

Occupational Health Brief: Low Back Pain Disorders in Louisiana Workers



Office of Public Health/Section of Environmental Epidemiology & Toxicology/
Occupational Health & Injury Surveillance Program

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Background

Low Back Pain (LBP) disorders are one of the leading occupationally related conditions and are the most frequent reason for filing a workers' compensation claim¹. LBP disorders can be defined as chronic or acute pain of the lumbosacral, buttock or upper leg region with pain radiating from the back region down one or both legs². These disorders include spinal disc problems such as hernias and spondylolisthesis, and muscle and soft tissue injuries³. Once injured, the back is susceptible to re-injury particularly if risk factors are not corrected. Poor ergonomics in the workplace can contribute to LBP disorders in a healthy back or accelerate existing changes in an already damaged back².

Studies show a positive association between LBP and heavy physical work and whole body vibration. Heavy physical work, including but not limited to jobs such as construction laborers, nurses, and maids, has been defined as work that has high energy demands, heavy tiring tasks, manual materials handling tasks (lifting) or dynamic intense work requiring some measure of physical strength. Whole body vibrations (forceful movements) affecting truck/bus drivers, helicopter pilots, crane or earth movers, refer to mechanical energy oscillations which are transferred to the body as a whole, usually through a supporting system such as a seat or platform. These two main risk factors impose large compressive and/or stretching forces on the spine^{2,3}.

Although surgeries are rarely done to treat LBP disorders, they can be performed for people with chronic pain, herniated discs, spinal stenosis or spondylolisthesis for which other treatment options have failed, and for people who have degenerative disc disease. Occupationally related LBP disorders that require surgery are of public health importance as this process can be invasive, require lengthy rehabilitation and have an economic burden. The Louisiana Department of Health and Hospitals' Occupational Health & Injury Surveillance Program tracks LBP disorders using data from various sources. This article briefly examines work-related hospitalizations for surgical LBP disorders.

Methods

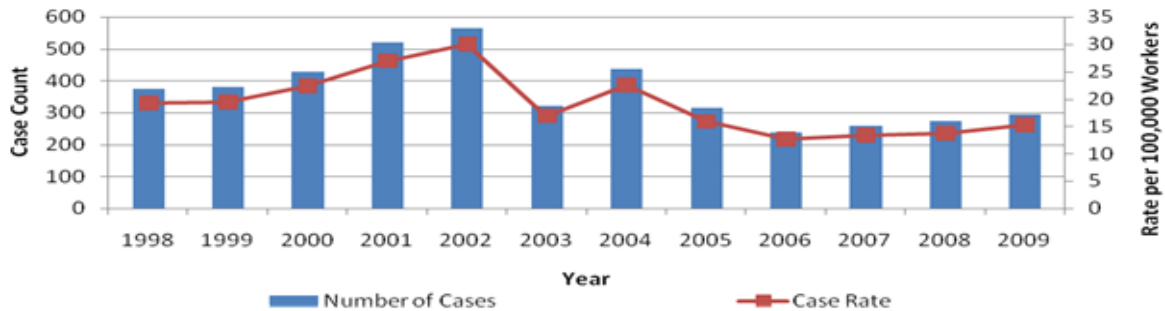
Louisiana Hospital Inpatient Discharge Data (LAHIDD) from years 1998-2009 served as the data source for this analysis. Cases were selected if they were Louisiana residents at least 16 years old who had a hospitalization paid for by workers' compensation and had a relevant LBP diagnosis and LBP surgery code (Tables 1 and 2). Linear regression was used to determine rate trends and a t-test to compare surgical rates stratified by gender. A p-value of 0.05 is considered statistically significant. Data were analyzed using SAS version 9.2.

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Results

There were a total of 5,267 workers hospitalized with LBP disorder. Eighty-three percent of these hospitalizations were surgical (N=4,383). There were approximately 365 surgical cases in Louisiana each year. The surgical rate showed a significant decrease over the study period with a mean annual rate of 19.05 per 100,000 employed persons ranging from a high of 30.0 in 2002 to a low of 15.3 in 2006 (Figure 1) (p=0.036).

Figure 1: Number and Rate of Lower Back Disorders Surgical Hospitalizations, Work-Related, LA, 1998-2009



The most common LBP disorder was herniated discs (65% of all diagnosis). Herniated discs occur when the hard outer coating of the discs that cushion the bones of the spine are damaged, allowing the discs' jelly-like center to leak and irritate nearby nerves (Table 1). Fusions, a surgical technique to join two or more vertebrae to eliminate pain caused by abnormal motion, and discectomies, the surgical removal of a herniated disc that presses on a nerve root or the spinal cord, accounted for approximately 49% and 43% of all procedures, respectively (Table 2).

The mean age of surgical cases was 43 (SD=10.1 range 19-79) with 65% of procedures occurring among individuals aged 35-54. Men had a higher rate of LBP surgical hospitalizations than women (27.6 per 100,000 employed men vs. 9.10 per 100,000 employed women). The mean length of stay in the hospital was 3 days (SD=2.09 range 0-31). However, women had a significantly higher mean length of stay than men (3.1 days versus 2.8 days, respectively) (p=0.0035). The mean cost of LBP disorders was \$37,731 with women having a significantly higher cost burden than men (\$41,099 versus \$36,719, respectively) (p=0.002).

Table 1: Diagnosis of Low Back Pain Surgical Hospitalizations, Work-Related, LA, 1998-2009

Diagnostic Categories	Number	Percent
Herniated Disc	2845	64.9
Probable Degenerative Changes	767	17.5
Spinal Stenosis	423	9.7
Possible Instability	241	5.5
Other	107	2.4
Total	4383	100

Table 2: Procedures of Low Back Pain Surgical Hospitalizations, Work-Related, LA, 1998-2009

Procedure Categories	Number	Percent
Fusion	2126	48.5
Discectomy	1898	43.3
Laminectomy	322	7.3
Other	37	0.8
Total	4383	100

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Discussion

This analysis indicates that surgeries for LBP disorders occur most commonly among middle-age workers and that herniated discs dominated the list of those disorders. These results are consistent with the literature that herniated discs are more common among middle-aged people as over time these discs lose water content, become narrower and less flexible. Age, compounded with repetitive, incorrect lifting techniques and other strenuous occupational activities can exacerbate the natural degeneration of these discs⁴. The elevated surgical LBP disorder rates among men compared with women may reflect differences in occupational patterns in Louisiana.

LBP disorders have high costs to society and the economic burden is primarily related to costs of losses in productivity⁵. In 2008, the United States spent \$7.4 billion of direct and indirect costs (loss wages and productivity) related to back injuries and low back pain accounted for 818,000 disability-adjusted life years lost annually⁶. Several interventions have been developed to help prevent LBP disorders among workers in high risk occupations. For example, nurses and other healthcare workers can experience serious back injuries during the handling and transferring of patients. The use of mechanical lifting devices and repositioning aids can reduce the amount of weight they have to lift. Studies have demonstrated that facilities using these devices have shown a reduction of lifting related injuries, days away from work and workers' compensation claims³. In construction, ergonomic solutions such as the reduction of the weight, size and shape of the load have been introduced. Using lifting devices and having job rotations are other methods to reduce the risk of low back injury. Interventions to address whole body vibrations are limited due to the nature of the machine. However, recommendations about implementing vibration limits that require oscillation acceleration of no more than 0.3-0.45 m/s² have been made. Oscillation speed can be decreased by jointly engineering the suspension of the vehicle's axles and the drivers' and passengers' seats⁷.

Conclusion

Low back pain disorders afflict many workers and can cause lifelong pain and disability. Changing workplace practices known to cause LBP disorders is an important first step in improving workers' safety and reducing these debilitating musculoskeletal injuries. More emphasis should be placed on implementing effective solutions into workplace wellness programs, such as broader education and training approaches that encompass anatomy, biomechanics, lifting and materials handling techniques, and recognition and correction of workplace risks. A comprehensive approach will focus not only on the physical risk factors, but the individual and psychosocial factors as well. Health departments can assist in efforts to improve the health of workers by tracking and evaluating LBP disorders to identify high risk populations, occupations, and industries.

Limitations

Although hospitalization data are useful for describing occupational injuries and illnesses, there are limitations. Use of expected payment by workers' compensation as an indicator of work-relatedness presents problems due to the potential for under-reporting, misclassification, and changes in final payment. In addition, national rates for comparison with Louisiana were not available.

¹ Johanning E. Evaluation and Management of Occupational Low Back Disorders. *American Journal of Industrial Medicine* 2000; 37, 94-111

² Beeck R. Work Related Low Back Disorders. National Institute of Occupational Safety and Health 2000.

³ National Institute of Occupational Safety and Health. Musculoskeletal Disorders and Workplace Factors. 1997.

⁴ Herniated Disc. The Mayo Clinic. www.mayoclinic.com/health/herniated-disk/DS00893. 2011

⁵ Lambeck C, et al. Effect of integrated care of sick list patients with chronic low back pain: economic evaluation alongside a randomized trial. *The British Medical Journal* 2010; 341, 6416

⁶ Kriebel D, et al. Lessons Learned: Solutions from Workplace Safety and Health (2011). Lowell Center for Sustainable Production. University of Massachusetts.

⁷ Bureau of Labor Statistics. Geographic Profile of Employment (2003-2008). www.bls.gov/opub/gp/laugp.htm