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AN INTEGRATIVE BIOPSYCHOSOCIAL APPROACH TO CHRONIC NON-SPECIFIC LOW BACK PAIN: A REVIEW OF PHYSIOTHERAPY AND YOGASAN INTERVENTIONS

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ABSTRACT

Background: Chronic Non-Specific Low Back Pain (CNSLBP) is a major cause of disability and prevents reversible changes in joint mechanics. Often it takes a long time to get relief in pain, mobility, and correction of disability, and quality of life can be improved with combined efforts. This study reveals methods being practised to decrease the effort and improve pain on long term basis by combining Yoga with Physiotherapy. According to some studies, the speed of recovery can occur if used wisely, according to conditions specifically. Also when Meditation procedure is added in the above it can improve pain, along with improving Psychosocial factors. The above triad can not only improve just pain but also improve Quality of life, and reduce dependency on Medication and its side effects.

Objective: This study included the studies conducted from 2021 to 2026 including the data base from Scopus, Pedro, Google scholar, and EBSCOhost. It evaluated the trimodality intervention which further included physiotherapy, yoga, and Meditation covering the bio psychosocial system. Yoga therapy was found effective in reducing pain and disability and improving lumbar flexion range, while physiotherapy helped in improving the core muscle endurance. Clinical studies support the combination as being more effective than either method alone in improving pain levels, physical function, and overall quality of life.

Methods: Screening of 180+ articles yielded a core set of 24 highly relevant clinical trials, systematic reviews, and meta-analyses satisfying the strict inclusion criteria of combining active biomechanical, kinetic, and cognitive interventions.

Results: Data synthesis indicated although Physiotherapy includes structural tissue tolerance, incorporating yoga and Meditations or relaxation techniques which further targets neuromuscular pathway regulating pain and stress. Integrated approached which include both domains showed reduction in disability score, pain and Psycho sociological issues. Over the past five years, systematic reviews and meta-analyses have stated in articles that yoga is an effective non-pharmacological intervention for managing chronic non-specific low back pain (NSLBP. When integrated with physiotherapy, yoga enhances pain relief, improves functional outcomes, and contributes to overall patient well-being.

Conclusion: In conclusion, integrating yoga and physiotherapy is a safe, effective, and sustainable approach to managing chronic low back pain, addressing both physical and psychological aspects of the condition.

KEYWORDS: Non-specific low back pain, Physiotherapy, Yogasanas, Yoga, Combined intervention, pain management, Rehabilitation.

INTRODUCTION

According to the studies and systematic reviews, pain is increasing in populations due to a sedentary lifestyle. And pain increases due to no modification in lifestyle. Since 1990 till date according to the population with maximum and common cause of disability Low Back Pain is considered as Global Burden disease [1]

Chronic low back pain is treated by Modalities causing pain relieve, postural guidance, stretching exercise, strengthening exercises. It enhances mobility, stabilizes the spine, and prevents pain recurrence. Yogasans help in improving strcebility, flexibility,muscle strength, Meditation help in attaing mental peace, and reducing stress. [2]

Some of the studies have even shown beneficial results in aspects of orthopaedics and sports injuries. According to the researcher, combined therapy was quite beneficial when combined and physiotherapy alone was applied in some of the sports injuries. [2, 3]

Recent advances are now moving towards more traditional approaches, this approach includes Yoga and some physiotherapy approaches; the combination is getting more common and effective for the therapeutic approach as a physiotherapist. Many articles have been published, and all show some benefits for the combination of the study, which was found effective for the patients. It has been found that the combined therapy has been effective in terms of improvement in balance, strength, flexibility, Range and mental wellness disturbed due to the chronicity of the pain. [3]

Some studies have authenticated the descriptive approach of benefits of yoga and traditional methods like Ayurvedic, Patanjali yoga etc. from the sources like Semantic Scholar, Google Scholar, PubMed, Web of Science, and Science Direct.[4,5]

According to Gordon Waddell, Back pain is not only general Back pain or musculoskeletal problem but more than physical experience, he focused on the phenomena which provide the concept of social as well as psychological factors with non specific low back pain ,he insisted in his book that for treating the NSCLBP, one must include the protocol including some social as well as psychological aspects.[6]

A 2005 systematic review by Hayden et al. evaluated the effectiveness of exercise therapy in managing chronic low back pain. The findings indicated that exercise therapy significantly reduced pain compared to no intervention, usual care, or placebo, supported by moderate-certainty evidence. However, improvements in functional limitations were minimal. It suggested that exercises were more effective than just advice, which suggested importance of physiotherapy [7]A review article recommended evaluating the effects of combining Yoga with physiotherapy (intervention group) versus physiotherapy alone (control group) on lower limb muscle strength and balance. In the study, 65 elderly participants were enrolled, and data were collected and analyzed after 12 weeks of intervention. The final assessment revealed that the intervention group.[8]In one of the studies, 228 adults suffering from chronic low back pain stated that yoga may be more effective than conventional stretching exercises or a self-care book for improving function and reducing symptoms. The participants were randomised to 12 weekly yoga classes, conventional stretching exercises, or a self-care book. The primary outcomes were back-related functional status and some pain at 12 weeks. After adjustment for baseline values, the yoga group showed superior 12-week outcomes to the self-care group, with a mean difference of -2.5 for function and -1.1 for symptoms at 26 weeks. The yoga group also remained superior at 26 weeks. Although the studies implied that Yoga was not better than stretching, it was more effective than self-care.[9]

Some studies had been published from the databases in July 2021, no language restriction was taken.The combination of Physiotherapy and Yogasanas for the NSLBP have stated the benefits and leveraging the strengths of both disciplines. In Physiotherapy some evidence-based practice provides a sequence for assessment, diagnosis, and treatment,it also focuses on the application of Exercises related to condition.On the other hand, Yogasanas provides traditional practise and training which help the patient on to become self-dependent in ADL,improve QOL and continuous Pain management.

In one of the studies, improvement was observed in elderly patients within 12 weeks of intervention. In the study 65 elderly were given Yoga and Physiotherapy in the intervention group.Data was analysed and showed improvement in intervention arm which stated the benefits that Combination of Physiotherapy with Yoga .[10]

As per studies, Physiotherapy modalities and exercises help in Pain Modulation,it functions as reducing the nociceptive input. Yogasanas, was beneficial through relaxation,pranayama which further help in improvement and activate the parasympathetic nervous system, reduce sympathetic arousal, and influence central pain processing, thereby modulating pain perception,It stated the importance of relaxation techniques along with the above Physiotherapy and Yoga. A RCT study was conducted to compare general exercise , 240 adults with NSLBP with 3 months and treatment of 8 weeks was given. Participants were given treatment of Motor control exercises, spinal manipulative therapy and general exercises including strengthening,stretching , aerobic exercises.[11] In one of the systematic reviews of cohort studies,it concluded with result of improvement by 33% in first 3 months,and chronic pain, 65% still reported some pain after 1 year. Many factors, including biophysical, psychological, social and genetic factors, and comorbidities, can contribute to disabling, chronic low back pain.[12,13]

Meditation has been used by different groups of people for thousands of years, and research has shown that it has a lot of good things for both the mind and the body. The effect of meditation on long-term pain is good. It can be a starting point for new discoveries. Meditation can make the body's way of dealing with pain stronger, lower stress, and make people more aware of their bodies. People who have pain can pick ways to meditate and add them to their treatment plans in a way that works best for them. Meditation is not a fix, but it can help people deal with their pain. In both hospital settings and in experiments, it has been found that being mindful while meditating can greatly reduce pain. Meditation can help with long-term pain.

Meditation science can help to deal with pain by maintaining mental balance.[14]

According to data base of PubMed, Embase and Cochrane databases.Ting-Han Lin,author searched 12 studies in 1153 patients. This study showed effectiveness meditation which was affecting their daily living. 10 studies were based on meditation-based therapy which proved effective in reducing CLBP pain when compared to therapies that did not use meditation. 7 studies showed people were mentally boosted and less bored who were suffering from pain as compared to others. Quality of life improvement was seen in 3 studies. The study concluded that meditation is an effective way to manage CLBP.

Study reviewed 12 studies with 1005 patients and followed some guidelines called PRISMA Guidelines. The researchers looked at information from Web of Science, CENTRAL Cam Quest and Pub Psych up to June 2020. They wanted to see if meditation could help people with Low Back Pain or LBP. They found that meditation can be an extra treatment for people with LBP. When they compared people who meditated to those who did not they saw that meditation really helped reduce pain and improved physical quality of life. This was true after treatment. However when they checked again after some time around 20 weeks the difference was not as big. Meditation seems to be really good at reducing pain in the term for people with LBP. CLBP and LBP are both types of pain that meditation can help with. Meditation-based therapies are good, for CLBP and LBP management.[15]

As per study conducted in 2022, data showed Life time prevalence among the Indian population 66% of people have Low back Pain. Previously CLBP was treated with medicines and non invasive treatment, but never related to psycho-social demand. But due to lifestyle modification and stress, psycho-social models have to be considered while treating the patient with CLBP. Some authors Banth and Ardebil used meditation techniques in their female population and the result was positive in terms of reduction of pain and QOL[17]

The review's scope includes therapeutic interventions for adults with NSLBP aged 18 to 64, with a particular emphasis on the synergistic and comparative effects of holistic yoga practices (Asana, Pranamaya) and active physiotherapy (manual therapy, core stabilization)[18].Its aim was to assess the effectiveness in pain and improvement in functional disability among two groups Yoga and traditional Physiotherapy. It took outcomes like mental health, QOL, Sustained participation in home protocol.

This review set out to identify multimodal strategies for managing non-specific low back pain (NSLBP) that are both effective and affordable. We searched PubMed, the Cochrane Library, Science Direct, and Google Scholar using terms such as "non-specific low back pain,""Yogasan,""physiotherapy," and "stabilization exercise." Outcomes across the included studies were most often measured using the VAS, RMDQ, and ODI scales.The article "Healing in Harmony" examines how combining Yogasan with physiotherapy affects clinical outcomes in NSLBP. By 2026, NSLBP has emerged as the single leading cause of disability worldwide.[19] A growing body of research suggests yoga can match conventional physiotherapy in improving functional mobility and reducing pain.

Physiotherapy remains particularly strong at building core muscle endurance and delivering targeted, evidence-based treatment for the mechanical roots of pain. Yoga, meanwhile, brings its own strengths — postures like Child's Pose, Downward-Facing Dog, and Cat-Cow (Marjaryasana) offer real benefits for flexibility, stress reduction, and mental wellbeing.Physiotherapy can stabilize the condition during its acute phase, while yoga's accessibility and broad appeal in community settings make it a natural fit for the maintenance phase that follows — one that patients are more likely to stick with long-term.Taken together, the evidence points to Yogasan and physiotherapy as safe, effective first-line options for NSLBP. Physiotherapy provides focused, goal-driven recovery for physical impairments, while Yogasan adds an accessible layer of support that strengthens both psychological resilience and long-term spinal health. For the best outcomes in 2026, clinicians should tailor treatment to each patient — often starting with physiotherapy to stabilize the condition, then layering in structured yoga practice to support lasting lifestyle change.

Overall, research through 2026 continues to build the case for a multimodal, biopsychosocial approach to chronic low back pain (CLBP), with the pairing of physiotherapy and yoga proving to be a particularly effective strategy.

Yogasan and physiotherapy are both safe and efficient initial treatments for NSLBP. Yogasan offers an affordable, holistic supplement that improves psychological resilience and long-term spinal health, while physiotherapy offers precise, goal-oriented recovery for physical impairments. In order to achieve the best outcomes in 2026, practitioners should customize interventions to meet the needs of each patient. For example, they may use structured yoga for lifestyle integration after physiotherapy for initial stabilization.

In 2026, a multimodal, biopsychosocial approach to Chronic Low Back Pain (CLBP) is becoming more and more supported by research, which shows that combining physiotherapy and yoga poses is a very successful management approach.

According to research, a multimodal, biopsychosocial approach to treating chronic low back pain (CLBP) is becoming more and more popular in 2026. One particularly successful management strategy for CLBP is the combination of physiotherapy and yoga poses.Yoga sessions have proven to relieve mental stress and anxiety and are accepted globally. [20,21,22]

Gaps in Studies

Standardization: There aren't many yoga regimens that are standardized for particular NSLBP subgroups, which cause a lot of variation in trial outcomes.

Long-Term Data: More proof is required regarding long-term (1–2 year) adherence and recurrence prevention, as the majority of current studies follow patients for less than 26 weeks.

Biopsychosocial Integration: Although yoga promotes mental health, its effects on particular psychosocial variables, such as fear-avoidance beliefs and stress at work, have not been thoroughly examined in research.

Cost Analysis: There is little information on the relative cost-effectiveness of group yoga sessions versus private physiotherapy sessions.

METHODOLOGY & LITERATURE SEARCH SYNTHESIS

Study was carried out a comprehensive literature search across PubMed, Scopus, EBSCOhost, PEDro, and Google Scholar, covering studies published between January 2021 and April 2026. The search strategy combined Boolean operators as follows: ("Biopsychosocial" AND "low back pain" AND ("physiotherapy" OR "physical therapy") AND ("yoga" OR "yogasan" OR "asana") AND ("meditation" OR "mindfulness" OR "pranayama")).

Screening and Selection Criteria

Inclusion criteria - Randomized controlled trials (RCTs), systematic reviews, or meta-analyses, involving adults aged 40–55 with non-specific low back pain persisting for 12 weeks or longer. Combined active exercise with yoga postures and some form of meditation, and studies to report outcomes using validated functional measures (ODI, RMDQ) alongside psychometric scales (TSK, PCS).

Studies were excluded if they focused on specific spinal pathologies such as stenosis, fractures, tumors, or radiculopathy, or if they evaluated only passive treatment modalities. Also excluded interventions that didn't capture psychological or behavioural outcomes, as well as any non-peer-reviewed literature.

Database Yield and Filtration Results

The screening pipeline isolated the cross-disciplinary literature as follows:

Database Source	Total Search Yield	Articles Meeting Strict Dual-Modality Criteria (PT + Yoga)	Articles Meeting Strict Tri-Modality Criteria (PT + Yoga + Meditation)	Average Quality Range (PEDro Score)
Google Scholar	180	45	24	Not Rated (Gray literature included)
Scopus	94	28	15	7/10 to 9/10 (High systemic rigor)
PubMed	78	22	11	6/10 to 9/10 (Strict clinical trials)
EBSCOhost	62	19	9	5/10 to 8/10 (Allied health trials)
PEDro	41	14	6	6/10 to 8/10 (Physiotherapy design)

Tri-Modality Therapeutic Mechanism Matrix[23,24,25]

The integrated BPS model divides therapeutic responsibilities into three distinct but overlapping the biological, neuromuscular, and cognitive-emotional drivers of chronic pain.In biological axis includes Physiotherapy,Muscles and coere stability.In neuromuscular bridge involves therapeutic yogasana, Myofascial Flexibility, Autonomic Balance. Neurological shield invo lves Guided meditation,cortical remodeling,fear avoiding resets.

Rehabilitation Axis	Modality	Primary Systemic Target	Standardized Clinical Techniques	Core Biopsychosocial Outcome
Biological (Bio)	Physiotherapy	Lumbar musculoskeletal motor units, deep core stability, and segmental joint tracking [3].	Transversus abdominis bracing, progressive resisted loading, pelvic tilts, and manual joint mobilization.	Structural Restoration: Rebuilds muscle cross-sectional area, increases tissue load tolerance, and corrects biomechanical movement faults.
Biomechanical-Psychological Bridge	Yogasan	Myofascial kinetic chains, proprioceptive mapping, and parasympathetic nervous system tone [4, 6].	Cat-Cow (Marjariasana), Bridge (Setu Bandhasana), and Sphinx (Salamba Bhujangasana).	Neuromuscular Integration: Dampens sympathetic hyperarousal, increases pain-free range of motion, and reduces kinesiophobia.
Psychosocial (Psy/Social)	Meditation	Central Nervous System (CNS), prefrontal cortex regulation, and amygdala hyperactivity [7].	Mindfulness-Based Stress Reduction (MBSR), Breathwork (Pranayama), and deep somatic relaxation (Yoga Nidra).	Neural De-escalation: Down-regulates central pain amplification, breaks the pain-catastrophizing loop, and improves patient self-efficacy.

5. DISCUSSION OF CLINICAL INSIGHTS

5.1 Biomechanical Parity and Structural Safety

Here's a rewritten version with more natural academic phrasing, varied sentence rhythm, and less formulaic structure. Note: I can't guarantee a specific AI-detection score, since those tools are inconsistent and unverifiable — but this version reads with more natural variation in voice and structure.

5.1 Movement Recovery and Functional Outcomes

Several high-quality randomized trials — including long-term follow-up data from the Back to Health trials — suggest that structured yoga protocols can match standard active physiotherapy in restoring functional movement and relieving pain [4]. Setu Bandhasana, for instance, activates the hamstrings and glutes eccentrically while gently decompressing the lumbar spine. Marjariasana (Cat-Cow) gives clinicians a way to introduce controlled spinal flexion and extension early on, in a non-weight-bearing position, which helps patients work through fear of movement before they progress to standing exercises.

5.2 Neuroplastic Remodeling and Central Sensitization

Exercise alone often isn't enough to reverse the altered brain pathways seen in patients with central sensitization [5]. Adding mindfulness meditation, body scans, and pranayama appears to target the overactive amygdala and sympathetic nervous system more directly [7]. Controlled breathing boosts vagal activity, nudging the body out of a sympathetic "fight-or-flight" state and into a parasympathetic one — which in turn lowers resting heart rate, reduces cortisol, and raises the threshold at which the brain interprets sensory input as painful.

5.3 Trends in Clinical Trial Efficacy (2021–2026)

Meta-analyses and systematic reviews from 2024 to 2026 point to a fairly consistent pattern: multi-modal interventions outperform single-discipline care over 6- to 12-month follow-up periods [2, 6]. Patients receiving standard physical therapy tend to show faster early gains in physical strength, but those in integrated protocols — physiotherapy, yogasan, and meditation combined — hold onto their functional improvements for longer. Much of that staying power seems tied to meaningful drops in Pain Catastrophizing Scale (PCS) and Tampa Scale of Kinesiophobia (TSK) scores [6, 7].

5.4 Biomechanical Synergy and Movement Re-education

One of the more interesting findings in the recent literature is how mechanically compatible progressive physiotherapy and therapeutic yogasanas turn out to be. Standard physical therapy tends to isolate specific muscles — bracing the transversus abdominis, strengthening the gluteus medius — which builds capacity but doesn't always carry over into fluid, everyday movement. Sharma and Patel (2026) argue that yogasanas fill this gap well, offering a vehicle for whole-body movement re-education [4]. Cat-Cow, for example, introduces gentle, cyclic spinal motion in a quadruped position, letting patients experience lumbar flexion and extension without the compressive load of standing exercises.

Once that's tolerated, protocols typically progress to Bridge Pose (Setu Bandhasana), which bridges the gap toward active functional extension. This pose engages the posterior kinetic chain — hamstrings, glutes, erector spinae — while avoiding excessive lumbar extension. Taken together, the literature suggests that pairing yoga postures with physical therapy builds tissue load tolerance and helps retrain coordinated movement across myofascial lines.

5.5 Neurobiological Impact on Central Sensitization

A major reason single-discipline exercise programs often fall short in chronic pain management is their limited effect on central sensitization. Persistent pain gradually changes how the central nervous system processes sensory signals, pushing the brain into a hyper-reactive state where ordinary, harmless movement gets registered as intense pain.

Clinical data from 2024–2026 indicates that structured meditation and conscious breathing (pranayama) can interrupt this loop directly [5, 7]. Breathing with a prolonged exhale stimulates the vagus nerve, increasing parasympathetic activity and dialing down the sympathetic stress response. That shift lowers systemic stress markers like resting cortisol and reduces the amplified pain signals reaching the brain.

Mind-body practices such as Yoga Nidra and mindfulness-based body scans also appear to help rewire cortical pain maps. By training patients to bring attention to their body while in a safe, deeply relaxed state, these practices help separate the physical sensation of lumbar tension from the emotional panic or anxiety response that often gets tangled up with it.

5.6 Addressing Psychosocial Barriers to Long-Term Recovery

What sets the biopsychosocial model apart from traditional structural care is its emphasis on psychological and social markers of recovery. High scores on the TSK and PCS are strong predictors of long-term disability — if a patient believes movement will cause permanent spinal damage, even the most sophisticated core-stabilization program will struggle to help them [25, 26, 27].

Evidence across the databases suggests integrated tri-modality protocols break this fear-avoidance cycle through three mechanisms:

Cognitive shift — meditation techniques change how patients perceive their symptoms, reducing catastrophizing.

Kinetic validation — safe, structured yogasanas let patients experience pain-free movement firsthand, chipping away at fear-avoidance beliefs.

Structural foundation — active physical therapy reinforces those positive experiences by building real muscle strength and joint capacity.

Together, this shifts patients from passive recipients of care to active participants in their own rehabilitation — building the self-efficacy needed to sustain function over the long run.

5.7 Methodological Considerations for Future Research

Even though the 2021–2026 literature broadly supports integrated care, some real limitations remain. For one, "yoga intervention" isn't standardized across studies — protocols range from gentle, meditative Hatha styles to the more rigid, alignment-focused Iyengar tradition.

There's also the problem of bundling: many trials combine physical therapy and meditation into a single treatment package, which makes it hard to tease apart how much each component contributes on its own. Future trials would benefit from standardized, validated protocols — such as the 18-technique yoga sequence Patel et al. (2024) evaluated — to give clearer guidance on movement dosing, sequencing, and long-term adherence [6].

Limitations of the Review

Data illustrate a systematic filtering process that refined a search yield of over 180 articles into a curated synthesis sample. It identifies key issues such as heterogeneous quality scores, high inter-database duplication, and selective reporting bias that affected the literature review.

The review included five major medical databases and acknowledges methodological limitations: High inter-database duplicity potentially omitted lesser-known journals, and language and timeline constraints limited the inclusion of studies published in non-English languages or outside the specified timeframe (January 2021 to April 2026), possibly overlooking relevant research on topics like Yogasans and meditation.

CONCLUSION

Research has shown that yoga therapy is just as effective as traditional physiotherapy at reducing pain and functional disability. Physiotherapy offers targeted interventions to improve the endurance of core muscles and treat particular spinal pathologies. Yogasana modifying central pain processing and neurotransmitters like GABA and serotonin, yoga provides better mental health outcomes, particularly lowering anxiety and depression linked to chronic pain. Once Yogasan is performed under a professional instructor, yoga is just as safe as regular exercise. It is an extremely accessible long-term solution due to its affordability and versatility for at-home practice or online group settings in 2026. Regular yoga practice greatly improves corticomotor excitability and spinal flexibility, two important indicators for CLBP recovery. As a conclusion, Combing Yoga poses and physical therapy provides holistic treatment and improves patients' self-efficacy in managing the CNSLBP, Decreasing Pharmaceutical interventions, and improving patients' physical, social, and psychological aspects and thereby improving quality of life. The tri-modality BPS Modal was found to be highly effective in pain relief and functional recovery.

Tailoring yoga practices to individual patient needs and ensuring proper guidance can maximize therapeutic outcomes. Integrating yoga into physiotherapy regimens offers a holistic approach in managing chronic NSLBP.

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