Effects of yoga exercises for headaches: a systematic review of randomized controlled trials

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Abstract. [Purpose] To assess the evidence for the effectiveness of yoga exercises in the management of headaches. [Subjects and Methods] A search was conducted of six electronic databases to identify randomized controlled trials (RCTs) reporting the effects of yogic intervention on headaches published in any language before January 2015. Quality assessment was conducted using the Cochrane risk of bias tool. [Results] One potential trial was identified and included in this review. The quality critical appraisal indicated a moderate risk of bias. The available data could only be included as a narrative description. Headache intensity and frequency, anxiety and depression scores, and symptomatic medication use were significantly lower in the yoga group compared to the control group. [Conclusion] There is evidence from one RCT that yoga exercises may be beneficial for headaches. However, the findings should be interpreted with caution due to the small number of RCTs. Therefore, further rigorous methodological and high quality RCTs are required to investigate the hypothesis that yoga exercises alleviate headaches, and to confirm and further comprehend the effects of standardized yoga programs on headaches.

Key words: Headaches, Yoga exercises

INTRODUCTION

Headaches are a common and universal phenomenon in humans. They have been suggested as the main cause of time off from work, reduced school performance, and low quality of life1–3). Furthermore, they have led to personal, familial and societal burdens, and significant healthcare problems globally4, 5). The prevalence of headaches is estimated at 13% of the United States population6), 20% of the Australians1), and migraines are estimated at 11%, with tension-type headaches at 78% of the population world-wide5, 7).

According to the International Headache Society, headaches can generally be divided into two categories which are primary and secondary headaches on the basis of the underlying pathology8). Primary headaches are not associated with pre-existing medical conditions and there are three types: migraines, tension-headaches and cluster-headaches9). Secondary headaches are related to a pre-existing medical condition.

Headache management is traditionally based on pharmacological therapies. However, only about half of migraineurs show clinically positive responses to medications9). The remaining headache-sufferers discontinue medications due to adverse side-effects or excessive use of abortive medications. These can lead to a refractory condition of medication overuse headache, which means a consequent worsening of the headaches10). As a result of these shortcomings, complementary and alternative medicine has recently become common practice in current headache management6, 10–13).

Yoga exercises are considered to be complementary and alternative medicine and are practiced by approximately 5% of the adult population in the United States and 12% of Australians for alleviating headaches14). Yoga is a combination of physical postures and breathing exercises. Yoga has been reported as a safe and cost-effective intervention for managing pain1, 14).

Evidence for the efficacy of yoga exercise for a number of conditions is emerging. A growing body of evidence also supports the belief that yoga benefits physical and psychosocial health through the mechanisms of down-regulation of the hypothalamic-pituitary-adrenal axis and the sympathetic nervous system15–17). As a result, yoga plays an important role in reducing sympathetic activity, increasing parasympathetic activity, improving quality of life, and decreasing pain levels18, 19). As stated, there is evidence of the benefit of yoga in reducing pain20, 21). However, rigorous methodology and quality of the evidence needs to be examined to establish whether or not we can assert yoga can be used as a complementary and alternative therapy for sufferers of headaches22, 23). Therefore, the aim of this review was to assess the evidence for the effectiveness of yoga exercises in the management of primary headaches.
SUBJECTS AND METHODS

The review was planned and conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines\(^24\), and the Consolidated Standards of Reporting Trials (CONSORT) guidelines for Reporting Parallel Group Randomized Trials\(^25\). The Cochrane Library, CINAHL, Embase, PsycINFO, PubMed, and KoreaMed electronic databases were searched to identify RCTs published between 1966 and January 2015. The search terms were as follows: yoga AND headache OR migraine. All potentially eligible studies were retrieved and the full texts of the articles were reviewed to determine whether they met the following selection criteria.

To be eligible, studies had to meet the following conditions. 1) Population: participants in the trials had to meet diagnostic criteria according to the International Classification of Headache Disorders, 3rd edition (beta version) published by the International Headache Society 2013\(^8\); primary headaches. 2) Intervention: randomized controlled trials were included that used yoga as an intervention to review or reduce symptoms associated with headaches or migraines compared with no yoga. 3) Outcomes: primary outcomes were headache intensity, frequency, and duration; secondary outcomes were anxiety and depression scores, and symptomatic medication use. Quality assessment of the articles was conducted using the critical appraisal, Cochrane risk of bias tool for RCTs, which was recommended by the Cochrane Handbook for systematic Reviews of Interventions\(^26\). The Cochrane risk of bias tool is a six-item list designed to assess sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting, and other potential sources of bias. Each item is rated as “yes”, “no”, or “unclear”. According to the Cochrane Handbook, the quality of clinical trials can be divided into three levels\(^27\). When the study design fully meets the preceding six criteria, it is considered A level, which means a low risk of bias. B level is assigned when one or more criteria are partly met, and when one or more criteria are not met, the study is defined as C level, implying high risk of bias. Studies rated as C level should be eliminated\(^24\). No meta-analysis was performed as only one study was identified.

RESULTS

A total of 179 titles related to the search terms were screened. Among these, there were 32 potential trials identified from CHINAL, 52 from KoreaMed, 43 from PsycINFO and 52 from the PubMed databases. After the titles had been retrieved a total of 121 studies were excluded either because they were duplicates or they were case studies, commentaries, review articles, or had no target concepts, which means no headaches or migraines. The remaining 58 abstracts were retrieved. After assessing the abstracts, 24 studies were excluded because there was no yoga intervention. Thirty-four potential trials were identified in the search conducted in January 2015. Thirty-four potentially relevant papers were retrieved for evaluation of the full text. After evaluation of the 34 full texts, 33 studies were excluded, because 30 studies had no randomized trials and 3 studies had no full text of RCT. The literature retrieval process is depicted in Fig. 1. The characteristics of the included study are also presented (Table 1).

The one RCT originated in India\(^28\). The trial was conducted at the Zoology department of a University. Participants were recruited from a headache clinic of the NMP medical research institute by advertising in local newspapers. The sample size of the trial totaled 72 participants. The participants’ mean age was 34.2 years, and they had primary headaches with migraines.

The yoga program comprised yoga postures, breathing and pranayama, and kriya etc. Yoga postures included physical exercises such the stretching of the neck, shoulder and back muscles, followed by relaxation, toning, strengthening, and flexibility. Breathing and pranayama means conscious breathing, kriya was practiced as a jalaneti (nasal water cleansing) and kapalbhanti (forced exhalations). Program length, frequency, and duration of one trial was 60 minutes a day, 5 days per week for 3 months. Yoga was performed under the guidance and supervision of a yoga therapist.

One trial was identified that compared a control group with a yoga intervention group and evaluated the effect on headaches. The available data could only be included as a narrative description. Headache intensity (p<0.001), headache frequency (p<0.001), anxiety and depression scores (p<0.001), and symptomatic medication use (p<0.001) were significantly lower in the intervention group then in the control group (Table 1). Neither included trial reported data on adverse effects of treatment (Table 1).

Assessments of each methodological quality item of the one included trial are described (Table 2). The quality of the one trial was level B.

![Fig. 1. Flowchart of included studies through the literature searches](image-url)
DISCUSSION

The purpose of this review was to assess the evidence for the effectiveness of yoga interventions for primary headaches when compared to no yoga. A meta-analysis combining results from all the trials was not possible because only one study was identified. Only one RCT was identified and included in this review. Its interventions included yoga poses, pranayama, and kriya to manage headaches or migraines. One trial reported a significant decrease in headache intensity, headache frequency, anxiety and depression scores, and symptomatic medication use in the trained group. If required, participants were allowed to take acute medication prescribed by neurologists during the trial. The effects of the medication could have diminished the efficacy of yoga exercises for alleviating headaches. In spite of both groups having received medication, reduction in the outcome of the yoga group was significantly higher than that of the control group. As stated in previous studies, these results support yoga practice as a means of evidence-based positive management of headaches or migraines. The quality rating of the trial included in this review had a moderate methodological quality, and the trial did not mention blinding. However, no strong conclusion can be made due to the number of small trials and other methodological considerations.

The strength of this systematic review includes the use of strict methodological criteria. Major strengths of this group of studies include the study, the use of randomization, and the quality of measurement tools. This may be the first comprehensive review of yoga exercises for headaches. No adverse effects associated with yoga practice were described.

This study had some limitations. First, the trial had no placebo group. This may have led to favorable effects in the yoga group. Second, the trial did not mention blinding, lack of which may have threatened the internal validity of the trial. Third, all the outcome measurements were questioner-based and subjective; objective parameters were lacking. Therefore, evidence-based research employing objective outcome parameters is needed to identify the efficacy of integrated yoga therapy for headaches. Fourth, the trial had no long-term follow-up data concerning the durability of the treatment effect. Finally, the generalizability of the findings was limited due to the number of small trials and their partially limited quality. However, this one trial does provide a strong basis for future studies and suggests that yoga exercises could provide a safe, cost-effective therapy for the growing public health issue of headaches. Furthermore, this review contributes to the development of knowledge in physical therapy about how sufferers with primary headaches can manage themselves.

In conclusion, although this review retrieved only a limited number of small trials, of partially limited quality, its findings suggest that yoga practice can effectively alleviate symptoms associated with primary headaches. However, further rigorous methodological and high-quality RCTs are needed to confirm and further comprehend the effects of standardized yoga programs aiming to control pain intensity and frequency, symptoms, and medication use etc., in the treatment of primary headaches.

Table 1. Characteristics of included randomized controlled trials

| Author, year, location | Participants | Interventions | Outcome measures | Main results | Adverse events | Limitations |
|------------------------|--------------|---------------|-----------------|--------------|---------------|-------------|
| John et al., 2013, India/Rajasthan | General person | 72 (36/36) | Yoga postures, pranayama, kriya | Headache intensity | p<0.001 | None | Absence of a placebo groups. |
|                         | (34.2/34.3)  | 60 min per day, 5 days per week | (p<0.001) | (p<0.001) | All subjective outcome measures. |
|                         | 7 (9.7)      | 3 months | Self-care Education | Headache frequency | p<0.001 |
|                         | 3 months | Anxiety-depression scores | (p<0.001) | Symptomatic medication use |
|                         | Yoga therapist | Handouts | Headache duration | (p<0.001) |
|                         |             |             |                        |               |
| EG: experimental group; CG: control group; N: number |

Table 2. Methodological quality summary of included trials

| Study, year | Random allocation | Allocation concealment | Blinding | Incomplete outcome reporting | Selective reporting | Other bias | Quality level |
|-------------|-------------------|------------------------|----------|-----------------------------|---------------------|------------|---------------|
| John et al., 2013 | + | + | ? | + | + | + | B |

+: criteria met; -: criteria not met; ?: unclear whether criteria were met
REFERENCES

1) Brummer M: Yoga and ayurveda for headaches and migraines. Posit Health, 2005, 110: 45–48.
2) Hainsworth KR, Salamon KS, Khan KA, et al.: A pilot study of yoga for chronic headaches in youth: promise amidst challenges. Pain Manag Nurs, 2014, 15: 490–498 [CrossRef]. [Medline]
3) Lauriti L, Motta LJ, Silva PF, et al.: Are occlusal characteristics, headache, parafunctional habits and clicking sounds associated with the signs and symptoms of temporomandibular disorder in adolescents? J Phys Ther Sci, 2013, 25: 1331–1334. [Medline] [CrossRef]
4) Steiner TJ, Stovner LJ, Birbeck GL: Migraine: the seventh disabler. J. Phys. Ther. Sci. Vol. 27, No. 7, 2015
5) Kisan R, Sujan M, Adoor M, et al.: Effect of Yoga on migraine: a comprehensive study using clinical profile and cardiac autonomic functions. Int J Yoga, 2014, 7: 126–132 [CrossRef]. [Medline]
6) Wells RE, Bertisch SM, Buettner C, et al.: Complementary and alternative medicine use among adults with migraines/severe headaches. Headache, 2011, 51: 1087–1097 [CrossRef]. [Medline]
7) Karakurum Göksel B, Coşkun Ö, Ucler S, et al.: Use of complementary and alternative medicine by a sample of Turkish primary headache patients. Agri, 2014, 26: 1–7 [CrossRef]. [Medline]
8) International Headache Society: The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia, 2013, 33: 629–808.
9) Shamiyani TA, Choi JY, Ramakrishnan R, et al.: Preventive pharmacologic treatments for episodic migraine in adults. J Gen Intern Med, 2013, 28: 1225–1237. [Medline] [CrossRef]
10) Wells RE, Burch R, Paulsen RH, et al.: Meditation for migraines: a pilot randomized controlled trial. Headache, 2014, 54: 1556–1565. [Medline] [CrossRef]
11) Vural M, Berkol TD, Erdogan Z, et al.: Evaluation of the effectiveness of an aerobic exercise program and the personality characteristics of patients with fibromyalgia syndrome: a pilot study. J Phys Ther Sci, 2014, 26: 1561–1565. [Medline] [ CrossRef]
12) Bae Y, Park Y: The effect of relaxation exercises for the masticator muscles on temporomandibular joint dysfunction. J Phys Ther Sci, 2013, 25: 583–586. [Medline] [CrossRef]
13) Preter M, Lieblitch S: Complementary and alternative medicine (CAM) approaches to headache; in the neuropsychiatry of headache, by Green MW, Muskin PR (ed.). New York: Cambridge University Press, 2013, pp 131–148.
14) Siibbritt D, Adams J, van der Riet P: The prevalence and characteristics of young and mid-age women who use yoga and meditation: results of a nationally representative survey of 19,209 Australian women. Complement Ther Med, 2011, 19: 71–77. [Medline] [CrossRef]
15) Sharma M: Yoga as an alternative and complementary approach for stress management: a systematic review. J Evid Based Complement Altern Med, 2014, 19: 59–67 [CrossRef]. [Medline]
16) Riley D: Hatha yoga and the treatment of illness. Altern Ther Health Med, 2004, 10: 20–21. [Medline]
17) Damodaran A, Malathi A, Patil N, et al.: Therapeutic potential of yoga practices in modifying cardiovascular risk profile in middle aged men and women. J Assoc Physicians India, 2002, 50: 633–640. [Medline]
18) Nespor K: Pain management and yoga. Int J Psychosom, 1991, 38: 76–81. [Medline]
19) Evans S, Subramanian S, Sternlieb B: Yoga as treatment for chronic pain conditions: a literature review. J Endocr Genet, 2008, 7: 25–32.
20) Sharma N, Singhal S, Singh A, et al.: Effectiveness of integrated yoga therapy in treatment of chronic migraine: randomized controlled trial. J Headache Pain, 2013, 14: 1. [CrossRef]
21) Büssing A, Ostermann T, Lüdtke R, et al.: Effects of yoga interventions on pain and pain-associated disability: a meta-analysis. J Pain, 2012, 13: 1–9. [Medline] [CrossRef]
22) Latha M, Kaliappan KV: The efficacy of yoga therapy in the treatment of migraine and tension headaches. J Indian Acad Appl Psychol, 1987, 13: 95–100.
23) Latha D, Kaliappan KV: Efficacy of yoga therapy in the management of headaches. Indian J Psychol, 1992, 10: 41–47.
24) Moher D, Liberati A, Tetzlaff J, et al. PRISMA Group: Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med, 2009, 151: 264–269, W64. [Medline] [ CrossRef]
25) Schulz KF, Altman DG, Moher D, CONSORT Group: CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. J Clin Epidemiol, 2010, 63: 834–840. [Medline] [CrossRef]
26) Higgins JP, Green S: Cochrane Handbook for Systematic Reviews of Interventions. Version 5.1.0 (updated March 2011) Ed: The Cochrane Collaboration, 2011.
27) Yang LH, Duan PB, Du SZ, et al.: Efficacy of auriculotherapy for constipation in adults: a systematic review and meta-analysis of randomized controlled trials. J Altern Complement Med, 2014, 20: 590–605. [Medline] [CrossRef]
28) John PJ, Sharma N, Sharma CM, et al.: Effectiveness of yoga therapy in the treatment of migraine without aura: a randomized controlled trial. Headache, 2007, 47: 654–661. [Medline] [CrossRef]
29) David Z: The effects of yoga-based and walking interventions on headaches, stress, and anxiety. ProQuest Information & Learning, 2014, AA13594057.