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# **REVIEW ARTICLE**

### EFFECTS OF PILATES IN THE MANAGEMENT OF PATIENTS WITH CHRONIC NON-SPECIFIC LOW BACK PAIN IN THE BUNDELKHAND REGION

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### ABSTRACT

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Introduction: Low back pain is a common problem in rural India as well. The lifestyle, working conditions, and health practices in these areas differ with those in urban environments. Research aimed at addressing low back pain in rural settings can help create targeted interventions that are both feasible and effective within the rural healthcare framework. Pilates, a holistic program that addresses both mental and physical conditioning, is frequently recommended by doctors and physiotherapists for managing chronic low back pain. Objective: To assess the effect of pilates exercises on pain and functional disability in patients with chronic non specific low back pain in Bundelkhand region. Design: Quasi experimental study design. Participants: A total of 30 patients with chronic nonspecific low back pain who met the inclusion and exclusion criteria and provided consent to participate were included in this study. Intervention: Participants attended 24 mat Pilates sessions, with 4 sessions per week for a duration of 6 weeks. Main Outcome Measures: The Visual Analog Scale (VAS) was utilized to measure pain intensity, while the Oswestry Low Back Pain Disability Questionnaire (OSWDQ) was employed to evaluate functional disability. Assessments were carried out both prior to the initiation of treatment and following its conclusion. Result: The results indicated significant improvements in functional activity and a reduction in pain following the intervention (p < p0.05). Conclusion: The study demonstrated that Pilates significantly enhances the management of chronic non-specific low back pain in patients from the Bundelkhand region. The intervention led to notable improvements in functional activity and a reduction in pain. These findings suggest that incorporating Pilates into treatment protocols can be an effective strategy for alleviating pain and improving functionality in this patient population.

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# INTRODUCTION

Low back pain is also a prevalent issue in rural India. The lifestyle, working conditions, and health practices in these areas often differ from those in urban settings. Limited studies have explored the specific challenges and effectiveness of management strategies tailored to the unique socio-economic and cultural contexts of rural areas. Research focused on managing low back pain in rural regions can lead to the development of targeted interventions that are both practical and effective within the rural healthcare system. This research can provide valuable insights into effective pain management, ultimately improving overall quality of life. Low back pain is characterized by discomfort and pain situated below the ribs and above the buttocks, with or without pain radiating to the legs. Non-specific low back pain is diagnosed when no particular conditions, such as tumors, osteoporosis, spinal canal stenosis, compression fractures, spinal deformities,

inflammatory or infectious diseases, lumbar radiculopathy, or cauda equina syndrome, are detected in the patient. <sup>(1, 2)</sup> Low back pain has been linked to dysfunction and weakness in the deep abdominal muscles. These core muscles, which include the transversus abdominis, multifidus, and pelvic-floor muscles, are crucial for stability.<sup>(3)</sup> Imaging studies have revealed changes in the multifidus <sup>(4)</sup> and transversus abdominis <sup>(5)</sup> muscles in individuals suffering from low back pain. Numerous studies have shown that targeted exercises for the multifidus and transversus abdominis can help alleviate pain by improving the stability of the lumbar spine segments. <sup>(6)</sup> The Pilates method focuses on training the deep abdominal muscles to enhance their tone and strength, which helps reduce strain and stress on the spinal joints.<sup>(7)</sup> As a comprehensive program for both mental and physical conditioning,(8) it is often recommended by doctors and physiotherapists, especially for addressing chronic low back pain.<sup>(9)</sup> Research indicates that Pilates exercise programs offer more significant improvements in both pain and disability compared to being inactive.<sup>(10)</sup> Some studies suggest that Pilates may be more effective than other treatment methods.<sup>(11)</sup> The objective of this study was to assess the effect of pilates exercises on pain and functional disability in patients with chronic non specific low back pain in Bundelkhand region. The study could contribute valuable insights into the feasibility and effectiveness of Pilates as a treatment modality for low back pain, especially in regions with specific socio-economic or cultural characteristics.

### **METHODS**

The study employed a quasi-experimental pre-test post-test design. All participants were briefed on the experiment, including its objectives, risks, benefits, and purposes, and were informed that they could withdraw or halt any part of the procedure at any time. Following this, they provided their consent by signing a form. The patients were chosen from the Department of Orthopaedics at Bundelkhand Medical College in Sagar, Madhya Pradesh.

Participants: A total of 30 participants were recruited for the study based on the following inclusion and exclusion criteria:

**Inclusion** Criteria: The inclusion criteria for the study were Individuals aged between 20 and 60 years, of any gender, who had been experiencing chronic non-specific low back pain for a minimum of 12 weeks. Participants were required to be capable of traveling independently and must have provided informed consent to take part in the study.

**Exclusion Criteria:** Participants were excluded if they had low back pain accompanied by radiculopathy, acute low back pain (lasting up to 4 weeks), or sub-acute low back pain (lasting 4 to 12 weeks). Additionally, individuals unable to walk without assistance, or those who had received physiotherapy for low back pain within the past 6 months, were not eligible. Pregnant women, as well as those with a history of cancer, cardiothoracic surgery, major surgery on the back or hip, or any systemic disorders, were also excluded from the study.

**Data-Collection Procedures:** Baseline (pre) measurements were taken prior to the initiation of treatment and the Outcome measurements were recorded at the 6th week, one day after the termination if treatment. Assessments were conducted using the Visual Analog Scale (VAS) for pain intensity and the Oswestry Low Back Pain Disability Questionnaire for functional disability.

#### **Outcome Measures**

**Visual Analog Scale (VAS):** visual analog scale was used to assess Pain intensity. A horizontal line of 10 cm long is divided into equal intervals where 0 signifies the absence of pain, while 10 denotes unbearable pain.<sup>(12)</sup>

**Oswestry low back pain disability questionnaire (OSWDQ):** The oswestry disability questionnaire is a self-administered questionnaire that provides a subjective percentage score reflecting the level of disability in daily activities. A decrease in MOSWD Score is considered to be the improvement.<sup>(13)</sup>

**Intervention:** The exercise programs involve 24 one-hour sessions, conducted four times a week for six weeks. Each session will begin with a 5 to 10-minute warm-up and Each session will conclude with a 5 to 7-minute cool-down.

The stretching exercises involved holding each stretch for 10 seconds, followed by a 10-second rest between repetitions. Strengthening exercises were done with a 5-second hold and a 2-second rest, using body weight as resistance. Pilates exercises were performed with the following intensity:

2 sets of 15 repetitions during weeks 1-2

2 sets of 20 repetitions during weeks 3–4

3 sets of 15 repetitions during weeks 5–6

Following pilates exercises were performed

Table of pilates exercise in the intervention section

S.No.	Name of Pilates exercise	How to perform
1.	Pelvic Tilt	<ul> <li>Begin by lying on your back with your knees bent.</li> <li>Make sure you're comfortable and position your arms at your sides, with your palms facing the floor.</li> <li>Exhale to engage the transversus abdominis muscles and press the lower back towards the floor, tilting the pelvis posteriorly. Inhale to return to the original position.</li> </ul>





**Statistical Analysis:** Data are presented as mean  $\pm$  SD. Due to the limited number of participants in this study, which affects the ability to test for normal distribution in the population, nonparametric tests were utilized. A Wilcoxon signed-rank test was employed to detect significant changes from pre-intervention to post-intervention within the group. Statistical significance was defined as  $P \leq 0.05$ .

### RESULTS

The research findings indicate that pain levels, as measured by the Visual Analog Scale (VAS), significantly decreased from a mean of 5.11 with a standard deviation of 1.53 before treatment to a mean of 1.88 with a standard deviation of 0.92 after treatment, with a p-value of 0.001\*. Similarly, disability scores assessed using the Oswestry Disability Questionnaire (OSWDQ) reduced from a mean of 14.70 with a standard deviation of 8.18 pre-treatment to a mean of 6.47 with a standard deviation of 4.38 post-treatment, also with a p-value of 0.001\*.

## DISCUSSION

This study assessed the effectiveness of Pilates exercises, revealing a notable reduction in both pain and disability, as evidenced by lower VAS and OSWDQ scores. It is widely recognized that muscle dysfunction in low back pain (LBP) involves more than just issues with muscle strength or endurance; it also stems from altered neuromuscular control mechanisms that impact trunk stability and movement efficiency.<sup>(14)</sup> Pilates exercises adhere to principles such as Centring, Control, Concentration, Precision, and proper breathing, which enhance neuromuscular coordination. It is suggested that Pilates exercises activate the transversus abdominis through subconscious and submaximal contractions, which enhances trunk stability during movement.<sup>(15)</sup> The improved motor control associated with Pilates routines likely contributed significantly to the reduction in pain observed.<sup>(16)</sup> The reduction may be attributed to better activation and coordination of core muscles such as the transversus abdominis and multifidus, which enhance both local and global spinal stability, thereby alleviating compressive forces and pain perception.<sup>(17, 18)</sup> Additionally, Complete and thorough inhalation and exhalation are essential components of every Pilates exercise. It is believed that proper and effective breathing reduces muscle tension, promotes relaxation, and consequently aids in pain reduction. Some studies indicate that Pilates breathing enhances the activation of the trunk stabilizer muscles.<sup>(19)</sup> The findings of the current study indicate that Pilates exercises are effective in treating chronic non-specific low back pain. However, due to the small number of participants, further research with a larger sample size and extended follow-up is needed to assess the long-term effects of Pilates exercises.

### **CONCLUSION**

The study on the effects of Pilates in managing chronic non-specific low back pain among patients in the Bundelkhand region demonstrates that Pilates exercises can lead to a significant reduction in both pain and disability. These positive outcomes suggest that Pilates is an effective intervention for improving quality of life in individuals suffering from chronic low back pain. Given the encouraging results, including Pilates in treatment plans could be advantageous.

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