if vertebral anteriolisthesis or retrolisthesis is seen Lumbarisation is to be considered when lumbar vertebrae are numerically six and above. . Other conditions are to be considered according to known standards.

Results were collated and analyzed using SSPS 13 statistical computer package.

RESULTS

A total of 240 patients were studied within the studied period. They were aged 10 to 89 years with mean age of 48.9 and standard deviation of 25.4. Males were 130 with median of 13.5 and females were 110 with median of 10.0. The number of separate pathologies in the lumbo-sacral radiographs of the total population of 240 were 257. (see tables 1 & 2) The commonest pathology was degenerative disc disease with 67.5% (n=162 cases) of total population. Associated male to female ratio was 0.97:1. Degenerative disc disease was commonest in the 4th to 6th decade of life and no recordable case in the first decade of life {see table 2 & graph 1). Other pathologies were spondylolisthesis 9.58% (23 cases), osteoporosis 3.75%, bony metastasis 2.92%, lumbarization 1.67%, spina bifida occulta 1.67%, trauma 1.25%, Pott's disease 0.83% and spondylitis 0.4%. 15.83% of patients had no specific pathology shown on their radiographs. This included 7.50% of normal radiographs, 5.83% showing as either loss of lumbar lordosis or exaggerated lordosis and 2.50% showing as scoliosis.

Table 1 Showing age range of studied population

AGE RANGE	MALES	FEMALES
0-9	0	0
10-19	5	2
20-29	11	6
30-39	12	14
40-49	25	33
50-59	30	37
60-69	25	14
70-79	15	2
80-89	7	2
90-99	0	0
TOTAL	130	110

Graph 1 - Showing age and sex distributions of degenerative disc diseases (serial 1=females, serial 2= males)

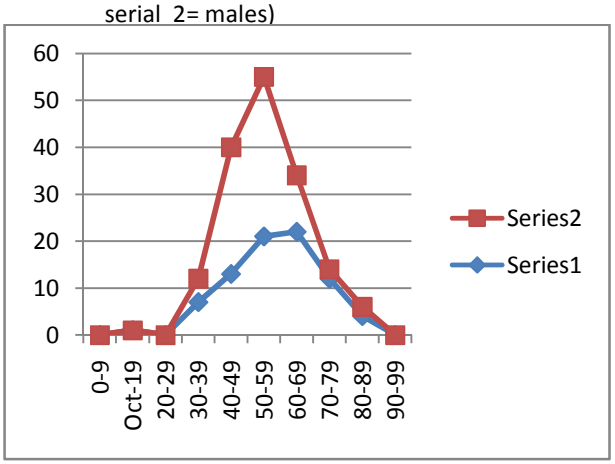


Table 2. Analysis of some pathologies according to sex distributions

AR	DDD		TB		LI		MRT		LUM		SP		OST		TR		LL		N		SC		SL	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
0-9	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
10-19	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0	0
20-29	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	2	7	2	0	1	0	0
30-39	7	5	0	1	4	4	0	0	0	0	1	1	0	0	0	0	2	2	1	0	2	0	0	0
40-49	13	27	0	2	2	0	0	0	1	1	1	0	0	0	0	0	2	4	3	0	0	1	0	0
50-59	21	34	0	1	8	5	3	0	0	1	0	0	0	1	1	0	0	0	1	2	0	0	0	0
60-69	22	12	1	0	4	3	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	1
70-79	12	2	0	0	0	0	2	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
80-89	4	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0
90-99	0	0	0		0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0

(AR-Age eange. DDD-Degenerative disc disease.. TB-Tuberculosis, LI-Listhesis,, MRT-Metasyadis, LUM-lumbarization.,SP-Spina bifida, OST-Osteoporosis,,TR-Trauma. LL-loss of lumbar lordosis. N-Normal, SC-Scoliosis.SL-Spondylitis.

DISCUSSIONS

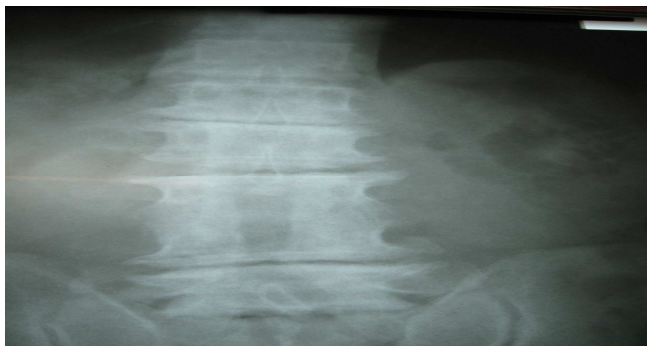
Our study was restricted to paired conventional radiographs of anterior-posterior and lateral lumbo-sacral spine. This was based on choice, cost and availability. Cost implications of LBP investigation without trading off diagnostic values should always be considered. More so, since in most cases of LBP, imaging is probably not necessary despite being widely performed [5]. For example, most episodes of back pain resolve on their own, especially when due to disk herniations which spontaneously regress [5]. Some authors are even of the opinion that there is no role for imaging in the initial evaluation of the patient with back pain in the absence of signs or symptoms of systemic disease [8]. Physical examinations of these patients do not provide significant clues for making a definitive diagnosis [1].

Therefore the baseline investigation of the lumbo-sacral spine still remains plain radiography. However, it is expected that the use of a multi-planar imaging with good soft tissue resolutions like magnetic resonance imaging (MRI) of lumbo-sacral spine would harvest more pathologies especially degenerative disc disease. This is because MRI will make obvious any subtle or gross morphological changes on the disc like its herniations even when they have not been any disc space reduction or symptomatologies. This will increase the number of patho-anatomic changes. For example, in a pioneer study in Cameroon using MRI of lumbo-sacral spine, disc hernia was discovered as the commonest cause of LBP [11].

Nevertheless, this result exposed degenerative disc diseases(DDD) of the spine as the unchallengeable culprit of low back pain in Uyo, Nigeria. This is against the backdrop of 67.5% of the studied population having DDD vis-a-vis its closet rival–spondylolisthesis (9.58%) (see table 2 & graph 2). But DDD being the sole primary cause of low back pain is not prove able with this radiological modality since this condition is also seen in asymptomatic patients as well [5,11,12]. On one hand, degenerative disorders in the spine are normal, age-related phenomena and largely asymptomatic in most cases[13]. In our environment such category of patients will not in most cases seek medical

attention or routine check due to financial constraints. On the other hand, DDD or spondylotic abnormalities can cause LBP through root compression or lumbar instability or both, with root compression as the primary cause of the complaint [1]. Features of degeneration depend on which component of the motion segment is predominantly affected, and include disk space narrowing, vacuum phenomenon, disk desiccation, vertebral osteophyte formation, disk herniation, and facet arthrosis, but these features do not necessarily have any relationship to symptoms[5]. Radiographically, lumbar disc degeneration is characterized by the presence of osteophytes, end-plate sclerosis and disc space narrowing[14] (see fig 1).These were the parameters we used in diagnosis of DDD. However this inadvertently excludes early disc herniations without the aforementioned secondary changes thereby diluting our achieved result of positive radiographic pathologies of LBP. But this variance may however not be substantiated as some of these disc bulging or mild prolapse as mentioned previously are usually asymptomatic or cause no significant symptoms [5,12]. In this study LBP incidence started increasing from third to fourth decade peaking early in females at 5th decade but 6th decade in males, thereafter tapers gradually (see graph 1). Similar pattern was seem in other studies in which the incidence of low back pain was highest in the third decade, and overall prevalence increased with age until the 60-65 year age group and then gradually declines [5]. Persistent LBP is most common among people in their mid-to-late thirties and early-to-mid forties.[1] It has been estimated to be the most costly ailment of people of working age [15]. This led to high social and economic cost from LBP as minority of individuals may lose more than six months from work[4]. Others who were gainfully employed have gone as far as quitting job especially the less educated ones and getting involved in litigation [1]. This has an enormous impact on individuals,

Fig 1. Anterior-posterior lumbosacral radiograph showing effacement of L3-L4 disc space and narrowing of other disc spaces as well as marginal osteophytes from L1-L5



families, communities, governments and businesses throughout the world [5]. These young age group involvement in LBP is because they are the group involved in jobs requiring manual labor, static posture, whole-body vibration, repeated heavy lifting, lifting while twisting, flexion and rotation of the trunk [15,16,17]. There is some suggestion that when work requirements or heavy lifting exceed individual capacities like blue-collar jobs, back pain is more likely to occur[16,21].

A range of morphologic, work-related physical factors, genetic, hormonal, metabolic, and psycho-social variables have been suggested as risk factors for serious LBP [5,15,18,19,20,21,22]. Previously, heavy physical loading was the main suspected risk factor for disc degeneration. Recent research indicates that heredity has a dominant role in disc degeneration [20]. Other commonly reported risk factors include aging, low educational status, stress, occupational lifting time per day, work postures, anxiety, heavy physical loading, job dissatisfaction, new jobs, recreational physical activity, smoking, low levels of social support in the workplace, workers' compensation, depression, obesity and high body mass index [5,11,16,18,19,20,22,23]. Increased body mass index is associated with an increase in bone mass and in some studies an increased risk of DDD [22].

In general, the number of itemized discovered

were more than the number of studied patients. This is because of co-existent or inter-current pathologies in a single patient. Examples are spondylolisthesis and spondylosis or lumbarisation and spondylosis.

No episode of LBP was observed in the first decade of life in this study (see table 2). In young patients, for example before the third decade, few pathologies were observed in the course of this study. In such cases of positive pathology in the lumbo-sacral radiographs of young patients, there were pre-existing conditions like spina bifida, spondylolisthesis or Pott's disease ante-dating any DDD. But visible signposts of a possible LBP in negative positive pathology were loss of lumbar lordosis (5.83%) and scoliosis (2.5%). The concavity of the scoliosis were predominantly towards the side of pain as a protective mechanism. Lumbar lordosis could well be attributable to non-specific abnormalities such as muscle spasm, tenderness [1].

Metastatic bone diseases came to 2.2% in this study. There were all males with 85.72% of the primaries arising from the prostrate. This may be due to bias in patients referral to our department for radiographic examinations of the lumbo-sacral spine. They were basically from Orthopaedics, Surgery, Family medicine and Neurology. In contrast, our Gynaecological department prefer abdomino-pelvic ultrasonographic examinations as first-line choice in evaluation of any LBP accompanied by a suspected abdominal mass among women.

Osteoporosis in this study has female to male ratio of 1.25 :1 with early onset in females. Comparable ratio of affected females to males is 2:1 [24]. All cases of osteoporosis in both sexes in this study started after 50years of age with male onset around 70years. This is in consonance with senile or postmenopausal osteoporosis. Post-menopausal or senile osteoporosis occurs in women typically aged 50-65years and have been linked to reduced oestrogen levels [24]. In osteoporosis, there is disproportionate loss of trabecular bone giving rise to rapid bone loss to rapid bone loss and a proportionate increase in fractures particularly of the vertebrae [24]. Such vertebral fracture presents as loss of height and anterior wedging with attendant kyphotic deformity [24]. Rather, our cases of osteoporosis manifest radiographically as loss in vertebral height and biconcave vertebrae with biconvex disc. Senile osteoporosis differs from post-menopausal osteoporosis in that there is a proportionate loss in cortical and trabecular bones. The aetiology of osteoporosis is uncertain, but reduced intestinal absorption, diminished adrenal function and secondary hyperparathyroidism may play a role [24].

Pott's disease(0.83%) were seen in extremes of life, hence implicating a depressed immunity. In Pott's disease, locations of predilection are upper lumbar and lower thoracic spine with L1 most commonly typical as in our study [9]. In Pott's disease, more than one vertebra is affected [9]. Usually, vertebral body is affected in 82% of cases and posterior elements in 18%. Anterior part of vertebrae adjacent to superior/ inferior subchondral bone plate are mostly affected accounting for the anterior wedging also observed in our study [9].

Acetaminophen and non-steroidal anti-inflammatory drugs (NSAID) are first-line medications for chronic low back pain. Tramadol, opioids, and other adjunctive medications may benefit some patients who do not respond to NSAID [25]. Multidisciplinary rehabilitation programs, acupuncture, exercise therapy, massage, behaviour therapy, and spinal manipulation are effective in certain clinical situations [25]. Patients with radicular symptoms may benefit from epidural steroid injections, but studies have produced mixed results [25]. Burden of LBP leads to multiple health care provider consultations and receipt of varied treatments to alleviate pain. More aggressive treatment measures include surgery, intra-discal therapy, narcotic and psychoactive drug[1]. A surgical

therapy, narcotic and psychoactive drugs [1]. A surgical evaluation may be considered for select patients with functional disabilities or refractory pain despite multiple non-surgical treatments [25].

The major limitation in this study was absence of control group for us to ascribe any discovered pathology as aetio-genetic. Our sample size was limited as our study was simply a reflection of who gets referred for x-ray of the lumbar spine. Further handicap was patients' refusal to proffer consent on premise of inappropriate exposure to radiation.

CONCLUSION

Degenerative disc disease was the commonest positive pathology in Uyo in paired lumbo-sacral radiographic evaluation of low back pain. The number of discovered pathologies outweighed the number of studied population due to co-existent lesions. Low back pain started rising from the third decade of life but in earlier age it had an underlying or associated condition.

REFERENCES

1. Long D.M., BenDebba M,, Torgerson W.S., Boyd R.J., Dawson E.G., Hardy R. W, et al Persistent back pain and sciatica in the United States: patient characteristics. J Spinal Disord. 1996 ;9(1):40-58.
2. Ehrlich G.E. Back pain. J Rheumatol Suppl. 2003 ;67:26-31.
1. Hoy D., Brooks P,, Blyth F., Buchbinder R., Baillieres R. The Epidemiology of low back pain. Best Pract Res Clin Rheumatol. 2010 ;24(6):769-81.
2. Valat J..P, Goupille P., Védere V. Low back pain: risk factors for chronicity. Rev Rhum Engl Ed. 1997 ;64(3):189-194.
3. Miller T.T. Imaging of disk disease and degenerative spondylosis of the lumbar spine. Semin Ultrasound CT MR. 2004 Dec;25(6):506-522.
4. Eubanks J.D,, Lee M.J., Cassinelli E., Ahn N.U. Does lumbar facet arthrosis precede disc degeneration? A postmortem study. Clin Orthop Relat Res. 2007 Nov;464:184-189.
5. Jinkins, J.R.. Acquired degenerative changes of the intervertebral segments at and suprajacent to the lumbosacral junction. A radioanatomic analysis of the nondiscal structures of the spinal column and perispinal soft tissues. Eur J Radiol. 2004 May;50(2):134-158.
8. Maus T. Imaging the back pain patient. Phys Med Rehabil Clin N Am. 2010 Nov;21(4):725-766.
9. Dahnert. W, Radiology Review manual, 6th ed, Wolters Kluwer, 2003:173,176.
10. Chou R, Deyo RA, Jarvik JG (2012) Appropriate use of lumbar imaging for evaluation for low back pain. Radiol Clin N Am 50; 569–585.
11. Uduma F.U., Ongolo P.,Assam G., Fokam P., Motah M., Evaluation of pattern of magnetic resonance images of lumbo-sacral spine in Cameroon-A pioneer study. Global Journal medical research, 2011,Vol 8 (2): 31-41.
12. Jegede K.A, Ndu A, Grauer J.N. Contemporary management of symptomatic lumbar disc herniations. Orthop Clin North Am. 2010 Apr;41(2):217-224.
13. Roh J.S, Teng A.L, Yoo J.U., Davis J., Furey C, Bohlman H.H. Degenerative disorders of the lumbar and cervical spine. Orthop Clin North Am. 2005 Jul;36(3):255-262.
14. Pye S.R., Reid D.M., Lunt M.,Adams J.E,. Silman A.J, O'Neill T.W, Lumbar disc degeneration: association between osteophytes, end-plate sclerosis and disc space narrowing, 2007, *Ann Rheum Dis*;**66**:330-333 doi:10.1136/ard.2006.052522
15. Van Nieuwenhuyse A., Fatkhutdinova L, Verbeke G., Pirenne D., Johannik K., Somville P.R, et al . Risk factors for first-ever low back pain among workers in their first employment. Occup Med (Lond). 2004 Dec;54(8):513-9. Epub 2004 Sep 22.
16. Skovron M.L. Epidemiology of low back pain. Clin Rheumatol. 1992 Oct;6(3):559-573.
17. Hoogendoorn W.E, Bongers P.M, de Vet H.C, Ariëns G.A, van Mechelen W., Bouter L.M. High physical work load and low job satisfaction increase the risk of sickness absence due to low back pain: results of a prospective cohort study. Occup Environ Med. 2002 May; 59(5):323-328.
18. Carragee E.J, Alamin T.F, Miller J.L, Carragee J.M, Discographic, MRI and psychosocial determinants of low back pain disability and remission: a prospective study in subjects with benign persistent back pain. Spine J. 2005 Jan-Feb;5(1):24-35.
19. Sambrook P.N, MacGregor A.J, Spector T.D. Genetic influences on cervical and lumbar disc degeneration: a magnetic resonance imaging study in twins. Rheum. 1999 Feb;42(2):366-372.
20. Battié M.C, Videman T., Parent E. Lumbar disc degeneration: epidemiology and genetic influences. Spine (Phila Pa 1976). 2004 Dec 1;29(23):2679-2690.
21. Fayad F., Lefevre-Colau M.M, Poiraudeau S., Fermanian, J., Rannou F., Wlodyka Demaille, S. et al. Chronicity, recurrence, and return to work in low back pain: common prognostic factors]. Ann Readapt Med Phys. 2004 May;47(4):179-189.
22. Pye S.R.,Reid D.M.,Adams J.E, Silman A.J. O'Neil T.W. Radiographic features of lumbar disc degeneration and bone mineral density in men and women, *Ann Rheum*

*Dis*2006;**65**:234-238 doi:10.1136/ard.2005.038224

23. Pye S.R., Reid, D.M., Adams J.E., Silman A.J., O'Neill, Influence of weight, body mass index and lifestyle factors on radiographic features of lumbar disc degeneration *Ann Rheum Dis*2007;**66**:426-427 doi:10.1136/ard.2006.057166
24. Young J. W.R., Gordon L., Metabolic and endocrine disorders affecting bone In Sutton, D., Textboook of Radiology and Imaging, Vol 2, 7th Ed , 2002, Churchill Livingstone,Pholdelphia p1357
25. Last A.R, Hulbert K. Chronic low back pain: evaluation and management. Am Fam Physician. 2009 Jun 15;79(12):1067-74.