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## "Enhancing Well-being: Investigating the Role of Pilates in Alleviating Low Back Pain among Postmenopausal Women"- A Narrative Review

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### Abstract

In India, where over 60% of the population has had severe back pain at some time in their life, the prevalence of low back pain is worrying. Women are more likely than males to experience low back discomfort, particularly postmenopausal women. This review discusses how Pilates exercises can help postmenopausal women with their low back discomfort, posture, flexibility, strength, and balance.

**Methods:** Articles published between 2008 and 2022 were found by searching the databases of PubMed, Web of Science, and Scopus. The selection and results of the studies were based on the following criteria: the studies had to assess how Pilates affected pain and flexibility in postmenopausal women with low back pain; these included systematic reviews, meta analyses, randomized controlled trials (RCTs), randomized clinical trials, randomized cross-over trials, quasi-RCTs, and non-RCTs. As outcome measures, the Oswestry disability scale, the Visual Analogue Scale (VAS), the Numeric Rating Scale (NRS), and the Quality of Life Scale were employed.

**Result:** The review study revealed that pilates exercise is a significant factor in low back discomfort in women who have gone through menopause, June reports Kloubec et al. [14] as stating that substantial improvements in balance and posture in 50 individuals following a 12-week period. According to Notornicola et al. [7], sixty people with long-term low back pain who underwent Pilates demonstrated improvements in their overall health and vitality, their physical and social functioning, pain and impairment.

**Conclusion:** The current review's findings suggest that pilates exercises are more beneficial than other treatments for lowering low back pain in postmenopausal women.

### Article History

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## INTRODUCTION

The Pilates technique is a form of low-impact exercise that may be modified to accommodate different medical and physical requirements. Van Tudler MW et al. (2004) reported that higher muscle tension is the cause of low back soreness. Low back discomfort lowers one's quality of life and is a major global public health concern. 2009[2] saw Hughes RE et al. The effects of Pilates exercises on patients experiencing non-specific low back pain in women who have gone through menopause have been the subject of several studies. According to Hayden JA et al. in 2005 [3], there are a number of therapy approaches for the treatment of low back pain, including stretching and strengthening.

Pain prevents people from engaging in social interactions, household tasks, recreational activities, and self-care. In addition to housing, additional energy-intensive jobs include maintaining farms and taking care of animals. These activities are repetitious and hard, endangering the health of the animals. Disc degeneration is more common in postmenopausal women due to their relative estrogen shortage. Lee Haelim et al. (2016). [4] This research reviews the scientific literature on the effects of the Pilates technique on postmenopausal women's nonspecific low back pain. The purpose of this study is to describe and provide a thorough overview of the scientific literature contrasting the effects of Pilates exercise approaches on pain and range of motion in patients with postmenopausal women experiencing non specific low back pain. The original research, meta-analyses, and systematic reviews of postmenopausal women with nonspecific low back pain that evaluated pain or flexibility are all included in this study. Research comparing the benefits of doing Pilate's exercises as the primary treatment to no treatment at all, as well as other forms of intervention exercises meant to enhance core stability and non-specific low back pain. There are eight studies including the Pilates exercise method in randomized cohorts, six trials comparing Pilates to no therapy, fifteen trials involving Pilates methods mixed with other forms of exercises, and eight reviews analysis the reviews.

## MATERIALS AND METHODOLOGY

### Eligibility Criteria

Comprehensive reviews of original research were taken into consideration for this review. These reviews involved adults with non-specific low back pain who were assessed for pain, disability, and therapeutic intervention of Pilates method exercises taken as the main form of treatment compared with no treatment, with other types of interventions or exercises, and with various variations of the Pilates method alone.

### Search approach and keywords

From 2007 to 2022, the aforementioned databases were used in the title, abstract, and keywords fields of the search strategy. The terms "Pilates," "low back pain," and "post menopausal women" were included in the title, abstract, and keyword as part of the typical search approach. Extending the search to include other terms like exercise, flexibility, strength, and core stability has shown to be beneficial, according to preliminary searches.

### Information sources

Based on a review of the literature, publications spanning 2007 to 2022 were chosen. The databases listed below were examined: Pub med, DOAJ, Sci ELO, PLOS ONE, EBSCO, JSTOR, Web of Science, Google Scholar, Scopus Elsevier, Cochrane, DOAJ, MEDLINE-NLM, Science Direct and MEDLINE-EBSCO

### **Selection Criteria**

The featured publications were published in peer-reviewed English-language journals. The entire texts of the articles were reviewed to assess their acceptability for inclusion in comparison to the selection criteria, together with the title and abstract when needed. This narrative review might contain abstracts, opinion pieces, case reports, case series, systematic, randomised trials, and other types of materials.

### **Data extraction**

The data that was extracted was as follows:

- The writer and the year of release
- Methodology layout
- Measures of disability
- Study samples - Interventions
- Using a mat or other specific Pilates equipment
- Primary outcomes

In order for the following points to be taken into account in this narrative review:

- (1) Written in English and published.
- (2) Complete publication so that the study's methodology and findings may be evaluated together.
- (3) The Pilates method's efficacy was evaluated, with reference to the word "Pilates" designating the particular kind of recommended exercise under investigation.
- (4) Participants with non-specific LBP, or localized pain in the lumbar area lasting longer than three months, were included. Studies were omitted if the individuals had LBP for less than three months.
- (5) The VAS, numerical rating pain scale (NRPS), the Oswestry disability questionnaire, Roland-Morris disability questionnaire, Borg scale CR10, Quebec back pain disability scale, patient-specific functional scale, pain self-efficacy questionnaire, and randomized controlled trial with outcome measures for pain and/or functional ability that did not have sufficient validity, reliability, or responsiveness were excluded to avoid not appropriate measurements of treatment effect. (5) Used outcome measures with appropriate scales that evaluate pain and/or functional ability in people with LBP.

### **Comparison of the Pilates method's pain-relieving effects with no intervention**

Low back pain was measured in six trials [6, 7, 8, 9, 10, and 11] both before and after receiving no medicine or other kinds of intervention, including reading a book. The results were compared to those of the control group. Sixty patients with EG who were diagnosed with persistent low back pain continued to receive NSAIDs, Pilates, and CG without any further therapies. After 45, 90, and 180 days, assessments were carried out for function (Roland Morris Questionnaire), pain

(VAS), satisfaction of life (SF-36), contentment with therapy (Likert scale), flexibility (sit and reach), and NSAID consumption.

A clinical investigation involving sixty individuals who had chronic LBP and a mean age of 51.2 years was carried out by Notornicola et al. in 2014[7]. In this instance, the EG received Pilates while the CG remained inactive. The Pilates group performed five one-hour lessons of Pilates exercises during the following six months. All respondents' questionnaires, including the Oswestry, SF-36, Roland-Morris disability, and Spinal Functional sort, were tested at baseline (T1) and six months later (T2). At T2, the Pilates group demonstrated gains in overall health and vitality, physical and social functioning, and pain and impairment. Fadime Kucuk et al. included 66 women in total in their 2015 research.[8] Three groups of subjects were formed: a control group (n = 20), a clinical Pilates group (n = 21), and a verbal education group (n = 25). The analysis's findings showed that the CPG performed better than the VEG in terms of BMI, waist and hip circumference. 53 individuals with non-specific low back pain for at least three months were included in either a Pilates therapy or a back school treatment group in a research conducted by S. Donzelli et al. in 2006 [11]. Better compliance and a more subjective reaction to therapy were demonstrated by the Pilates technique group. In 2014[31], Gisela C. Miyamoto et al. looked at 86 individuals who had persistent, non-specific LBP. An educational pamphlet regarding back discomfort was given to one group, and participants were then randomly assigned to either undergo 12 sessions of exercises based on Pilates principles over a six-week period (n = 43) or not (i.e. education alone n = 43). At six months, the differences in pain were no longer statistically significant, favoring the Pilates group.

### **Pilate's technique compared to alternative workout regimens for the result of pain**

Fifteen studies (12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 26) were analyzed in this area. Both during and after these therapies, pain was evaluated, and the results were compared to CGs who engaged in other activities. Valerie et al. (2006) recruited 49 individuals with chronic low back pain, and they were randomized into two groups: CG (n = 24) and Pilates (n = 25). The Pilates group showed improvements in pain reduction, flexibility, sports functioning, and general health. According to June, who cites Kloubec et al. [14], fifty people signed up for a 12-week Pilates course that met for one or two hours per week. All variables showed substantial improvements after 12-week period, with the exception of balance and posture.

Paul W.M. Marshall et al. [20] randomly assigned 64 individuals with low back discomfort to either a stationary cycling group (CEG) or a specialized trunk exercise group (SEG) for six-week duration. David Cruz-Diaz et al. [20] evaluated the effects of Pilates exercises on women over 65 with chronic low back pain's fear of falling and their ability to balance. a randomized controlled trial evaluating the benefits of six weeks of Pilates combined with physiotherapy treatment for 50 participants against 47 participants receiving only physiotherapy treatment for low back pain. When compared to the Physiotherapy group alone, the Pilates group showed improvement in functional mobility, balance and pain.

Lias campos De Oliveira et al.[12] randomly assign 32 participants to the EG (n = 16) who participated in two weekly Pilates sessions for a duration of 12 weeks and the CG (n = 16) in two weekly sets of static stretching. A research conducted by Aiswarya K. Ravindran et al.[23]

included 47 volunteers who had chronic low back pain that was non-specific. The NPRS and RM Questionnaire were used to measure changes. It has been discovered that for postmenopausal women experiencing non-specific chronic low back pain, pilates instruction is more effective in reducing pain and disability than aerobic exercise. Eleftherios Papapas et al. (2013) investigated the pain relief and functional improvement effects of a Pilates exercise program utilizing the Fit ball on individuals with persistent low back pain. 74 patients with persistent non-specific low back pain, ages 65 to 85, were investigated by Naiane Teixeira Bastos de Oliveira et al.<sup>[22]</sup> and divided into two groups: one for Pilates (n = 37) and the other for aerobics (n = 37). Eight weeks following randomization, pain intensity and overall disability will be evaluated and showed the improvement in using pilates.

Forty senior women, 65 years of age or older, were split into two groups in a research by Ju Hyun et al.[15]: one group performed Pilates mat exercises (PME), while the other group performed unstable support surface exercises (USSE). They worked out three times a week for forty minutes each for a total of twelve weeks. The PME and USSE groups showed a considerable improvement in the balance abilities of senior female persons, suggesting that Pilates exercises are beneficial for improving balance in this specific set of subjects. 27 ambulatory older people who were community members were recruited by Marie-Lousie Bird et al. [16] (n = 32). The participants were divided into two groups: one for group pilates instruction and the other for routine activities. After a six-week washout period, the participants carried out the alternative intervention. Wen-Dien Chang et al. [24] looked at the relationship between HRV, the menopausal rating scale, and exercise activity in a cross-sectional research. 327 postmenopausal females underwent assessment. Variations in exercise activity had an effect on the ANS adjustment and postmenopausal symptoms in women. Modifying exercise habits might potentially mitigate postmenopausal symptoms in women.

### **The Pilates Method's impact on postmenopausal women's non-specific low back pain in randomized controlled trial.**

The application of Pilates exercise to postmenopausal symptoms changed the symptoms significantly between groups and for the time interaction of physical, mental, and vasomotor symptoms, but not for the time. Lee Haelim et al. Changes in flexibility after applying Pilates exercises to the sit and reach test showed significant differences between the groups. Similarly, significant differences were seen in time, interaction and group in the trunk lift test. In Mauricio Antonio da Luz Jr. et al.'s study [27], 86 people with chronic, nonspecific low back pain were examined. Patients were randomly assigned to one of two groups: mat Pilates (n = 43) or equipment-based Pilates (n = 43). Both groups underwent 12 Pilates lessons over the course of six weeks after randomization, and then again after six months. After six months, disability differed statistically significantly.

A Pilates exercise program was recommended by Gagnon Laura Horvath[28] in 2005 as a therapeutic intervention for low back pain. Twelve patients were split into two groups: six patients in EG (exercises) and six patients in CG (usual lumbar stabilization). All patients exhibited significant improvements in center balance time, pain and function. The study provides a sound and reliable basis for integrating Pilates exercises as a therapeutic exercise intervention for people with lower back pain.

In a research conducted by U. Albert Anand et al. [29], 52 physically active people, ages 18 to 60, who had persistent, non-specific low back pain were included. Group A engaged in modified, specialist Pilates-based exercises, whereas Group B engaged in therapeutic exercises mixed with flexibility exercises. Hye Jin Kim et al.[30] looked at how a 12-week Prop Pilates Program (PPEP) affected MSD patients' stability and level of pain. After a 12-week Prop Pilates Exercise Program (PPEP), there was a noticeable decrease in the pain index (VAS). Chae- Woo Lee et al.[31] looked at the effects of Mat Pilates and equipment on the pain and static balance of business women with chronic low back pain. They performed the Pilates routines three days a week for eight weeks. Pilates mat exercises showed greater pain alleviation and better balance when compared to Pilates apparatus training. The advantages of administering a Pilates workout program in addition to yoga were studied by Susan Sorosky et al. [26]. Those who have done the pilates and yoga showed good improvement. In a research published in 2012, Hita Contraras et al.[32] investigated the role postmenopausal women's Pilates exercise training had in avoiding falls. For ladies in their later years, Pilates exercises are a useful fall management and prevention technique.

### Examination of Reviews

This section included an analysis of eight studies.[33–34, 35–36, 37–38, 39–40]After a careful examination of the studies, the findings of all published systematic reviews (with and without meta-analysis) examining the effectiveness of Pilates method exercise in reducing pain impairment in postmenopausal women with non-specific low back pain were collated. Antonino Patti et al.[34] suggested that Pilates-based exercises are better than either no treatment or very little physical exercise therapy for the treatment of chronic non-specific low back pain. According to Cherie Wells et al. (2012), Pilates is a mind-body training technique that requires attention to muscle control, posture, and breathing in addition to core stability, strength, and flexibility. Pilates was said to be better in 2013 by Gisela C. Miyamoto et al.[33] than a minimal intervention. In the short term, minimal intervention is less effective than the Pilates method exercises at reducing pain and disability. As a result, using the Pilates method exercises to reduce pain and impairment is advised. The meta-analysis now included seven RCTs by Edwin Choon Wyn Lim et al. [36]. He concluded that minimal intervention is not as effective at lowering pain in those with non-specific low back pain as Pilates-based exercises.

On the other hand, four clinical trials (n = 4) including Pilates for the treatment of low back pain were reviewed by Paul Posazzki et al. in 2010 [38]. Based on his study, it appears that there is some evidence to bolster the effectiveness of Pilates in treating low back pain. Apart from the requirement for larger sample sizes, more accurate definitions of standard care, and comparable outcome measures, no conclusive results have been found. Because Pilate's technique currently has a limited data base, it also highlights the need for bigger, more meticulously organized clinical research. The 2015 study [39] by A.L. Barker et al. investigated the effects of Pilates on older adults' balance and fall risk. When compared to non-active control groups, Pilates has been shown to improve balance. The effectiveness of Pilates exercises in treating chronic, non-specific low back pain and functional impairment was evaluated by Arian R. Aladro-Gonzalvo, Lic et al in 2013[40]. The results showed that Pilates-based therapeutic exercise gives equivalent benefits and is moderately superior to minimum intervention for pain reduction when compared with pooled scores to another physiotherapeutic treatment. Ligia M. Pereira et al. assessed the effects

of the Pilates approach on individuals who had persistent low back pain in 2011 [37]. According to the review, there was no difference in pain or functioning between the Pilates and control groups. The authors note that there is not enough information to make clear conclusions about the results of their investigation, despite the fact that Pilate's approach can be advised for lowering pain and impairment.

## **DISCUSSION**

The Pilates approach increases muscle endurance and strength by utilizing practical movements Shweta Ravindra Kulkarni in 2022 [41] Week by week, the intensity of these workouts rises, leading to a significant improvement in postural control Rydeard R in 2006[46] Curnow et al. at 2009 study[43] demonstrated how the Pilates approach enhances the pelvic load transfer process. According to the study by Natour et al [44] the participants using Pilates method had statistically different results compared using pain medication. Latey et al in 2002[45] Pilates workout helps in muscular control, strength and flexibility. Additionally, Pilates improves older ladies in quality of life and static balance (Rodrigues, Cader, Torres, Oliveira, & Dantas [46] 2010. Kucukcakir et al [47] Pilates has been shown to increase spine stabilization and to reenergize or enhance core muscle groups Bird et al[49]; Gladwell Head et al[50]. According to several research, postmenopausal women are more likely to develop sedentary behaviors and lose fitness in 2007 Sowers et al [51], which lower quality of life, Martin et al [52] in 2009.

According to Curnow D et al. (2009), postmenopausal women like adopting the prescribed approach of Pilates exercises to improve their control and posture. Marini M. et al.[53] state that it is imperative that these women change their sedentary lives by becoming physically active. [42]. A Pilates exercise regimen can successfully relieve pain while improving lumbar strength and flexibility, according to a 2016 research by Lee H et al. [54]. In conclusion, it is often unclear how much physical activity, how often, how intense, and how much labor goes into the Pilates programs that are used. Table 1 indicates that the number of well-defined trials demonstrating the superiority of one specific exercise program over another in treating non-specific low back pain in postmenopausal women is rather small. In this domain, specialists concur that exercises based on the pilates technique are more effective than either no therapy or other therapies in treating nonspecific low back pain in postmenopausal women. Further study is needed to find out more about the advantages of a Pilates exercise program on lowering low back pain in postmenopausal women.

## **RESULTS**

The review study revealed that pilates exercise is a significant factor in low back discomfort in women who have gone through menopause, June reports Kloubec et al. [14] as stating that substantial improvements in balance and posture in 50 individuals following a 12-week period. According to Notornicola et al. [7], sixty people with long-term low back pain who underwent Pilates demonstrated improvements in their overall health and vitality, their physical and social functioning, pain and impairment.

## **Disclosure of statement**

There was no disclosed conflict of interest by the authors.

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There was no funding for this work.

## Statement of Data Availability

The study's data are available inside the publication and/or its additional materials, as confirmed by the authors.

## Abbreviations

CG stands for control group. NRPS is for numerical rating pain scale, LBP stands for low back pain, CLBP for chronic low back pain, and EG for experimental group. Non-steroidal anti-inflammatory medication, or NSAID OLBPDQ is the Oswestry low back pain disability scale; VAS is the visual analog scale; MSC is musculoskeletal conditions; and RMVAS is the Roland Morris visual analog scale. Menopause rating scale, or MRS Heart rate variability, or HRV Patient Specific Functional Scale, or PSFS Pain Catastrophe Scale (PCS) The acronyms FABQ, EMS, SPS, FES, and FES stand for Fear Avoidance Beliefs Questionnaire, Emotions Scale Questionnaire, and Spinal Functional Sort Questionnaire. Beck Depression Inventory, or BDI FR stands for functional reach. SR stands for Sit and Reach. Rosemberg Self-Esteem Scale, or RSS Balance Performance Monitor, or BPM Global Perceived Effect Scale, or GPES

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