The Efficacy of Herbal Drug Interventions, Yogic Therapy and Lifestyle Modifications in Alleviating Chronic Low Back Pain

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Abstract: *Low back pain (LBP) is a prevalent condition affecting millions worldwide. It is a prevalent musculoskeletal disorder that significantly impacts quality of life and work productivity. Conventional treatments often involve analgesics, physical therapy, and invasive procedures, but alternative approaches such as herbal interventions, yogic therapy, and lifestyle modifications have gained attention for their holistic benefits. This review explores the efficacy of these integrative therapies in alleviating CLBP. Herbal interventions, including anti-inflammatory and analgesic herbs like Nyctanthes arbor-tristis (Parijat), Moringa Oleifera (Sahjan), Vitex negundo (Nirgudi), Withania somnifera (Ashwagandha), and Pluchea lanceolata (Rasana), have shown promise in reducing pain and inflammation. These botanicals modulate inflammatory pathways, improving musculoskeletal function with minimal side effects. Yogic therapy, incorporating asanas, pranayama, and meditation, enhances spinal flexibility, strengthens core muscles, and reduces stress-related pain exacerbation. Scientific studies highlight yoga's role in improving functional mobility and pain perception in CLBP patients. Additionally, lifestyle modifications, such as posture correction, ergonomic adaptations, dietary optimization, and stress management, contribute to long-term pain relief and prevention. Integrative approaches that combine these interventions have demonstrated superior outcomes compared to standalone treatments.*

Keywords: *Chronic Low Back Pain, Herbal Medicine, Integrative Medicine, Yogic Therapy, Lifestyle Modifications*

1. Introduction: People experience Lower back pain (LBP) as a common musculoskeletal disorder. While modern medicine offers pain relievers and physical therapy, Yoga and Ayurveda provide a holistic approach to addressing the root causes of pain, improving spinal health, and preventing recurrence. Chronic low back pain (CLBP) lasts longer than three months or exceeds the average recovery time[1]. It affects people of all ages and is associated with smoking, obesity, sedentary jobs, and low socioeconomic status. An aging and expanding global population is contributing to its spread[2]. Between 70% and 80% of adults will experience

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CLBP At some point in their life[1]. Women have a roughly 50% greater prevalence of CLBP compared to men[2]. Research shows that 23% of adults worldwide experience persistent low back pain, with a 24%–80% recurrence rate. CLBP diagnosis and treatment require multidisciplinary care. Microsocial treatment is the best for non-specific CLBP[3]. Disability is a major issue in CLBP because it affects physical performance and job productivity[4]. Chronic pain makes physical activity difficult. Chronic pain and mental illness often co-occur. Without treatment, these disorders can cause serious disability and a lower quality of life[5]. Depression and anxiety are the most common co-occurring illnesses with chronic pain. Anxiety, pain, and depression cause clinical depression.

Scientific studies show that yoga can improve spinal mobility and reduce pain, analgesic use, and disability[6]. Numerous studies have shown that yoga is safe and effective for musculoskeletal issues, reducing pain and improving function[7]. Yogic lifestyle modification is more effective than exercise at treating chronic low back pain. Yoga is more therapeutic than physical therapy[8]. Yoga improves spinal flexibility and strength, helping low back pain sufferers[9]. Mental functioning, pain catastrophizing, pain acceptance, and joint and muscular flexibility can also improve.

Causes of Low Back Pain

Low back pain (Katishoola) is a general condition in both Ayurveda and modern medicine. Below is a comparison of the causes according to both perspectives:

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I. Causes of Low Back Pain in Ayurveda

The oldest Indian medical system defines low back pain as the most common symptom of musculoskeletal disorders, called Kati Soola in Ayurveda[1]. Because Vata Dosha is activated, this illness affects the musculoskeletal system. Shleshmadhara Kala (joint between vertebrae) secretes Shesmaka Khapa to lubricate and reduce friction during vertebral column movements[2]. Kati Soola signs of several musculoskeletal diseases, including Vataja Shoola, Trika Vedana, Prushta Shools, Kat Vayu, Trika Graha, and Grudrasi Vata. Common reasons:

A. Dosha Imbalance[3]

- **Vata Dosha (Air & Ether Element)** – Dryness, degeneration, and nerve irritation.
- **Kapha Dosha (Water & Earth Element)** – Stiffness and heaviness.
- **Pitta Dosha (Fire Element) -** Inflammation and burning sensations.

B. Nidana (Causes)[4]

- **Ajeerna (Indigestion & Poor Digestion)[5]** – This leads to Ama (toxins), causing stiffness and pain.
- **Dhatukshaya (Tissue Degeneration)** – Loss of bone mass (Asthi Kshaya) or muscle weakness (Mamsa Kshaya).
- **Sandhigata Vata (Osteoarthritis-like condition)** – Degeneration of joints and vertebrae.
- **Gridhrasi (Sciatica)** – Radiating pain due to nerve compression.
- **Agantuja (External Causes)** – Trauma, improper posture, excessive lifting.
- **Vyayama Atichar (Excessive Exercise)** – Overuse of muscles and ligaments.
- **Shayyasana Dosha (Wrong Sitting & Sleeping Posture)** – Prolonged sitting, soft mattresses, or poor posture.
- **Mental Stress (Manasika Nidana)** – Anxiety and stress aggravate Vata, leading to tension and stiffness.

II. Causes of Low Back Pain in Modern Science

Modern medicine classifies low back pain into mechanical, inflammatory, infectious, and systemic causes:

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A. Mechanical Causes[1]

- **Muscle Strain or Ligament Sprain** – Overstretching or tearing of muscles/ligaments.
- **Herniated Disc (Slipped Disc)** – Nerve compression due to displacement of spinal discs.
- **Degenerative Disc Disease** – Age-related wear and tear of intervertebral discs.
- **Spinal Stenosis** – Narrowing of the spinal canal, causing nerve compression.
- **Facet Joint Dysfunction** – Arthritis in spinal joints.
- **Spondylolisthesis** – Vertebral displacement leading to instability.

B. Inflammatory[2] **& Autoimmune**[3] **Causes**

- **Ankylosing Spondylitis** – Chronic inflammation affecting the spine.
- **Rheumatoid Arthritis** – Autoimmune attack on joints causing pain and stiffness.

C. Infectious & Systemic Causes[4]

- **Osteomyelitis (Spinal Infection)** – Bacterial infection affecting vertebrae.
- **Tuberculosis (Pott's Disease)** – TB infection of the spine leading to vertebral destruction.
- **Kidney Stones & Urinary Tract Infections (Referred Pain)** – Pain radiating to the lower back.

D. Neurological[5] **Causes**

- **Sciatica (Gridhrasi in Ayurveda)** – Nerve pain due to disc herniation or compression.
- **Cauda Equina Syndrome** – Compression of the lower spinal nerves, requiring urgent treatment.

E. Lifestyle-Related Causes[6]

- **Poor Posture & Sedentary Lifestyle** – Prolonged sitting leads to muscle weakness and strain.
- **Obesity** – Excess weight puts pressure on the spine.
- **Smoking & Poor Nutrition** – Reduces blood supply, slowing tissue repair

2. Herbal Drug Compounds for Low Back Pain

Herbal medicine plays a crucial role in the management of LBP due to its anti-inflammatory,

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analgesic, and muscle-relaxant properties. Some key herbal compounds include:

I. **Nyctanthes arbor-tristis (Parijat)**[1] - Ayurvedic practitioners use Harsingar leaves for inflammatory conditions due to their anti-inflammatory properties. The water-soluble fraction of the ethanol extract exhibited significant anti-inflammatory activity against acute inflammatory edema in rats caused by carrageenin, formalin, histamine, 5-hydroxytryptamine, and hyaluronidase. Turpentine oil-induced knee joint inflammation in rats was significantly reduced by the extract.

II. **Moringa Oleifera (Sahjan)**[2]**-** The scientific literature reports antibiotic, antitrypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypocholesterolemic, and hypoglycemic effects of moringa extracts, decoctions, creams, oils, powders, and porridges. HIV/AIDS treatment might include moringa powder as an immune stimulant. Folk medicine uses moringa flowers, leaves, roots, and seeds to treat various tumors, including abdominal tumors.

III. **Ashwagandha (Withania somnifera)**[3] - Chronic non-specific lower back pain has led to increased interest in botanical products to reduce pain and improve function. There is little evidence that herbal medicine helps back pain. Has adaptogenic and anti-inflammatory properties that reduce pain and stress-induced muscle tightness.

IV. **Nirgundi (Vitex negundo)**[4,5] - Vitexin and flavonoids control neutrophil and macrophage recruitment and activation to reduce inflammation. Vitexin decreases leukocyte migration in RAW 264.7 mice and decreases TNF-α, IL-1β, and NO release in the peritoneal cavity of lipopolysaccharide-challenged mice. Vitexin reduces p-p38, p-ERK1/2, and p-JNK in LPS-elicited cells. Lignin in V. negundi reduces inflammation. VN leaf oil inhibits COX-2 without affecting COX-1 and is potently anti-inflammatory. Casticin from V. rotundifolia and V. agnus-castus reduces inflammation in vivo. Whole-body C57BL/6 mice were exposed to mainstream cigarette smoke (CS) or fresh air for 2 weeks. Casticin inhibits neutrophils, macrophages, and lymphocytes and lowers BALF proinflammatory cytokines and chemokines.

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3. **Pluchea lanceolata (Rasana)[1] -** Phytochemicals, biological, and pharmacological activities of P. lanceolata, including anti-inflammatory, anti-arthritis, anticancer, muscle relaxant, CNS stimulant, anti-implantation, immunosuppressant, contraceptive, and toxicological effects, and their use in traditional systems are critically evaluated

4. **Yoga for Low Back Pain Relief**

Yoga is an ancient practice that enhances flexibility, strengthens muscles, and improves posture, thereby alleviating LBP. Some beneficial yoga postures include:

I. **Asanas (Postures):** according to hatha yogis asanas open energy channels and psychic centers, Controlling the body through these practices helps them control the mind and energy[2]. Yogasanas provided a stable foundation for exploring the body, breath, mind, and higher states. It improves spinal flexibility, lower back tension, back muscle stretching and strengthening, lower back and circulation, spine and core muscle strengthening. According to yoga scriptures, there were 8,400,000 asanas, representing the 8,400,000 incarnations each person must go through before liberation from birth and death. Through these asanas, life evolved from its simplest form to that of a fully realized human. Famous rishis and yogis have modified and reduced the number of asanas to a few hundred. They can avoid karmic cycles and skip many evolutionary stages in one lifetime through practice. Only the 84 most useful of these few hundred are discussed. There are some asanas described that play a crucial role in Katishool (LBP) Patients. Tadasana (Palm tree pose), Tiryaka Tadasana (Swaying Palm Tree Pose), Advasana (Reverse Corps Pose), Marjhari Asana (Cat Pose with Movement), Bhujangasana (Cobra Pose), Ardh Shalabhasana (Half Locust Pose), Shalbhasan (Locust Pose), Viprit Naukasana (Reverse Boat Pose), Dhanurasana (Bow pose), Makarasana (Crocodile pose), Setubandhasana (Bridge Pose), Matsyasana (Fish pose) and Supta Udarakarshanasana (Sleeping Abdominal Stretch Pose).[3]

II. **Pranayama (Breathing Techniques):** The body's most vital process is breathing. It affects every cell and, most importantly, brain function. Humans breathe 15 times per minute, 21,600 times daily. Respiration burns oxygen and glucose to power every muscle contraction, glandular secretion, and mental process. The breath is central to all human experience.[4] Most people breathe improperly, using only a small portion of their lung capacity. Breathing becomes shallow, depriving the body of oxygen and prana needed for health. This section begins with five breathing exercises to teach proper breathing. They also draw attention to breathing, which is often overlooked. Practitioners increase vital capacity and prepare for pranayama by becoming sensitive to the respiratory process and

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retraining pulmonary cavity muscles. Calm, contentment stimulates rhythmic, deep, slow respiration. Irregular breathing disrupts brain rhythms and causes physical, emotional, and mental blocks. These cause inner conflict, personality imbalance, lifestyle disorders, and disease. Pranayama reverses this negative cycle by establishing regular breathing patterns. It does so by controlling the breath and restoring gentle body and mind rhythms. Anulom-Vilom (Alternate Nostril Breathing), Bhramari (Humming Bee Breath), and Ujjayi Pranayama (The Psychic Breath) pranayama described which are playing a crucial role in Katishool (LBP) Patients. It affects people as Calms the nervous system and balances Vata reduces stress, and relaxes spinal tension.

III. **Meditation & Relaxation:** All meditation practices aim to control attention and emotions. Here meditation is divided into two types: concentrative and mindfulness. Concentrative meditation involves focusing on an image or mantra without distractions. Mindfulness meditation emphasizes present-moment awareness and open, non-judgmental awareness. Clinicians have used these meditation practices for fibromyalgia, migraine, chronic pelvic pain, irritable bowel syndrome, cancer-related pain, and chronic low back pain. Yoga Nidra (Deep Relaxation with full body scan) also plays a crucial role among lower back patients as helps reduce stress-induced back pain

5. Lifestyle Modifications for Long-Term Relief

Lifestyle modifications play a crucial role in achieving long-term relief from various chronic conditions, including metabolic disorders, cardiovascular diseases, and mental health issues. This paper explores the significance of sustainable lifestyle changes, such as balanced nutrition, regular physical activity, stress management, and adequate sleep, in promoting overall well-being[1]. It also highlights the impact of unhealthy habits, such as poor dietary choices, sedentary behaviour, and chronic stress, on long-term health deterioration. Evidence-based strategies, including mindful eating, structured exercise programs, and behavioural interventions, are discussed to emphasize their effectiveness in disease prevention and management. By adopting personalized and consistent lifestyle modifications, individuals can enhance their quality of life, reduce dependence on medications, and achieve long-term health benefits[2].

Implementing lifestyle modifications can significantly reduce the recurrence of LBP. Key recommendations include[3]:

- **Posture Correction** - Maintaining proper spinal alignment while sitting, standing, and sleeping to reduce strain on the lower back.

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- **Regular Exercise** - Incorporating stretching, strength training, and low-impact activities like walking to enhance muscle support.
- **Ergonomic Adjustments** - Using supportive chairs, proper desk setup, and avoiding prolonged sitting to prevent postural imbalances.
- **Balanced Diet** - Consuming anti-inflammatory foods like fresh fruits, vegetables, nuts, and herbal teas to reduce inflammation.
- **Stress Management** - Practicing meditation, deep breathing, and relaxation techniques to prevent stress-induced muscle tension.

6. Conclusion: Yoga and Ayurveda offer a natural, side-effect-free approach to managing low back pain by addressing its root causes. A combination of Ayurvedic therapies, herbal remedies, Yoga postures, and lifestyle modifications can help in long-term pain relief and overall spinal health. Traditional healing approaches, including herbal medicine, yoga, and lifestyle modifications, have been used for centuries to manage and alleviate LBP. These methods not only address the symptoms but also work on the root causes, promoting overall well-being. Despite growing evidence, more rigorous clinical trials are necessary to standardize herbal formulations, yoga protocols, and lifestyle guidelines. A multidisciplinary approach integrating traditional wisdom with modern medical insights may offer sustainable and cost-effective solutions for CLBP management. This study underscores the need for further research and awareness to validate and implement these interventions for broader clinical acceptance.

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