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Is Yoga an Effective Treatment for Reducing the Frequency of Episodic Migraine?

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A SELECTIVE EVIDENCE BASED MEDICAL REVIEW

In Partial Fulfillment of the Requirements For

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In

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Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
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ABSTRACT

OBJECTIVE: The objective of this selective EBM topic is to determine whether or not, “Is yoga an effective treatment for reducing the frequency of episodic migraine?”

STUDY DESIGN: Review of 3 English language primary studies published between 2007 and 2015.

DATA SOURCES: Three randomized control trials (RCTs) were found using PubMed search criteria. These studies analyzed the frequency of migraine experienced by sufferers as influenced by yoga therapy.

OUTCOMES MEASURED: Migraine frequency was measured as self-reported by the participants in each study.

RESULTS: All three studies demonstrated a statistically significant reduction in the number of migraine episodes after yoga therapy treatment, as compared to control.

CONCLUSION: The results of all included studies show that yoga is an effective treatment for reducing the frequency of episodic migraine headaches.

KEY WORDS: Migraine, Yoga, Frequency

INTRODUCTION

Migraine is a debilitating neurologic disorder that is the 6th most disabling illness worldwide.¹ During acute attacks, 90% of sufferers are unable to work due to the severity of head pain, which often presents in conjunction with dizziness, nausea, vomiting, photophobia, phonophobia, as well as numbness and/or tingling in the extremities and face.¹ The most common reason for migraine to progress from episodic to chronic form is medication overuse.¹ The latter findings have spurred interest to find effective alternatives to medication for the acute and prophylactic treatment of episodic migraine.

While the etiology of migraine is idiopathic, research suggests that migraines arise due to arteriole narrowing often as a result of stress or muscular tension. Arteriole narrowing causes a sudden shift in blood vessel dilation which then triggers the severe pain of a migraine episode. Acute medical therapies for migraine primarily include ergotamines, triptans, and NSAIDs. Propranolol is also used as an effective prophylactic medication. While effective, the medical costs of treating chronic migraine were estimated to be more than \$5.4 billion in 2015. Healthcare costs and lost productivity are estimated to be as high as \$36 billion annually.¹

Existing research has documented generally positive effects of yoga on stress, anxiety, depression, epilepsy, multiple sclerosis, carpal tunnel syndrome, back pain, arthritis, musculoskeletal and cardiopulmonary disease and even cancer.² Derived from the Sanskrit word “yuj” which means “to unite or integrate”, the practice of yoga is a means of harmonizing the body with mind and breath. Specifically, yoga incorporates breathing exercises, yoga postures known as asanas, and meditation. The calming effect of yoga on the autonomic nervous system is believed to promote vessel tone regulation

by increasing levels of circulating nitric oxide in the blood.³ This action is thought to mitigate effects of stress on the vessels that in turn trigger the migraine attack. As such, the following review seeks to evaluate the effectiveness of yoga therapy on reducing the frequency of migraines experienced, among sufferers.

OBJECTIVE

The objective of this selective EBM review is to determine whether or not yoga is an effective treatment for reducing the frequency of episodic migraine.

METHODS

The population of the studies used for this review included both men and women age 18 to 60. In each of the three studies, headache frequency was assessed through participants' self report of migraine frequency. In each of the treatment groups, weekly yoga therapy was given for different periods of time. One study offered a 12 week yoga training program consisting of 3, 75 minute sessions per week as well as medical therapy as compared to a control group that was offered medical therapy alone. Another study offered 12 weeks of yoga therapy consisting of 5, 60-minute sessions per week as compared to a control group that was offered only medical therapy alone. The third study offered 6 weeks of yoga therapy, consisting of 5, 60 minute sessions per week in addition to 6 weeks of conventional care as compared to conventional care alone, given to control.

Using the keywords “yoga “ and “migraine frequency”, the author carried out a detailed search using PubMed. Each of the articles were published in English and peer

reviewed journals. Each of the articles were selected based on their relevance to the clinical question at hand as well as their applicability to meeting POEM criteria.

Studies that were not conducted as randomized control trials, those that contained less than 30 participants, and those that were not conducted within the last 10 years were excluded from this evidence based medical review.

The studies contained in this review included participants who met HIS and ICHD-II criteria for migraine with or without aura, and those with a minimum 2 year history of migraine who reported frequency of 4 -15 times per month. Included participants agreed to abstain from all other forms of exercise during the treatment periods and were willing to attend regular yoga therapy sessions. Participants had no previous yoga training and had taken no prophylactic medication for migraine within the last 2 months. The studies contained in this review excluded participants with co-occurring systemic diseases or psychiatric conditions, pregnant or lactating women, as well as those who had suffered head or neck trauma within the last 2 years (Table 1).

In these 3 RCT studies, mean change from baseline was reported to assess treatment effect as indicated by migraine frequency. T-tests were reported in order to assess statistical significance of each study's findings. Table 1 displays the demographics and characteristics of the included articles.

Table 1. Demographics and Characteristics of Included Studies

Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Boroujeni, 2015	RCT	32	F 18+	All patients of menstrual age and had no previous experience with yoga training before; All subjects under the same pharmacologic treatment and had no other exercise during the treatment period	Receiving different medical treatment; Coexisting diseases	10	12 week course medication treatment and yoga training program of 3, 75-minute sessions per week
John, 2007	RCT	72	M/F 20-25	Willing to attend regular sessions; No prophylactic medication taken for migraine within the last 2 months; Minimum of 4 and maximum of 15 migraine attacks per month; understanding of English language	15+ migraine attacks per month; Systemic disease or psychiatric condition; Pregnant women; Subjects having headaches linked to diet, allergy, or menstruation; Current migraine treatment; Pre-existing yoga practice	7	12 weeks of yoga therapy of 5, 60 minute sessions per week
Kisan, 2014	RCT	60	M/F 15-60	Pts meet HIS, ICHD-II criteria for migraine with or without aura, 2 yr hx of migraine and 5-15/month frequency	Existing medical or psychological illness; head or neck trauma within 2 yrs; Pregnant or lactating patients	24	6 weeks yoga therapy of 5, 60 minute sessions per week AND 6 weeks of conventional care

OUTCOMES MEASURED

Each outcome measured was a POEM. In each of the studies, migraine frequency was assessed similarly. In the study conducted by Bourojeni et al., daily reports of headache frequency were reported by participants. In the study conducted by John et al., participants reported the average number of total headache days they experienced on a weekly basis over the 3 month study period. Lastly, in the study conducted by Kisan et al., participants maintained a headache diary, documenting migraine frequency, which was collected at the conclusion of the study.

RESULTS

The randomized control trial conducted by Boroujeni et al. consisted of 32 female patients who were allocated to either a case or control group through a computer generated random number list. The study was completed by 22 participants. Three participants withdrew from the yoga therapy group; Two patients withdrew due to unknown reasons and 1 patient due to drug side effects. Seven participants withdrew from the control group; Four participants withdrew due to worsening symptoms, 2 refused to participate in the blood test, and 1 participant withdrew due to work scheduling conflicts. In summation, eighteen participants completed the yoga therapy treatment, which consisted of 3, 75-minute sessions per week in addition to the same medical treatment, received only by the 12 control participants. Yoga therapy consisted specifically of Hatha yoga (yoga postures), breathwork, and shavasana (relaxation).

The average age of participants in the yoga therapy and control groups were 35.4 and 34.9 years respectively. After the 12 week treatment period, the yoga therapy group

showed an average decrease in headache frequency of 2.8 as compared to a mean increase of 1.37 as seen in control. This reduction in headache frequency was found to be statistically significant with a reported p-value of 0.007 as shown in Table 2.

The randomized control trial conducted by John et al. recruited participants from the headache clinic of the NMP Medical Research Institute as well as from local newspaper advertisements. Seventy-two patients found to initially fit the inclusion criteria were randomly assigned into the yoga therapy and self-care groups. Thirty-two participants completed the study for the yoga therapy group, and 33 participants completed the study for the self-care group. The treatment phase was 12 weeks for both groups and each was allowed to take acute migraine medications as approved by neurologists only. In addition, the experimental group received 5, 60 minute sessions of yoga therapy per week. Yoga therapy consisted of yoga postures, breathing practices, kriya (nasal cleansing), and meditation. Conversely, the self-care group received a once monthly educational session on migraine where participants were educated on triggering factors, self-care strategies, and lifestyle modifications.

The average age of participants for each study was 34.4 and 34.2 for the yoga and self-care groups respectively. After the 12 week study period, the yoga therapy group reported the incidence of 5.66 fewer migraine headaches as compared to a mean increase of 0.36 seen in control. This reduction in headache frequency was found to be statistically significant with a reported p-value of 0.001 (Table 2).

In the randomized control trial conducted by Kisan et al., participants were recruited from a tertiary referral neurology center. Eighty-four participants were found to meet the diagnostic criteria for migraine as outlined by the International Headache

Society, International Classification of Headache Disorders 2nd Edition. Seven participants withdrew from the control group; Three participants did not keep up with daily headache diary entries and 4 did not come for the post-assessment. Seventeen participants withdrew from the treatment group; Eleven participants were withdrawn from the study due to the fact that they only participated in yoga and 6 did not come for the post assessment. In summation, thirty participants completed the study for the yoga therapy group, and 30 participants completed the study for the self-care group. The study was conducted for 6 weeks. The treatment group received 5, 60 minute sessions of yoga per week in addition to conventional care, while the control group received conventional care alone. Specifically, yoga therapy consisted of asanas, breathing exercises, and shavasana.

Participants ranged from 15 to 60 years of age although average ages for the therapeutic and control groups were not reported. At the conclusions of the 6 week study period, the yoga therapy group reported 9.5 fewer migraine episodes as compared to an average of 5.3 fewer as reported by the control group. Thus, both yoga therapy and control treatments were found to reduce headache frequency with statistical significance at a reported p-value of 0.001 (Table 2). Between group differences were not statistically analyzed by the authors of the study, however the authors concluded the yoga therapy to be effective “to a greater extent” than conventional care alone.

Table 2. Statistical Analyses for Included Studies

Study and Therapeutic Group	Number of Participants	Mean Age	Migraine Frequency: Mean Change from Baseline	P-value
Bourojeni et al. Yoga Therapy Group	18	35.4	-2.8	<0.007
Bourojeni et al. Control Group	12	34.9	+1.37	<0.007
John et al. Yoga Therapy Group	32	34.4	-5.66	<0.001
John et al. Control Group	33	34.2	+0.36	<0.001
Kisan et al. Yoga Therapy Group	30	—	-9.5	<0.001
Kisan et al. Control Group	30	—	-5.3	<0.001

DISCUSSION

The three randomized controlled trials discussed in this review suggest that a relationship does exist between the practice of yoga and the experience of migraine headaches. Each of the three studies demonstrated a relationship between the practice of yoga and a statistically significant reduction in the number of migraines experienced by sufferers ($P < 0.05$).

Each of the studies however, were not without limitations. Of the 3 studies discussed, the study conducted by Bouojeni et al. provided the least generalizable results as the study population consisted of only females and a relatively small sample size of 30 subjects. Additionally, all of the subjects in the study conducted by Bouojeni et al. were told that the intention of treatment therapy was to reduce the negative effects of migraine.

Future replications of this study could be improved thus, by including equal numbers of both genders, increasing the sample size, as well as keeping participants blind to the intention of the study in order to reduce response bias.

The study conducted by John et al. was also limited by response bias as subjects were again, informed that a study of migraine treatment was being conducted which intended to reduce the negative effects of the disease on their personal, family, and social lives. As such, the yoga group may have felt the need to record a favorable result whereas the control group may have felt a desire to report an unfavorable outcome.² Future replications of this study would benefit from keeping both the control and treatment groups blind to the intention of the study.

Conversely, a strength of the John et al. study was that the control and treatment groups were very similar at measures at baseline. Nearly equal numbers of participants completed the yoga therapy and control treatments; Thirty-two participants completed the yoga therapy treatment and 33 completed the study under the control conditions. The latter helped to improve the validity of results seen between the two groups.

The greatest reduction in migraine frequency was seen in the study conducted by Kisan et al., which demonstrated 9.5 fewer migraine episodes among the treatment group at the completion of the study period. Limitations to this study included the length of the study period, which was only 6 weeks as compared to the 12 week study periods of the studies conducted by Bourojeni and John et al. Replications of this study would benefit from lengthening the clinical phase of treatment.

Withdrawal rates were an additional area of concern as Kisan et al. lost 29% of participants and Boroujani et al. lost 31%. Overall, the majority of participants in the

study conducted by Kisan et al. were withdrawn due to failure of the participants to attend the post-assessment. The reasons for withdrawal in the study conducted by Boroujani et al. were diversified but were mostly due to adverse drug effects. Future studies could be proactive to screen participants with a past medical history of medication sensitivities and also take steps to encourage post-assessment attendance.

Despite the limitations discussed above, the results of each of the studies discussed in this review suggest that yoga therapy is an effective treatment modality in reducing the number of migraines experienced by sufferers. While variability exists between the number and length of yoga sessions offered to the treatment groups of the 3 studies (Table 2), the total amount of yoga experienced by participants was relatively comparable as shown in Table 3. Furthermore, it was demonstrated that the greatest reductions in migraine frequency were seen in participants who received the most yoga therapy, 300 minutes per week. The latter offers further support to the effectiveness of yoga practice on reducing migraine episodes.

Table 3. Study Duration and Yoga Therapy Treatment Details of Included Research

Study	Duration of Study	Minutes of yoga per week received by treatment group	Type of Yoga	Migraine frequency Mean Change from Baseline
Bourojeni et al.	12 weeks	225 min/week	Hatha yoga, Breathwork, Shavasana	-2.8
John et al.	12 weeks	300 min/week	Asanas, Breathwork, Kirya (nasal cleansing), Meditation	-5.66
Kisan et al.	6 weeks	300 min/week	Asanas (postures), Breathwork, Shavasana	-9.5

CONCLUSION

The results of the studies included in this review support yoga therapy as an effective treatment for reducing the frequency of episodic migraine among sufferers.

The results of each of the three randomized controlled trials demonstrated fewer migraine episodes after yoga therapy treatment with statistical significance. Based upon such findings, yoga should be considered as a non-pharmacologic, supplemental treatment for individuals suffering from episodic migraine.

Future studies could focus on an identifiable mechanisms of action such as nitric oxide, as a quantitative variable for evaluation in future studies. Future studies could also examine the comparative benefits between yoga styles and specific yoga postures in order to maximize practice benefits for migraine sufferers. Finally, long term follow up studies should be conducted as to better assess the cumulative effects of yoga therapy on episodic migraine over time.

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