

Original Article

What is the source of low back pain?

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Abstract

Aims: Determining the source of low back pain (LBP) is still controversial. This study was designed to determine the source of LBP and its relations with age and gender. **Settings and Design:** A retrospective chart review at Isfahan University of Medical Sciences, Isfahan, Iran. **Materials and Methods:** A total of 1,125 patients were evaluated to determine the sources of their LBP with physical examinations, imaging, injections, and other laboratory examinations, if needed. The patients were divided into five groups based on their ages. Frequencies of the sources of pain were assessed in the five age groups, and the assessments were done separately by gender. **Statistical Analysis Used:** Independent t-test, analysis of variance (ANOVA), chi-square test. **Results:** The patients enrolled in this study consisted of 527 males (46.8%) and 598 females (53.2%). The frequencies of the sources of pain were, in descending order, spine (689, 61.2%), no cause found (163, 14.5%), spine with sacroiliac joint (SIJ) (72, 6.4%), spine with hip (65, 5.8%), SIJ (60, 5.3%), hip (44, 3.9%), spine along with hip and SIJ (20, 1.8%), hip with SIJ (8, 0.7%), and other diseases (4, 0.4%). There were significant statistical differences between the genders and mean ages for different sources ($P = 0.03$ and 0.000 , respectively). **Conclusions:** This study showed that the spine was the main source of LBP in all age groups. Physicians should always be alert for other sources in middle-aged and older patients. Future studies with long-term follow-up for determining the benefits of treatments are warranted.

Key words: Etiology, low back pain, source, spine

INTRODUCTION

Low back pain (LBP) is a common disease^[1] that up to 84% of adults will experience during their lives, and up to 50% of them will have more than one episode.^[1,2] This disease is the second

ranked cause of lost days at work, and approximately \$50 billion per year is spent on LBP in the US.^[3]

The severity of symptoms in LBP varies widely. Some episodes are self-limiting and resolve without specific therapy, but some causes of LBP might be excruciating enough to necessitate treatment in an emergency room. Many sources are responsible for LBP, including muscles, nerves, bones, and referred pain from abdominal organs. Although there can be many underlying causes for LBP, often no specific reason can be found. So, better identification of the source of LBP may result to better treatments.

Some studies have evaluated the tissue source of LBP, but a major limitation of these studies was that the subjects that were used were not associated with patients who came to clinics

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seeking relief from their LBP. Also, the prevalence of responsible tissue was different in these studies, which may have been due to preselection biases.

Therefore, this study was conducted to evaluate the sources of LBP and its prevalence within specific age groups so that better decisions can be made by the specialists who treat those who suffer from LBP.

MATERIALS AND METHODS

This is a retrospective chart review of all patients who were seen for the first time between October 2008 and July 2012 in the Department of Orthopedic Surgery at two university hospitals (Referral Centers, Isfahan University of Medical Sciences) in Isfahan, Iran. The records of patients whose chief complaint was first time LBP were reviewed in detail, including their medical histories, examinations, imaging, and consultations with other specialists. This study was approved by the Institutional Review Board.

Demographic data, such as age and gender, were reviewed. If the evidence for determining the source of LBP were strong enough during the review of the records, a diagnosis was established. However, if other sources of the LBP were suspected or if there were other red flags for given patients [Table 1], other evaluative tools were considered; such as magnetic resonance imaging (MRI), plain anteroposterior and lateral radiographs of the lumbosacral spine (a total of two views), erythrocyte sedimentation rate (ESR), complete blood count, and C-reactive protein level.

Spinal diseases have been evaluated mainly by history and physical examination findings in correlation with imaging. In these patients, well-controlled injection techniques directed at specific targets in and around the spine were performed for diagnostic and therapeutic purposes. Patients who had suspicious to discogenic back pain underwent discography.

Hip pathology was considered when patients had pain in the groin area that started with walking and increased on passive hip range of motion. So, injections in the hip and computerized topography (CT) scans were performed.

Table 1: Red flags for a potentially serious underlying cause for low back pain

Recent significant trauma, or milder trauma age >50 years
Unexplained weight loss
Unexplained fever
Immunosuppression
History of cancer
Intravenous (IV) drug use
Osteoporosis, prolonged use of corticosteroids
Age >70
Focal neurologic deficit progressive or disabling symptoms
Duration greater than 6 weeks

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Sacroiliac (SI) joint injection^[4] and CT scan of the pelvis were performed for patients who had pain in the region of the sacral sulcus and positive findings on maneuvers. For, the cases in which improvement was reported after injections, the diagnosis of SI joint (SIJ) pathology was considered.

Pain was evaluated with a visual analogue scale (VAS) with scores ranging from 0 to 10 (0 for no pain and 10 for intolerable pain), and a 50% decrease in the pain score was considered to be indicative of significant pain relief.

For patients who had evidence of more than one source of pain, all procedures for doubtful sources were done in different visits with the spot of anesthetic agent time period and for whom no sources of the pain had been found, No cause found subscale was considered.

Statistical Package for Social Sciences (SPSS) software (Windows version 18.0) was used to analyze the data using the independent *t*-test (if the data were normally distributed), analysis of variance (ANOVA) tests for comparing means between groups, and the chi-square test for categorical data.

RESULTS

The patients enrolled in this study consisted of 527 males (46.8%) and 598 females (53.2%). The mean age of the patients was 44.9 ± 18.9 (range: 12-80) years. The frequencies and percentages of sources are shown in [Table 2]. The source frequencies were as follows: spine (689, 61.2%), no cause found (163, 14.5%), spine with SIJ (72, 6.4%), spine with hip (65, 5.8%), SIJ (60, 5.3%), hip (44, 3.9%), spine along with hip and SIJ (20, 1.8%), hip with SIJ (8, 0.7%), and other diseases (4, 0.4%).

According to the chi-square test, there was a significant statistical difference between the sources of LBP in males and females ($P = 0.03$). The mean age of each source group also is shown in [Table 2 and Figure 1]. According to the ANOVA test, there was a significant statistical difference between the mean ages in different source groups ($P = 0.000$). The variety of sources in the different age groups is shown in [Table 2]. Our data indicated that the spine was the only source of LBP in patients who were 18 or younger, and most of the 'no cause' findings also were in this age range.

Among the 689 cases for which the spine was the source of LBP, 129 (18.7%) of those cases had sciatic nerve presentation. Other causes included three cases of skeletal tuberculosis and one case in which prostate cancer had metastasized to the bone.

DISCUSSION

Our findings showed that the spine is the most frequent source of LBP. The frequencies with which other sources were identified were in the following order: No cause found, spine with SIJ, spine with hip, SIJ, hip, spine along with hip and SIJ, hip with SIJ, and other diseases. The sources of LBP are

Table 2: The frequencies of the sources of low back pain and its relationship with gender and age

Characteristics	Spine	Hip	SIJ	S+H	S+SIJ	S+H+SIJ	H+SIJ	Other	No cause	P-value
Gender Male	328 (29%)	27 (2%)	27 (2%)	38 (3%)	26 (2%)	10 (0.8%)	5 (0.4%)	3 (0.25%)	63 (5%)	0.03*
Female	361 (32%)	17 (1.5%)	33 (3%)	27 (2%)	46 (4%)	10 (0.8%)	3 (0.25%)	1 (0.08%)	100 (8.8%)	
Mean of age (years)	44.0±17.2	58.8±11.6	55.7±13.0	61.5±11.1	60.7±11.5	70.9±6.5	70.8±4.0	45.2±3.2	23.4±10.2	0.000**
Age groups ≥18 (122)	22 (19.6%)	0	0	0	0	0	0	0	90 (80.4%)	
in year										
(number)										
19-35 (273)	221 (81%)	3 (1.1%)	4 (1.5%)	0	0	0	0	3 (1.1%)	42 (15.4%)	
36-50 (329)	224 (68.1%)	10 (3%)	18 (5.5%)	20 (6.1%)	25 (7.6%)	1 (0.3%)	0	0	31 (9.4%)	
51-70 (264)	140 (53%)	22 (8.3%)	0	0	31 (11.7%)	7 (2.7%)	4 (1.5%)	1 (0.4%)	0	
≥71 (147)	82 (55.8%)	9 (6.1%)	10 (6.8%)	14 (9.5%)	16 (10.9%)	12 (8.2%)	4 (2.7%)	0	0	

Data is presented for frequencies of low back pain sources including spine (S), hip (H), and sacroiliac joint (SIJ); *Chi-square test, **analysis of variance (ANOVA) test

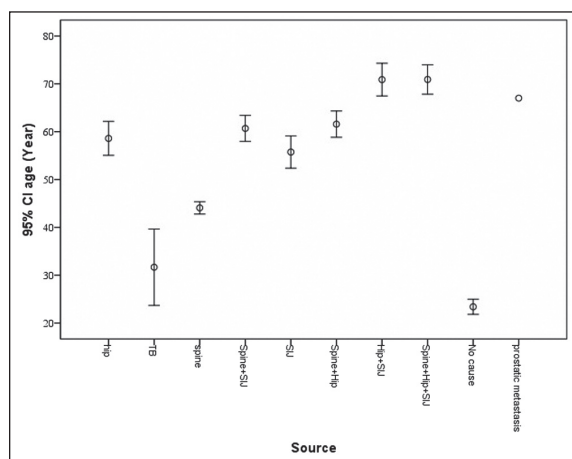


Figure 1: Prevalence of the sources of low back pain

significantly different in males than in females; and also, the mean ages at which the two genders encountered the onset of LBP were significantly different. Most of the 'no cause' findings occurred in patients who were 18 or younger.

LBP is the second chief complaint (after the common cold) of patients who are referred to clinics. Therefore, having knowledge of the frequencies with which various sources cause LBP and also specifically the age ranges affected by specific sources can help physicians provide effective treatment. As our results showed, the spine is the most common cause of LBP. This finding confirmed the results of previous studies.^[5-7]

Our findings showed that patients whose LBP has a spinal source are generally younger than the people whose LBP is caused by other sources. This result is in agreement with the results of previous studies.^[8-10] We found that the prevalence of the spine as a source of LBP increased until the patients were 50-years-old, after which it decreased. This finding is in contrast with the results of Laplante *et al.*,^[11] multivariable model analysis. They showed that the prevalence of the spine as the source of LBP decreases as age increases. The difference may be because of the difference in the sizes of the sample in the two

studies and also sampling biases. We found that 5.3% of patients had solely an SIJ source. Our result is in contrast with the results of the study conducted by Maigne *et al.*,^[4] which indicated that the rate at which SIJ was the source of LBP was approximately 18.5%. This difference may be because their study focused only on SIJ, but we have identified the reasons that SIJ was combined with other causes of LBP, such as the spine, hips, or both. Therefore, it is understandable that the rate of LBP associated with only SIJ was less in our study than it was in their study. We found that the role of SIJ with respect to LBP increases as the ages of the subject increase, and this finding agrees with that in a previous report.^[8]

The results of our study indicated that females are more likely to be affected by LBP than males. This result also was in agreement with the findings of previous studies.^[12-15] However, no difference between males and females was observed in some studies; and in fact, some studies found that men reported more LBP than women.^[16,17] This may be due to sampling bias, especially if the studies enrolled males who did physical labor at work.^[12,13]

We found that most of the undetermined sources occurred in patients who were 18 or younger. This finding may have been influenced by the fact that more psychiatric problems occur in young adult females. The role of psychological distress, including somatization (the expression of distress due to physical symptoms or their persistence) as a presumed source of LBP, has been shown in previous reports,^[18-20] and physicians should be aware of the potential role of psychological problems when they are dealing with patients who have LBP.

Our results showed that the rate of involvement of the hip as a source of LBP increases as patients' ages increased. This may be attributable to the increased rate of osteoporosis and microfractures in hip joints as people age. In this study, we found three cases of LBP due to skeletal tuberculosis and one case in which prostate cancer had metastasized to the bone, and these four cases were referred to the responsible department for follow-up.

The strengths of our study include its large sample size and its focus on determining the sources of LBP separately by age groups. There are also some limitations associated with our

study, that is, the lack of long-term follow-up to verify whether patients improved after treatment and the questionable accuracy of the diagnostic tests.

CONCLUSION

This study showed that the spine was the main source of LBP in all age groups. However, as people age, the potential sources of LBP tended to be combined; for example, the spine with the sacroiliac joint (SIJ), the hip with the spine, and the hip with the SIJ. Therefore, physicians should always be alert for other sources of LBP in middle-aged and older patients. Future studies with long-term follow-up for determining the benefits of treatments are warranted.

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