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Yoga as an Alternative and Complementary Treatment for Patients With Low Back Pain: A Systematic Review

Manoj Sharma, MBBS, MCHES, PhD[1] and Taj Haider, MPH[1]

Abstract

Low back pain is not only a leading cause of disability in the United States but also one of the most expensive to treat. Exercise proves to be inconsistent, and surgery often leads to disease reappearance. Yoga offers a holistic approach to overcome the psychological and physical aspects of low back pain. A systematic review was performed to determine the efficacy of yoga for low back pain. Study inclusion criteria were studies (*a*) published in the English language, (*b*) published between January 2000 and June 2012, (*c*) included any form of yoga as an intervention, (*d*) used any quantitative study design, and (5) measured low back pain as an outcome. Of the 13 studies included, 9 demonstrated a reduction in low back pain using yoga as part of the intervention. Limitations include lack of theory-based approaches, unclear definitions of low back pain, and multiple instruments used to measure the outcome.

Keywords

low back pain, yoga, hip injury, herniated disc

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Although the prevalence of low back pain is difficult to determine due to the lack of a concise definition for low back pain, varying degrees of severity, an overall underestimation by sufferers of this musculoskeletal disorder, rising health care costs, and the associated psychosocial factors demonstrate its importance.[1] In the United States, back injuries are the leading cause of disability among adults age 45 years and younger.[2] Posadzki and Ernst defined low back pain as pain localized between the 12th rib and the inferior gluteal folds, with or without leg pain.[3] There are several causes of low back pain, including injury or overuse of muscles, ligaments, and joints of hip and spine; pressure on nerve roots in the spinal canal due to herniated disc, osteoarthritis, spondylolisthesis, and so on; compression fractures due to osteoporosis; ankylosing spondylitis; and spinal tumors. Researchers suggest that this pain is experienced, at some point, by nearly everyone in a population.[2]

Studies classify musculoskeletal disorder as chronic low back pain, low back pain, and/or mild to moderate low back pain, confounding researchers' ability to determine those truly affected. What is clear is the need to determine treatments for low back pain as the economic and public health effects are increasingly apparent,[1] although these costs are predominantly indirect.[2] Considering it is the most expensive health care problem for those 30 to 50 years of age and is predominantly chronic, lasting 3 to 6 months or more,[2] with attributing psychological and physical factors, a therapy encompassing the entire functionality of the disease is necessary.

Because yoga offers an increase in flexibility and relaxation, it can act as a possible therapy to treat low back pain.[3] Many of the current treatments for low back pain have not proven successful. Exercise has been proven somewhat efficacious, but effects are neither curative nor consistent.[4] Surgery is often expensive and can lead to the reappearance of low back pain or failure altogether. Since yoga has been used previously to treat chronic diseases such as asthma, hypertension, and diabetes,[5] its holistic approach can offer health benefits to those with low back pain.[6] Research has suggested that yoga improves cardiovascular, psychological, and musculoskeletal function.[7] The purpose of this review is determine the benefits of yoga on low back pain. An extensive systematic review of the literature returned studies concerned with recurrent, chronic, and mild to moderate low back pain. All were included in this review.

Questions being addressed in this study include the following: Is yoga efficacious to significantly reduce low back pain (reduce functional disability, increase flexibility, increase sit

[1] University of Cincinnati, Cincinnati, OH, USA

Corresponding Author:
Manoj Sharma, MBBS, MCHES, PhD, University of Cincinnati, Health Promotion & Education Program, 526 Teachers College, PO Box 210068, Cincinnati, OH 45221-0068, USA
Email: manoj.sharma@uc.edu

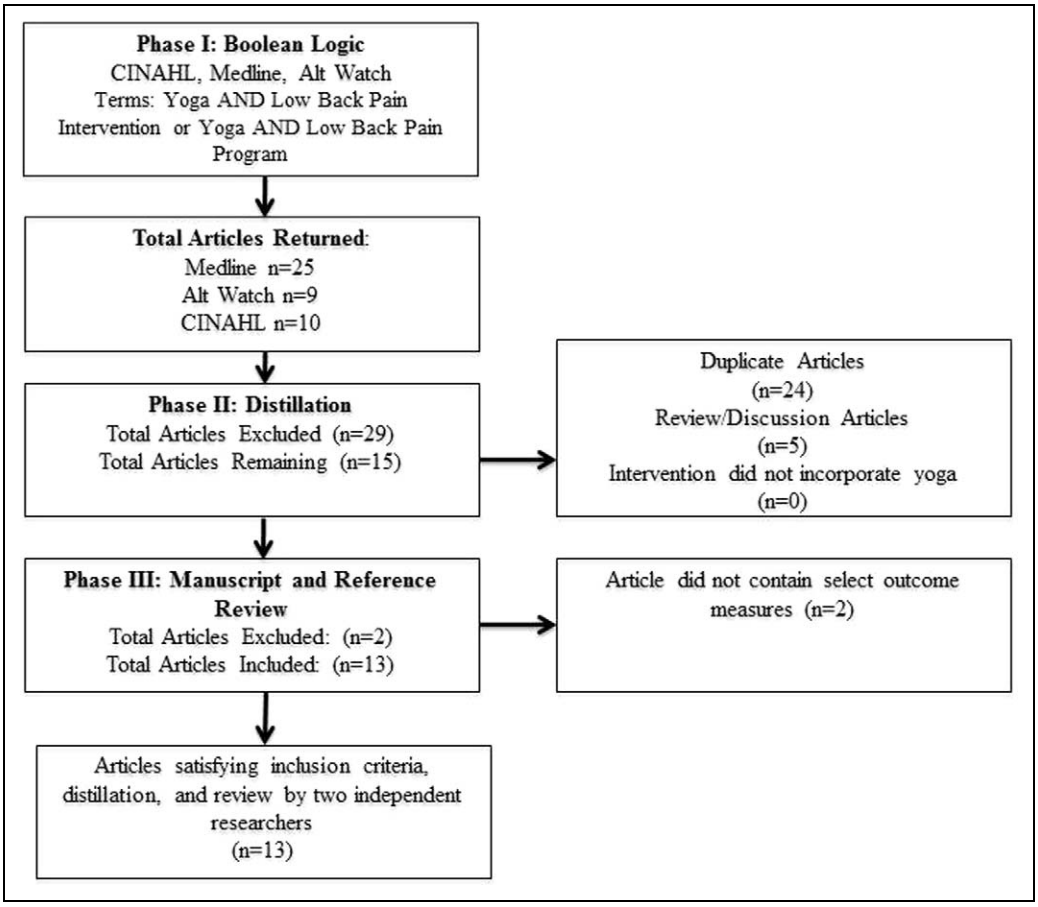

Figure 1. Flow chart depicting the 3-phase data extraction process

and reach scores, etc) and are there sufficient data available to draw conclusions regarding the efficacy of yoga in reducing low back pain?

Methods

The method used in this study included a systematic review of the literature regarding interventions using yoga as a therapy for low back pain (chronic, moderate, mild, or recurrent). To be included in this review, the study must be (*a*) published in the English language, (*b*) published between January 2000 and June 2012 (last 12 years), (*c*) include any form of yoga as a treatment or therapy in an intervention, (*d*) use any quantitative study design, and (*e*) measure low back pain (Oswestry Disability Index, Visual Analogue Scale, Roland-Morris Disability Questionnaire, etc) as an outcome. Exclusion criteria included (*a*) studies that did not implement a quantitative design, (*b*) did not sample subjects with some type of chronic or recurrent low back pain, and (*c*) did not index in any of the following databases: CINAHL (Cumulative Index to Nursing and Allied Health), Medline, or Alt HealthWatch. Considering yoga has been used for a number of chronic disorders in the past, it was crucial to include search terms contributing to the study of yoga as part of or as a complete intervention for low back pain exclusively. The definition of low back pain and its nomenclature (chronic, recurrent, etc) varies; to overcome this, any study regarding low back pain employing yoga as a treatment was included.

Three phases of review were used to find studies meeting the above criteria (Figure 1). Medline, Alt HealthWatch, and CINAHL database searches were enlisted to complete Phase I. Boolean terms used to identify studies meeting the criteria included "Yoga AND Low Back Pain Intervention" and "Yoga AND Low Back Pain Program."

The use of the aforementioned terms in the database searches returned 44 articles: 25 from Medline, 9 from Alt HealthWatch, and 10 from CINAHL. Phase II included preliminary distillation of the articles by eliminating duplicates (n = 24) and review/discussion articles (n = 5). All returned studies incorporated yoga as part of the intervention; therefore, none was excluded due to this criterion. Of the remaining articles (n = 15), 2 did not incorporate low back pain in the outcome measures. The remaining articles (n = 13) satisfied the eligibility criteria.

Results

The 3-phase data extraction process resulted in 13 articles satisfying the eligibility criteria. Table 1 summarizes the studies including the year of publication, authors, study design and sample size, age of participants, intervention modality and

Table 1. Summary of Yoga Interventions for the Treatment of Low Back Pain (n = 13)

Year	Authors	Design and Sample	Age (Years)	Intervention Modality	Intervention Dosage	Salient Findings
2004	Galantino, Bzdewka, Eissler-Russo, and Holbrook[2]	Randomized control design; n = 22 subjects with chronic low back pain assigned to yoga or control group	30-65	Hatha yoga	Sessions with an instructor twice weekly for 6 weeks an hour each	Oswestry Disability Index suggest a decrease in yoga group scores from 24.98 ± 1.28 to 21.15 ± 10.18 (n.s.)
2005	Sherman, Cherkin, Erro, Miglioretti, and Deyo[4]	Randomized control design; n = 101 adults with chronic low back pain assigned to yoga, self-care book, or exercise group	20-64	*Viniyoga* (emphasizes safety)	12-Week sessions of 75-minute yoga instruction with encouraged home practice (12-26 weeks)	Roland Disability scores between groups show a significant improvement for yoga subjects over self-care book group ($P < .001$) at 26 weeks. Yoga vs exercise group (n.s.)
2005	Williams, Petronis, Smith, Goodrich, Wu, Ravi, Doyle, Juckett, Kolar, Gross, and Steinberg[8]	Randomized control design; n = 44 subjects with nonspecific lower back pain for >3 months assigned to yoga or educational control group	23-67	Iyengar Yoga	1.5-hour weekly yoga course with an instructor for 16 weeks, encouraged home practice for 30 minutes 5 days weekly	Pain Disability Index showed that functional disability was significantly lower in yoga group vs control ($P = .005$) and Visual Analogue Scale (VAS) showed significant reduction in present pain intensity in yoga vs control ($P < .05$) at 3 months
2008	Groessi, Weingart, Aschbacher, Pada, and Baxi[9]	Pretest–posttest design; n = 49 Veterans with chronic benign low back pain >6 months	Mean age 55.3 years	*Anusara* yoga (a type of *Hatha* yoga)	10 Weeks of once weekly yoga sessions completing at least 8 sessions	Improvement were found from the scores of the Visual Pain Scale (a modified Visual Analogue Scale) for pain ($P < .0001$)
2008	Tekur, Singphow, Nagendra, and Raghuram[6]	Double-blind randomized control design; n = 80 subjects with chronic low back pain assigned to yoga or physical exercise group	18-60	*Asanas*, *pranayamas*, meditation, and concepts of yoga	1-Week intensive residential yoga program from 5:00 AM to 10:00 PM	Scores from the Oswestry Disability Index show a reduction in disability scores in yoga from 36.50 ± 14.22 to 18.70 ± 11.55 vs control 38.9 ± 13.27 to 35.75 ± 15.19 ($P < .01$)
2009	Saper, Sherman, Cullum-Dugan, Davis, Phillips, and Culpepper[10]	Pilot randomized control design; n = 33 adults with moderate to severe chronic low back pain assigned to yoga or usual care control group	18-64	*Hatha* yoga with *svasana*	12 weekly 75-minute yoga classes, home practice 30 minutes daily encouraged	Roland-Morris Disability Questionnaire scores show decrease for yoga by 6.3 points vs control by 3.7 points (n.s.) and reported back pain scores decreased significantly for yoga group vs control ($P = .03$) at 12 weeks
2009	Telles, Dash, and Naveen[11]	Randomized control design; n = 291 professional computer users assigned to yoga or waitlist control group	21-49	Yoga (*asanas*, *sithilikarana*, *vyayama*, *pranayamas*, and *trataka*)	Yoga practice 60 minutes daily for 5 days a week for 60 days taught by an instructor	Low back flexibility significantly increased among yoga group ($P < .001$) at day 60. Comparisons between groups showed significant differences between group scores at baseline
2009	Williams, Abildso, Steinberg, Doyle, Epstein, Smith, Hobbs, Gross, Kelley, and Cooper[12]	Randomized control design; n = 90 subjects with chronic low back pain assigned to yoga or standard of care group	18-70	Iyengar Yoga	24 weeks of 90-minute twice weekly yoga classes led by an instructor, home practice encouraged for 30 minutes on nonclass days	Oswestry Disability Index scores show baseline yoga at 24.1 ± 1.22 vs control at 23.4 ± 1.78 (n.s.) and at 6-month follow-up yoga at 15.8 ± 2.00 vs control at 22.0 ± 1.83 ($P < .01$) Visual Analogue Scale at 6-month follow-up yoga at 22.2 ± 3.96 vs control at 38.3 ± 3.09 ($P < .01$)

(continued)

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Year	Authors	Design and Sample	Age (Years)	Intervention Modality	Intervention Dosage	Salient Findings
2010	Cox, Tilbrook, Aplin, Chuang, Hewitt, Jayakody, Semlyen, Soares, Torgerson, Trewhela, Watt, and Worthy[13]	Randomized control design; n = 20 subjects with low back pain in previous 18 months assigned to yoga or usual care group	18-65	Iyengar Yoga and British Wheel of Yoga	12 weekly 75-minute yoga classes (10 classes total) led by an instructor	Roland-Morris Disability Questionnaire scores show decrease from baseline of 1.76 for yoga and 2.94 for usual care group ($P = .72$) and Aberdeen Back Pain Scale score decrease from 7.72 for yoga and 5.16 for usual care ($P = .03$) at 12 weeks (n.s.)
2010	Evans, Carter, Panico, Kimble, Morlock, and Spears[7]	Quasi-experimental design; n = 53 adults with chronic low back pain assigned (nonrandomly) to yoga or physical therapy group	49.3 ± 14.04 (mean age)	Modified back yoga program based on integral yoga method	6 Weeks of once weekly 2-hour yoga classes	Yoga group subjects with high and low self-efficacy for pain demonstrated small differences in disability at 6 weeks (Roland-Morris Disability Questionnaire = 2.679 ± 1.525) vs control where those with low self-efficacy of pain reported twice the disability (Roland-Morris Disability Questionnaire = 8.369 ± 1.706) than those with high self-efficacy for pain (Roland-Morris Disability Questionnaire = 4.045 ± 1.854) at 6 weeks
2011	Sherman, Cherkin, Cook, Hawkes, Deyo, Wellman, and Khalsa[14]	Randomized control design; n = 210 subjects with chronic low back pain >3 months assigned to yoga, conventional therapeutic exercise, or self-care book group at a 2:2:1 ratio	20-64	*Viniyoga* (emphasis on safe performance)	12 weeks of once weekly 75-minute yoga classes led by an instructor, at home practice 20 minutes daily with CD was requested	Roland-Morris Disability Questionnaire scores show yoga vs self-care significant difference in function scores at 12 weeks ($P < .001$). No significant differences between yoga and exercise group
2011	Tilbrook, Cox, Hewitt, Kang'ombe, Chaung, Jayakody, Aplin, Semlyen, Trewhela, Watt, and Torgerson[15]	Randomized control design; n = 313 adults with chronic or recurrent low back pain assigned to yoga or usual care group	18-65	British Wheel of Yoga and Iyengar Yoga (10 instructors from each)	12 Weeks of once weekly 75 minute yoga classes, home practice at 4 intervals over the 12 weeks	Roland-Morris Disability Questionnaire scores show yoga reduction of 2.14, while usual care reduction was 0.03 at 3 months ($P < .001$). At 6 months reductions for yoga was 2.42 and for usual care 0.94 ($P = .011$), for 12 months yoga down 2.04 and usual care down 0.48 ($P = .007$)
2012	Tekur, Nagarathna, Chametcha, Hankey, and Nagendra[16]	Single-blind randomized control design; n = 80 patients with chronic low back pain assigned to yoga or physical therapy control group	18-60	Integrated Approach of Yoga Therapy (*asanas*, *pranayama*, meditation, and yoga counseling)	7-Day residential program from 5:00 AM to 10:00 PM	Visual Analogue Scale scores for pain show yoga from 6.68 ± 1.82 to 3.40 ± 1.88 ($P < .001$) at end of week. Sit and reach scores for yoga from 11.6 ± 10.11 to 17.37 ± 10.77 ($P < .001$). Pre- and post-pain reduction in control (Visual Analogue Scale) same as for yoga group, but sit and reach scores not significant for control group

dosage, and the salient findings. The studies are arranged by year of publication in the ascending order.

Discussion

The purpose of this review was to determine the efficacy of yoga as an alternative and complementary treatment for low back pain by analyzing studies published between 2000 and June 2012. Of the 13 studies identified, 8 were performed in the United States, 3 in India, and 2 in the United Kingdom. Yoga has been used as a holistic approach to treat mental and physical disorders in India since the third century but is becoming widely popular throughout the world as an alternative treatment.[7] There were 10 studies identified that demonstrated significant changes in low back pain among subjects, such as increased flexibility, decreased pain, and decreased disability scores.[4-6,8-12,14-16] The instruments used in these studies include the Oswestry Disability Index,[2,5,11] Roland Morris Disability Questionnaire,[4,7,10,13-15] and the Visual Analogue Scale.[8-9,16]

Randomized control trials are considered the most robust of study designs as the threats to external and internal validity are at a minimum. Here, 9 studies used a randomized control design.[2,4,8,10-15] This design institutes a pretest and posttest feature, uses a control group for comparison, and subjects are randomly selected for each group. Two additional studies were single-blind randomized control studies to counteract threats and bias.[6,16] In those studies the statistician and the clinical psychologist who administered the low back pain questionnaires were masked from knowing the group the subjects had been assigned.[6,16] Quasi-experimental design is similar to a random control design, except it does not include randomization of the sample, meaning subjects are specifically selected for each group. Only 1 study examined here used this type of design.[7] This sometimes occurs when researchers' intent is to match subjects between groups or when random selection is not ethical.[5] Pretest–posttest design is the simplest and least expensive but contains threats to the internal validity of the study, including history (external events between the pretest and posttest) and maturation (growth of the subjects). One study identified enlisted this design.[9]

The duration of the studies identified here range from two 1-week intensive inpatient interventions[6,16] to a 6-month twice weekly yoga session with instructor.[12] The duration of the other studies are as follows: 6 weeks,[2,7] 8 weeks,[11] 10 weeks,[9] 12 weeks,[4,10,13-15] and 16 weeks.[8] To determine the efficacy of yoga as a treatment for low back pain, it is suggested that the intervention must be at least 2 to 3 months long with regular practice of yoga throughout the intervention.

Two studies randomized subjects to yoga, exercise, and self-care booklet groups. For both of these studies significant reduction in low back pain scores were found in the yoga group versus the self-care book group from the Roland-Morris Disability Questionnaire. But no significant difference in scores was apparent from between-group comparisons of yoga versus the exercise group.[4,14] This suggests that the efficacy of yoga could be comparable to that of exercise for low back pain. Conversely, a randomized control study that compared only yoga and exercise demonstrated a significant reduction in scores, from the Oswestry Disability Index, in the yoga group versus the exercise group.[6] The majority of randomized control design studies examined compared yoga to a control or usual care group, prohibiting this review from drawing conclusions regarding the efficacy of yoga versus exercise. Some researchers suggest that yoga is more efficacious then exercise, as it offers a multidimensional approach that includes not only physical exercises but also breathing techniques, relaxation techniques, and meditation.[7]

An advantage of the studies reviewed is that all of them ($n = 13$) used an instructor to teach yoga sessions weekly or biweekly, with encouraged home practice included in some of the interventions. By employing an instructor, the interventions could readily determine the attrition rates of yoga practice as well as ensure correct technique of the subjects. Although strengths associated with use of actual instructors are apparent, it is important to note that by including this in an intervention affects the cost of the program as well as the time and convenience of the participants. A weakness of these studies is a lack of use of theory-based designs where constructs can clearly be built on and tested. In addition, a number of instruments, although validated, were used, which could influence the pain, flexibility, and disability scoring.

Some researchers estimate that 25% of the United States population experiences back pain at any one time. In addition, back pain, associated with chronic discomfort, is also associated with anxiety and quality of life reductions.[9] Because of this, current therapies that do not address the psychological aspect of low back pain are now being abandoned for a holistic approach to treatment. Yoga offers promising results as, in this review, all studies demonstrated pain reductions, but many ($n = 10$) exhibited statistically significant pain reductions. More testing with larger sample sizes using randomized controlled trials and applying theory-based approaches can assist in establishing yoga as an efficacious approach to treating low back pain.

Author Contributions

This work was performed by MS and TH. MS conceptualized the study, developed the inclusion criteria, collected the data, developed the table, analyzed the data, and reviewed the article. TH collected the data, analyzed the data, and wrote the first draft of the article.

Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical Approval

This study did not warrant institutional review board review as no human subjects were involved.

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