



Review Article

ISSN : 2277-3657  
CODEN(USA) : IJPRPM

## ***Literature Review on Prevalence, Risk Factors and, Evaluation of Acute Lower Back Pain***

**Ibrahim Bin Abdullah<sup>1\*</sup>, Maha Masad Al-Mutairi<sup>2</sup>, Muhtada Abdulkarim Alghubayan<sup>2</sup>, Ahmed Abduljaleel Alamir<sup>3</sup>, Ahmed Yasir Bu-Jubarah<sup>3</sup>, Nour Almajed<sup>3</sup>, Ghusoon Al-Moaibed<sup>4</sup>, Mohammed Saud Almubaddil<sup>5</sup>, Alwah Mohammed Alqahtani<sup>6</sup>, Thamer Ahmed Alghaith<sup>7</sup>, Saleh Abdulaziz Alabood<sup>8</sup>**

<sup>1</sup> Faculty of Medicine, Department of Family Medicine, Imam Muhammad ibn Saud Islamic University, Riyadh, Saudi Arabia.

<sup>2</sup> Faculty of Medicine, Department of Family Medicine, Almaarefa University, Riyadh, Saudi Arabia.

<sup>3</sup> Faculty of Medicine, Department of Family Medicine, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia.

<sup>4</sup> Faculty of Medicine, Department of Family Medicine, King Faisal University Dammam, Saudi Arabia.

<sup>5</sup> Faculty of Medicine, Department of Family Medicine, Shaqra University, Shaqra, Saudi Arabia.

<sup>6</sup> Faculty of Medicine, Department of Family Medicine, King Abdulaziz University, Jeddah, Saudi Arabia.

<sup>7</sup> Faculty of Medicine, Department of Family Medicine, Majmaah University, Majmaah, Saudi Arabia.

<sup>8</sup> Faculty of Medicine, Department of Family Medicine, Qassim University, Qassim, Saudi Arabia.

\*Email: [Dr.Ibrahim.Bin.Abdullah@gmail.com](mailto:Dr.Ibrahim.Bin.Abdullah@gmail.com)

---

### ABSTRACT

**Background:** Acute back pain is any pain located at the back that lasts for less than 4 weeks duration. The prevalence is fair with as many as 84% of the adult population around the globe experience back pain at some point in life and is often self-limiting. However, in few selected patients it may serve as indicator of a serious underlying disease making it crucial to properly evaluate, characterize and address this concern. **Objectives:** In this review we intend to explore the prevalence, risk factors and highlight the available methods using diagnostic imaging modalities to evaluate and address this condition. **Materials and Methods:** A review of relevant articles published from 1987 onwards in English language was done using the electronic databases of PubMed Pico and, Google Scholar with preset keywords. **Conclusion:** Acute back pain prevalence range between 22 to 48 percent and risk factors are non-modifiable such as advanced age and female gender while modifiable risk factors are obesity, smoking, low education, sedentary lifestyle, etc. Employment related factors such as physically strenuous work also increase the risk of developing back pain. Notably, under-appreciated risk factors including psychological risk factors such as anxiety should be screened for while evaluating patients. Evaluation of back pain mostly relies on comprehensive history and physical examination, as most cases are self-limited. Diagnostic imaging is only recommended in cases presenting with red flag symptoms.

**Key words:** Back pain, acute lower back pain, evaluation methods, risk factors, prevalence of back pain, diagnostic imaging.

---

### INTRODUCTION

Lower back pain is an extremely common condition experienced by more than 80% of the adult population around the globe, at least once during their lifetimes [1]. Lower back pain is categorized based on the duration of pain into acute lower back pain lasting for less than 4 weeks, sub-acute back pain lasting between 4 and 12 weeks and

chronic back pain persisting for  $\geq 12$  weeks [2]. This review aim to discuss several risk factors associated with the likelihood of experiencing back pain. Evaluation of acute lower back pain is imperative and should be focused on history and physical examination as most episodes resolve rapidly with minimal intervention. Diagnostic imaging should be minimized since it rarely reveals any relevant findings, contributes to financial burden and increases the probability of receiving unnecessary treatments, and unwarranted surgical interventions [3, 4].

## MATERIAL AND METHODS

**Sample:** This literature review was conducted using the electronic biomedical databases of Google Scholar and PubMed Pico. We included studies published after the year of 1987 till date in English language. The keywords used to search through the databases were back pain, acute lower back pain, evaluation methods, risk factors, prevalence of back pain, diagnostic imaging and red flags.

**Analysis:** We employed no software for analyzing the results obtained from the review of published articles. However, to ensure that the data compiled is free of error and valid, multiple revisions were done by each of the authors.

## DISCUSSION

Low back pain continues to be a substantial health concern in the field of medicine encountered in both developed and developing countries. Back pain is usually described as pain, stiffness or muscle tension located above the inferior gluteal folds and below the coastal margins. Back pain may present solely or along with other complains and is frequently seen in the general healthcare settings. Several studies have attempted to outline the prevalence of back pain. Many surveys and questionnaires have been designed to estimate the period and point prevalence of lower back pain [1, 5]. A systematic review conducted in the year 2012 estimated the worldwide point prevalence of low back pain to be 12 percent and 23 percent when lasting for one day and one month respectively [6]. Another survey conducted in 2002 reported 26 percent of the total population to have experienced back pain for at least one day in the past month [7]. A study performed in Germany estimated that as many as 70% of the adult population experience at least one episode of back pain every year [8]. Overall, based on the review of several studies highlighting the epidemiology of back pain, we conclude that the global prevalence of low back pain ranges from 22 to 48 percent, and is dependent on the type and ages of the population being considered [9-12].

There is a myriad of different risk factors that predispose an individual to the development of back pain. Some of these factors are non-modifiable such as female gender and age [13]. In a cross-sectional survey by Cassidy et al. (1998) among the total 11% of the adult population that reported back pain, high-disability back pain was reported more frequently by females than by males [12]. Similarly, another study on risk factors associated with acute back pain reported that among the total 2715 study population, a new episode of lower back pain occurred in more women than men i.e. 37 % versus 34% in men [14]. Modifiable risk factors predisposing to back pain include obesity, smoking, poor general health, sedentary lifestyle, low education, and psychological stress [15]. A study by Croft et al. (1999) described poor general health at baseline to be the strongest predictor of the probability of developing back pain with a relative risk (RR) of 1.5 and 2.2 in males and females respectively [13]. The study also linked obesity with lower back pain in women with a relative risk of 1.4, although the link of obesity and back pain in men was not found to be statistically significant [14].

Several factors that increase the likelihood of acute lower back pain can be linked to the type of employment of the individual. Physically strenuous work, job dissatisfaction, and low employment support especially co-worker support have been linked to increasing development and poor prognosis of back pain, in terms of sick leaves and not returning to work [15]. In a study by Macfarlane et al. (1997), the type of work was described to be significantly linked to onset of acute lower back pain since jobs requiring pulling, pushing or lifting objects of 25 pounds or above increased chances of developing back pain as did jobs with requirements of standing or walking for prolonged periods [15]. Psychological factors such as anxiety, depression, and somatization disorder have also been shown to play a role in the development of acute lower back pain [16]. This was successfully demonstrated in a prospective population-based cohort study by Croft et al. (1999) in which the 12-item General Health Questionnaire, which is a validated schedule for measuring psychological distress was used to asses 4501 adults with no back pain at baseline. The results of the study revealed that over the 12 month study period the propensity of developing a new episode of lower back pain was higher in individuals that had General Health Questionnaire scores in the upper third range as compared to the lower third with an odds ratios of 1.8, showing a significant play of psychological distress in new-onset acute lower back pain [13].

Having established a high prevalence and plentiful risk factors of lower back pain, it is important to comprehend the available techniques for evaluating back pain. Most patients with acute lower back pain are seen by general practitioners as outpatients and their evaluation begins with a detailed history. The most essential points that clinicians should remember to elucidate while taking a history include determination of duration, location, type, and severity of the pain, in addition to any prior history of acute or chronic back pain, and how current symptoms can be compared to any previous episodes. It is worthwhile to explore constitutional symptoms including any accompanying symptoms, presence of unintentional weight loss, history of malignancy, night sweats, any precipitating events, attempted therapies, and associated neurologic symptoms such as bowel/bladder symptoms, sensory changes, motor deficits, falls or gait instability, history of recent bacterial infections and, recent history or current use of injection drugs, or corticosteroids. An important aspect many clinicians fail to explore while taking histories from patients of lower back pain is making inquiries of social and psychological factors such as stress levels, anxiety, depression, etc. [17].

An initial evaluation of a patient with acute back pain may also include screening for depression. It is equally important to ask employment-related questions and explore the patient's occupational health including type and severity of work as well as support in the workplace including, supervisor, co-worker and general health support which have been linked to development as well as prognosis of back pain [18]. While history taking alone may not be able to delineate a precise cause of low back pain, it is imperative to take a comprehensive history to collect evidence for a specific etiology of back pain. Following the history, a detailed physical examination is recommended including both a general physical and a local exam. The purpose of performing a physical examination is to detect any abnormal findings that necessitate further evaluation, rather than to make a conclusive diagnosis. Local physical examination of the back should include inspection of the back and posture to check for any anatomic abnormalities, palpation, and percussion of the spine to check for soft tissue or vertebral tenderness and a complete neurologic exam including evaluation of strength, power, reflexes, sensation, and gait. The presence of vertebral tenderness on physical exam is a sensitive, finding for spinal infection, compression fracture and vertebral metastases [19]. If examination points towards a radicular origin of pain, straight leg raise test can be performed. In addition, it is pertinent to check for the presence of nonorganic signs called Waddell's signs. Several studies show that the presence of multiple Waddell's signs in an individual presenting with acute lower back pain may be suggestive of the presence of a psychological component to the patient's pain [20, 21]. In most patients with acute lower back pain laboratory testing and diagnostic imaging is not widely encouraged. However, there are some exceptions in which further testing becomes pertinent. When history and physical examination findings are suggestive of malignancy or spinal/vertebral infection, laboratory tests such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) are recommended, of which CRP is considered to be the more sensitive one [22, 23].

Acute lower back pain of less than 1-month duration is often self-limiting and resolves with minimal intervention or the use of simple painkillers. The use of imaging modalities for evaluating an acute variety of lower back pain without any alarming symptoms pointing towards infection or cancer is not recommended. This observation is based on several studies such as a meta-analysis that compared immediate imaging with standard care for acute and sub-acute lower back pain. This study concluded that imaging modalities such as radiography, computed tomography (CT), and magnetic resonance imaging (MRI) displayed no significant differences in outcomes of pain and physical function of patients in both short-term (up to three months) and long-term (6 to 12 months) [24]. Similarly, another prospective study in patients with lower back pain concluded no significant differences in disability in patients who received early imaging compared to those who did not undergo imaging at the end of one year study period [25]. Performing diagnostic imaging is not only unnecessary and costly but also presents the additional challenge of discovering abnormal imaging findings in back pain patients that may be difficult to correlate with the reported symptoms. For example asymptomatic patients undergoing imaging of the back may be seen to have a disc herniation on MRI in as many as 22 to 67 percent of the cases; similarly, spinal stenosis can be seen in about 21 percent of asymptomatic adults over the age of 60 [26, 27]. These findings may not be the root cause of acute lower back, but when discovered may present additional diagnostic and management challenges. On the other hand, even if the findings obtained from imaging the back correlate with the clinical presentation of the patients, the magnitude of the observed findings may not essentially correlate with clinical severity and predict outcome, as well as the expected clinical improvement, may not correlate well with the resolution of the defect discovered on imaging [28, 29].

Based on the aforementioned studies and observations, it can be concluded that in the majority of patients presenting with acute lower back pain of less than one-month duration, imaging techniques are not necessary,

cost-effective or recommended [30]. Approximately one-quarter of patients 18 to 50 years of age with acute low back pain who underwent imaging exams had no identifiable indication for imaging [31]. In compliance with the guidelines from the American College of Physicians (ACP) and the American Pain Society imaging modalities are reserved for patients with serious underlying conditions and findings suggestive of progressive neurologic deficits as suggested by comprehensive history and physical examination [32]. In this regard, certain alarming features collectively referred to as "red flag" symptoms are findings that help categorize patients at high risk for a more serious underlying cause of back pain and constitute the subgroup of acute lower back pain patients that ideally should receive for emergent imaging [33]. These red flag symptoms include advanced age, past history of malignancy, severe trauma, high-grade fever, long term use of steroids, past or current use of intravenous drugs, presence of a contusion, and many more. Systematic reviews have demonstrated that the presence of one or more of these red flags symptoms considerably increases the post-test probability of discovering an abnormal finding on imaging for example malignancy, abscess, or vertebral fracture [34, 35].

Finally, given the high prevalence rates of lower back pain globally, it is imperative that clinician remain aware and properly implement diagnostic imaging modalities and reserve it for cases where it is absolutely essential and, will likely impact the outcome and overall health of patients. If no underlying cause is discovered, treatment of an acute episode of lower back pain is simple and includes activity reduction and relative rest, non-steroidal anti-inflammatory, and physical therapy. In addition to treatment, patient education is also crucial to raise awareness among these patients, since they are at higher risk for further future episodes of lower back pain.

## CONCLUSION

Based on the findings of this literature review, it can be concluded that back pain is an extremely prevalent condition seen all over the world with at least 80% of adults experiencing significant low back pain in their life time, it interferes with quality of life and affect work performance, and it is one the most common reason for patients to seek medical attention. Back pain is believed to be caused by contraction of supportive muscles along the spine, although the pain, numbness and tingling in the buttocks or lower extremity can be radiated to the back. It is reported more often in women and has several risk factors including obesity, smoking and, low education, sedentary lifestyle and most importantly poor general health. Employment related factors such as physically strenuous work, and low employment support are significant contributors. Also implicated are muscle strain, ligament sprain, poor posture, age and disc bulge in the etiology of low back pain. An important risk factor that needs to be evaluated by each clinician is the presence of psychological risk factors such as anxiety, depression and somatization. For evaluation of back pain, history and physical examination is recommended, as most cases resolve spontaneously. Diagnostic imaging needs to be limited to the cases presenting with red flag symptoms as in other cases imaging may reveal irrelevant findings and substantially increase the financial burden and lead to unnecessary interventions. In addition to treatment, patient education is also crucial to raise awareness among these patients, since they are at higher risk for further future episodes of lower back pain.

## REFERENCES

1. Deyo RA, Tsui-Wu YJ. Descriptive epidemiology of low-back pain and its related medical care in the United States. *Spine*. 1987 Apr;12(3):264-8.
2. Chou R. In the clinic. Low back pain. *Ann Intern Med* 2014; 160:ITC6.
3. Jarvik JG, Hollingworth W, Martin B, Emerson SS, Gray DT, Overman S, Robinson D, Staiger T, Wessbecher F, Sullivan SD, Kreuter W. Rapid magnetic resonance imaging vs radiographs for patients with low back pain: a randomized controlled trial. *Jama*. 2003 Jun 4;289(21):2810-8.
4. Srinivas SV, Deyo RA, Berger ZD. Application of "less is more" to low back pain. *Archives of internal medicine*. 2012 Jul 9;172(13):1016-20.
5. Deyo RA, Rainville J, Kent DL. What can the history and physical examination tell us about low back pain?. *Jama*. 1992 Aug 12;268(6):760-5.
6. Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, Woolf A, Vos T, Buchbinder R. A systematic review of the global prevalence of low back pain. *Arthritis & Rheumatism*. 2012 Jun;64(6):2028-37.
7. Deyo RA, Mirza SK, Martin BI. Back pain prevalence and visit rates: estimates from US national surveys, 2002. *Spine*. 2006 Nov 1;31(23):2724-7.

8. Lieb K. Chronifizierung von Rückenschmerzen in der Lübecker Bevölkerung–Eine Analyseunter besonderer Berücksichtigung des Amplifikationsmodells (Doctoral dissertation, Dissertation, Universität Lübeck).
9. Deyo RA, Mirza SK, Martin BI. Back pain prevalence and visit rates: estimates from US national surveys, 2002. *Spine*. 2006 Nov 1;31(23):2724-7.
10. Skovron ML, Szpalski M, Nordin M, Melot C, Cukier D. Sociocultural factors and back pain. A population-based study in Belgian adults. *Spine*. 1994 Jan;19(2):129-37.
11. Papageorgiou AC, Croft PR, Ferry S, Jayson MI, Silman AJ. Estimating the prevalence of low back pain in the general population. Evidence from the South Manchester Back Pain Survey. *Spine*. 1995 Sep;20(17):1889-94.
12. Cassidy JD, Carroll LJ, Côté P. The Saskatchewan health and back pain survey: the prevalence of low back pain and related disability in Saskatchewan adults. *Spine*. 1998 Sep 1;23(17):1860-6.
13. Croft PR, Papageorgiou AC, Thomas E, Macfarlane GJ, Silman AJ. Short-term physical risk factors for new episodes of low back pain: prospective evidence from the South Manchester Back Pain Study. *Spine*. 1999 Aug 1;24(15):1556.
14. Steffens D, Ferreira ML, Latimer J, Ferreira PH, Koes BW, Blyth F, Li Q, Maher CG. What triggers an episode of acute low back pain? A case–crossover study. *Arthritis care & research*. 2015 Mar;67(3):403-10.
15. Macfarlane GJ, Thomas E, Papageorgiou AC, Croft PR, Jayson MI, Silman AJ. Employment and physical work activities as predictors of future low back pain. *Spine*. 1997 May 15;22(10):1143-9.
16. Croft PR, Papageorgiou AC, Ferry S, Thomas E, Jayson MI, Silman AJ. Psychologic distress and low back pain. Evidence from a prospective study in the general population. *Spine*. 1995 Dec;20(24):2731-7.
17. Centers for Disease Control and Prevention. National Ambulatory Medical Care Survey: 2010 Summary Tables. [http://www.cdc.gov/nchs/data/ahcd/namcs\\_summary/2010\\_namcs\\_web\\_tables.pdf](http://www.cdc.gov/nchs/data/ahcd/namcs_summary/2010_namcs_web_tables.pdf) (Accessed on September 30, 2014)
18. Campbell P, Wynne-Jones G, Muller S, Dunn KM. The influence of employment social support for risk and prognosis in nonspecific back pain: a systematic review and critical synthesis. *International Archives of Occupational and Environmental Health*. 2013 Feb 1;86(2):119-37.
19. CHANDRASEKAR PH. Low-back pain and intravenous drug abusers. *Archives of internal medicine*. 1990 May 1;150(5):1125-8.
20. Fritz JM, Wainner RS, Hicks GE. The use of nonorganic signs and symptoms as a screening tool for return-to-work in patients with acute low back pain. *Spine*. 2000 Aug 1;25(15):1925-31.
21. Polatin PB, Cox B, Gatchel RJ, Mayer TG. A prospective study of Waddell signs in patients with chronic low back pain: when they may not be predictive. *Spine*. 1997 Jul 15;22(14):1618-21.
22. Chelsom J, Solberg CO. Vertebral osteomyelitis at a Norwegian university hospital 1987-97: clinical features, laboratory findings and outcome. *Scandinavian journal of infectious diseases*. 1998 Jan 1;30(2):147-51.
23. Beronius M, Bergman B, Andersson R. Vertebral Osteomyelitis in Göteborg, Sweden: A Retrospective Study of Patients During 1990-95. *Scandinavian journal of infectious diseases*. 2001 Jan 1;33(7):527-32.
24. Chou R, Fu R, Carrino JA, Deyo RA. Imaging strategies for low-back pain: systematic review and meta-analysis. *The Lancet*. 2009 Feb 7;373(9662):463-72.
25. Jarvik JG, Gold LS, Comstock BA, Heagerty PJ, Rundell SD, Turner JA, Avins AL, Bauer Z, Bresnahan BW, Friedly JL, James K. Association of early imaging for back pain with clinical outcomes in older adults. *Jama*. 2015 Mar 17;313(11):1143-53.
26. Jensen MC, Brant-Zawadzki MN, Obuchowski N, Modic MT, Malkasian D, Ross JS. Magnetic resonance imaging of the lumbar spine in people without back pain. *New England Journal of Medicine*. 1994 Jul 14;331(2):69-73.
27. Boden SD, McCowin PR, Davis DO, Dina TS, Mark AS, Wiesel S. Abnormal magnetic-resonance scans of the cervical spine in asymptomatic subjects. A prospective investigation. *The Journal of bone and joint surgery. American volume*. 1990 Sep;72(8):1178-84.
28. Oland G, Hoff TG. Intraspinal Cross-section Areas Measured on Myelography-Computed Tomography: The Relation to Outcome in Nonoperated Lumbar Disc Herniation. *Spine*. 1996 Sep 1;21(17):1985-9.
29. El Barzouhi A, Vleggeert-Lankamp CL, Lycklama à Nijeholt GJ, Van der Kallen BF, van den Hout WB, Jacobs WC, Koes BW, Peul WC. Magnetic resonance imaging in follow-up assessment of sciatica. *New England Journal of Medicine*. 2013 Mar 14;368(11):999-1007.

30. Chou R, Qaseem A, Snow V, Casey D, Cross JT, Shekelle P, Owens DK. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Annals of internal medicine.* 2007 Oct 2;147(7):478-91.
31. National Committee for Quality Assurance. The state of health care quality 2006. Available at: [www.ncqa.org](http://www.ncqa.org) (Accessed on October 11, 2011).
32. Chou R, Qaseem A, Owens DK, Shekelle P. Diagnostic imaging for low back pain: advice for high-value health care from the American College of Physicians. *Annals of internal medicine.* 2011 Feb 1;154(3):181-9.
33. American College of Radiology. ACR Appropriateness Criteria. Low back pain. Available at: [http://www.acr.org/SecondaryMainMenuCategories/quality\\_safety/app\\_criteria/pdf/ExpertPanelonNeurologicImaging/LowBackPainDoc7.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/app_criteria/pdf/ExpertPanelonNeurologicImaging/LowBackPainDoc7.aspx) (Accessed on April 05, 2012).
34. Downie A, Williams CM, Henschke N, Hancock MJ, Ostelo RW, de Vet HC, Macaskill P, Irwig L, van Tulder MW, Koes BW, Maher CG. Red flags to screen for malignancy and fracture in patients with low back pain: systematic review. *Bmj.* 2013 Dec 11;347:f7095.
35. Williams CM, Henschke N, Maher CG, van Tulder MW, Koes BW, Macaskill P, Irwig L. Red flags to screen for vertebral fracture in patients presenting with low-back pain. *Cochrane Database of Systematic Reviews.* 2013(1).