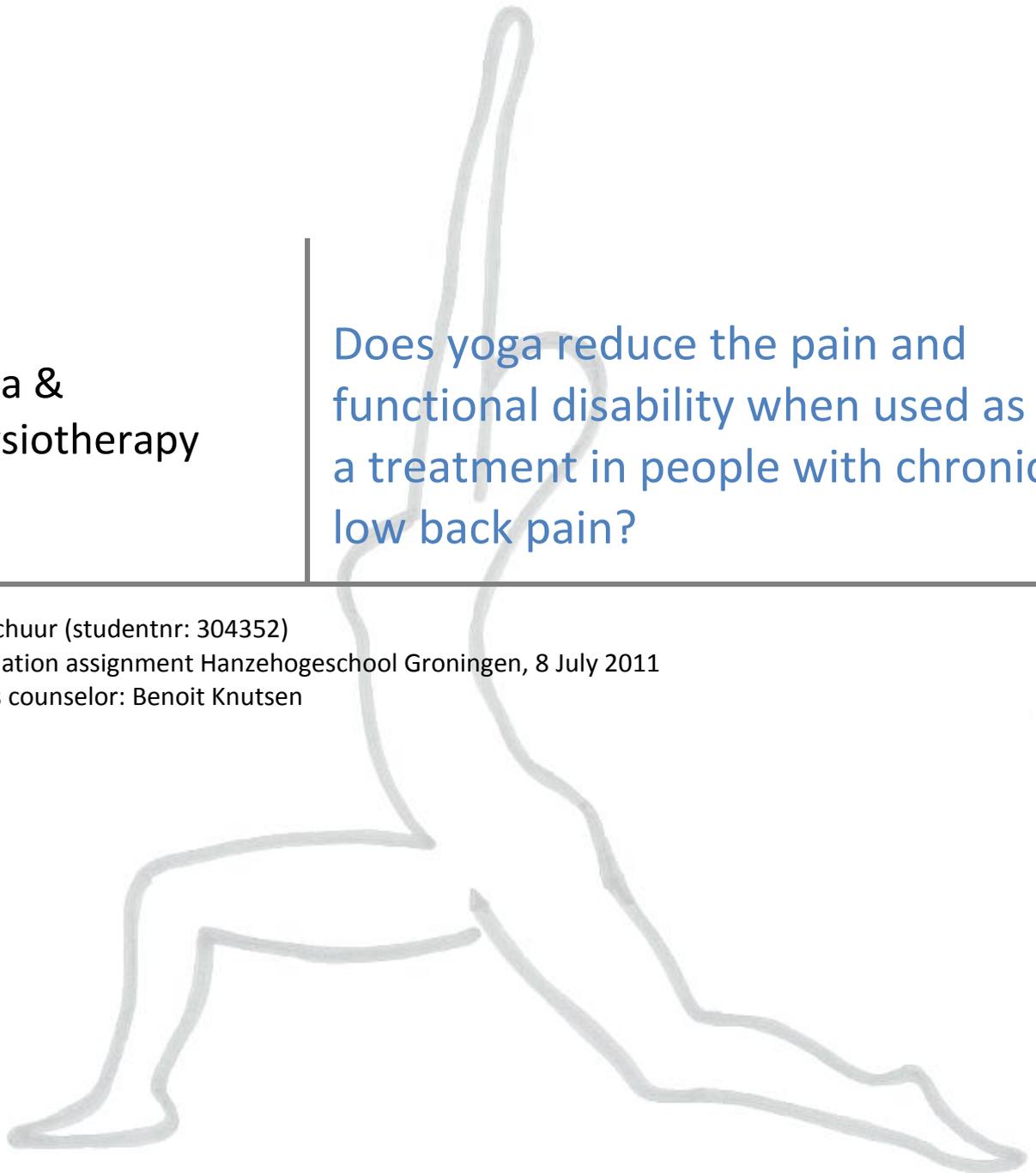


Yoga & Physiotherapy

Does yoga reduce the pain and functional disability when used as a treatment in people with chronic low back pain?

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Graduation assignment Hanzehogeschool Groningen, 8 July 2011
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Preface

For my graduation assignment I decided to do research on the effects of yoga on chronic low back pain. This idea started when I heard about the McKenzie concept and low back pain a few years ago. In the process of learning about the McKenzie concept I discovered that there were several similarities with yoga. Both consider that balance in movements are the most important. In which I mean when you do a lot of one movement, for example flexion in the lower back, you also need to make extension. Also some of the postures, which are called asanas in yoga terms, are the same. This could mean that physiotherapy and yoga (which is considered an alternative therapy) are more alike than most people think.

Yoga has been practiced for many centuries, while in comparison, physiotherapy is a relative new profession. Which of these, centuries of experience versus modern science, has the best results in treating chronic low back pain? This is an interesting question I intend to answer by writing a review based on research done in this field.

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Abstract

Background This paper is based on recent research (2004-2011) to determine if yoga helps to reduce chronic low back pain (CLBP) when used as a treatment.

Objectives To assess if yoga will help reduce chronic low back pain (CLBP) and functional disability.

Methods The following electronic databases were searched for randomised controlled trials (RCT's) for the years 2001 to 2011: PUBMED, CINAHL, MEDLINE.

Keywords: yoga - low back.

129 articles were found after screening for inclusion and exclusion criteria and screening the methodological quality (Delphi list) seven studies were found relevant to include in the review.

Results Seven randomized controlled trials (RCT's) were included in this review, originated from the USA and India. Comparing yoga to usual care/ standard medical care, physical exercises, education or no treatment. Five out of seven studies showed a positive effect of yoga on functional disability and pain.

Discussion All studies had blinding limitations, also the research population of this review was small due to the fact only seven studies were collected. Although some outcomes were statistically significant. And in some outcomes the Minimal Clinical Important Change is not considered valuable.

Conclusion Further study should be done to confirm the hypothesis that yoga helps reduce pain and functional disability in people with low back pain.

Introduction

Low back pain is a common problem in the Netherlands, between 60% and 90% of the population will experience low back pain at least once in their lives. It also has economic consequences, due to sick leave. Risk factors as mentioned in the KNGF guideline¹⁸ are heavy physical work, frequent bending, twisting, lifting, pulling and pushing, repetitive work, static postures and vibrations. Psychosocial risk factors include stress, distress, anxiety, depression, cognitive dysfunction, pain behaviour, job dissatisfaction, and mental stress at work. Chronic low back pain is defined as a back pain persisting for 12 weeks or more. Common treatment is exercise therapy.¹⁸ Yoga, which often consists of physical exercise with breathing, is a popular alternative form of therapy.⁴

The exact origin of Yoga is unknown, it is thought to be about five thousand years old. In the mid 1800's westerners started practising yoga in a sense of exercise therapy. The yoga that is practised today is developed through the ages and mainly consists out of asanas (postures), pranayama (breathing exercises) and dhyana (meditation). Yoga might be effective to help reduce complaints in CLBP patients, simply because it is a combination of exercise, breathing and relaxation training. In which exercise and relaxation therapy is also mentioned in the KNGF guideline. Therefore, the objective of this study was to assess if yoga is effective to decrease pain and functional disability in people with CLBP.^{11,12,13,14}

Methods

Search methods

The following electronic databases were searched from 1st of May until the 15th of May in the year 2011 for randomised controlled trials (RCT's): PUBMED, CINAHL, MEDLINE.

Keywords: yoga - low back.

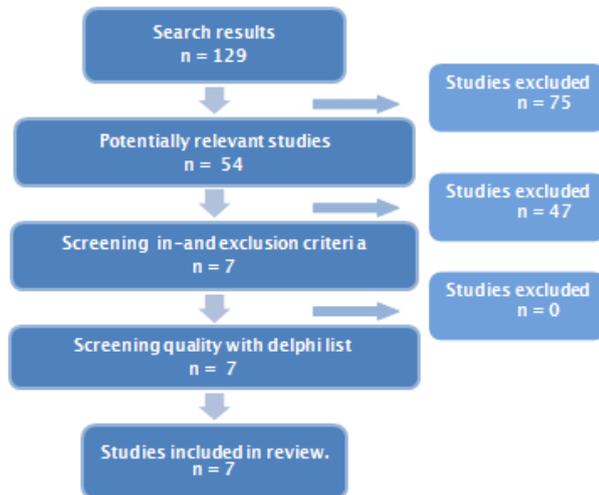


Fig. 1 Flowchart

In total 129 articles were found, a selection of potentially relevant studies was made based on the title of the article. Seven of the studies met the inclusion and exclusion criteria. Screening the methodological quality is done by using the Delphi list. In which the studies must have a score of 5 or higher to be considered high quality and be included in this review.

Inclusion and exclusion criteria

All studies are randomized controlled trials (RCT's) published in the years 2001 until 2011. Only RCT's written in English that included yoga therapy on adults with chronic low back pain from the ages 18 to 70 years, any sex were included. Eligible studies were those that had the main focus on the pain and functional disability, by using any questionnaire or scale which measures pain and/or functional disability.

Screening

To assess the methodological quality of the RCT's the Delphi list is used.⁹ Studies with a score ≥ 5 were considered high quality. One point is given when one of the nine questions is answered with 'yes'. All studies were classified by levels of evidence based on the CBO/EBRO guidelines (Dutch Institute for Healthcare Quality).^{8,9}

Results

Seven randomized controlled trials (RCT's) were included in this review, originated from the USA^{1,2,4-7} and India³. Comparing yoga to usual care/ standard medical care⁵⁻⁷, physical exercises^{3,4}, education^{2,4} or no treatment¹.

Outcome measures included Roland and Morris Disability Questionnaire (RMDQ)^{4,6}, Oswestry Disability Index (ODI)^{1,3,7} and Pain Disability Index (PDI)² to evaluate functional disability. To evaluate pain the following outcome measure were used; 11-point NRS⁴, Visual Analogue Scale (VAS)⁷, pain-score⁶ and Short Form-McGill Pain Questionnaire (SF-MPQ)².

Galantino et al.¹ aimed to evaluate a possible design for a 6-week modified hatha yoga protocol to study the effects on participants with chronic low back pain. This pilot study tested 22 subjects between the ages of 30 and 65, with CLBP. There were no significant differences found between the yoga group and the control group (no treatment), except for the Beck Depression Inventory (BDI), which was substantially higher post treatment in the control group. The small research population makes the quality of this study questionable.

Williams et al.² based their research on the hypothesis; that the yoga group would report a greater reduction in a number of pain-related measures. To confirm this hypothesis 60 subjects with CLBP were assessed and divided into a iyengar yoga group or in an educational care group. Results were in favor of yoga (Table 3), these treatment effects could also be due to therapist bias since the principal investigator also delivered the yoga therapy intervention.

Tekur et al.³ aimed to compare the effect of a short-term intensive residential yoga program with physical exercise (control group) on pain and spinal flexibility, measured with a goniometer, in 80 subjects with chronic low back pain. The hypothesis of this study is based on other studies that used yoga as treatment for patients with CLBP, in which the yoga was practiced for 3-6 months. Tekur et al. assessed if changes in pain and flexibility can be achieved in a short period of time, one week program 8h a day practice. A 48,76% reduction in disability and a significant increase in spinal flexibility were measured.

Sherman et al.⁴ compared yoga with two control groups, one using a self-care book and one exercise group on 101 subjects. Compared with the self-care book group, the yoga group showed clinically important and statistically significant improvements in functional status, measured with the RMDQ. The difference between the yoga and exercise group were clinically unimportant. At 6 and 12 weeks, the yoga group experienced clinically and statistically significant reduction in pain compared to the self-care book group (1.6 and 2.2 points, respectively) on the 11-point numerical scale. Between weeks 12 and 26 (follow-up) symptoms continued to improve only in the yoga group, whereas in the controls groups participants experienced worsening symptoms.

Cox et al.⁵ assessed the efficacy of yoga for the treatment of chronic low back pain. This pilot RCT compared a 12 week course of specialized yoga back classes with usual care on 20 subjects. The yoga group also continued with usual care during the study and both groups received written information on how to manage their low back pain. At four weeks follow-up the yoga group reported greater

mean decreases in disability and pain. Although only the decrease in pain was statistically significant ($p = 0.03$). The sample size of this study was small and also the class attendance was low, which makes this study less reliable.

Saper et al.⁶ assessed the feasibility of studying yoga in a predominantly minority population with chronic low back pain in 30 subjects, the treatment consisted out of a 12-week Hatha yoga course. Yoga was more effective than usual care at least in the short term for reducing pain and medication use. The long-term effects were not assessed properly due to a loss to follow-up.

Williams et al.⁷ aimed to evaluate Iyengar yoga therapy on chronic low back pain. 90 subjects were randomized to a 24 biweekly Iyengar yoga treatment or standard medical care (SMC). Individuals randomized to the yoga group showed significantly greater reduction in functional disability, pain intensity, and depression. Also there was a clinically important trend for the yoga group to reduce their pain medication usage compared to the control group.

Title	Author	Level of evidence	Methodological quality (Delphi score)*
The impact of modified hatha yoga on chronic low back pain: a pilot study. ¹	M.L. Galantino et al. (2004)	B	5/9 high
Effect of Iyengar yoga therapy for chronic low back pain. ²	K.A. Williams et al. (2005)	B	5/9 high
Effect of short-term intensive yoga program on pain, functional disability, and spinal flexibility in chronic low back pain: a randomized control study. ³	P. Tekur et al. (2007)	B	6/9 high
Comparing yoga, exercise, and a self-care book for chronic low back pain. ⁴	K.J. Sherman et al. (2005)	B	6/9 high
A randomized controlled trial of yoga for the treatment of chronic low back pain: results of pilot study. ⁵	H. Cox et al. (2010)	B	5/9 high
Yoga for chronic low back pain in a predominantly minority population: a pilot randomized controlled trial. ⁶	R.B. Shaper et al. (2009)	B	6/9 high
Evaluation of the effectiveness and efficacy of Iyengar yoga therapy on chronic low back pain. ⁷	K. Williams et al. (2009)	B	7/9 high

*score ≥ 5 is considered high methodological quality

Table 2 Included studies

Table 3 Characteristics of included studies

Author	Subjects	Intervention	Control group	Outcome measures	Main results (only pain and functional disability)	Length of follow-up
Galantino et al.(2004) ¹	22 Yoga n= 11 Control group n=11	Iyengar yoga (6 biweekly sessions)	No treatment	Forward Reach (FR), Sit and Reach (SR), Oswestry Disability Index (ODI), Back Depression Inventory (BDI)	No significant differences are found between the yoga group and the control group.	12 weeks
Williams et al.(2005) ²	60 Yoga n= 30 Control group n=30	Iyengar yoga (16 weekly 90-min sessions)	Educational care	Pain Disability Index (PDI), Short Form-McGill Pain Questionnaire (SF-MPQ), Tampa Scale of kinesiophobia (TSK), Survey of Pain Attitudes (SOPA), Coping Strategies Questionnaire-Revised (CSQ-R), Back Pain Self-Efficacy Scale (BPSES), ROM	The yoga group had significantly less functional disability (76,9%) compared to the control group 39,6%). And significant difference in present pain at the 3-month follow-up, yoga group reported 70% reduction compared to 38% reduction reported by the control group.	12 weeks
Tekur et al.(2007) ³	80 Yoga n= 40 Control group n=40	Yoga (1 week intensive program 8h per day)	Physical exercise	Oswestry Disability Index (ODI), Goniometer (for spinal flexibility)	Significant reduction in the yoga group in ODI scores (48,76% reduction in functional disability). And a significant reduction in pain ($p < 0.001$).	No follow-up
Sherman et al.(2005) ⁴	101 Yoga n= 36 Exercise n= 35 Self-care book n=30	Viniyoga (12 weekly 75-min sessions)	Exercise or self-care book	Roland Disability Scale (RMDQ), 11-point numerical scale (pain)	The yoga showed significant improvements in functional status versus self-care book (yoga vs. book: mean difference, -3.4 [95% CI, - 5.1 to - 1.6] [$p < 0.001$]. The difference between the yoga and exercise group were clinically unimportant (yoga vs. exercise: mean difference, - 1.8 [CI, -3.5 to -0.1] [$p = 0.034$]. The yoga group was superior to the self-care book group with respect to pain at 6 and 26 weeks(mean difference, -2.2 [CI, -3.2 to -1.2]; $p < 0.001$).	26 weeks
Cox et al. (2010) ⁵	20 Yoga n= 10 Control group n=10	Yoga + written advice (12 weekly 75-min sessions)	Usual care + written advice	Roland and Morris Disability Questionnaire (RMDQ), Aberdeen Back Pain Scale, SF-12, EQ-5D, Pain Self-Efficacy Questionnaire (PSEQ)	The yoga group reported greater mean decreases in disability and pain. Although only the decrease in pain was statistically significant ($p = 0.03$).	12 weeks
Shaper et al. (2009) ⁶	30 (not mentioned how many subjects in each group)	Hatha yoga (12 weekly 75-min sessions)	Usual care	Pain-score (0=no pain to 10= worst possible pain), Roland-Morris Disability Questionnaire (RMDQ), SF-36	Main pain scores for yoga participants minimal clinical significantly decreased 2.3 points ($p = 0.02$) and mean RMDQ scores decreased 6.3 points ($p = 0.028$).	26 weeks
Williams et al. (2009) ⁷	90 Yoga n= 43 Control group n=47	Iyengar yoga (24 biweekly 90-min sessions)	Standard medical care (SMC)	Oswestry Disability Questionnaire (ODI), VAS, Beck Depression Inventory, pain medication-usage questionnaire.	Significantly greater reductions in functional disability on the ODI ($p = 0.016$) and pain intensity on the VAS ($p < 0.001$) were observed in de yoga group.	48 weeks

Discussion

Although all studies are considered high quality, as screened with the Delphi list, all studies had a blinding limitation. In which it is not possible to blind the therapist and patients. The people who gave the yoga needed to be yoga instructors. And the patients who received yoga therapy, also could not be blinded due to the fact that they received the therapy as yoga therapy.

A second limitation is the form of therapy. Yoga has a lot of different forms and exercises. It would be more relevant if all the studies used the same exercises and used the same reliable outcome measures. The limitations of these studies are also considered a limitation for this review. Also the amount of studies done in this specific patient population with this intervention are limited. This resulted in a small amount of studies included in this review, which means a small research population.

Another limitation is the use of outcome measures. In the KNGF-guideline 2003¹⁸ the outcome measure recommended to measure functional status is the Quebec Back Pain Disability Scale. Though none of the studies used this scale to measure the functional status.

In the study of Saper et al.⁶ the principal investigator and the yoga teacher were also panel members who made the yoga protocol. Also in Williams et al.² the principal investigator also delivered the yoga therapy. These could be considered as a investigator and/or therapist bias. This could also mean there is a blinding problem due to the fact that the person who is treating the patients also evaluates the results.

In all studies randomization was used to assign the subjects to the yoga group or the control group. Although only four studies used a computer program to randomize.^{2,3,4,5} Which is more reliable.

The strengths of this review are that the included studies consist only of RCT's. And the fact that these RCT's are only based on yoga and low back pain.

Some studies^{2-4,6,7} found that yoga had a positive effect on functional disability and pain. In none of the studies it is mentioned that the changes could also be considered Minimal Clinically Important Changes (MCIC). To determine if the outcomes are relevant for patients, the Minimal Clinically Important Change (MCIC) should be taken into consideration. Ostelo et al.2005¹⁵ assessed the RMDQ, ODI, VAS and NRS, by comparing different studies. This review (ostelo et al. 2005) provides MCIC values that can be used as an indication, rather than a fixed value. The MCIC for pain on a VAS should be at least 20 mm and if a NRS is used the MCIC should be at least 2.5 points. For functional disability as measured with the RMDQ the MCIC should be at least 3.5 points, whereas an MCIC on the ODI should be at least 10 points.¹⁵

The PDI had found both reliable and valid measure of pain-related disability (Tait et al. 1990).¹⁶ Scrimshaw et al.2001¹⁷ showed that the VAS is more responsive to clinical change than the Short Form-McGill Pain Questionnaire(SF-MPQ).

In conclusion we could consider that all seven studies used relevant outcome measures.

But if the values that are given by ostelo et al.2005¹⁵ are used to determine if the outcomes are relevant for patients and to determine if there is a MCIC, some studies could be considered less useful. Both Williams et al.⁷ and Galantino et al.¹ showed a decrease in ODI scores less than 10 points. Which would indicate no MCIC. Keeping this in mind the changes in these studies are possibly not as meaningful for patients. Whereas in Tekur et al.³ the ODI changes in the yoga Group were 17.8 points, and therefore it could be considered that a short intensive yoga program has a better effect on the functional status then long term yoga, practiced once or twice a week. Taking into consideration that the long term effects of a short intensive program are not evaluated, there was no follow-up in the study of Tekur et al.³

The other articles used the RMDQ to assess functional disability. Sherman et al.⁴ showed a 3.6 points improvement on this scale after 26 week follow-up, so a MCIC is seen after the

treatment. Cox et al.⁵ showed a 4.16 point difference in the 4-week follow up. Saper et al.⁶ showed a 6.3 points decrease and at the 26 weeks follow up a 6.6 decrease. Overall we could say that there is a greater MCIC on the long-term. In comparison to the effects on a short-term, when the treatment is given weekly or biweekly.

The two studies of Williams et al.^{2,7} used VAS and in both studies it is indicated that yoga does help to reduce the pain, although the pain is not reduced with 20mm. Although this is not enough for MCIC, the VAS is considered more valuable in comparison to the SF-MPQ.² Conclusion no relevant change is found in the yoga intervention.

Sherman et al.⁴ used NRS in which the difference after six weeks is almost 2.5 points, so it would be considered a clinically important change for patients. If the MCIC values given as in Ostelo et al. are used as an indication and not as a set value. Shaper et al⁶ used pain scores which could be considered as a NRS, but instead is a 10-point scale. Mean pain scores decreased 2.3 points in this study, what could be considered clinically important.

Some results had a MCIC and a significant improvement, it could be said that yoga has a positive effect on people with low back pain. But due to the limitations of the studies, these results are not considered relevant to prove this statement.

Conclusion

Overall, yoga does seem to show some benefits. Five^{2-4,6,7} out of seven studies showed a positive effect of yoga on functional disability and pain. Although not always statistically significant. And also not always a relevant decrease of pain or functional disability for patients, showed with the MCIC. Also the yoga exercises that are used should be mentioned and possibly other outcome measures should be used, such as the Quebec Back Pain Disability Scale. Due to the limitations of the RCT's it is not possible to claim that yoga does help in chronic low back pain. Further studies should be done to confirm the hypothesis that yoga helps reduce pain and functional disability in people with low back pain.

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