Effects of yoga interventions on pain and pain-associated disability: a meta-analysis
Bussing A, Ostermann T, Ludtke R, Michalsen A

CRD summary
The authors concluded that despite some limitations there was evidence that yoga could be useful for several pain-associated disorders. The authors' cautious conclusions reflect the evidence presented but the differences between studies, small sample sizes and low quality evidence should be considered.

Authors' objectives
To evaluate the effectiveness of yoga interventions on pain and pain-associated disability.

Searching
PubMed, EMBASE and CAMbase were searched to January 2010. Search terms were reported. Reference lists of retrieved articles were checked and experts in the field were approached for unpublished material. It appeared that no language restrictions were applied.

Study selection
Controlled clinical studies that evaluated the effects of yoga interventions on pain symptoms were eligible for inclusion. The outcomes of interest were pain intensity/frequency and pain-induced disability. Outcomes had to be assessed with appropriate pain measurement tools. Studies with complex interventions which could have included yoga practice were excluded.

Where specified, yoga styles included hatha, Iyengar and viniyoga. Control groups included waiting list, physical activity and lectures, routine care and conversation or anti-inflammatory drugs. Participants included patients with back pain, rheumatoid arthritis, headache/migraine, irritable bowel syndrome, muscle soreness, carpal tunnel syndrome or labour pain or were on hemo-dialysis or were healthy computer users. Participant age ranged from 14 to 70 years old; most studies included participants under 50 years old. Studies evaluated treatment in the short term (up to four weeks), medium term (six to 10 weeks) and long term (12 to 24 weeks).

Two authors assessed studies for inclusion. It appeared that disagreements were resolved by consensus.

Assessment of study quality
Study quality was assessed using a modified Jadad score which evaluated randomisation, blinding of outcome assessors and drop-outs with a maximum possible score of 4 points. Allocation concealment was also assessed.

Two reviewers independently assessed the quality of the studies. Disagreements were resolved by consensus.

Data extraction
Data on pain, pain related disability and mood were extracted and used to calculate mean differences and their standard errors.

Two reviewers assessed studies for inclusion. Disagreements were resolved by consensus.

Methods of synthesis
Data were pooled using a random-effects model to calculate standardized mean differences (SMDs) and corresponding 95% confidence intervals (CIs). Heterogeneity was assessed using $X^2$ and $I^2$. Subgroup analyses were conducted for studies using the visual analogue scale as an outcome measure, different intervention condition, methodological quality and duration of treatment. Further subgroup analyses were used to explore heterogeneity and compared results for high and low quality, short, intermediate and long duration and type of control group. Publication bias was assessed using Egger's test.

Results of the review
Sixteen studies (1,007 participants) were included in the review; eleven randomised controlled trials (RCTs) and four
non-randomised controlled studies. Five RCTs scored 4 points for quality as they were randomised and single blind, seven RCTs scored between 2 and 3 points as they were randomised but unblinded. The four non-randomised controlled studies scored 0 to 1 point. Sample sizes ranged from 12 to 291.

Yoga interventions had a moderate positive effect on pain (SMD -0.74, 95% CI -0.97 to -0.52, 12 studies) with moderate heterogeneity ($I^2=44\%$) and pain related disability compared to control groups (SMD -0.79, 95% CI -1.02 to – 0.56, 12 studies) with high heterogeneity ($I^2=54\%$). Yoga also had a moderate effect on patients’ mood (SMD -0.65, 95% CI -0.89 to -0.42, six studies) with no evidence of heterogeneity ($I^2=0\%$).

Subgroup analyses did not significantly alter the overall results (details reported in review). There was no evidence of publication bias.

**Authors’ conclusions**
Despite some limitations, there was evidence that yoga could be useful for several pain-associated disorders. There was some evidence that even short-term interventions could be effective.

**CRD commentary**
The review question and inclusion criteria were clearly reported. Several relevant sources were searched and efforts were made to locate unpublished data. Formal assessment found no evidence of publication bias. Study quality was assessed and some results were reported. Appropriate methods to reduce reviewer error and bias were used for assessment of quality and data extraction but it was unclear whether similar methods were used for the selection of studies.

Given the differences between studies in terms of design (randomised and non-randomised), patient indications, control groups and quality, a meta-analysis may not have been appropriate. However the authors conducted various subgroup analyses to investigate differences between studies. It should be noted that the study with the largest sample included healthy computer users and many studies included patients less than 50 years old, which may affect the generalisability of the results to other patient populations. The authors’ cautious conclusions reflect the evidence presented but the differences between studies, small sample sizes and low quality evidence should be considered.

**Implications of the review for practice and research**
**Practice:** The authors concluded that evidence suggested yoga was a useful supplementary approach with moderate effect on pain and associated disability.

**Research:** The authors stated that further large studies were needed to identify which patients could benefit from yoga interventions and which aspects or style of interventions were most effective. Future studies should also consider the effect of positive expectations by patients of yoga on outcomes.

**Funding**
None.

**Bibliographic details**

**PubMedID**
22178433

**DOI**
10.1016/j.jpain.2011.10.001

**Original Paper URL**
http://www.jpain.org/article/S1526-5900%2811%2900792-9/abstract

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adolescent; Adult; Databases, Bibliographic /statistics & numerical data; Disabled Persons /psychology /rehabilitation; Female; Humans; Male; Middle Aged; Pain /complications /prevention & control /psychology; Yoga; Young Adult

**AccessionNumber**
12012002107

**Date bibliographic record published**
02/04/2012

**Date abstract record published**
22/08/2012

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.