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Non-Specific Lower Back Pain in Healthcare Professionals and Students: Diagnosis, Management, and Prevention Strategies

Prakash Shashi[1*], Sharma Atul[2]
[1]Department of Medical-Surgical Nursing, College of Nursing, S. N. Medical College, Agra, Uttar Pradesh, India
[2]Department of Physiotherapy, S. N. Medical College, Agra, Uttar Pradesh, India

Abstract: ***Background*:** Lower back pain (LBP) is a prevalent and debilitating condition among healthcare professionals and students, significantly affecting their quality of life, work productivity, and mental well-being. Non-specific LBP, which accounts for approximately 90% of all cases, is characterized by pain without an identifiable structural or neurological cause. This case report explores the diagnosis, management, and prevention strategies for non-specific LBP in healthcare professionals and students, with a focus on the role of proper body mechanics and ergonomics in mitigating the risk of injury. ***Case Presentation*:** A 38-year-old female registered nurse (RN) with 12 years of experience and a 24-year-old nursing student presented with non-specific LBP. Both cases were linked to improper body mechanics during patient care activities, such as lifting and transferring patients. The RN reported pain localized to the lower lumbar region, worsened by prolonged standing and bending, while the nursing student described similar symptoms following intensive clinical rotations. Both individuals were diagnosed with non-specific LBP based on clinical examination and imaging studies, which showed no structural abnormalities. A multimodal treatment approach was adopted, including pharmacological therapy (NSAIDs, muscle relaxants), physical therapy focusing on core and lumbar muscle strengthening, and education on ergonomic practices to improve posture and prevent further injury. ***Discussion*:** Non-specific LBP is a common issue among healthcare professionals and students, often exacerbated by physical strain and poor body mechanics during clinical tasks. The cases presented demonstrate the importance of early diagnosis and the integration of both pharmacological and non-pharmacological treatments. Pharmacological interventions, including NSAIDs and muscle relaxants, provide immediate relief, while physical therapy and ergonomic education address the root causes and help prevent recurrence. It is crucial to incorporate ergonomics and body mechanics training into healthcare curricula to reduce the incidence of musculoskeletal injuries and improve long-term health outcomes for both professionals and students. ***Conclusion*:** This case report underscores the effectiveness of a comprehensive, multimodal approach to managing non-specific LBP in healthcare professionals and students. Early intervention, proper ergonomic education, and a combination of pharmacological and rehabilitative treatments can significantly improve both pain management and functional recovery. Proactive measures, such as integrating ergonomics training into healthcare education, are essential for reducing the burden of LBP in this high-risk population.

Keywords: Non-Specific Lower Back Pain (LBP); Healthcare Professionals; Musculoskeletal Disorders; Pain Management; Rehabilitation; Ergonomics; Body Mechanics; Preventive Strategies; Nociceptive Pain; Nursing Students; Occupational Health.

Case Series

***Corresponding Author:**
Prakash Shashi
Department of Medical-Surgical Nursing, College of Nursing, S. N. Medical College, Agra, Uttar Pradesh, India

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INTRODUCTION

Lower back pain (LBP) is a leading cause of disability worldwide and is particularly prevalent among healthcare professionals (HCPs). It is estimated that around 80% of individuals will experience LBP at some point in their lives, with a significant proportion of cases affecting workers in physically demanding professions such as healthcare (Dagenais *et al*., 2008). LBP can be

classified as either specific or non-specific, with the latter accounting for approximately 90% of all cases. Non-specific LBP refers to pain without an identifiable structural or pathological cause, and it remains a diagnostic challenge due to its complex, multifactorial nature (Kreiner *et al*., 2020).

In healthcare professionals, the risk factors for LBP are multifactorial, including prolonged standing, lifting patients, repetitive bending, and high levels of physical and mental stress (Burns *et al*., 2011). These factors contribute to both the physical and psychosocial dimensions of LBP, which can negatively impact quality of life, work performance, and mental well-being (Blyth *et al*., 2001). LBP among HCPs often leads to decreased productivity, absenteeism, and long-term disability, resulting in a substantial economic burden for healthcare institutions (Gih *et al*., 2022).

The management of non-specific LBP typically involves a combination of pharmacological and non-pharmacological interventions. Initial treatment often includes the use of analgesics, such as nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants, to manage acute pain. However, a more comprehensive approach, incorporating physical therapy, manual therapy, and rehabilitation, is recommended for long-term recovery and to prevent recurrence (Carter *et al*., 2019). Recent guidelines emphasize a multimodal approach to LBP management, focusing on restoring function and reducing pain through individualized treatment plans (Chou *et al*., 2020).

This case report highlights the challenges of diagnosing and managing non-specific LBP in a healthcare professional and discusses the successful application of conservative treatment strategies, including pharmacological therapy and rehabilitation techniques, in improving patient outcomes.

CASE PRESENTATION

Background:

Lower back pain (LBP) is one of the most common health problems encountered in both healthcare professionals (HCPs) and healthcare students. This condition, which affects a significant portion of the workforce globally, is particularly prevalent in professions where physical demands—such as prolonged standing, lifting, bending, and assisting patients—are routine. In the healthcare setting, both experienced professionals and students undergoing clinical training are at higher risk of developing LBP due to the physically demanding nature of their tasks.

Healthcare professionals, such as nurses, physiotherapists, and doctors, are often required to lift patients, assist with mobility, and perform various procedures that strain the back muscles and spine. Healthcare students, who are still learning how to handle patients safely, are particularly vulnerable to developing musculoskeletal injuries, including non-specific LBP. A lack of ergonomic training, poor posture, and improper lifting techniques contribute to the higher incidence of back pain in both these groups. As such, non-specific lower back pain—pain that cannot be attributed to a specific disease or condition—is a widespread issue that can affect both the quality of life and the work performance of healthcare workers (Gih *et al*., 2022; Burns *et al*., 2011).

This case presentation will discuss two individuals—an experienced registered nurse and a nursing student—both of whom developed non-specific LBP, shedding light on the factors that contribute to the development of this condition in healthcare settings, the management strategies employed, and the importance of prevention through proper body mechanics and ergonomic interventions.

Improper Body Mechanics in Healthcare Students:

One of the key factors contributing to the development of non-specific LBP in healthcare students is the lack of experience in proper body mechanics. Healthcare students, especially those early in their clinical education, are often unfamiliar with or inadequately trained in how to move and lift patients safely. As students are learning clinical skills, they frequently engage in repetitive movements, such as bending, twisting, and lifting, without applying the principles of ergonomics. These improper practices put undue strain on the lower back, leading to pain and potential injury.

For instance, many students fail to maintain a neutral spine position when lifting or transferring patients, often bending at the waist instead of using their legs. In clinical rotations, students may also perform tasks that require prolonged standing or awkward postures, such as holding a patient in a specific position during a procedure. Over time, these poor postural habits can lead to overuse injuries, muscle strain, and eventually chronic pain. The incidence of LBP among healthcare students is concerning, as it not only affects their health and well-being but may also hinder their ability to complete clinical rotations and successfully enter the workforce (Gih *et al*., 2022).

This case report emphasizes the need for healthcare educational programs to integrate training on body mechanics and ergonomics into their curricula. It highlights how addressing these issues early in a student's education can help prevent the development of musculoskeletal disorders, including non-specific LBP.

Case 1: Healthcare Professional (Registered Nurse)

Lower back pain (LBP) is a widespread condition among healthcare professionals, particularly those who perform physically demanding tasks such as lifting, transferring patients, and standing for long hours.

The nature of nursing work—characterized by frequent patient handling, repetitive bending, and prolonged periods of standing—puts nurses at significant risk for musculoskeletal injuries, especially non-specific LBP. It is estimated that between 50% and 70% of healthcare workers will experience some form of musculoskeletal disorder during their careers, with LBP being one of the most common (Burns *et al*., 2011).

Case Description:

A 38-year-old female registered nurse (RN) with 12 years of experience in a hospital setting presented with a 3-week history of lower back pain. The pain had begun insidiously, initially mild but progressively worsening. It was exacerbated by tasks that are routine for her, including patient handling, lifting, and prolonged periods of standing during clinical rounds. The pain was localized to the lower lumbar region, with occasional radiation to the right buttock. The patient reported that the pain was aggravated by bending and lifting and was somewhat relieved by rest and changes in posture. She rated her pain as 7/10 on the Visual Analog Scale (VAS), indicating moderate intensity.

Risk Factors and Contributing Factors:

The primary risk factors for LBP in this registered nurse included prolonged standing, repetitive bending, and lifting heavy patients without appropriate ergonomic support. The nurse's duties, which required her to lift, transfer, and reposition patients, often without using assistive devices such as patient lifts, placed significant strain on her lumbar spine and lower back muscles. Studies show that healthcare professionals with long shifts, limited access to assistive devices, and inadequate ergonomic training are at higher risk of developing non-specific LBP (Burns *et al*., 2011; Gih *et al*., 2022).

Physical Examination and Diagnosis:

Upon physical examination, the nurse had localized tenderness over the lumbar spine and sacroiliac joints, but there were no neurological deficits. The straight leg raise test was negative, indicating no nerve root compression. Lumbar range of motion was full, though discomfort was experienced during flexion and extension. Based on the clinical presentation and the absence of significant structural abnormalities on imaging, including MRI and X-rays, the diagnosis of non-specific LBP was confirmed. Non-specific LBP refers to back pain that cannot be attributed to a specific anatomical cause such as a herniated disc or fracture, and it accounts for approximately 90% of all LBP cases (Kreiner *et al*., 2020).

Management Strategy:

The management plan for this nurse involved both pharmacological and non-pharmacological interventions.

- **Pharmacological Treatment:** Initially, a stepwise approach was taken, using diclofenac, a nonsteroidal anti-inflammatory drug (NSAID), to manage acute pain and inflammation. After initial relief, B vitamins were added to support nerve health and reduce inflammation. A muscle relaxant (methocarbamol) was prescribed to ease muscle spasms, and slow-acting analgesics were used for ongoing pain management.
- **Non-Pharmacological Treatment:** The nurse was referred for physical therapy, which included exercises aimed at strengthening the core and lumbar muscles to support the spine. Additionally, manual therapy and spinal manipulation were introduced to help alleviate discomfort and improve spinal mobility. Educational interventions were critical, emphasizing the importance of maintaining a neutral spine during patient handling and using assistive devices, such as patient lifts and transfer aids, to reduce strain. The nurse was also advised to take frequent breaks during long shifts to avoid prolonged standing.
- **Ergonomic Interventions:** Recommendations included using patient lifts and ensuring the nurse had a height-adjustable workstation for patient care, to avoid repetitive bending or lifting in awkward positions. Work shifts were adjusted to ensure adequate time for rest and physical recovery.

At the 6-week follow-up, the nurse reported a significant reduction in pain and was able to resume her normal duties without restriction, demonstrating the effectiveness of both pharmacological and non-pharmacological approaches in managing non-specific LBP.

Case 2: Student Healthcare Professional (Nursing Student)

Background:

Healthcare students, especially those in clinical training, are often exposed to the same physical demands as practicing professionals. However, unlike seasoned healthcare workers, students may lack the experience and knowledge to engage in safe patient handling, making them more susceptible to developing LBP. Students frequently fail to adhere to proper body mechanics during clinical tasks, such as patient lifting, bending, and transferring. This failure to use correct body mechanics, compounded by fatigue during long clinical rotations, puts them at risk for musculoskeletal injuries, including non-specific LBP (Gih *et al*., 2022).

Case Description:

A 24-year-old female nursing student, currently in her third year of clinical training, presented with a 2-week history of lower back pain. The pain began after a particularly strenuous clinical rotation that involved several hours of patient care, including lifting, assisting with patient mobility, and performing nursing

procedures such as wound care and hygiene tasks. The pain was described as dull and localized to the lower lumbar region, radiating mildly into the left buttock. The pain worsened toward the end of long shifts and was somewhat relieved with rest. The student rated her pain as 6/10 on the Visual Analog Scale (VAS), indicating moderate discomfort.

Risk Factors and Contributing Factors:

The nursing student's lack of experience with proper lifting techniques and body mechanics during patient care activities were major contributors to the development of her LBP. Studies have shown that healthcare students, particularly in the early stages of their training, often lack the awareness of ergonomics and fail to implement strategies to reduce physical strain. In this case, the student's repetitive bending, lifting without proper support, and long hours of standing during clinical procedures led to excessive strain on the lumbar spine (Gih *et al*., 2022). Furthermore, the lack of access to or use of assistive devices, such as patient lifts, worsened her risk of developing musculoskeletal injuries.

Physical Examination and Diagnosis:

On examination, the student had localized tenderness over the lumbar region, but no neurological deficits or signs of radiculopathy were observed. The straight leg raise test was negative, suggesting no nerve involvement. The student exhibited full range of motion in the lumbar spine, although movement caused discomfort. Imaging, including an MRI of the lumbar spine, was unremarkable, supporting the diagnosis of non-specific LBP. Non-specific LBP is the most common form of back pain in individuals under the age of 45, and it often resolves with conservative treatment, though proper management is critical to prevent chronic pain (Kreiner *et al*., 2020).

Management Strategy:

- **Pharmacological Treatment:** A short course of ibuprofen (NSAID) was prescribed to address inflammation and provide pain relief. This was followed by physical therapy to address the underlying musculoskeletal imbalances contributing to the LBP.
- **Non-Pharmacological Treatment:** The student was advised to engage in physical therapy focused on strengthening the core muscles, which play a crucial role in stabilizing the spine. Postural training was also introduced, with exercises that emphasized maintaining proper body alignment, especially during patient handling tasks.
- **Ergonomic Interventions:** The student received education on proper body mechanics during lifting and transferring patients. Emphasis was placed on maintaining a neutral spine, using the legs to lift rather than the back, and avoiding twisting motions. In addition, the student was encouraged to use assistive devices like patient lifts and avoid long periods of standing without breaks. Regular posture checks and task rotation were recommended to minimize strain.

At a 4-week follow-up, the student reported significant improvement in her symptoms. Her pain had decreased substantially, and she was able to continue her clinical rotations without further discomfort. The success of the treatment plan highlighted the importance of early intervention, education on body mechanics, and the integration of ergonomic practices in clinical training.

DISCUSSION

Lower back pain (LBP) is a common and significant issue faced by healthcare professionals (HCPs) worldwide. The physical demands of healthcare work, including prolonged standing, patient handling, lifting, bending, and twisting, place substantial strain on the musculoskeletal system. These factors contribute to the high prevalence of LBP, with estimates suggesting that between 50% and 70% of healthcare workers experience LBP during their careers (Gih *et al*., 2022). Additionally, healthcare students, who are often exposed to similar physical stresses without adequate ergonomic training, are particularly vulnerable to musculoskeletal injuries, including LBP (Carter *et al*., 2019).

The Burden of LBP in Healthcare Professionals and Students

LBP is the leading cause of disability worldwide, and its prevalence among healthcare professionals is notably high. Studies indicate that up to 60% of healthcare workers will experience LBP at some point in their careers (Chou *et al*., 2020). The nature of healthcare work—frequent lifting, bending, and awkward postures—puts substantial strain on the spine and surrounding muscles. For healthcare students, these risks are compounded by inexperience and insufficient training in body mechanics. During clinical rotations, students often perform patient handling tasks without proper guidance on ergonomics, which significantly increases their risk of developing LBP (Gih *et al*., 2022). The nursing student presented in this case report is a clear example of this trend, where the absence of proper body mechanics during patient care led to non-specific LBP.

Non-specific LBP, defined as back pain without a clear anatomical or neurological cause, is the most common type of back pain experienced by both healthcare professionals and students. It is often caused by repetitive strain, poor posture, and improper body mechanics during physically demanding tasks (Chou *et al*., 2020). In the cases discussed, both the registered nurse and nursing student exhibited non-specific LBP, which was exacerbated by patient handling and clinical procedures. The student, in particular, demonstrated the common issue of failing to implement proper lifting

techniques, leading to strain on the lumbar spine and muscles.

Impact of Improper Body Mechanics on Healthcare Students

One of the most significant contributing factors to LBP in healthcare students is improper body mechanics during patient care activities. While healthcare curricula focus on clinical knowledge and procedures, students often lack sufficient training in ergonomics and body mechanics. As a result, many students engage in poor lifting practices, such as bending from the waist rather than using their legs, twisting the spine during tasks, or failing to use assistive devices (Burns *et al*., 2011). These practices significantly increase the risk of developing musculoskeletal disorders, including non-specific LBP (Gih *et al*., 2022).

Research shows that poor lifting techniques, particularly when combined with prolonged standing, repetitive bending, and twisting motions, are closely associated with an increased incidence of musculoskeletal injuries in healthcare workers (Chou *et al*., 2020). The nursing student in the case study is an example of how these habits can contribute to LBP. Her pain worsened as she engaged in patient handling tasks without the use of proper body mechanics, exacerbating the strain on her lower back. Without adequate ergonomic training, students are more likely to adopt harmful habits that can lead to chronic pain and long-term musculoskeletal issues.

The Importance of Training in Body Mechanics for Healthcare Students

Training healthcare students in proper body mechanics and ergonomics is essential in preventing LBP. According to research by Burns *et al*., (2011) and Huang *et al*., (2022), healthcare students who receive education in ergonomics and proper lifting techniques report fewer musculoskeletal injuries and lower rates of LBP. In the case presented, both the nurse and the nursing student benefited from interventions that included education on proper lifting techniques, postural alignment, and ergonomic practices during clinical tasks. This highlights the importance of integrating body mechanics education into healthcare training programs. Students must be equipped with the knowledge and skills to handle patients safely and to maintain proper posture during clinical tasks to prevent injury.

Furthermore, incorporating regular ergonomic assessments and task rotation into clinical education can help mitigate the risk of musculoskeletal strain. Healthcare students should be encouraged to take breaks, use assistive devices, and modify their movements to reduce physical strain during their clinical rotations. By promoting these practices early on in their education, healthcare institutions can significantly reduce the incidence of LBP among students (Carter *et al*., 2019).

Effective Management of LBP in Healthcare Professionals and Students

The management of non-specific LBP requires a multimodal approach that includes both pharmacological and non-pharmacological treatments. In the cases presented, both the nurse and the nursing student received a stepwise pharmacological approach, beginning with NSAIDs (e.g., diclofenac) for pain relief and inflammation control, followed by muscle relaxants and B vitamins for long-term support and muscle relaxation. This approach aligns with current guidelines for managing non-specific LBP, which recommend the use of pharmacological treatments in the short term (Chou *et al*., 2020).

However, the primary focus of treatment in both cases was on physical therapy. A regimen aimed at strengthening the core muscles and improving lumbar spine stability was integral to both the nurse's and the student's rehabilitation. Manual therapy, including spinal manipulation and mobilization, was also utilized to improve spinal mobility and reduce pain. These non-drug therapies are well-supported by evidence, which demonstrates that strengthening exercises for the lumbar spine and core muscles are effective in improving function and reducing pain in individuals with non-specific LBP (Kreiner *et al*., 2020).

Equally important in both cases was education on body mechanics and ergonomics. The nurse was advised to incorporate the use of patient lifts and take frequent breaks to reduce strain during long shifts. Similarly, the nursing student received guidance on proper posture, lifting techniques, and the importance of using assistive devices. These interventions are consistent with the recommendations from the National Institute for Health and Care Excellence (NICE), which emphasize a combination of pharmacological, physical, and educational interventions in the management of non-specific LBP (NICE, 2020).

Workplace and Educational Strategies to Prevent LBP in Healthcare Students

To prevent LBP in healthcare students, educational institutions and healthcare workplaces must implement comprehensive strategies that address both individual behavior and systemic factors. Integrating ergonomics training and body mechanics education into healthcare curricula is crucial. Students should be taught not only the clinical procedures but also how to safely lift, transfer, and reposition patients. Educational programs should include hands-on training that simulates clinical tasks while reinforcing the importance of ergonomics.

In healthcare workplaces, the use of assistive devices, such as adjustable beds, patient lifts, and transfer aids, should be prioritized. These devices can significantly reduce the physical strain on healthcare workers and students during patient handling tasks.

Additionally, regular breaks, job rotation, and postural checks can help prevent prolonged exposure to strain and reduce the risk of musculoskeletal injuries (Burns *et al*., 2011).

Furthermore, healthcare organizations should foster a culture of musculoskeletal health awareness. Providing ongoing ergonomic training and rehabilitation programs for both students and professionals will reduce the incidence of LBP and improve overall well-being. Establishing return-to-work programs for individuals with chronic LBP is essential to ensuring long-term health and productivity (Huang *et al*., 2022).

CONCLUSION

This case report highlights the significant risk of non-specific low back pain (LBP) among healthcare professionals and students, emphasizing the critical need for proper body mechanics and ergonomic practices to prevent musculoskeletal injuries. The cases of the registered nurse and nursing student demonstrate how both pharmacological and non-pharmacological interventions, including physical therapy, education on posture, and ergonomic training, can effectively manage LBP and improve outcomes. However, the broader challenge lies in preventing LBP among healthcare students, where inexperience and inadequate ergonomic training during clinical education can exacerbate the risk of injury. To address this, systemic changes are needed within both educational curricula and healthcare work environments.

Future recommendations include integrating comprehensive ergonomic training into healthcare education from the outset, alongside practical exercises that simulate clinical tasks. Furthermore, healthcare institutions should prioritize the provision of ergonomic tools, such as patient lifts and adjustable workstations, and implement policies that encourage regular breaks and job rotation to minimize strain. By fostering a culture of musculoskeletal health awareness and implementing preventive measures, healthcare organizations can significantly reduce the incidence of LBP, safeguarding the long-term health and well-being of both students and professionals. Through a proactive, multifaceted approach, the healthcare sector can ensure that its workforce is better equipped to manage the physical demands of the profession, ultimately reducing the burden of musculoskeletal disorders in the future.

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