

## **Efficacy of Yoga Therapy in Chronic Low Back Pain – A Critical Review**

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**Abstract:** *Chronic back pain is a major public health and socio-economic problem worldwide. Standard pain treatments for chronic back pain are not very effective and often unsatisfactory. A lot of chronic low back pain (CLBP) patients are recommended or take help of complementary and alternative therapies including Yoga therapy.*

*Critical literature review of yielded quality papers on 'Efficacy of Yoga on CLBP. Electronic searches of Cochrane Library, EMBASE, MEDLINE, AMED (Allied and Complementary Medicine), CINAHL- Cumulative Index to Nursing and Allied Health Literature, Scopus, Zetoc and PEDro for the above purpose. Electronic searches yielded articles, pilot studies and randomised trials in the web and journals. Only non descriptive papers were selected for critical review. On the basis of the reviewed studies yoga seems to be moderately effective in improving functional disability, flexibility and in reducing symptoms and the usage of pain medications in CLBP. This review also exposes the need for higher quality yoga intervention studies for CLBP.*

**Key words:** *yoga, yogic therapy, asana, chronic back pain.*

### **Introduction**

Chronic back pain is a major public health and socio-economic problem worldwide. It has been a major reason for health care service utilization, disability and loss of working hours, also affecting the social and other activities. 70 to 85% of the adults have been estimated to suffer from back pain in their lives out of which 2-3% develop chronic disabling back pain. Back pain is termed chronic usually 12 weeks after the onset (Dagenais et al 2008, Lewis et al 2008, Maniadakis and Gray 2000). Chou et al (2007) report up to one third of the acute low back pain cases developing into chronic and one fifth growing into disability later.

Standard pain treatments for chronic back pain are not very effective and often unsatisfactory. A wide variety of complementary and alternative medicine (CAM) interventions are available for the treatment of chronic back pain including physiotherapy, back schools, self-care, massage, acupuncture, yoga, manipulation etc. (Deyo 2004, Sherman et al. 2005, Slade and Keating 2007). A lot of frustrated chronic low back pain (CLBP) patients are recommended or take help of above-mentioned CAM therapies including Yoga therapy (Chou et al 2007, Deyo 2004, Williams et al 2003).

Williams et al (2003) described Yoga as an ancient science developed around 5000 years ago in Indian subcontinent for sole purpose of liberating suffering/misery from life i.e. self-realization or enlightenment. Williams et al (2003) explained the attainment of health and overcoming diseases through the practice of yoga as just by-products because these were hindrances on the way to self-

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realization. Yoga has demonstrated many physiological benefits. Yoga is believed to work on physical, mental and spiritual levels of health though it is very distinct from physiotherapy, other exercises and psychotherapy. (Cowen et al 2005, Joshi 2004, Monro 1997). Yoga therapy is a combination of traditional yoga with modern medicine and includes yoga practices for many health problems/ diseases including chronic back pain. (Joshi 2004, Monro 1997, Nayak and Shankar 2004). The definition of Yoga therapy by Chou et al (2007) states:

An intervention distinguished from traditional exercise therapy by the use of specific body positions, breathing techniques and an emphasis on mental focus. Many styles of yoga are practiced, each emphasizing different postures and techniques.

## **Method**

**Aim:** To critically evaluate the evidence for effectiveness of yoga in chronic low back pain management.

**Literature Search Strategy:** Electronic searches of Cochrane Library, EMBASE, MEDLINE, AMED (Allied and Complementary Medicine), CINAHL- Cumulative Index to Nursing and Allied Health Literature, Scopus, Zetoc and PEDro were carried out.

**Key words:** yoga, yogic therapy, asana, chronic back pain.

**Limits:** publication year 1997 to 2010.

**Literature review:** Literatures reviewed include articles, pilot studies and randomised trials in the web and journals.

Williams et al (2003) carried out a pilot, randomized, wait-list controlled trial on effects of Iyengar (Hatha) Yoga on CLBP, with an educational control group. The inclusion and exclusion criteria were set to obtain a specific group of ambulatory patients with non-specific chronic low back pain however there were no upper limits of age set leading to a sample that were not very fit to be included in a quality study. Previous experience of yoga was not an exclusion criterion, which could have biased the outcome with positive expectations. The study does not mention whether it was approved from any ethical committee or any written consents were obtained. There were differences in baseline demographic and clinical data as the yoga group had higher functional ability, less disability, lower catastrophizing than the control group, which might have biased the results positively. The study also fails to address about the number of patients assigned to each group. The yoga group had to commit of 14 classes in 16-weeks, which was achieved by 92% of the patients excluding the dropouts. The measurements were taken with validated tools however observer was not blinded which could have biased the results positively. Significant improvements were seen in functional disability, pain level, flexibility, pain tolerance and usage of pain medication. The study also indicates at the need of longer intervention period for effectiveness of yoga in CLBP.

Jacobs et al (2004) compared Hatha (Iyengar) yoga with an educational booklet for CLBP in a pilot wait-list, randomized controlled trial (RCT). The yoga protocols designed by a panel of 8 experts and included a combination of 28 postures, which had to be practiced in 90 minutes semi weekly classes and 30 minutes-5 days a week at home for 12 weeks. The postures were specifically named and structured for easy replication. The inclusion and exclusion criteria were structured excellently in order to obtain a non-specific mechanical low-back-pain population without any previous yoga experience. Randomization of the 52 patients was appropriate, 28 were assigned for yoga and 24 for wait-control. Baseline characteristics including expectation were found similar. The measurement tools were better than other yoga studies and included Visual Analog Scale (VAS), ODI, Roland-Morris Back Disability Questionnaire, drug usage and secondary outcome measures of stress/ depression. Small sample group, short duration, very low

adherence to yoga practice, lack of any measures to make sure of compliance, lack of blinded observers and no results published were the major limitations of the study.

In a wait list randomized pilot study, Galantino et al (2004) used Modified Hatha Yoga (postures, relaxation and meditations) for 6 weeks in a small group of patients (n= 22; male=4, female=17) with CLBP. The yoga protocol was designed and modified by a certified yoga instructor but the authors fail to specify any original names or types of the practices. This would result in standardization and replication failures of the intervention. The history of surgery was not an exclusion criterion, which could have affected the study as any failure or success of previous back surgery could affect the outcome. The randomization was not adequate as sequential numbers were used for randomization. The administration of yoga postures including meditation and relaxation within an hour would be difficult to implement and the participants recorded neither duration nor frequency of the practice, which limits both compliance and practical implication of this study. The very small sample size with huge baseline differences, not powered to reach statistical significance, high drop out rates, short duration and poor follow-ups limit the significance of the study. The blinding of the observers was also not mentioned. Inclusion of Beck Depression Inventory as a measurement tool was a positive step as Ashburn and Staats (1999) stated that a lot of people with chronic pain suffer from depression and sleep disturbances. This pilot study indicates that balance, flexibility, disability and depression might improve by yoga practice and sets a stage for future randomized controlled trial though.

Cowen et al (2005) reported improvement in back pain in 2 of the 26 participants in a pilot study carried out on physical and perceptual benefits of yoga. The impacts of two different styles of yoga (astanga yoga and hatha yoga) were also compared in the study. The results indicated improved physical functioning (strength and flexibility), pain and mental health; astanga yoga producing better results. This study was highly flawed as there were no inclusion/ exclusion criteria, randomization was very poor (it was done by tossing coin), the very small sample group was self-chosen, there were gross baseline differences in between the yoga groups, there was no control group, there was high rate of non-compliance and withdrawals (34.6%), there was no observer blinding etc.

One RCT by Williams et al (2005) compared Iyengar Yoga with an educational group for CLBP. The exclusion criteria also included history of yoga practice and pregnancy; and were strict enough to obtain a good sample of non-specific CLBP patients. A modest size of 60 patients was randomized (30 each for yoga and educational groups) and had approval by the ethical committee. Informed consents were obtained too. Yoga group followed 1.5-hour instructed class (only postures) each week and patients were asked to observe 30-minute practice, 5 days per week at home for 16 weeks. There were many lapses during the intervention; first: the compliance in the yoga group was not made sure by providing additional information, instructions or manuals, second the educational group followed a back care manual written by physical therapy students rather than an evidence based booklet. The assessments were done post-intervention and after 3 month follow-up. The measures of outcome included Functional disability by using Pain Disability Index (PDI), Pain using VAS and Present Pain Index (PPI), Tampa Scale of Kinesiophobia (TSK) for measuring fear of movement, Survey of Pain Attitudes (SOPA), Coping Strategies Questionnaire- Revised (CSQ-R), Back Pain Self efficacy Scale (BPSES), Range of Motion, Pain medication usage etc. The use of too many outcome measures decreased the power of the study. Though the adherence was very poor i.e. just 52.3 minutes practice per week the results were highly positive towards the yoga group. Pain intensity, functional disability and the use of medication decreased significantly in the yoga group than the educational group and the improvements were present at 3-month follow-up too. Baseline matching was adequate but had lower scores of disability and pain and high scores of self-

efficacy that meant this was a relatively healthy sample, which might have caused a bias for highly positive outcome. Another major source of bias was the involvement of principal investigator in yoga instruction that could have positively biased the study. High rate of withdrawals (30%) and lack of good control group limited the significance of this study.

Sherman et al (2005) compared Viniyoga with conventional exercises and self-care book in a randomized controlled trial (RCT) for CLBP. This was a rigorous study with appropriate randomization of a bit bigger sample group (n=101; yoga=36, exercise=35, self-care=30); inclusion and exclusion criteria, blinded observers, ethical approval/ consent were all taken care appropriately; diagnostic assessments before the trial were not addressed though. Yoga included postures, relaxation and breathing practices designed by an experienced and certified instructor. The exercise was designed by a physical therapist and included warm-ups, aerobics, strengthening, stretching and breathing practices that matched with the yoga group. Self-care group were given an evidence based Back Pain Help-book. The adherence to practice in all groups was good and but follow-ups were short (only 14 weeks after the practice). The compliance in yoga group was assured with home practice handouts and compact discs. Baseline characteristics were found similar but the expectation of success in yoga and exercise groups were higher than the self-care group which could have lead to the better results in the yoga and exercise groups (placebo-effect) i.e. after 12 and 26 weeks, yoga and exercise groups had better improvement in functioning than the self-care group. Symptoms reduction in yoga group was better than exercise and self-care group after 26 weeks but benefit of yoga over exercise was not statistically or clinically significant. All the patients kept using medical care covered by their insurance plan, which might have affected the outcome positively. Medication use decreased most sharply and the benefits persisted more than 14 weeks after the practice in the yoga group, this effect could be potential in tapering the drugs in CLBP patients to reduce side effects and drug costs.

Two quality studies on Yoga for CLBP by Williams et al (2005) and Sherman et al (2005) failed to measure psychological outcomes such as depression/anxiety/stress in detail. So the purpose of this study by Groessl et al (2005) was to examine the benefits of yoga for CLBP in military veterans who were found to be more prone for anxiety/depression and substance abuse by using a questionnaire method. Another aim of this research was to study the feasibility of conducting a RCT of yoga for CLBP in the veterans. Patients were evaluated by a physician, trained in the practice of yoga, at beginning to ensure that they could participate safely. Inclusion and exclusion criteria were strict enough to exclude the complicated cases and patients with substance abuse in order to obtain a sample of chronic benign low-back pain patients. Patients with minimal use of narcotics for back pain were included into the study. 49 patients satisfying the inclusion criteria were instructed a series of 32 poses of Anusara Yoga (a type of Hatha yoga) by an experienced instructor. The intervention needed at least 8 sessions of attendance in 10-week period along with home practice but there were no measures to insure home practice. Assessment measure was a short battery of questionnaires that included measures of pain by using VAS, validated measures of depression, energy/fatigue and Health-Related Quality of Life (HRQOL). Data were taken at baseline and after 10 weeks. 33 patients completed the study. Results indicate that the patients showed significant reduction in pain and depression along with improvement in energy and the mental health. Higher yoga class attendance was associated with decreased pain but not with home practice, which indicated that instructed form of yoga would be far more effective than home practice. This was a low quality and very weak study providing an insight on effects of yoga on depression/ anxiety/ stress/ mental health. This study also indicates at the huge potential of yoga therapy as a supportive intervention in CLBP population associated with psychological disorders and would certainly help to study the feasibility of conducting a randomized controlled trial of a yoga program for veterans with CLBP.

Tekur et al (2008) compared the effects of residential short-term intensive yoga with exercise for CLBP in a randomized controlled trial. The authors stated this RCT as wait-list, which could be dubious as both interventions went on side by side inside the same facility at the same time. A modest sample size (n=91; yoga= 45, exercise=46) followed 1-week intensive interventions for CLBP, designed and instructed by qualified professionals. This rigorous RCT included appropriate randomization, blinded observers, ethical approval/ consent, appropriate outcome measures and methodology. The previous experience of yoga, which could induce the bias towards the positive outcome, was not an exclusion criterion and fibromyalgic back pains, pregnancy, history of surgery should have been included in exclusion criteria as well. This RCT was found to be the only study included in this review that provided complete explanation and description of the all yoga practices followed during the period. Both yoga and control (exercise) followed the similar kinds of daily schedules with 8 hours of different practices everyday, for same duration during the seven days period but the study fails to state whether the yoga postures were instructed to hold or to repeat few times. The study also does not mention whether the use of medications was allowed during the period. Yoga showed significant improvement in the disability scores (measured by Oswestry Disability Index- ODI) and spinal flexibility (measured by goniometer) than the exercise group, in this short intensive study. The intensive 8-hour instruction per day were closely supervised and monitored by experts, which could have lead to the successful results. The study accepts that the short term 1-week follow-up and possible interaction in between the patients during the trial as limitations. Inclusion of stress/depression measurement tool would have added to the value of this study. This study also underscores the potential of residential intensive CLBP management workshops in clinical practice for this fast paced world. The trial profile (figure 1) states that 91 satisfied the inclusion criteria and 80 completed the final analysis where as the study design states that only 80 were randomized which is contradictory; a few spelling and grammar mistakes were also noted in the paper.

Backward chaining lead to another old study on the effects of yoga practices in non-specific low back pain by Vidyasagar et al (1989) but full-text/ abstract could be obtained.

## **Discussion**

Yoga has been found useful in the treatment of many various non-communicable diseases. (Evans et al 2008, Groessl et al 2008, Nayak and Shankar 2004, Williams et al 2005). Yoga definitely seems to benefit the back pain patients but lack of standard yoga therapy practices and protocols were eminent during the review. Various styles of yoga practiced in the western countries seem to be mostly limited to asanas (postures) and breathing only and were found very far from the real yoga described in the traditional texts, which gives more emphasis to purity of mind and practice beyond the mind. (Cowen and Adams 2005, Groessl et al 2008, Joshi 2004). The best practice being the 'integrated approach' directly derived from the traditional texts by Tekur et al (2008). The numbers of studies found regarding yoga for CLBP were very less and only a few were rigorous (Sherman et al 2005, Tekur et al 2008, Williams et al 2005). High quality studies with bigger sample and longer follow-up period could yield better implications for practice. Large multicenter studies in different countries would be better to find out the effects of yoga in people with different culture and ethnicity. In order to make yoga a more accepted therapy; studies on economy or cost of yoga intervention, its effects on depression/stress, safety and adverse effects etc need to be studied in depth. Studies of yoga in conjunction with other compatible therapies like physiotherapy for CLBP could be another field to be explored and could enhance the efficacy of the therapy. There has not been much research on the mechanism of action and physiological effects of each yoga practice either.

## Conclusion

On the basis of the reviewed studies yoga seems to be moderately effective in improving functional disability, flexibility and in reducing symptoms and the usage of pain medications in CLBP. This review also exposes the need for higher quality yoga intervention studies for CLBP.

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