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Is Massage Therapy Effective As A Non-Pharmacologic Treatment For Individuals Suffering From Migraines?

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A SELECTED EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences—Physician Assistant

Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
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ABSTRACT

OBJECTIVE: The objective of this selective EBM review is to determine whether or not massage therapy is effective as a non-pharmacologic treatment for individuals suffering from migraines.

STUDY DESIGN: Review of all English language primary randomized controlled trials from 1996-2011.

DATA SOURCES: Three randomized controlled trials were found using Pubmed, CINAHL, and Cochrane databases. These compared massage therapy trials in patients suffering from migraine headaches.

OUTCOMES MEASURED: Each trial measured the outcomes in slightly different ways. The Hernandez et al study used the VITAS pain scale, symptom checklist, headache log, and a sleep log to record outcomes. The Lawler et al study used patient daily diaries of headache frequency, intensity, medication use, and sleep behavior. The Lemstra et al study used a headache diary to record pain intensity, duration, frequency, quality of life, functional status, depressive symptoms, medication use, work status, and health status.

RESULTS: There were statistically significant differences between control and intervention groups that received massage therapy in all three studies. Though each study measured different outcomes, all three showed a statistically significant decrease in migraine frequency for those who received that treatment. Hernandez et al study showed a statistically significant decrease in somatic symptomatology and the pain scale. Lawler et al showed an increase in sleep quality. Lemstra et al showed a decrease in pain intensity, pain duration, and depressive symptomatology as well as an increase in functional status for these patients.

CONCLUSIONS: The results show that massage therapy is an effective non-pharmacologic treatment for those who have migraine headaches. It shows a decrease in migraine frequency, duration, somatic symptomatology, and sleep quality. Additional research is needed on the long-term effects of patients to quantify the impact it has on functional status.

KEY WORDS: Migraine; Headache; Massage therapy

INTRODUCTION

Migraines are a chronic, episodic condition that are distressing to their population and involves a general decrease in ability to function during their variable duration³. Most treatment is pharmacological when being treated by a physician, but many patients are seeking alternative and non-pharmacological treatments to treat and prevent their migraines. This paper evaluates three randomized controlled trials (RCTs) looking at the effectiveness and use of massage therapy as non-pharmacologic treatment for migraine headaches.

Migraines are a common health problem among all ages of the population, which makes it very likely that practioners will encounter many patients who suffer from migraines. Migraines affect approximately 18% of women and 6% of men in the United States causing approximately 5.5 million visits in either a practitioners office, Emergency Department, or inpatient care facility annually. Migraine sufferers require on average 3.8 bed rest days for men and 5.6 days for women each year, resulting in a total of 112 million bedridden days. Employers loose about \$13 billion a year because of missed workdays and impaired work function. Annual direct medical costs are about \$1 billion and about \$100 was spent per diagnosed patient².

Migraines result due to a complex series of neural and avascular events, including dilation of blood vessels. They may be caused by an external stimulus, psychological factors, or hormonal changes, including stress, barometric pressure, certain foods, and flashing lights¹. Migraines are a benign and recurring syndrome associated with varying neurologic dysfunction consisting of unilateral, throbbing headache pain. Many patients experience varying degrees of nausea, vomiting, photophobia, phonophobia, osmophobia, and anorexia associated with the headache which presents with or without an aura³.

There are many differing treatments available for migraines—pharmacological and non-pharmacological. Some of the non-pharmacological treatments range from avoidance of triggers to behavioral changes like resting in a dark room, regular mealtimes, and regular daily exercise. First line pharmacological therapy is treatment with NSAIDs and simple analgesics, including Naproxen, Ibuprofen, and Excedrin Migraine. In more moderate to severe migraines, treatment with 5-HT₁ agonists, like Rizatriptan, Treximet, Sumatriptan, Zolmitriptan, etc., are used. Dopamine agonists, like Reglan and Compazine, are used as adjunctive treatments. If the migraines are very severe and occur multiple times per week, propranolol topiramate, amitriptyline, and Botox injections may be used as preventative treatments².

Migraine headaches have many pharmacological treatment options that come with many adverse drug reactions and drug interactions. Many patients are looking for an effective non-pharmacological therapy as an adjunct or sole treatment of their migraine headaches. Massage therapy is an alternative treatment option for these patients. It is theorized that massage can prevent migraines by reducing sympathetic arousal, reducing muscle tension, and improving sleep behaviors³. Approximately half of patients discontinue pharmacologic treatment because they are frustrated with the side effects or non-satisfactory response to current treatments⁴. The use of stress relieving activities are effective in reducing the severity of migraine headaches. Massage therapy is being proposed as an effective non-pharmacological option for the treatment of migraine headaches.

OBJECTIVE

The objective of this selective EBM review is to determine whether or not massage therapy is an effective non-pharmacological treatment for patients with migraines.

METHODS

The following criteria were used in the selection of the three main studies found in this review. The articles included men and women over the age of 12 suffering from migraine headaches, as well as including massage as an intervention. Comparison groups and outcomes measured were varied in the selected studies. Hernandez et al. (1998) compared groups given massages twice a week and a control group that did not receive the massages until after the study was completed. The outcomes measured were a VITAS pain scale, symptoms checklist, headache log, and sleep log. Lawler et al. (2006) compared a group who underwent weekly massage sessions and a group that did not undergo the sessions and they compared daily diaries of headache frequency and intensity, medication use, and sleep behavior. The outcomes measured were state of anxiety, migraine frequency, perceived stress, and coping efficacy. Lemstra et al. (2002) compared groups undergoing exercise therapy sessions, stress management classes, dietary lecture, and massage therapy sessions. This group was compared with a group undergoing standard care with their family physician. The outcomes measured were self-perceived migraine intensity, frequency, and duration, functional status, quality of life, health status, depression, medication use, and work status.

The studies were researched using the Cochrane Database, PubMed, and CINAHL, using the keywords “migraine,” “headache,” and “massage therapy,” as well as setting the language to English. Each article was published in peer-reviewed journals and were selected based on relevance and patient oriented outcomes. Inclusion criteria for this review were RCT studies published after 1996 with outcomes that are important to patients suffering from migraine headaches. Exclusion criteria were patients under the age of 12 years old and those who are not suffering from chronic migraine headaches (ex. Cluster headaches, tension headaches, etc.).

Table 1 describes the demographics of each study used. The statistics measured by these studies were p-values, numbers needed to treat (NNT), absolute benefit increase (ABI), and relative benefit increase (RBI).

Table 1: Demographics of the three included studies.

Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Intervention
Hernandez-Reif ¹ , 1998	RCT	26	24-65	Men and women age 24-65 who suffer from migraines for a period of at least 6 months; middle socioeconomic status	Patients unable to attend therapy for 5 weeks	N/A	30 minute massages were given twice a week for 5 consecutive weeks by massage therapists
Lawler ³ , 2006	RCT	47	12-60	Men and women between the ages of 12-60 years old who suffer from migraines	Patients unable to transport to therapy; pts unable to commit to 13 weeks of treatment	4	Weekly massage sessions during weeks 5 to 10
Lemstra ⁴ , 2002	RCT	80	≥ 18	Patients within Saskatchewan city limits; diagnosis of migraines; chronic migraine pain >6 months; ≥ 18 years of age	Headache pain of a benign nature	3	18 group supervised exercise therapy sessions, 2 group stress management and relaxation therapy lectures, 1 group dietary lecture, 2 massage therapy sessions

OUTCOMES MEASURED

The outcomes in Lawler et al. measured patients-oriented outcomes before, during, and after the massage or non-massage interventions, including the patients perceived state of anxiety using STAI-sf, migraine headache frequency and sleep quality using daily patient diaries collected 4 times daily, perceived stress using the Perceived Stress Scale (PSS), and coping efficacy relayed with a 7 item questionnaire rated 0-4. Hernandez et al. measured outcomes including pain through the VITAS Pain Scale, time interaction effect and somatic symptoms—like anxiety, depression, and hostility—using the SCL-90R, days with headaches and associated pain level using a headache log and the Global Headache Score, and the quality and quantity of sleep through the Sleep Log before and after the 5 weeks of intervention. Lemstra et al. measured several patient oriented outcomes, including: self perceived pain, functional status, quality of life, health status, depression, prescription/non-prescription medication use, and work status through the written and telephone questionnaires before and after the interventions.

RESULTS

The primary outcome measured in all three studies pertained to the overall improvement in migraine frequency, duration, and functional status. Each study used a slightly different scale to measure the outcomes of either: improvement of migraine symptoms, migraine frequency, quality of life, stress/anxiety state, and/or sleep quality. Table 2 shows the significant outcomes made between groups in each study who received massage therapy versus control groups who did not receive massage therapy. Each study showed a significant change from baseline for the groups that received massage therapy.

The Hernandez et al. study studied pain intensity, symptomatology, and sleep quantity. There was a significant decrease in pain intensity for the group that received the massage therapy

($F=8.34$, $p < 0.001$). When symptomatology was measured there was a significant decrease in somatic symptoms and lower anxiety for groups that had the therapy (Baseline: $M=59.1$, $SD=7.2$; Intervention: $M=55.5$, $SD=9.2$, $p < 0.01$). There was also a significant change made between groups for number of days experienced without a migraine headache (Massage Group: $M=57.6$, $SD=21.9$; Control Group: $M=44.2$, $SD=28.7$). There was an increase in the amount of hours slept and a decrease in nightwakings for the massage therapy group (Hours slept: $F=6.59$, $p < 0.05$; Nightwakings: $F=5.82$, $p < 0.05$)¹.

In the Lawler et al. study, participants were either assigned to a massage or control group and completed daily ratings of their migraines and sleep patterns. There was a significant difference from the Baseline to Follow-up phases, where the group that received massages, showed a decrease in migraine frequency. There was a significant decrease in state of anxiety from pre-massage to post-massage sessions. As for sleep quality, the massage group showed an increase in sleep (Baseline: $M=23.33$, $SE=0.86$; Intervention: $M=24.75$, $SE=0.88$, $p < 0.01$) and the control group did not (Baseline: $M=23.32$, $SE=0.90$; Intervention: $M=22.62$, $SE=0.92$, $p=0.45$). There were no significant changes in migraine intensity and medication use³.

The Lemstra et al. study showed a significant change between control groups and intervention groups in pain frequency, reduced pain intensity by $19.55 \pm 5.61\%$, pain duration, functional status, and depression inventory. The intervention group had exercise therapy sessions, stress management and relaxation therapy lectures, dietary lectures, and massage therapy sessions. The intervention group reduced pain frequency by $33.64 \pm 5.29\%$, pain intensity, reduced pain duration by $28.75 \pm 5.17\%$, increased functional status by $34.77 \pm 4.75\%$, and reduced depression inventory by $9.77 \pm 1.23\%$. A follow up study 3 months later showed that the intervention group maintained the statistically significant changes in pain frequency

($p=0.000$), pain intensity ($p=0.000$), pain duration ($p=0.000$), functional status ($p=0.000$), and depressed mood ($p=0.000$)⁴.

Table 2. Summary of outcomes and improvement in migraine frequency, duration, and perceived quality of life when treated with massage therapy vs. comparison groups not receiving massage therapy.

Study	Type of Measurement	Treatment Group	Baseline Phase	Follow-up Phase	P-Value
Hernandez-Reif ¹ , 1998	Pain Scale	Massage Group	M=2.2, SD= 2.3	M=1.0, SD=2.1	<0.001
		Control Group	M=1.9, SD=2.1	M=2.3, SD=1.9	ns
	Somatization	Massage Group	M=59.1, SD=7.2	M=55.5, SD=9.2	0.01
		Control Group	M=58.5, SD=10.2	M=59.2, SD=9.5	ns
	Headache Diaries: no headache days	Massage Group		M=57.6, SD=21.9	0.01
		Control Group		M=44.2, SD=28.7	
Lawler ³ , 2006	Daily Diary: migraine frequency	Massage Group	M = 1.52, SE=0.26	M=1.07, SE=0.28	<0.05
		Control Group	M=1.65, SE=0.27	M=1.72, SE=0.29	ns
	Sleep Quality	Massage Group	M=23.33, SE=0.86	M= 24.75, SE=0.88	<0.01
		Control Group	M=23.32, SE=0.90	M=22.62, SE=0.92	0.45
Lemstra ⁴ , 2002	Pain Frequency	Massage Group	Reduced by 33.64 ± 5.29%		0.000
		Control Group	Increased by 2.22 ± 2.22%		
		95% CI	23.53-48.19		
	Pain Intensity	Massage Group	Reduced by 19.55 ± 5.61%		0.001
		Control Group	Increased by 2.78 ± 1.98%		
		95% CI	9.46-35.19		
	Pain Duration	Massage Group	Reduced by 28.75 ± 5.17%		0.000
		Control Group	Increased by 5.00 ± 2.91%		
		95% CI	21.21-46.29		
	Functional Status	Massage Group	Increased by 34.77 ± 4.75%		0.000
		Control Group	Reduced by 0.56 ± 2.03%		
		95% CI	24.25-46.41		
	Depression Inventory	Massage Group	Reduced by 9.77 ± 1.23%		0.000
		Control Group	Reduced by 1.17 ± 0.46%		
		95% CI	5.77-11.44		

One study in this review presented dichotomous data, which allowed for further calculations of Relative Benefit Increase (RBI), Absolute Benefit Increase (ABI), and Numbers Needed to Treat (NNT). The other two studies presented continuous data that does not allow these values to be calculated. Number Needed to Harm (NNH) was not calculated, as there are a minimal number of side effects making it a very safe treatment for most patients, noting the absolute and relative contraindications presented in the Discussion section. Table 3 depicts the ABI, RBI, and NNT from the Hernandez et al. study, which shows 8 patients would need to be treated with massage therapy for one to have an improvement of symptoms.

Table 3. Analysis of Outcomes and NNT in order to decipher if massage therapy is an effective non-pharmacological treatment for migraine headaches vs. control groups not receiving massage therapy.

Study	# Patients	RBI	ABI	NNT
Hernandez-Reif ¹ , 1998	26	30.3%	13.4%	8
Lawler ³ , 2006	43	*	*	*
Lemstra ⁴ , 2002	77	*	*	*

*Data was continuous and the information provided was not enough for conversion to dichotomous data.

DISCUSSION

Two of the studies had limitations that may have affected the outcomes of the studies. The Lemstra et al. study used a multitude of interventions along with massage therapy in its study group. The interventions used were exercise therapy sessions, group stress management and relaxation therapy lectures, dietary lectures, as well as massage therapy sessions. It is impossible to determine which, if any, of the interventions individually decreased the frequency and duration migraines in the participants. The Hernandez et al. study used patients of middle socioeconomic status where the other two studies did not have that inclusion criterion. This could have had an effect on outcome due to disparities of affordability or previous use of massage therapy in other socioeconomic groups.

The majority of insurance plans do not include massage therapy sessions in their coverage. Each session ranges from \$15 for a 10-minute session up to hundreds of dollars for specialty treatments depending on the location and type of massage therapy session. Massage therapy is contraindicated in patients with a DVT, acute infection, bleeding, or a new open wound. Some relative contraindications include scar tissue, fragile skin, calcified soft tissue, skin grafts, atrophic skin, inflamed tissue, malignancy, and inflammatory muscle disease. It is currently being used in the treatment of pregnancy, pain management, depression, anxiety, anger management, edema, prevention/elimination of adhesions, as well as many other indications as the primary treatment or as an adjunctive therapy⁵.

There are limitations in the three studies reviewed, as it was impossible to determine if the patients logged all information in their headache diaries at the actual times recorded and noted. Though this is a very well accepted method for all headache research, there are limitations to data collection. Though it is a very common medical condition, the sample size in the Hernandez et al. study was not very large. More studies on massage therapy need to be performed on patients suffering from migraines in order to decipher its long term and lasting benefits. There is also great difficulty in the ability to double blind a study of this nature making patient bias a possibility.

CONCLUSION

The studies reviewed show statistical support that massage therapy is an effective non-pharmacological treatment for migraine headaches. All three studies showed statistically significant differences between groups that received massage therapy and the control groups. Though each study measured different outcomes, all three showed a statistically significant decrease in migraine frequency for those who received that treatment.

For patients getting the massage treatment, the Hernandez et al. study also showed a statistically significant decrease in somatic symptomatology and the pain scale. The Lawler et al. study showed an increase in sleep quality. The Lemstra et al. study showed a decrease in pain intensity, pain duration, and depressive symptomatology. It also showed an increase in functional status for these patients.

Further research is needed in this field, as the studies were unable to use a placebo control group. The group receiving more perceived attention and therapeutic treatment may have some responsibility for having a positive effect on the outcome. Future studies should evaluate the exact frequency massage therapy is needed over time for an effective and long-term outcome. The sample size of further studies could also be increased to come up with a more definitive outcome on the exact influences that massage has on the physiological and cognitive changes of migraines.

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