

Effect of Yoga in Migraine and related stress disorder among working woman



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Abstract

Background

Migraine is a common neurological disorder affects mainly woman; it is associated with different stress disorders. Women are always under constant stress to maintain a balance between workplace and home. Conventional medical treatments in migraine are effective but developing a lot of side effect. The aim of the study is to find out the efficacy of yoga therapy combined with conventional medical treatment against migraine pain and its related stress disorders.

Methods

Sixty patients were selected with signs and symptoms of migraine without aura. Patients were randomly divided into two groups, with each group having thirty patients. Group-A (treated with conventional medical therapy alone) and group-B, (treated with conventional medical therapy combined with yoga) for six months. Serum Cortisol was measured, the frequency and duration of migraine were determined. Hospital anxiety and depression scale (HADS), Pittsburgh sleep quality index (PSQI), and migraine disability assessment test (MIDAS) questionnaires were used in this study. Student's t test was performed.

Results

It has been revealed that patients in group-B developed a significant improvement in Serum cortisol level ($P < 0.001$), Sleep ($P < 0.001$), Anxiety & depression status ($P < 0.001$) Pulse rate ($P < 0.001$) blood pressure ($P < 0.001$) and migraine status ($P < 0.001$).

Conclusion

Integrated therapy of yoga combined with conventional medicine approach is beneficial in treating not only migraine but also associated mood disorders as compared to conventional medical therapy alone.

Key words

Migraine, Cortisol, Yoga, Depression, Anxiety, Sleep status.



Background

Migraine is considered as a disabling, hemi cranial, painful primary headache disorder which involves a Neuronal dysfunction leads to a sequence of changes intracranial and extra cranially that account for migraine and associated with stress, it affects 13% of the population worldwide [1]. Anxiety, depression and sleep disorder are common psychological disorder associated with migraine [2, 3]. In today's fast life women are constantly under stress to maintain a balance between their working places and at home, but Stress jacks up the nervous system overburden the adrenal glands and lower immunity. Stress is one of the significant trigger factors in patients with migraine. Women have an 18% risk of having a migraine compared to a 6% chance of man, the higher prevalence of woman is attributed to hormonal fluctuation especially estrogen [4]. Mainly it is more common in-between 25 to 55 years, the most productive age. Migraine not only affects productivity at work but also diminishes the quality of life also [5, 6]. Autonomic nervous system (ANS) imbalances reveal many of the clinical manifestations of the migraine disorder. [7] Although the pathophysiology of migraine is not very clearly understood [8].

Conventional medical therapies, against migraine are effective but having clear side effects [6]. Some advancement occurred in the field of research in migraine treatment, but it never gives a complete solution to many migraine patients [9]. It has been already documented that yoga therapy is beneficial against Migraine as well as various stress disorders [10, 11].

The aim of the study was to find out the efficacy of yoga therapy against migraine pain and its related stress disorders to increase the quality of life among working woman.

Material and Methods

The present study was done in the Department of Physiology, Subharti Medical College and Hospital, Meerut. It is approved by the Institutional Ethical Committee. Sixty working woman patients who had complained of migraine with or without aura were recruited from tertiary referral neurology Centre for the study. The age groups of the subjects were between 20 to 55 years, screened by Neurologist according to "International headache society" (IHS) and International Classification of Headache Disorders 2nd edition (IHS, ICHD - II) criteria for migraine [1].

Proper medical history of patients was taken, and they were divided equally (N=30) and randomly into two groups. Group-A (treated with conventional medical therapy alone) and group-B, (treated with conventional medical therapy combined with Yoga).

Group A - Patients were treated for six months with conventional medical therapy according to a physician. Commonest drugs like Sumatriptan, Naratriptan, Zolmitriptan, Almotriptan, Eletriptan, Ergotamine, NSAID'S-Aspirin, Paracetamol, Diclofenac, Naproxen etc. were used for acute attack & Propranolol, Methylsergide, Cyproheptadine, Flunarizine, Clonidine, Tricyclic antidepressants, Pizotifen were used for Prophylaxis.

Group B - Patients were treated with combined conventional medical therapy with yoga. The same physician treated migraine patients, along with one yoga expert, who taught them an integrated yogic approach. It includes different yoga posture, Pranayama (yoga breathing), relaxation practices and meditation for 5 days a week for 60 minutes. [10].

Patients were informed to maintain a diary for a period of six months, in which they recorded duration, frequency, pain intensity of migraine for each week; they also filled informed consent form. Average record of frequencies and duration of the headache of a week before and after treatment phase were collected. All patients were filled standardized Questionnaires of the hospital anxiety and depression scale (HADS), Pittsburgh sleep quality index (PSQI), Migraine disability assessment test (MIDAS), Visual analog scale (VAS) to measure anxiety, depression, sleep, and migraine status.

Enzyme-linked immune sorbent assay (ELISA) was performed to assay serum cortisol. Blood Pressure and pulse rate are also measured.

The Integrated yogic approaches in this study were Kriya-Jalaneti (nasal water cleansing) followed by Kapalbhathi (forced exhalations) goes further in stimulating the nerves, glands, and organs of the entire nasal and cranial area including the eyes, sinuses, ears, and cranium. [10].

Kriya-Jalaneti (nasal water cleansing) followed by Kapalbhathi (forced exhalations) were practiced as the integrated yogic approach. Patients were instructed to practice breathing, techniques, relaxation, postures, and deep relaxation techniques in the prodromal stage. Jalaneti-performed two times in the morning, once in a week. Patients were instructed to fill the neti pot with warm salt mixed water, and then place the nose cone of the neti pot into the right nostril, which seals it to the nostril (by slight pressure). Then opening mouth and gently breathe through the mouth. Now they were instructed to bend slowly in forward direction and keeping the nose cone fully sealed into the right nostril such a way that water doesn't come out. They continued mouth breathing while the water flows. After a few seconds water ran out through the left nostril [11,12].

Kapalbhathi – performed in the morning with duration of 10 – 15 minutes, according to the comfort ability. Patients were instructed to sit straight and crossed legs. Then takes in a deep breath and exhale quickly and suddenly, which arouse a puffing sound. They were asked to focus on exhaling



forcefully and not on the inhalation. They were also told to draw the abdominal muscles inward during exhalation; simultaneously. Abdomen was also noticed for rising during inhalation and fold during exhalation. They continued for 10 breaths and then took a break [13].

ELISA-- solid phase enzyme-linked Immunosorbent assay based on the principal of competitive binding was performed to check serum cortisol level to find out the severity of stress level. The DRG cortisol ELISA kit, EIA-1887, DRG Instruments GmbH, Germany was used to assay serum cortisol level from each patient before and after treatment.

Cortisol is considered the stress marker. [14] 2ml blood was collected by means of venipuncture between 8 AM to 9 AM from each patient, then allowed to clot and separated serum by centrifugation at room temperature to analyses the serum cortisol level.

Blood pressure& pulse rate was also measured from each patient during the same time only; both blood pressure& pulse rate were measured before and after the treatment phase.

Integrated yoga set was prescribed to practice as follows: -

Table 1: Asana [10, 14].

Tadasana	1.5 rounds per day
Pavanmuktasana-	2 5 rounds per day
Bhujangasana-	4.5 rounds per day
Makarasana-	5.5 rounds per day
Savasana-	6.Minimum 10 min, after completion of all asana
Pranayam	
Nadishodona-	1.10 rounds per day
Bhramari-	2.10 rounds per day
Kriya	
Jalaneti	1.Once in a week
Kapal bhati	2.Once in a week
Meditation	
Omkar Dhyana	1.5 min per day.

HADS- was used in this study. It is one standardized questionnaire comprised of 14 items intended to evaluate anxiety and depression, each item has 4 possible answers, scored from 0 to 3. The score of clinical signs for the 2 subscales is 10 and over [10]. MIDAS- was used to find out the consequences of illness on the ability to work and function. MIDAS is a seven-item questionnaire that assesses the severity of migraine status based on obtained grade [15]. PSQI--is an effective instrument used to measure the quality and patterns of sleep in the older& adult. The patients self-assess their quality of sleep. Scoring of answers is based on a 0 to 3 scale, a global sum of 5 or greater indicates a "poor sleeper. [16]

Data collection

All different type of questionnaires used in the study was distributed among all the patients and they were instructed to fill it correctly after understanding it properly. Blood sample Blood pressure, pulse rate, frequency and duration of migraine attack were also measured before and after intervention from each patient of both groups. Blood sample was collected in morning from each patient before and after intervention, then allowed to clot and separated serum by centrifugation at room temperature to analyses the serum cortisol level by means of ELISA.

Inclusion criteria

Patient's diagnosed migraine without aura was considered for this study. All religions working woman patients included with an age group between 20 to 55 years. Subjects were agreed to comply with the protocol and to give consent for participating in the study.

Exclusion criteria

Patients receiving other therapy, (Ayurveda, Reiki, Homeopathy and yoga etc.) for last one month, pregnant women, patients, suffering from significant disease, psychiatric problems, major physical impairment which, in the opinion of the therapist, may either put the subject at risk, or may influence the results, or the subjects' ability to participate in the study. Subject's history of alcohol or drug abuse was not considered. Patient's age below 10 years and above 55 years was not taken in this study

Sample size calculation

From a pilot study, it is estimated that for 95% confidence interval, and significance level $\alpha=1\%$, $P=70\%$, $Q=30\%$, allowable errors is 30%, required sample size was 30.

Ethical Committee approval

All subjects were explained about the procedure to be undertaken, and written informed consent was also obtained. Ethical clearance was received for this proposed research from the ethical committee of Subharti Medical College& Hospital, Meerut. UP. Consent was taken from their parents who were below 18 years.

Data management and statistical analysis

Graph pad Prisma7 used in this study and paired 't' tests were performed to compare and analyze the data between pre and post treatment subgroup of same group, and unpaired' tests were performed in between different post treatment group. Confidence level-95% used in this study.



Results

The prevalence of migraine was found to be higher in the age group of 31 to 41(52%). In the age group of 20 to 30 was 35%, and Lowest was in the age group of 41 to 55(13%). It was observed that Pulse rate, Systolic blood pressure, Diastolic blood pressure, Serum blood cortisol level, Hospital anxiety and depression scale (HADS) & Pittsburg sleep quality index for sleep status were not Significantly Improved after receiving Conventional medical treatment alone in group A, whereas Visual analog scale, Migraine Disability assessment Test, frequency & duration of migraine status were improved Significantly ($P < 0.001$).

On contrary, it has been observed that conventional medical treatment combination with Yoga Significantly improved ($P < 0.001$), all the migraine pain related parameter with associated stress parameters in group-B.

Table 2: Treatment option:-Conventional medical treatment only (Group-A)

Parameter	Pre	Post	P value
Pulse rate	80.8±5.7	80.2±5.8	0.1994 ^x
SBP	122.7±9.4	126.2±4.8	0.0879 ^x
DBP	88.5±4.9	88.5±5.03	0.9999 ^x
Serum Cortisol	251.8±8	250.5±5.5	0.2084 ^x
PSQI	13.5±3.2	13.2±3.17	0.1033 ^x
HADS(Anxiety)	11.2±2.5	10.7±2.76	0.0744 ^x
HADS(Depression)	11.3±1.8	10.9±1.7	0.0136 [*]
VAS	7.4±0.6	4.03±0.8	<0.0001 [†]
MIDAS	15.5±1.9	8.5±1.1	<0.0001 [†]
Frequency	7.4±1.13	5.63±0.66	<0.0001 [†]
Duration	10.6±2.7	5.46±0.57	<0.0001 [†]

[†] $P < 0.01$ statistically significant

^{*} $P < 0.05$ statistically significant

^x $P > 0.01$ statistically not significant

Discussion

It has been observed in present study that combination yoga therapy with conventional medical treatment can give comparatively more beneficial effect on migraine and its associated stress disorder parameters.

Changes in BP and pulse rate after yogic practice

The main mechanism is contributing in the yogic treatment of migraine is the activation of parasympathetic nervous system, which induces reduction rate of heart and blood pressure, with the coordination of limbic system and higher areas of central nervous system.

It has been also reported that continuous practice of yoga stimulates the baroreceptor reflex and reduces the sympathetic tone in patients of essential hypertension, the same effect corroborates with our study. [14]

Table 3: Conventional medical treatment with Yoga Practice (Group-B)

PARAMETER	PRE	POST	P value
Pulse Rate	80.9±7.1	76.0±4.05	0.0012 [*]
SBP	128±5.01	123.7±8.6	0.0243 [*]
DBP	87±4.2	86.4±4.4	0.0029 [*]
Serum Cortisol	265.7±4.2	246.6±4.1	<0.0001 [†]
PSQI	11.7±1.5	8.3±1.1	<0.0001 [†]
HADS(Anxiety)	14.3±3.3	8.8 ±1.3	<0.0001 [†]
HADS(Depression)	11.7±2.7	8.3±1.1	<0.0001 [†]
VAS	7.4±5.6	3.2±0.7	<0.0001 [†]
MIDAS	19.4±1.3	5.5±1.5	<0.0001 [†]
Frequency	8.36±1.8	4.46 ±0.50	<0.0001 [†]
Duration	10±2.4	4.36±0.49	<0.0001

[†] $P < 0.01$ statistically significant

^{*} $P < 0.05$ statistically significant

Changes in serum cortisol level, anxiety, depression and sleep quality after yogic practice Cortisol hormone is a well-established stress marker, Increased Cortisol level is common in Depression. Yoga practice has been used widely to reduce stress, depression & anxiety. It is already well established that yoga increased parasympathetic activity causing decreased stimulation over locus ceruleus, which decrease norepinephrine could output resulting in reduced respiratory and heart rate. [13,17]

Decreased norepinephrine level could be a possible reason to reduce the stimulation over the Para ventricular nucleus of hypothalamus causing decrease cortisol hormone release. It has been reported that yoga may cause the stimulation of the prefrontal cortex and enhanced the glutamic transmission leading to release beta-endorphin, which inhibits anxiety as well as cause a reduction of cortisol. [12] Javnbakht et al have been mentioned that participation in a two-month yoga class can lead to significant decrease in perceived levels of anxiety among females; it supports the outcome of our result from the post-treatment section of Group-B. [18] Sushil et al stated that Kapalbhathi and breath awareness can improve the stress status, our research also reflects the same findings. [19] There are few explanations available, which support regular yogic practice may induce good sleep mainly it involves stretching and relaxing of muscles causing significant physical and mental exertion resulting in less sleep latency, more deep sleep, fewer sleep disturbances, and better sleep efficiency. [20,21] Increase in vagal tone and the decrease of sympathetic discharge in the form of significantly decreased heart rate response on standing as well as decreased catecholamine levels in plasma. This decreased physiological arousal effect of Yoga has been cited as one of the reasons for less sleep disturbances. Thus, it is suggested that Yoga exercises are



associated with less sleep disturbances (low PSQI score) [20]. Recently Shohani et al have suggested that yoga can be used as an effective complimentary medicine in the treatment of Stress, anxiety & depression. [22]

Effect of Yoga on Migraine pain

Recent progress on migraine research reveals that popular vascular theory of Migraine which suggested that migraine headache was caused by the dilatation of blood vessels, while the aura of migraine resulted from vasoconstriction, is replaced by dilation of Dural and extra cranial vessels. [23, 24]. Regular practice of yoga is proved to be useful for balancing the autonomic nervous system by increasing parasympathetic drive, calming of stress response systems, the neuroendocrine release of hormones, and thalamic generators. [25] Yoga is helpful to reduce tension produced near the areas of pain and loosen the tight muscles, especially in the back and neck. Since tight muscles can trigger migraine [26]. Kriya – Jalaneti, a process of nasal water cleansing followed by Kapalbhathi, force exhalation help to stimulate and regulate the nerve tone, glands, and organs of the entire nasal and cranial area including eyes, sinuses, ears, and cranium. [1, 27]

Hypoxia is one of the important triggering factors; Pranayama helps to increase baseline O₂ Consumption which could be due to the stimulation of the adrenal medulla. It has been reported that regular exercise regulates the expression of the endothelial nitric oxide synthase (NOS) gene in the vascular tissue [28, 29]. Our results also reveal that continuous practice of yoga reduced migraine pain in terms of reducing Visual analog scale reading (VAS), Migraine disability assessment test (MIDAS), Frequency and Duration of migraine attack.

Conclusion

The Present study was undertaken to find out the efficacy of an integrated therapeutic approach of yoga and conventional medicine on migraine, and related mood disorders to improve the quality of life among working women, this study indicates preface evidence that integrative approach of yoga and conventional medicine may be used together to get more potent result in migraine and related mood disorders. However more in-depth research is needed to be done to deduce more beneficial effects.

Limitations & future scope of the study

The limitation of the study is the small sample size, it is always recommended to perform a multi centric study with the larger population.

Competing interests

The authors declare that they have no competing interests

Authors' contribution

SS was involved with study planning, data acquisition, analysis & manuscript writing. JA conceived the study, constructed the questionnaire, deduced the data, drafted the manuscript and revised it. MR was involved in study planning, data interpretation and manuscript revise.

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Abbreviations

Hospital anxiety depression scale (HADS), Migraine disability assessment score (MIDAS), Pittsburgh Sleep Quality Index (PSQI), International headache society (IHS).

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