

Effectiveness of Yoga Therapy (A Mind-Body Medicine) in Prevention and Management of Chronic Low Back Pain (CLBP): A Review Based on Evidence

Running title: Yoga for chronic low back pain

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Abstract: Back pain is an increasing economic and health problem affecting nearly 80% of the general population. Healthcare costs for low back pain (LBP) are increasing rapidly. Hence, it is important to provide effective and cost-effective treatments. Patients with CLBP are often unsatisfied with conventional medical treatment and seek complementary and alternative therapies, such as massage, acupressure, and other mind-body techniques. Mind-body techniques, such as yoga, tai chi, sensory awareness, body awareness therapy, and breath therapy are said to help patients with low back pain by enhancing body awareness. Yoga plays a significant role in enhancing one's psychological and physical health. Many CLBP patients seek relief using complementary therapies such as yoga. For this review, 12 randomized controlled trials (RCT's) have been reviewed from different databases. Details of the all RCT which suggest the management and prevention of CLBP through yoga are mentioned in the text. Based on the available researches, it appears that yoga is the most effective treatment approach to low back pain when comparing other CAM treatments.

Keywords: CLBP; Yoga therapy; RCT; Pain; Flexibility; Stress.

1. Introduction

In recent years, back pain is becoming a common health problem in general population.[1] Because of the evolutionary adaptation, the human spine gives troubles in 80% of the general population at a certain moment of life.[2] Low back pain (LBP) is an increasing economic and health problem affecting around 80% of the general population.[3]

Chronic low back pain (CLBP) is defined as the pain that persists longer than twelve weeks and is often attributed to degeneration of the spine.[4] Prolepses of intervertebral disc are the most common cause of compression of the spinal cord and nerve roots. Prolapse is more common in the lumbar region usually below the level of the spinal cord that is below L2, so the injury is to the nerve roots only.[2] Nonspecific chronic low back (nCLBP) pain is prevalent among adult population and often leads to functional limitations, psychological symptoms, lower quality of life, and higher healthcare costs.[5]

The most common reasons for back pain are the incorrect postures and constant feeling of restlessness of mind and psychological-emotional strain.[2] Apart from this injury, infection and tumor in back can be the possible causes of low back pain. Four major factors responsible for increasing problem of back pain are: a. muscles are weaker than our ancestors, b. wrong muscles are overworked, c. repeated injuries due to unused exercise and d. psychological stress.[6]

Most people have experienced back pain sometime in their life. The causes of back pain are numerous, some are due to

bad habits. Other back pain causes include accidents, muscle strains, and sports injuries. Although the causes may be different, most often they share the same symptoms. Symptoms of back pain include persistent aching or stiffness anywhere in the spine, inability to stand straight without having pain or muscle spasms in the lower back.

For the diagnostic purpose, medical history and a thorough physical examination are necessary. The doctor may test reflexes and sensation using a pin or other sharp object to assess any loss of sensation in the legs. Spinal X-rays are also used to check the curve of the spine. For analyzing soft-tissue damage such as disk herniation, magnetic resonance imaging (MRI) may be needed. Magnetic resonance imaging (MRI) is a well-documented diagnostic technique for the study of degenerative disc disease.[7-9]

2. Complementary and alternative medicine (CAM)

Healthcare costs for low back pain (LBP) are increasing rapidly. Hence, it is important to provide effective and cost-effective treatments.[10] Patients with CLBP are often unsatisfied with conventional medical treatment [11] and seek complementary and alternative therapies, such as massage, acupressure, *panchkarma*, and mind-body techniques.[12,13] Mind-body techniques, such as yoga, tai chi, sensory awareness, body awareness therapy, and breath therapy are said to help patients with low back pain by enhancing body awareness.[14,15]

Complementary and alternative medicine (CAM) is commonly used to treat back pain, but little is known about factors associated with the improvement.[16] Using a nationally representative survey, analyses documented that the majority of respondents who used CAM for back pain perceived great benefit.[16] Back pain is the second most common reason for which patients seek ambulatory medical care in the United States of America. CAM is used by 40 percent to 60 percent of the population every year, and back pain is the most common medical condition for which people use CAM .[16]

3. Summary of randomized controlled trials (RCT's) which suggest the management and prevention of CLBP through yoga

Yoga plays a significant role in enhancing one's physical as well as psychological health. Recent research also suggests that yoga is effective for dealing with many chronic health conditions such as cardiovascular disease,[17] diabetes,[18] cancer,[19] anxiety and stress,[20] migraine,[21] musculoskeletal discomfort & motor functions [22] and chronic low back pain.[23] Many CLBP patients seek relief using complementary therapies such as yoga.[24,25] The results of the following RCTs indicate that yoga may be an effective treatment for CLBP. The strongest and most consistent evidence emerged for the short-term benefits of yoga on functional disability.[26] Iyengar yoga was also found to be beneficial for the management of chronic low back pain.[5,27]

Randomized controlled trials have demonstrated that yoga is an effective treatment for reducing pain and improving functions in adult with chronic low back pain.[28] Based on the available researches, it appears that yoga is the most effective nonphysician-directed treatment approach to nonspecific low back pain when comparing it with the other CAM methods.[29]

In a study, 74 participants ages ranged between 25 and 64 years were randomized equally into a yoga and control group.[30] Yoga group received one 50 minute Dru Yoga session (including activation exercise, energy block release movements, postures and relaxation) each week for 8 weeks and a 20 minutes DVD for home practice while control group received no intervention. In comparison to the control group, the yoga group reported significant reduction in perceived stress and back pain, and a substantial improvement in psychological well-being. In a pilot randomized controlled trial, *Hatha yoga* was found more effective than usual care.[31] 30 adults (ages between 18 and 64 years) with moderate to severe chronic low back pain were randomized into a standardized 12-week protocol of *hatha* yoga classes and a usual care waitlist control group. Yoga participants had statistically significant greater reduction in pain intensity and pain medication use at 12 weeks compared to individuals receiving usual care only.

In another randomized trials, yoga therapy was found more beneficial. 228 adults with chronic low back pain were randomized to 12 weekly classes of yoga (92 patients) or conventional stretching exercises (91 patients) or a self-care book (45 patients).[32] A series of 12 standardized, weekly

75-minute yoga and stretching classes, were held in group health facilities. Participants were asked to practice 20 minutes on non class days and were given handouts and CDs (yoga) or DVDs (stretching) to assist in this. Each class included breathing exercises, 5 to 11 postures (lasting approximately 45-50 minutes), and guided deep relaxation. Here yoga classes were found more effective than a self-care book, but not more effective than stretching classes, in improving function and reducing symptoms due to chronic low back pain, with benefits lasting at least several months.

101 adults between 20 and 64 years with chronic low back pain were randomized in three groups that are yoga, exercise and self-care book to determine whether yoga is more effective than conventional therapeutic exercise or a self-care book for patients with chronic low back pain.[33] 12-week sessions (75 minutes per classes) of *vini yoga* or conventional therapeutic exercise classes or a self-care book were provided as the intervention to the respective group. Back-related function in the yoga group was found superior to the book and exercise groups at 12 weeks.

313 adults having ages between 18 and 65 years with chronic or recurrent low back pain were recruited for a randomized controlled trial to compare the effectiveness of yoga ($n=156$) and usual care ($n=157$).[34] All participants received a back pain education booklet and the intervention group was offered a 12 class, gradually progressing yoga program over 3 months (twelve 75-minutes classes, 1 class per week). The yoga group had better back function at 3, 6, and 12 months than the usual care group. Two participants out of the 157 usual care participants and 12 out of the 156 yoga participants reported an adverse event that is in terms of increased pain.

To evaluate selected yogic procedures on individuals with low back pain, twelve patients were randomly divided into two groups, yoga and control group.[35] Yogic intervention revealed 79 percent relief in both subjective and objective parameters. In a matched case-control study, magnetic resonance imaging showed that the group of long-term practitioners of yoga (with teaching experience of more than 10 years) had significantly less degenerative disc disease than a matched control group.[36] In a randomized dosing trial, 12 weeks of once-weekly or twice-weekly yoga classes were found similarly effective for predominantly low income minority adults with moderate to severe chronic low back pain.[28]

In a study, one week of a residential intensive yoga-based lifestyle program reduced pain related disability and improved spinal flexibility (in terms of spinal flexion, spinal extension, right lateral flexion and left lateral flexion) in patients with CLBP better than a physical exercise in 80 patients.[37] In another study 80 patients (ages between 18 and 60 years) with chronic low back pain were randomized into two groups (40 in each).[38] The yoga group practiced a specific module for CLBP (residential short term intensive yoga program) comprising of *asanas* (physical postures), *pranayama* (breathing practices), meditation and lectures on yoga philosophy while the control group practiced physical therapy exercises. Quality of life and spinal flexibility was found better in the yoga group than physical therapy

exercises. Spinal flexibility was found better after LSP (*laghu shankha prakshalana*, a yogic colon cleansing technique) than BST (Back pain special technique) sessions in a self as control study on 40 in-patients between 25 and 70 years with CLBP.[39]

Psychological distress such as anxiety, depression, and somatization were found more prevalent in LBP patients (ages 15-65 years) compared to patients without LBP in a cross-sectional survey study.[40] Seven days intensive residential yoga program also reduced pain, anxiety, depression and improves spinal mobility in patients with CLBP than physiotherapy exercises.[41]

4. Mechanisms underlying the effects of yoga

Yoga reduces chronic spinal pain, one reason might be that the stretching and positioning of the spine that occur during yoga exercises decrease the gradual disc degeneration that occurs with age. It might also be because the decreased weight bearing during yoga practice lessens the stress on the spine. Yoga may benefit back pain patients because it involves exercise or because of its effects on mental focus. Yoga includes physical movements, but it is a complex intervention involving other components such as specialized use of the breath and relaxation.[42] Mind-body techniques, such as yoga, tai chi, sensory awareness, body awareness therapy and breath therapy are said to help patients with low back pain by enhancing body awareness.[14,15] Yoga techniques involving slow body movements followed by practices of deep relaxation are useful in maintaining the strength and flexibility of the spine.[6] Deep relaxation is a powerful mind-body technique that works on the mental level by reducing agitation and quieting the mind, which in turn, reduces activity in the sympathetic nervous system while activating the parasympathetic system.[2]

5. Conclusion

After reviewing all the randomized controlled trials on yoga for chronic low back pain, it can be concluded that practice of yoga in expert supervision is an effective mind-body medicine that can help in pain and stress reduction. Apart from this, regular and long term practice of yoga with general precautions provides better psychological well-being and quality of life and that can definitely minimize the occurrence of low back pain.

References

- [1] Hoy D, Bain C, Williams G, March L, Brooks P, Blyth F, Woolf A, Vos T, Buchbinder R. A systematic review of the global prevalence of low back pain. *Arthritis Rheum.* 2012; 64(6): 2028-2037.
- [2] Agrawal P. Back-care through yoga. Lonavla, India: Shri Kaivalyadhama Ashram; 2009.
- [3] Wedderkopp N, Leboeuf-Yde C, Anderson LB, Froberg K, Hansen HS. Back pain reporting pattern in a Danish population-based sample of children and adolescents. *Spine (Phila Pa 1976).* 2001; 26(17): 1879-1883.
- [4] Shankar N, Thakur M, Tandon OP, Saxena AK, Arora S, Bhattacharya N.
- Autonomic status and pain profile in patients of chronic low back pain and following electroacupuncture therapy : a randomized control trial. *Indian J Physiol Pharmacol.* 2011; 55(1): 25-36.
- [5] Nambi GS, Inbasekaran D, Khuman R, Devi S, Shanmuganath, Jagannathan K. Changes in pain intensity and health related quality of life with Iyengar yoga in nonspecific chronic low back pain: A randomized controlled study. *Int J Yoga.* 2014; 7(1): 48-53.
- [6] Nagarathna R, Nagendra HR. Yoga for back pain. Bangalore, India: Vivekananda Yoga Research Foundation; 2011.
- [7] Fujiwara A, Tamai K, Yamato M, et al. The relationship between facet joint osteoarthritis and disc degeneration of the lumbar spine: an MRI study. *Eur Spine J.* 1999; 8(5): 396-401.
- [8] Pappou IP, Cammisa FP, Girardi FP. Correlation of end plate shape on MRI and disc degeneration in surgically treated patients with degenerative disc disease and herniated nucleus pulposus. *Spine J.* 2007; 7(1): 32-38.
- [9] Pfirrmann CWA, Metzdorf A, Zanetti M, et al. Magnetic resonance classification of lumbar intervertebral disc degeneration. *Spine.* 2001; 26(17): 1873-1878.
- [10] Lin CW, Haas M, Maher CG, Machado LA, van Tulder MW. Cost-effectiveness of guideline-endorsed treatments for low back pain: a systematic review. *Eur Spine J.* 2011; 20(7): 1024-1038.
- [11] Deyo RA, Diehl AK. Patient satisfaction with medical care for low-back pain. *Spine.* 1986; 11(1): 28-30.
- [12] Astin JA, Shapiro SL, Eisenberg DM, Forsys KL. Mind-body medicine: state of the science, implications for practice. *J Am Board Fam Pract.* 2003; 16(2): 131-147.
- [13] Cherkin DC, Sherman KJ, Deyo RA, Shekelle PG. A review of the evidence for the effectiveness, safety, and cost of acupuncture, massage therapy, and spinal manipulation for back pain. *Ann Intern Med.* 2003; 138(11): 898-906.
- [14] Ives JC. Comments on "the Feldenkrais Method: a dynamic approach to changing motor behavior". *Res Q Exerc Sport.* 2003; 74(2): 116-123.
- [15] Mueller-Braunschweig H. Psychohygiene und koerperorientierte Psychotherapie: Allgemeine Grundlagen (Psycho-hygiene and body-oriented psychotherapy: general basics). In: Buehring M, Kemper FH, eds. *Naturheilverfahren (Methods of natural healing)*. Springer: Berlin; 1992.
- [16] Kanodia AK, Legedza AT, Davis RB, Eisenberg DM, Phillips RS. Perceived benefit of Complementary and Alternative Medicine (CAM) for back pain: a national survey. *J Am Board Fam Med.* 2010; 23(3): 354-362.
- [17] Innes KE, Bourguignon C, Taylor AG. Risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga: a systematic review. *J Am Board Fam Pract.* 2005; 18(6): 491-519.
- [18] Upadhyay AK, Balkrishna A, Upadhyay RT. Effect of pranayama (voluntary regulated yoga breathing) and yogasana (yoga postures) in diabetes mellitus (DM): a scientific review. *J Compl Integr Med.* 2008; 5: 3.

- [19] Bower JE, Woolery A, Sternlieb B, Garet D. Yoga for cancer patients and survivors. *Cancer Control*. 2005; 12(3): 165–171.
- [20] Kirkwood G, Rampes H, Tuffrey V, Richardson J, Pilkington K. Yoga for anxiety: a systematic review of the research evidence. *Br J Sports Med*. 2005; 39: 884–891.
- [21] John PJ, Sharma N, Sharma CM, Kankane A. Effectiveness of yoga therapy in the treatment of migraine without aura: a randomized controlled trial. *Headache*. 2007; 47(5): 654–661.
- [22] Telles S, Dash M, Naveen KV. Effect of yoga on musculoskeletal discomfort and motor functions in professional computer users. *Work*. 2009; 33(3): 297–306.
- [23] Posadzki P, Ernst E. Yoga for low back pain: a systematic review of randomized clinical trials. *Clin Rheumatol*. 2011; 30(9): 1257–1262.
- [24] Wolsko PM, Eisenberg DM, Davis RB, Kessler R, Phillips RS. Patterns and perceptions of care for treatment of back and neck pain: results of a national survey. *Spine*. 2003; 28(3): 292–297.
- [25] Saper RB, Eisenberg DM, Davis RB, Culpepper L, Phillips RS. Prevalence and patterns of adult yoga use in the United States: results of a national survey. *Altern Ther Health Med*. 2004; 10(2): 44–49.
- [26] Holtzman S, Beggs RT. Yoga for chronic low back pain: a meta-analysis of randomized controlled trials. *Pain Res Manag*. 2013; 18(5): 267–272.
- [27] Williams KA, Petronis J, Smith D, Goodrich D, Wu J, Ravi N, Doyle EJ Jr, Gregory Juckett R, Munoz Kolar M, Gross R, Steinberg L. Effect of Iyengar yoga therapy for chronic low back pain. *Pain*. 2005; 115(1-2): 107–117.
- [28] Saper RB, Boah AR, Keosaian J, Cerrada C, Weinberg J, Sherman KJ. Comparing Once- versus Twice-Weekly Yoga Classes for Chronic Low Back Pain in Predominantly Low Income Minorities: A Randomized Dosing Trial. *Evid Based Complement Alternat Med*. 2013; 2013: 658030.
- [29] Carneiro KA, Rittenberg JD. The role of exercise and alternative treatments for low back pain. *Phys Med Rehabil Clin N Am*. 2010; 21(4): 777–792.
- [30] Hartfiel N, Burton C, Rycroft-Malone J, Clarke G, Havenhand J, Khalsa SB, Edwards RT. Yoga for reducing perceived stress and back pain at work. *Occup Med (Lond)*. 2012; 62(8): 606–612.
- [31] Saper RB, Sherman KJ, Cullum-Dugan D, Davis RB, Phillips RS, Culpepper L. Yoga for chronic low back pain in a predominantly minority population: a pilot randomized controlled trial. *Altern Ther Health Med*. 2009; 15(6): 18–27.
- [32] Sherman KJ, Cherkin DC, Wellman RD, Cook AJ, Hawkes RJ, Delaney K, Deyo RA. A randomized trial comparing yoga, stretching, and a self-care book for chronic low back pain. *Arch Intern Med*. 2011; 171(22): 2019–2026.
- [33] Sherman KJ, Cherkin DC, Erro J, Miglioretti DL, Deyo RA. Comparing yoga, exercise, and a self-care book for chronic low back pain: a randomized, controlled trial. *Ann Intern Med*. 2005; 143(12): 849–856.
- [34] Tilbrook HE, Cox H, Hewitt CE, Kang'ombe AR, Chuang LH, Jayakody S, Aplin JD, Semlyen A, Trehwela A, Watt I, Torgerson DJ. Yoga for Chronic Low Back Pain: A Randomized Trial. *Ann Intern Med*. 2011; 155(9): 569–578.
- [35] Pushpika Attanayake AM, Somarathna KI, Vyas GH, Dash SC. Clinical evaluation of selected Yogic procedures in individuals with low back pain. *Ayu*. 2010; 31(2): 245–250.
- [36] Jeng CM, Cheng TC, Kung CH, Hsu HC. Yoga and disc degenerative disease in cervical and lumbar spine: an MR imaging-based case control study. *Eur Spine J*. 2011; 20(3): 408–413.
- [37] Tekur P, Singphow C, Nagendra HR, Raghuram N. Effect of short-term intensive yoga program on pain, functional disability and spinal flexibility in chronic low back pain: a randomized control study. *J Altern Complement Med*. 2008; 14(6): 637–644.
- [38] Tekur P, Chametcha S, Hongasandra RN, Raghuram N. Effect of yoga on quality of life of CLBP patients: A randomized control study. *Int J Yoga*. 2010; 3(1): 10–17.
- [39] Haldavnekar RV, Tekur P, Nagarathna R, and Nagendra HR. Effect of yogic colon cleansing (*Laghu Sankhaprakshalana Kriya*) on pain, spinal flexibility, disability and state anxiety in chronic low back pain. *Int J Yoga*. 2014; 7(2): 111–119.
- [40] Bener A, Verjee M, Dafeeah EE, Falah O, Al-Juhaishi T, Schlogl J, Sedeeq A, Khan S. Psychological factors: anxiety, depression, and somatization symptoms in low back pain patients. *J Pain Res*. 2013; 6: 95–101.
- [41] Tekur P, Nagarathna R, Chametcha S, Hankey A, Nagendra HR. A comprehensive yoga programs improves pain, anxiety and depression in chronic low back pain patients more than exercise: an RCT. *Complement Ther Med*. 2012; 20(3): 107–118.
- [42] Sherman KJ. Guidelines for developing yoga interventions for randomized trials. *J Evid Based Complementary Altern Med*. 2012; 2012: 16 pages.