Journal Of Medical Science And Clinical Research

IGM Publication — An Official Publication Of IGM Publication

Original Research Article

Various Underlying Pathologies Causing Chronic Low Back Pain and their Relationship with Demographic Parameters and Co-Morbidities: A Cross Sectional Study

Authors
Dr Asoke Kumar Middya[1], Dr Dilip Kumar Khatua[2]*, Dr Kshetra Madhab Das[3]
[1]Associate Professor, Dept. of P. M & R, B. S. Medical College & Hospital, Bankura
[2]Professor, Dept. of P. M & R, B. S. Medical College & Hospital, Bankura
[3]Professor, Dept. of P. M & R, Burdwan Medical College & Hospital, Purba Barddhaman
*Corresponding Author
Dr Dilip Kumar Khatua
Professor, Dept of PMR, BSMC, Bankura, India

Abstract
Introduction: *Chronic low back pain (LBP) is very common in Indian community. It is a major cause of activity limitation and is a very common musculoskeletal disorder requiring physiatric intervention. Most of the referred cases of low back pain coming to the physical medicine & rehabilitation (PMR) department, after careful evaluation and investigations, reveal a myriad of pathological condition.*
Aims and Objectives: *To find out the distribution and incidence of various pathological conditions presenting as chronic low back pain and its relationship with demographic parameters and pre-existing pathologies and co-morbidities.*
Materials & Methods: *Total three hundred patients of all genders of chronic LBP with functional impairment were included in this cross sectional observational study. Appropriate clinical examinations, radiological and other necessary investigations were done. Descriptive statistical tools were used for data analysis.*
Results: *Majority were ageing adults with higher incidence of female patients. Lumbar degeneration or spondylosis, the leading cause of permanent spinal damage, seems to be the major cause of chronic LBP. Atraumatic vertebral fractures were associated with underlying pathologies. Those with systemic diseases had more prevalence of gross vertebral osteoporosis.*
Conclusion: *Predominance of vertebral and paravertebral tissue pathologies as the major cause of chronic LBP may be related with its typical biomechanics. Relation was seen between atraumatic vertebral fracture and underlying pathologies. Systemic pathology predisposes to gross vertebral osteoporosis.*
Keywords: *Chronic Low Back Pain, Mechanical Low Back Pain, Lumbar Spine, Spondylosis, Osteoporosis, Biomechanics.*

Introduction

Chronic low back pain (LBP) is a symptom, not a single disease, and has many causes. Chronic low back pain (LBP) is characterised by pain, muscle tension, or stiffness, localized in the area below the costal margin and above the inferior gluteal

folds, with or without referred or radicular leg pain (sciatica)[1]. It is extremely common; about 40% of people say that they have had LBP within the last 6 months[2]. Studies have shown lifetime prevalence as high as 84%[3].

The lumbar spine has a dichotomous role in terms of function, which is strength coupled with flexibility. The spine performs a major role in support and protection of the spinal canal contents (spinal cord, conus and cauda equina), but also give us inherent flexibility, allowing us to place our limbs in appropriate positions for everyday function.

The strength of the spine results from the size and arrangement of the bones, as well as from the arrangement of the ligaments and muscles. The typical lordotic framework of the lumbar spine assists with the flexibility and increases the stability of the lumbar spine by absorbing shock, which is an important role due to the amount of forces that travel through the spine on a regular basis. LBP is the most common cause of limitation of activity in patients younger than 45 years old, the second most frequent reason for a visit to the physician's office, the third most common surgical indication, and ranks fifth among hospital admission diagnoses[4]. Data from the 2002 National Health Interview Survey identified LBP as the most prevalent pain syndrome, eclipsing migraine headaches, neck pain, and face / jaw pain[5]. The financial impact on society is even more staggering— lost wages, loss in household services and tax revenues, social security benefits, and lost productivity collectively amount to $45 to $54 billion per year in[6].

The aim of our study was to determine the distribution of various pathological conditions presenting as chronic low back pain and to find out its relationship with demographic parameters like age, gender, ergonomic, socio-economic, educational status, dietary habit etc. and pre-existing pathologies and co- morbidities.

Materials & Methods

This cross sectional observational study was conducted in the department of physical medicine & Rehabilitation, IPGME&R, and SSKM Hospital, Kolkata India. The time period of study was from June 2015 to July 2016. After getting institutional ethics committee clearance, patients of all genders between 20 and 80 years of age, presenting with chronic low back pain associated with functional impairment and attending the department of physical medicine & rehabilitation were included in the study group while pregnant women were excluded from the study.

A total of 300 patients were taken in this cross-sectional observational study. Informed consent was obtained from all the individuals and study was carried out in accordance with the institutional ethical committee guidelines.

Demographics and medical history were taken. Physical examinations including neurovascular examinations of back and lower extremity were done. X-ray, CT Scan, MRI etc. of lumbosacral spine were done as appropriate, routine blood investigations were also done in the form of CBC, ESR, C-reactive protein, blood sugar etc. Help of biochemical and serological investigations like thyroid profile, rheumatoid factor and HLA-B27 were taken when required. Special tests like USG, DEXA BMD etc were also used in some patients as required.

Results

Data collected in our study were analysed using appropriate statistical tests. The age of the patients ranged from 23 to 78 years. The mean age was 47.1 years. Age composition of our study population showed that 30% of patients were more than 60 years. And 65% of patients were in the age-group of 40 - 60 years of age. Only 5% of patients belong to less than 40 years group. Number of male and female patients were117 (39%) and 183 (61%) respectively. Patients coming from urban areas were 183 (61%) whereas 117 (39%) patients belonged to rural areas.

Almost half of the male patients were agricultural worker by profession while more than two-third of the female patients were homemakers (Table 1). The per capita monthly income of the patients ranged from Rs. 2000/- to Rs. 7200/-, the mean being Rs.6610/- (+/-2842.8%) and the median being Rs. 6000/-. Though majority of female patients were from better socio- economic status the per capita monthly income of the male and female groups did not differ statistically. There were no significant correlation between per capita monthly income and incidence of low back pain.

The educational level of the patients (expressed in terms of number of completed years of formal institutional education) ranged from 0 (illiterate) to 17 years, the mean being 8.3 (+/-5.1) years. In spite of the fact that the female cohort had significantly low level of education (P=0.007), chronic LBP could not be statistically correlated with education (r=0.055, p>0.1). Only 54 (18%) were vegetarians while 246 (82%) were nonvegetarians. But food habit could not be correlated with low back pain prevalence (r-0.065, p>0.1).

Total 52 (17.33%) patients were smokers (all males). 27 (9%) patients consumed alcohol (all males) and 23 (7.66%) patients chewed tobacco (female-17, male- 6). It was also found that these three parameters had no relation with low back pain.

Number of different kind of medication used by the patients ranged from 0 to 5. The mean being was 1.6 (+/- 1.5).

Hypertension, diabetes and rheumatoid arthritis were found to be three most commonly associated disease conditions and their respective percentage did not differ much between males and females.

Rheumatoid arthritis was present in 13.3% patients, with 11.1% males and 14.8% females. Hypertension was found to be existing co-morbidity in 30% of patients with almost equal prevalence in the males and females (Table2).

Degenerative joint disease like spondylosis, facet arthropathy etc. were more common in older age group (50 to 70 years) (mean age 61year). It is more prevalent in females (29+12= 41) (9.66% +4%=13%) than male patients (21+6= 27) (7%+2%=9%).

Vertebral fracture (20+18=38) (12.66%) were seen to be more common in female (12+15=27) (4%+5%=9%) than male (8+3=11) (2.67%+1%=3.67%). Females (15) (5%) are 5 times more prone to atraumatic vertebral fracture than male (3) (1%) and most of the females are post menopausal and grossly osteoporotic.

In our study, both gender (male 12, 4%, female 12, and 4%) was found to be equally susceptible to intervertebral disc herniation (24, 8%) and different age groups were involved. In this study vertebral osteoporosis (30, 10%) was found to be more common in women (21, 7%), than men (9, 3%) in terms of greater than 2 times and most of the patients are old aged (>50years) (mean age 61 years).

In case of spondyloarthopathy (25, 8.33%), our study shows males (19, 6.33%) are more commonly affected than females (6, 2%), younger age group (23 to 36)(mean 26years) is mostly involved.

In the study, the vertebral structural abnormality likes kyphoscoliosis (20, 6.66%) was seen more in females (12, 4%) than male (8, 2.67%).

Table 1: Different Occupations of the Patients

Occupation	No of patients	%age of total	Males	Females	% Males	% Females
Agricultural Worker	64	21.3	56	8	47.9	4.4
Service Holder	59	19.7	20	39	17.1	21.3
Business person	6	2	6	0	5.1	0
Shopkeeper	2	0.7	2	0	1.7	0
Manual labour	19	6.3	12	7	10.3	3.8
Electrician	3	1	3	0	2.6	0
Sportsperson	5	1.7	5	0	4.3	0
Homemaker	126	42	0	126	0	68.9
others	16	5.3	13	3	11.1	1.6

Table 2: Different Co- Morbidities

Co-Morbidities	No of patients	%age of total	Males (117)	Females (183)	% Males	% Females
Hypertension	90	30	37	53	31.62	28.96
Diabetes	74	24.66	31	43	26.49	23.49
RA	40	13.33	13	27	11.11	14.75
Others	12	4	5	7	1.67	2.44
No Associated Disease	84	28	31	53	10.34	17.67

Table 3: Different Underlying Pathologies

Low back pathology	No of pt	% of pt	Male pt	Female pt	% of male pt	% of female pt
Spondylosis	50	16.7	21	29	7	9.66
Spondylolysis	30	10	9	21	3	7
Spondylolisthesis	35	11.66	10	25	3.33	8.33
Traumatic Fracture	20	6.66	8	12	2.67	4
Atraumatic Fracture	18	6	3	15	1	5
Intervertebral Disc Herniation	24	8	12	12	4	4
Facet Arthopathy	18	6	6	12	2	4
Sacroiliac Arthopathy	25	8.33	19	6	6.33	2
Osteoporosis	30	10	9	21	3	7
Kyphoscoliosis	20	6.66	8	12	2.67	4
Osteosclerosis	2	0.67	2	0	0.67	0
Metastasis	7	2.33	2	5	0.67	1.66
Primary Bone Tumor	1	0.33	1	0	0.33	0
Vertebral Osteomyelitis	10	3.33	4	6	1.33	2
Abdominal Aortic Aneurysm	1	0.33	0	1	0	0.33
Tethered Spinal Cord	1	0.33	0	1	0	0.33
Septic Discitis	2	0.67	1	1	0.33	0.33
Spina Bifida Occulta	6	2	2	4	0.67	1.33

Discussion

In this study majority of patients were found to be suffering from mechanical low back pain and were seen to have different pathologies like spondylosis, spondylolysis, and spondylolisthesis etc. Lumbo-sacral spinal stability is sacrificed for mobility and a major proportion of stability is shared by lumbo-sacral vertebral structure, ligaments and paravertebral muscles, its dynamic stabiliser. Probably because of this typical anatomic structure and biomechanical arrangement, spine and paravertebral structures are more prone to injury and leading cause of pain which is reflected in our study.

Age composition of our study population showed that 30% of patients were more than 60 years of age and 55% of all patients were in the age group of 40-60 years. Only 15% of patients belonged to less than 40 years age group. Our observation matches those in literature that low back problems most often occur in aging adults and the most common age group is fourth to sixth decade as

shown by kent et al.[7]. Out of 300 patients included in our study, 117 (39%) were males and 183 (61%) were females. It corresponds with the information that low back pain is more often occurs in females than males. Like other previous studies[8, 9] where females were found to suffer more from LBP, we found similar results (69% females) although more female predominance might be due to more female participants in our study. Another contributing factor for female vulnerability is their occupation (homemaking) which involved 'bending and twisting' movement of spine as 70% of our female participants were homemakers. It is also known that women experience greater severity of symptoms, which may also be the cause behind greater number of female patients attending hospital, seeking for medical and rehabilitation help.

The study showed that lumber spondylosis or degenerative changes of spine is the most common cause of low back pain involving a total 50 number (16.7%) of patients patients among which 40 patients (19 male and 21 female) were of age group 60-70 years. This observation indicates that the changes are irreversible and will probably worsen[10]. The majority of these patients most probably have a multifactorial cause for back pain, which includes functional instability, deconditioning, abnormal posture, poor muscle recruitment, emotional stress and changes associated with aging and injury such as disk degeneration, arthritis ete. Tissue damage can also lead to abnormal movement pattern and further damage, which is the basis for the Kirkeldy-Willis degenerative cascade[11]. Our study showed that 40 out of 50 patients suffering from spinal degeneration are 60-70 years old. It matches Mooney and McCall observation that lumbers spondylosis is more common in older patients[12, 13]. In our study, intervertebral disk herniation occurs equally in both genders (4%) and in the age group of 20-70 years indicating that it occurs in any age group and both genders are equally susceptible.

In our study, 3.67% (11) male and 9% (27) females had vertebral fractures, it matches with the observation that vertebral fracture is more common in female than in male. Atraumatic vertebral fracture is 5 times more common in females (5%, 15) than males (1%, 3) and 12 patients (1 male, 11 females) are above 60 years and grossly osteoporotic which matches with the observation that there is higher incidence of back pain associated with osteoporotic fractures in elderly women as compared with in men. Pain is especially prevalent if three or more vertebral fractures are present. These subjects have twice as much back pain as those without compression vertebral fracture[14].

In our study 30 patients were diagnosed with gross osteoporosis and among them 5 were diabetic, 13 were on oral steroid as treatment for rheumatoid arthritis, 8 were suffering from hyperthyroidism and only 4 patients had history of minor trauma revealing that more than three fourth of the patients with osteoporosis were suffering from these three medical condition. This matches with the evidence based proposition that in patients with a history of minor trauma or no trauma and LBP, metabolic cause should be excluded[15].

Our study showed that 2 males and 5 females were suffering from lumbar vertebral metastasis, among them 1 male and 3 females were suffering from colonic CA, 1 male with prostatic CA, 2 females with rectal CA. This matches with the evidence based proposition that in patients with carcinoma suffering from LBP with minor or no trauma, vertebral metastasis should be excluded[16].

Conclusion

The present cross-sectional observational study of a sample of 300 patients attending PMR OPD of a tertiary care hospital of West Bengal was concerned with the distribution and prevalence of various causes of chronic low back pain. This study was also aimed to determine the relationship of the chronic LBP of the patients with their age, gender and other demographic parameters as well as associated clinical conditions.

Age and gender composition of the study population matches with the population statistics. Lumbar degeneration or spondylosis is found to be the major cause of low back pain and has multifactorial causes such as poor muscle co-ordination, bad posture etc. causing permanent lumbar damage. Gross osteoporosis in young age group had a strong correlation with systemic disease. In patients with atraumatic vertebral fracture, underlying pathology like metastasis, multiple myeloma should be excluded.

References

1. Van den Heijden GJMG, Bouter LM, Terpstra-Lindeman E. The efficacy of traction for low back pain: results of randomized blinded pilot study. Ned T Physiotherapy 1991; 101:37-43.

2. Von Korff M, Dworkin SF, Le Resche L, et al. An epidemiologic comparison of pain complaints. Pain 1988; 32(2): 173-183.

3. Walter BF. The prevalence of low back pain: a systematic review of the literature from 1966 to 1998. j Spinal disorder 2000; 13(3): 205-217.

4. Anderson G.B.: Epidemiological features of low-back pain. *Lancet* 1999; 354:581-585.

5. U.S. Department of Health and Human Services: Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2002. Vital and Health Statistics Series 10, No. 222 [DHHS Publication No. (PHS) 2004-1550]. Hyattsville, Md,

6. U.S. Department of Health and Human Services, 2004. Available at: www.cdc.gov/nchs/data/series/sr_10/sr10_222.pdf. Accessed January 8, 2007.

7. National Academy of Sciences and Institute of Medicine: *Musculoskeletal Disorders and the Workplace*. Washington, DC, National Academy Press, 2001.

8. Kent PM, Keating JL. The epidemiology of low back pain in primary care. Chiropractic and osteopathy2005; 13:13.

9. Gilgil E, Kacar C, Butun B et al. prevalence of low back pain in a developing urban setting. Spine 2005; 30: 1093- 8.

10. Nagasu M, Sakai K, Ito A et al. prevalence and risk factors for low back pain among professional cooks working in school lunch services. BMC Public Health 2007; 7: 171.

11. Waddell G, Burton K. Information and advice for patients. In: the back pain revolution. Edinburgh: Churchill Livingstone; 2004:323-342.

12. Magee DJ, Magee DJ, ed. Orthopaedic clinical assessment. 4th edn. Philadelphia: Elsevier; 2002:467-566.

13. McCall IW, Park WM, O'Brien JP. Induced pain reffered from posterior lumber elements in normal subjects. Spine 1979, 4(5): 441-446.

14. Mooney V, Robertson J. the facet syndrome. Clin. Orthop 1976; Mar-Apr(115): 149-156.

15. Old JI, Calvert M, Vertebral compression fractures in the elderly. Am Fam Physician 2004; 69(1):111-116.

16. Patel SR,Benjamin RS. Soft tissue and bone sarcomas and bone metastasis, In: Braunwald E, Fauci AS, Kasper DL, et al eds. Harrison's principles of internal medicine. 15th edn. New york: McGraw-Hill; 2001: 625-628.