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EFFECTIVENESS OF YOGA THERAPY ON THANDAGA VATHAM-INDUCED LOWER BACK PAIN: A 12-WEEK RANDOMIZED CONTROLLED TRIAL IN MEN AGED 35–50 YEARS

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ABSTRACT

Thandaga Vatham, a Vata-predominant lumbar spondylosis, causes chronic low back pain and disability in middle-aged men, often linked to sedentary lifestyles. Yoga therapy shows promise in reducing pain and improving function, but RCT evidence specific to Thandaga Vatham remains limited. This randomized controlled trial (CTRI/2024/10/074878) enrolled 60 men aged 35–50 years with clinician-diagnosed Thandaga Vatham, randomized 1:1 to a yoga therapy group (30 minutes a day, 5 days for week for 12 weeks with Paschimottanasana, Halasana, Chakrasana, Bhujangasana, Shalabhasana, Dhanurasana, Pada Hastasana, with warm-up/Savasana) or control (usual care). Blinded assessments at baseline, 6, and 12 weeks measured primary outcomes—Y-angle test (spinal mobility) and Pain Management Questionnaire (PMQ; coping)—plus VAS pain and ODI disability. Repeated-measures ANOVA analyzed group × time effects (p<0.05). Baseline scores were comparable. At 12 weeks, yoga group gains exceeded control: Y-angle 76.8° ± 6.9 vs 66.4° ± 8.0 (p<0.001); PMQ 58.1 ± 5.2 vs 44.9 ± 7.0 (p<0.001); VAS 3.2 ± 1.4 vs 6.5 ± 1.7 (p<0.001); ODI 24.1% ± 6.7 vs 45.2% ± 9.1 (p<0.001), with significant group × time interactions.

Keywords: Thandaga Vatham, yoga therapy, low back pain, Y-angle test, Pain Management Questionnaire, RCT, lumbar spondylosis

INTRODUCTION

Lower back pain is a major cause of disability and work-related limitation, particularly among adults aged 35–50 years who are often engaged in physically demanding or sedentary occupations (Wieland et al., 2011; Li et al., 2023). Within the Siddha medical tradition, this pattern of recurrent, Vata-dominated lumbar discomfort is commonly described as "Thandaga Vatham," which broadly corresponds to lumbar spondylosis and degenerative spinal changes in modern biomedical terms (Shenbagaraj, 2025; Paripex-Siddha study, 2022). Evidence from systematic reviews and meta-analyses supports the role of exercise-based interventions, especially yoga, in reducing pain intensity and functional disability in chronic low back pain, with effects often comparable or superior to usual care or non-exercise physiotherapy (Wieland et al., 2011; Lin et al., 2022; Li et al., 2023). Recent randomized controlled trials have shown that structured yoga programs, either

alone or combined with Ayurvedic procedures such as Kati Basti, can significantly improve pain scores (VAS), functional disability (ODI), and psychosocial outcomes over 8–12 weeks of intervention (Bhatta et al., 2024; Söderlund et al., 2022).

Despite this growing body of evidence, there is limited RCT-level data specifically evaluating yoga therapy for Thandaga Vatham–related lower back pain, particularly in middle-aged men (Bhatta et al., 2024; Shenbagaraj, 2025; Paripex-Siddha study, 2022). Siddha-oriented case reports suggest that integrating purificatory procedures, Siddha-style yoga (Siddhar Yogam), and local herbal oleations can reduce pain and stiffness in Thandaga Vatham, but larger, gender-specific trials with standardized outcome measures are still lacking (Paripex-Siddha study, 2022; Shenbagaraj, 2025). Given the high prevalence of prolonged sitting, biomechanical strain, and sedentary lifestyles among men aged 35–50 years, a well-designed yoga-based intervention may offer a safe, low-cost, and culturally acceptable approach to managing Vata-predominant lumbar disorders (Wieland et al., 2011; Li et al., 2023). In the present study, lower back pain and functional status in men (35–50 years) with Thandaga Vatham are assessed using the **Y-angle test** and the **Pain Management Questionnaire (PMQ) by Brodie et al. (1990)** as key outcome variables. The Y-angle test provides an objective measure of spinal mobility and postural alignment and has been used in studies of dynamic balance and functional performance in people with chronic low back pain (Alshehre et al., 2021). The PMQ evaluates self-reported pain-related coping strategies, perceived control over pain, and psychological aspects of pain management, and has demonstrated reliability and validity in low back pain populations (Brodie, Burnett, Walker, & Lydes-Reid, 1990). By comparing a 12-week yoga therapy program with a control group using these tools, the study aims to generate evidence on the efficacy of yoga in improving both biomechanical and psychosocial dimensions of Thandaga Vatham–related lower back pain.

METHODOLOGY

This study employed a **randomized controlled trial (RCT)** design with two groups: a **Yoga Therapy group** and a **Control group**, each comprising **30 male participants** aged 35–50 years diagnosed with Thandaga Vatham–related lower back pain. Participants were randomly assigned to the groups using a computer-generated randomization schedule, with allocation concealment maintained until baseline assessment. The trial duration was **3 months (12 weeks)**, and all assessments were conducted at baseline, 6 weeks, and 12 weeks.

Participants

Men between 35–50 years with clinician-diagnosed lower back pain consistent with Thandaga Vatham (Vata-predominant lumbar spondylosis) were invited to participate.

Inclusion criteria included: chronic low back pain for at least 3 months, ability to perform mild physical activity, and informed consent.

Exclusion criteria included: history of spinal surgery, radiculopathy requiring surgery, severe neurological deficit, or any medical condition contraindicating yoga practice. All procedures were approved by the institutional ethics committee and written informed consent was obtained. This randomized, parallel-group, multi-arm clinical trial is registered with the **Clinical Trials Registry – India (CTRI/2024/10/074878)** and has received ethical approval from the **Institutional Human Ethics Committee of Meenakshi Academy of Higher**

Education and Research (MAHER).

Interventions

Yoga therapy group

Participants in the Yoga Therapy group practiced yoga for ½ **hour daily, Monday through Friday**, for **3 months (12 weeks)**, under the supervision of a trained yoga instructor. The asana sequence included:

- **Paschimottanasana**
- **Halasana**

- **Chakrasana**
- **Bhujangasana**
- **Shalabhasana**
- **Dhanurasana**
- **Pada Hastasana**

Each session began with 5 minutes of gentle warm-up and ended with 5 minutes of relaxation (Savasana). The poses were performed in a standardized order, with emphasis on proper alignment, gradual progression, and breath awareness (pranayama integration). Participants were instructed to avoid pain-provoking movements and to stop if any sharp or radiating pain occurred.

Control group

The Control group did not receive yoga therapy. They were advised to continue their usual routine (standard lifestyle and self-care) but were not permitted to start any new structured exercise or yoga program during the 12-week period. They were, however, encouraged to maintain their usual physical activity and were educated on basic back-care principles.

Outcome measures

The primary outcomes were changes in:

- **Y-angle test** score (biomechanical measure of spinal mobility and balance)
- **Pain Management Questionnaire (PMQ; Brodie et al., 1990)** score (psychosocial and coping-related aspects of pain)

Secondary outcomes included self-reported pain intensity (visual analogue scale, VAS) and functional disability (Oswestry Disability Index, ODI). Assessments were performed at **baseline, 6 weeks, and 12 weeks** by blinded assessors.

Test Administration

All outcome measures were administered at **baseline, 6 weeks, and 12 weeks** by trained, blinded assessors in a quiet, standardized clinical setting. Each participant completed the assessments on the same day as their yoga session (post-session, after a 10-minute rest).

Y-angle test

The Y-angle test was performed with the participant in **standing position** against a plumb-line backdrop. Using a digital inclinometer or goniometer, the angle between the vertebral column and the vertical line was recorded during maximum forward flexion without knee bending. Three trials were taken and the **mean value (in degrees)** was used for analysis.

Pain Management Questionnaire (PMQ)

The **Pain Management Questionnaire (Brodie et al., 1990)** was administered in a **self-administered format** in the participant's preferred language (Tamil/English). Where needed, a trained investigator read the items aloud and recorded responses without influencing answers. The questionnaire included items on **pain-related beliefs, coping strategies, and perceived control over pain**. Total PMQ score was calculated according to the original scoring protocol and recorded as a continuous variable.

Visual Analogue Scale (VAS)

Pain intensity was assessed using a **10-cm horizontal Visual Analogue Scale (VAS)**, with "0" labeled as *"no pain at all"* and "10" as *"worst pain imaginable"*. Participants were instructed to place a mark along the line that best represented their **average pain intensity over the past 24 hours**. The distance from 0 to the mark (in mm or cm) was recorded as the VAS score.

Oswestry Disability Index (ODI)

The **Oswestry Disability Index (ODI)** was administered in written form. Participants responded to **10 items** covering pain intensity, personal care, walking, sitting, standing, lifting, sleeping, sex life, social life, and traveling. Each item was scored on a 0–5 scale, totaled, and converted into a **percentage score (0–100%)**, with higher values indicating greater functional disability.

All four instruments were completed in the same sequence at each time point:

1. Y-angle test
2. VAS
3. ODI
4. PMQ

This standardized protocol ensured consistency and minimized tester-induced bias in data collection.

Data collection and procedures

At baseline, demographic data, duration of back pain, and baseline scores for Y-angle test, PMQ, VAS, and ODI were recorded. The same protocol was repeated at 6 and 12 weeks. The Y-angle test was administered according to standardized protocol, and the PMQ was completed in written or assisted interview format where needed. Practitioners recorded adverse events and adherence to the yoga and herbal regimen.

Statistical analysis

Data were analyzed using **SPSS (version 26)**. Descriptive statistics (mean ± standard deviation) were computed for continuous variables.

Within-group changes over time were assessed using **paired t-tests** from baseline to 6 weeks and from 6 weeks to 12 weeks. Between-group differences across the three time points were evaluated using **repeated-measures ANOVA**.

Eligibility Criteria:

- Men aged 35 to 50 years
- Clinical diagnosis of Thandaga Vatham
- Residents of Chennai
- Ability to understand the study procedures and questionnaires
- Willingness and ability to provide written informed consent

Exclusion Criteria:

- Currently taking prescribed medication specifically for lumbar pain (e.g., ongoing analgesic or anti-inflammatory therapy for lower back pain)
- History of spinal surgery, osseous fracture, or significant spinal complications
- Regular participation in yoga or any other organized physical therapy/exercise program during the study period
- Substantial lifestyle, climatic, nutritional, or socioeconomic constraints that may affect adherence to the 12-week intervention
- Inability or refusal to provide signed informed consent

RESULTS

The results showed that the **Yoga Therapy group** improved significantly more than the **Control group** over the 12-week period in all four outcome measures. At **baseline**, both groups had similar levels of pain, disability, coping, and spinal mobility, indicating good comparability.

Outcome	Time	Yoga Therapy Group (n = 30)	Control Group (n = 30)	Notes
Y-angle (°)	Baseline	65.2 ± 8.3	64.8 ± 7.9	No significant between-group difference at baseline
	6 weeks	72.1 ± 7.6	66.0 ± 8.1	Yoga group shows greater improvement
	12 weeks	76.8 ± 6.9	66.4 ± 8.0	Significant between-group difference $p < 0.001$
PMQ	Baseline	42.5 ± 6.4	43.1 ± 6.8	Comparable baseline coping
	6 weeks	52.3 ± 5.9	44.2 ± 7.1	Yoga group reports better coping
	12 weeks	58.1 ± 5.2	44.9 ± 7.0	Significant between-group difference $p < 0.001$
VAS	Baseline	7.4 ± 1.3	7.3 ± 1.4	Similar baseline pain
	6 weeks	5.1 ± 1.5	6.7 ± 1.6	Yoga group shows faster reduction
	12 weeks	3.2 ± 1.4	6.5 ± 1.7	Significant between-group difference $p < 0.001$
ODI (%)	Baseline	48.7 ± 8.9	49.3 ± 8.6	Similar baseline disability
	6 weeks	36.4 ± 7.8	45.8 ± 8.4	Yoga group improves faster
	12 weeks	24.1 ± 6.7	45.2 ± 9.1	Significant between-group difference $p < 0.001$

\Over time, the **Yoga Therapy group** exhibited a clear, progressive improvement in the **Y-angle test**, reflecting better spinal flexibility and posture. By 12 weeks, the Yoga group's mean Y-angle increased from about 65° at baseline to around 77°, whereas the Control group changed only slightly, remaining close to baseline values. This indicates that yoga practice meaningfully enhanced spinal mobility in men with Thandaga Vatham.

For **pain intensity (VAS)**, the Yoga Therapy group reported a marked reduction, with mean scores decreasing from approximately 7.4 at baseline to around 3.2 at 12 weeks. In contrast, the Control group showed only a small, non-meaningful change, remaining around 6.5 at the end of the study. This demonstrates that yoga led to a substantial reduction in perceived low back pain over time.

On the **Oswestry Disability Index (ODI)**, the Yoga Therapy group moved from moderate–severe disability (around 49% at baseline) to mild disability (about 24% at 12 weeks), indicating clear improvement in everyday functional activities such as walking, sitting, and lifting. The Control group's ODI scores remained largely unchanged, staying in the moderate–severe disability range, which suggests that usual self-care alone did not significantly improve functional status.

In terms of **psychosocial coping (PMQ)**, the Yoga Therapy group showed a systematic increase in scores from about 42.5 at baseline to 58.1 at 12 weeks, reflecting better pain-related coping strategies and greater perceived control over pain. The Control group's PMQ scores increased only slightly and remained near baseline levels, indicating limited improvement in pain-management behaviour without structured yoga intervention.

Repeated-measures ANOVA confirmed a statistically significant **group and time interaction** for all four outcomes, implying that the **Yoga Therapy group improved more over time** than the Control group. Together, the results suggest that the 12-week yoga-and-herbal therapy program significantly reduced pain, improved spinal mobility, decreased functional disability, and enhanced pain-coping and sense of control in men with Thandaga Vatham–related lower back pain.

DISCUSSION

The present study demonstrates that a 12-week supervised yoga-and-herbal therapy program significantly improves lower back pain, spinal mobility, functional disability, and pain-coping behaviour in men (35–50 years) diagnosed with Thandaga Vatham, when compared with a Control group receiving usual self-care. The Yoga Therapy group showed clinically meaningful reductions in VAS scores, substantial improvement in ODI-based functional status, increased Y-angle values indicating better spinal flexibility, and higher PMQ scores reflecting enhanced perceived control over pain. These findings are consistent with recent evidence that structured yoga can reduce pain intensity and functional limitation in chronic low back pain, often with effects comparable or superior to non-exercise care or standard physiotherapy-based approaches (Wieland et al., 2011; Lin et al., 2022; Li et al., 2023). The observed improvement in Y-angle scores suggests that the selected asanas (Paschimottanasana, Chakrasana, Bhujangasana, Shalabhasana, Dhanurasana, Pada Hastasana, and Halasana), practiced with proper alignment and breath control, enhanced segmental spinal mobility and postural control. This is particularly relevant in Thandaga Vatham, where Vata-dominated stiffness, reduced lumbar range of motion, and postural imbalance contribute to persistent discomfort (Shenbagaraj, 2025; Singh et al., 2023). The alignment-conscious, gradual progression used in the protocol likely minimized strain while promoting neuromuscular re-education and improved motor control, which may partly explain the robust within-group gains seen in the Yoga group (Singphow et al., 2022; Nikolis et al., 2024). The marked reduction in VAS scores and ODI percentages further indicates that yoga does more than just "stretch the back"; it appears to modify pain processing and reduce interference of pain in daily activities. Recent RCTs and systematic reviews have similarly reported that yoga-based interventions lead to clinically important reductions in pain and disability in chronic low back pain, with benefits sustained over several weeks (Cramer et al., 2024; Anheyer et al., 2023; Lin et al., 2022). The greater magnitude of change in the Yoga Therapy group, compared with the minimal improvement in the Control group, supports the hypothesis that supervised, standardized asana practice—even at 30 minutes per day, five days a week—can serve as an effective adjunctive non-pharmacological strategy for chronic low back pain (Li et al., 2023; Singh et al., 2023).

The PMQ findings add an important psychosocial dimension to this picture. The Yoga Therapy group showed progressive improvement in pain-related coping and perceived control, suggesting that the structured practice conferred not only biomechanical benefits but also psychological and self-regulatory advantages. Mindful movement, breath awareness, and the regularity of practice may have helped participants reframe pain experiences, reduce catastrophizing, and feel more empowered in managing their symptoms. This aligns with literature on mind–body interventions showing that yoga can reduce stress, anxiety, and maladaptive pain-related thoughts, all of which are linked with enhanced pain modulation and functional recovery (Singphow et al., 2022; Singh et al., 2023; Cramer et al., 2024).

The use of yoga therapy aimed at promoting smooth blood flow and balanced Prana—highlights the potential of integrative, context-sensitive care for Thandaga Vatham. The observed benefits support the view that traditional concepts such as Vata-related lumbar stiffness and Prana-circulatory imbalance can be meaningfully addressed through standardized, non-invasive practices when tested under rigorous RCT conditions (Shenbagaraj, 2025; Leena et al., 2024).

In conclusion, the findings provide evidence that a 12-week yoga therapy program can significantly alleviate Thandaga Vatham–related lower back pain, improve spinal mobility, restore functional capacity, and enhance pain-related coping in men aged 35–50 years. Yoga may thus serve as a safe, low-cost, and culturally acceptable option within an integrated care model for chronic low back pain, particularly in settings where access to

sophisticated pharmacological or interventional resources is limited.

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