

Analysis of Incidence of Lumbar Spondylosis by Gender in Rural Area its Severity & Occupational Consequences: Rare Indian Study

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Abstract

Objectives—To describe workers with low back symptoms, to identify risk factors and to assess the occupational consequences separately in men and women.

Methods—A descriptive study was conducted between 1 January 2010 and 31 March 2013 in a sample of workers selected at random from all types of different occupations. A group of orthopaedic surgeons interviewed 600 workers with a standardised questionnaire including the Nordic questionnaire. Data analysis was performed by sex in the two groups: male with low back pain and female with low back pain over the previous 12 months. The group with low back pain was then divided into four subgroups: mild cases of lumbar spondylosis (without referred pain), moderate cases of lumbar spondylosis (with referred pain above the knee), serious cases of lumbar spondylosis (with referred pain below the knee), and of lumbar spondylosis with occupational consequences.

Results—600 cases could be evaluated out of which 200 were regarded eligible for this research study. The sample consisted of 64.8% of men () and 35.2% of women (), with a mean age of 32.8 and 38.0 years. The following risk factors occurred significantly more often in men: high weight, height, body mass index (BMI), smoking, number of children, increased driving time and work time, material handling tasks, uncomfortable working positions. Most women were house wife's (53%). The following risk factors were common to both sexes: lifting weights >10 kg, in women and in men, uncomfortable working positions, and absence of means to achieve good quality work, respectively. Driving was a risk factor only in men and its importance increased with driving time (driving >4 hours a day. Severe low back pain was linked to female sex (10.2% of women v 6.6% of men), aging, and uncomfortable working positions. Low back pain with occupational consequences (n=258) was not linked to sex, but only to aging and severity.

Conclusions—The incidence and severity of low back pain were higher in women, although they seemed to be less exposed to known occupational risk factors. However, our results indicate a preponderance of these risk factors among female workers. Particular attention must therefore be paid to lifting of weights and uncomfortable working positions in female jobs (clerk, trading, health care staff).

Key words: low back pain; gender based study; severity

Introduction

The vertebral column of humans is unique among the animal species in both function and aging patterns. Humans are the only few species that engage in bipedal locomotive behavior, and the only species that uses bipedalism exclusively. Backache is an extremely common human phenomenon; a price mankind has to pay for their upright posture. Lumbar Spondylosis, canal stenosis has

reached an epidemic proportion. It is a common cause of occupational and domestic disability in industrialized societies. The patterns of behaviour of the normal back and the nature of the events and incidents that lead to derangements have intrigued the practitioner since primitive times. Various causes have been attributed to low backache, but lumbar spinal canal stenosis as a causative factor for backache is of great interest.

Lumbar Spondylosis is a very common symptom in the population. Even though the problem of lumbar spondylosis is equally prevalent all over the universe, we see little studies done on lumbar vertebrae in Indian context. It is well established that the morphometrical data varies within different sex, race, ethnic and regional groups.¹ The spine is the most complicated articular system in the body, with separate joints including intervertebral discs. The normal spine moves 600 times per hour, whether the individual is awake or sleeping.² In

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order to understand the patho-mechanics of discopathy, one must understand normal function of the intervertebral discs. The intervertebral discs contribute approximately 22% of the length of the spine. The discs function to allow motion between vertebral bodies in all planes of motion. The deformability of the intervertebral disc allows for the distribution of forces over the entire surface area of the vertebral body endplate rather than focusing loading and torsional forces at the periphery of the vertebral body (3, 4). The gelatinous nucleus pulposus acts as a hydrodynamic ball bearing that converts the vertical pressures of axial loading to horizontal forces that can be absorbed by the annulus fibrosus. When axial forces are applied to the lumbar spine, the annulus acts elastically (although no elastic fibers are found within the annulus) to provide for an increase in the radius of the disc. As axial forces expand, the distance between the vertebral endplates decreases and the disc's radius increases. With the aging process, lumbar mobility decreases and the degree of expansion on axial loading increases. Thus, the disc loses its energy absorbing capacity and sustains mostly vertical loads (4).

Lumbar degenerative joint disease is a dynamic process that begins with an insult to the intervertebral disc and ends at a variable point between the initial insult and the pathology associated with advanced cases of lumbar spondylotic myelopathy. Typically, age and abnormal physical loading ("wear and tear") have been associated with the development of intervertebral disc degeneration. In the past decade, various additional etiologic factors for disc degeneration have been sporadically reported in the literature; however, many investigators continue to place tremendous emphasis on the effects of age, gender and biomechanics associated with disc degeneration. The aim of this study was to provide additional insight into the notion that age, gender and biomechanics are key factors in the development of disc degeneration. Lumbar Spondylosis associated with low back pain is a common debilitating condition worldwide with severe socioeconomic and health care consequences (6). It can cause functional impairment, diminished quality of life, loss of working ability, potential psychological distress, and increased health care costs. Although various factors have been implicated in low back pain, intervertebral disc degeneration that is evident radiologically or on advanced imaging (i.e., magnetic resonance imaging [MRI]) is a known cause of low back pain.

In a recent systematic review of MRI studies assessing disc degeneration, Chou et al found that disc degeneration is a significant risk factor for the development of back pain. In fact, previous studies have also shown that an increase in the global severity of disc degeneration or the presence of end-stage disc degeneration with disc space narrowing is significantly associated with an increased risk of having low back pain (7).

This is the first population-based study of lumbar spondylosis ever done in rural area. The Faculty and Department of Orthopaedics, AVBRH under DMIMS University, Nagpur, held the project. The objective of the present study was to identify the prevalence and related factors of lumbar Spondylosis gender wise in this population. Therefore, proper health promotion programs should be implemented for the rural area in order to improve their quality of life. The numbers of the studied population in each decade are shown, with the gender ratio male: female is 2: 3. The female subjects had higher body mass index (BMI) with the mean value of > 25 kg/m². About 54.8% of the subjects reported low back pain within 6 months, and 27% were moderate to severe pain.

Material And Methods

Study design

1. Type of study-

This study was comparative study between male and female patients. Thus making it a cross-sectional study. This study included both prospective and retrospective group of patients. The research project was from the academic year 2010- 2012 including retrospective cases of 2010 and 2011 and prospective cases for the year 2013. Total approximately of 200 cases were taken for the study. This study was simple based on the questionnaire prepared equally same for both female and male patients. The questionnaire was distributed, explained and filled simultaneously. In the end all the questionnaires were evaluated for the incidence of lumbar spondylosis among male and female patients. This study was not a monetary burden and didn't require any funds for its process. This was a unique study as till yet it would be the first in this rural setup. This research project was done in AVBRH Sawangi Meghe in the department of Orthopaedics.

All the patients coming to the orthopaedics opd, admitted patients in orthopaedic wards diagnosed for lumbar spondylosis would be taken into consideration.

Data Collection

The first 15 questions described the worker and his work station according to known risk indicators by: sex, age, weight, height, right or left handed, number of children, smoking habits, regular physical exercise, driving time, job, duration of work time, work time a week, manual lifting of weights heavier than 10 kg, uncomfortable working positions, and means to achieve good quality work. The 16th question, derived from the Nordic questionnaire was: "Have you ever experienced low back problems (back ache, pain, and discomfort)?" If the answer was no, no further questions were completed. If the answer was yes, the attending orthopaedic surgeon asked another 11 questions: pain with or without radiation, pain

referred above or below the knee; admission to hospital for low back pain; change of job, change of work station, or work station enhancement; during the past 12 months: total duration of low back problems, reduction of work activities, reduction of leisure activities, consultation with health care providers, medication intake, duration of sick leave for low back problems, and type of compensation. We compared those who had experienced low back pain for each by questionnaire in men and women.

Analysis and Statistical Methods

We created two groups according to the answer to question: 1) Male 2) Female which was then divided into three subgroups according to (a) lumber spondylosis without irradiation, called mild cases, (b) lumber spondylosis with irradiation above the knee, called moderate cases, (c) lumber spondylosis with irradiation below the knee, called serious cases. Independently of the severity of the lumber spondylosis already described, we created two other subgroups derived from group 2 (a) low back pain with occupational consequences (change of job, change of work station, work station enhancement), (b) low back pain without occupational consequences.

Inclusion Criteria-

- 1) All cases coming to AVBRH hospital, Sawangi Meghe with lowbackache.
- 2) Patients of young to middle aged 18 years to 60 years.
- 3) All patients diagnosed by Magnetic resonance imaging technique in addition to clinical assessment.
- 4) All retrospective patients admitted to AVBRH in the department of orthopaedics diagnosed for lumber spondylosis in year 2011 and 2012.

Exclusion Criteria-

- 1) All patients below age 18 years.
- 2) Patients with predisposing morbid conditions.
- 3) Patients diagnosed without magnetic imaging.

2) Method-

Proper history of the patients with complaint of low backache was taken. All required investigations including radiological was done to diagnose or label them as lumber spondylosis. Once done then questions of the prepared questionnaire were asked. Quantitative analysis was done after 200 cases for male to female ratio.

3) Statistical Analysis-

All data was abstracted on a standardized data- collection form. We used spreadsheet to enter the data electronically. Statistical analysis was done by statistical software STATA (version 10, Stata Corporation, Texas, and USA).

Discussion

In our sample, low back pain occurred more often and was more severe among men. Men were identified as a risk factor for lumber spondylosis in some studies before 1990. More recent studies have also reported contradictory results. In the review by Burdorf and Sorock, sex did not seem to be linked with low back pain (8). On the other hand, male sex seemed to be preponderant for the long duration of sick leave related to low back pain in the study of Hemingway et al (9). In the study of Park et al, lumber spondylosis occurred more often among men except for low back pain caused by occupational injuries or occupational repetitive activities (10); our results are similar, except for repetitive activities, which were not analyzed in our study. Finally, Dempsey et al emphasized the marked sex related differences in job category (11). This finding justified our separate analysis by sex. The main differences found were: more manual tasks among men and less qualified jobs or jobs with responsibilities among women. Men drive more often and driving time is longer, have uncomfortable working positions, and manually lift weights >10 kg. Men traditionally do more transporting and manual handling jobs. Longer work time a week among men is a known sociological phenomenon (12). Women more often have part time jobs, allowing them to carry out house- hold tasks and to take care of children (13). In our study, we did not assess this extra occupational workload that nevertheless plays a part in the development of lumber spondylosis.

Non-conditional logistic regression analysis confirmed male sex as an associated factor of low back pain in our population of workers performing all kind of activities. The higher incidence of lumber spondylosis with referred pain among women that occurred in our preliminary results was also confirmed.

We classified low back pain into three levels of severity according to the presence of referred pain above or below the knee, as recommended by the Canadian experts group (14). This classification of severity seemed to be more relevant than duration of sick leave, which is influenced by various psychosocial factors (15-17). The influence of psychosocial factors was found in our results, as only 6% of men and women declared that they were obliged to reduce their work activity, whereas 27.1% of women and 26.0% of men reported reduction of extra occupational activities. The more frequent severity among men explains their more frequent use of health care facilities: consultation with healthcare providers and consumption of medication for low back problems.

The risk factors for lumber spondylosis found in this study are already known—manual lifting of weights >10 kg, uncomfortable working positions, driving time, absence of means to achieve good quality work and smoking. As

expected, manual handling tasks, uncomfortable working positions, and driving were found not to be associated with occupational consequences. These factors could be present in the worker's occupational history, before the onset of low back pain, but, by definition, workers with lumber spondylosis and occupational consequences are either no longer exposed to these risk factors, or only at a much lower degree. The composition of our sample was representative of the working population according to age, sex, and socio-occupational group. It is natural to find higher mean values among men than among women for weight, height, and BMI, based on these data. The higher prevalence of smokers among men is a known phenomenon. The greater mean number of children for families of men than for working women is explained by socio-occupational factors: women with a lot of children at home tend to stop work to care for their children.

Tsai et al, identified smoking as a factor associated with lumber spondylosis(18). In our study, smoking seemed to be associated with low back pain with referred pain in men.

Aging was a risk factor only among women for lumber spondylosis with referred pain above and below the knee. As women of our sample were house-wife's (53%), uncomfortable working position was again found to be a risk factor in sedentary jobs, as emphasized by Burdorf et al (19). On the other hand, only aging seemed to be linked to serious cases in both men and women. This is disappointing in terms of prevention, as there is no way in which we can act on this factor. Hadler showed that this cost could be decreased if physicians prescribed fewer medications to cure the symptom in favour of psychosociological intervention (20).

Our study, carried out in workers employed in all types of jobs, showed aging as a main risk factor for severity of low back pain. Nominee also found aging to be a risk factor among building workers exposed to a heavy physical workload. The main prevention issue is to assess occupational risk factors involved before aging. Direct observation of movements and working positions of workers seems to be the best assessment method to evaluate postural load on the low back. This method is better than self-administered questionnaires on physical workload. However, in practice, it is impossible to obtain such observations over the entire working life. Based on this analysis of our data by sex, the incidence and severity of lumber spondylosis were higher in men although women seemed to be less exposed to known occupational risk factors. However, our results indicate a higher weighting of these risk factors among male workers according to OR values. Each year, occupational physicians should visit and study all work places to recommend improvements to working conditions. Particular attention must therefore be paid by occupational physicians to lifting of weights and

uncomfortable working positions in male jobs.

Results

During the data collection 600 cases of lumber spondylosis were reviewed and 200 were kept eligible for analysis. The sample consisted of men (64.8%) and 3168 women (35.2%). The mean age was 32.8 - 38 years in men (SD 10, range 15-73 years), significantly higher than in women: 37.0 years (SD 11, range 16-72 years). Weight and height were higher in men and mean BMI was significantly higher in men than in women: 24.6 v 23.3 ($p < 0.001$).

Although most workers were right handed (87% of men and 90% of women), the prevalence of left handed and ambidextrous subjects was significantly higher in men: 8% v 7% and 5% v 4%. Men had a significantly higher mean number of children (1.42) in their families than women (1.21), (range 0-9 for both sexes). There were more smokers among men (76.5%). Regular physical exercise was more often reported by men (35.7%) than women (19.6%, $p < 0.001$). Driving time was more frequent and driving time was longer in men. In both sexes, the equal frequency of driving time <2 hours probably corresponds to the time to get to and from work. Main function and hierarchical position in the current job was very different according to sex. Main tasks with a handling component occurred more often in men (49.5% v 19.6%), as were qualified or management jobs (67.9% in men v 34.8% in women); 53% of women were clerks. The mean duration in the occupation was about 10 years in each sex, but was significantly higher in men (10.0 v 9.4 years, $p < 0.01$). Work hours a week were significantly higher in men (42.8 (SD 8, range 6-98) hours) than in women (38.0 (SD 8, range 2-80) hours). Men more often manually lifted weights >10 kg. Men more often reported uncomfortable working positions (34.3% v 31.9%, $p < 0.05$). Means to achieve good quality work were slightly more often among men (74.6% v 73.3%), but the difference was not significant.

Social consequences were similar in both sexes except for change of job, which occurred more often among men, compensation for sick leave, which occurred more often among women, and compensation for occupational injury leave, which occurred more often among men.

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