
Chapter 3

Review of Literature (Scientific)

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3.0 Review of Scientific Literature

3.1 About Migraine headache:

Migraine is a disabling headache related disorder due to its impact on quality of life, affecting 14.7% of the world population (Steiner, 2013). It is more common in women than in men, and is most prevalent in young adults and middle ages people (Breslau & Rasmussen, 2001). There is large economic burden on the society in terms of medical costs of care and indirect costs due to reduced work time and reduced productivity (Ferrari, 1998). Despite the seriousness of the condition the management at primary care level is not considered to be enough and only 50% of physicians diagnose migraine correctly. Many sufferers rely on suboptimal over-the-counter medications (Edmeads et al., 2001). Migraine is said to be under-recognized, under-diagnosed and under-treated in daily clinical practice. Though patients report benefits from prophylactic medicines, these interventions are associated with limitations or side effects such as drowsiness, dry mouth, constipation, weight gain, cardiac arrhythmias, seizures as seen during the usage of amitriptyline, which is one of the most widely used anti migraine agents (Couch, 2011). Migraine being a heterogeneous condition (Nappi et al., 2000), the treatment should be tailored for individuals need and following diagnosis the patients should be encouraged to assess factors of trigger and explore non-pharmacological approaches whose effectiveness is well documented (Antonaci et al., 2016). Conventional line of treatment has focused on pain management aiming at symptomatic relief. The migraine prophylaxis involving the other class of drugs is also attributed to poor patient compliance and side effects (Berger et al., 2012).

3.2 Complementary and Alternate medicine (CAM)

Evidence of CAM use is emerging though large population studies have shown that it is common in headache and migraine patients. One such US based National Health Interview survey (n= 31,044) showed that headache was one of the commonest problem faced by CAM users (Hendrickson et al., 2006). A large cross-sectional cohort study among patients of tertiary headache centers in Austria and Germany found that 82% of the respondents used CAM in some stage in their life (Gaul et al., 2009). In an Italian study on prevalence of CAM in migraine patients, migraine without aura (MwoA) was by far the most frequently diagnosed subtype (72.3%). 29 CAM therapies were listed and 43.7% used more than one therapy. The most frequently used CAM therapies were acupuncture (27.3%), homeopathy (21.5%), massage (10.1%) and chiropractic therapy (8.9%). 47.7% reported that the reason for choosing CAM therapy was the 'potential improvement of headache' (Rossi et al, 2004). The use of Complementary and Alternative medicine in migraine or in patients with severe headache is also popular as they feel it is congruent to their beliefs in health and lifestyle and has lesser known side effects with less dependency on medication (Wells et al., 2011).

3.3 Studies on Ayurveda

Studies of Ayurveda provide scientific understanding to the *Tridoṣa* (Principal systems functions) theory on which Ayurveda system of Medicine is developed. Prasher et al. introduced Ayurveda based phenotyping with reference to body constitution as a method to understand the predisposition of individuals to certain diseases (Prasher et al., 2008). This supports the traditional description that a person is prone to a disease caused by the same *doṣa* as his *Prakṛti* (Acharya, 2006). Similar correlations reported earlier, with respect to Rheumatoid Arthritis (Juyal et al., 2012) demonstrated that the concept of *Prakṛti* specific disease susceptibility mentioned in Ayurveda is important in both diagnosis and treatment of diseases. The association of *Pitta* with inflammatory processes was speculated (Gokani, 2014) and in *Pitta* individuals, the genes related to Oxidative stress pathway were up-regulated (Juyal et al., 2012). Evidence on Pañcakarma (mild *virecana* and *nasya* based) have shown significant reduction in certain plasma metabolites (Peterson et al., 2016). In case of Ayurveda for migraine headache, it was reported that an Ayurveda based treatment protocol which included 5 Ayurvedic medicines administered for 90 days showed a significant decrease in migraine related disability, frequency and intensity. (Vaidya et al., 2010). In different studies on the effect of *nasya karma* on *ardhāvabhedaka* (migraine), *kumkumadi taila* (Chithralatha, 2009), *Satahvadi taila* (Srividya et al., 2013), *Br̥hat Dashamoola taila* (Parekh & Rajagopala, 2009) were used for *nasya* along with oral medicines. Significant changes were seen in the severity, duration, frequency and associated symptoms of migraine. Ginger is reported to be useful in neurological disorders according to Ayurveda and Tibb systems of medicines as it may exert abortive and prophylactic effects in migraine headaches (Mustafa & Srivastava, 1990)

In a randomized triple-blind, placebo-controlled trial, the effect of *Coriandrum sativum* syrup used commonly in Persian medicine was studied and results showed that it has short term

considerable effects in reducing the duration and frequency of migraine attacks (Kasmaei et al., 2016).

3.4 Studies on Yoga

There are many studies on Yoga and migraine headache and the beneficial effects of Yoga have been attributed to autonomic balance shifting towards vagal dominance, reduced biochemical markers of stress such as cortisol, reduced anxiety and improved psychological well-being. John et al, have reported that the practice of Yoga for 3 months in migraine patients significantly reduced pain intensity, frequency pain rating index, affective pain rating index, total pain rating index, anxiety and depression scores and symptomatic medication use. This was attributed to reduction of levels of stress bio-markers such as serum cortisol and superoxide dismutase. (John et al., 2007). Yoga in Migraineurs can bring in autonomic modulation by improving vagal tone and also reduction of drug dosage when used along with conventional care (Kisan et al., 2004). 12 weeks of Yoga therapy for migraine has shown to significantly reduce the blood vascular cell adhesion molecule thereby inferring that yoga therapy can be an effective treatment due to improved vascular functions (Esfahani et al., 2014). 32 female migraineurs took part in a study where they were divided into two groups, control (n= 14) who were on medication and yoga group (n= 18) who were on 12 weeks of yoga and medication. The results showed significant reduction in the impact of headache on patient's lives, headache frequency and severity. Nitric oxide which is an endothelium derived relaxing factor like substance plays a key role in regulating brain metabolism, cerebral circulation and vascular smooth muscle function. It was measured but was found to be non significantly high in both groups (Boroujeni MZ et al., 2015). In a prospective randomized clinical trial 8 weeks of mindfulness based stress reduction program (MBSR), practiced 2 hours a day was evaluated in migraine patients who were on prophylactic drugs. The intervention

group (n=10) was added with MBSR while the control group (n=9) continued with medication. Results showed that MBSR group had 1.4 fewer migraines per month with reduced duration and severity. The disability and impact assessed using MIDAS and HIT-6 decreased while the quality of life and perceived stress improved (Wells RH et al., 2014).

3.5 Conventional Medicine research

Migraine is a neurovascular disorder characterised by attacks of severe headache, autonomic and neurological symptoms (Michel & Ferrari, 1998)

Stress is considered as one of the most acknowledged headache triggers. (Spierings et al., 2014) According to Scientific literature stress can be due to physical, mental or psychological factors. A study on 3259 civil servants has shown that high strain jobs with low social support is associated with migraine (Santos et al., 2014). It is found that prolonged stress activates immune system and may facilitate pain. The pro-inflammatory mediators such as TNF alpha, IL-1beta, IL-6 and nitrous oxide are activated due to stress leading to migraine (Sauro & Becker, 2009).

Functional disability associated with migraine can lead to physical, mental and social consequences (Dawn et al, 2009) and it is commonly measured through the migraine disability assessment questionnaire (MIDAS) (Stewart et al., 1999). The subjective perception of the impact of stress is measured through perceived stress scale and studies show a higher incidence of perceived stress in migraineurs (Moon et al., 2017). Stress can induce changes in autonomic nervous system which is measured non-invasively through heart rate variability. Migraine headache is known to induce autonomic imbalance. The sympathetic activity is heightened not only during the attacks but also during headache-free states (Cortelli et al., 1991). Sixteen female migraine without aura subjects were investigated in comparison to age matched control

group. Continuous finger pulse pressure and ECG were measured in 24 hours and spontaneous baroreflex sensitivity increased in migraine (20.6 ms/mmHg) compared to controls (15.7 ms/mmHg). The heart rate variability parameters calculated showed an increase ($p < 0.045$) in patients, suggesting central hypersensitivity (Nilsen et al., 2009). Studies on headache patients also show an increased muscle activity compared to healthy controls (Jensen et al., 1994). In another study, deep and surface electromyographic responses to stress were recorded in 22 migraineurs who were exposed to 60 minutes of cognitive stress followed by 30 minutes of relaxation during headache free periods. It showed that muscle pain responses were regional and there was delayed pain recovery (Leistad et al., 2006).

One of the Probable mechanisms how Yoga improves quality of life in Migraine patients is detailed below:

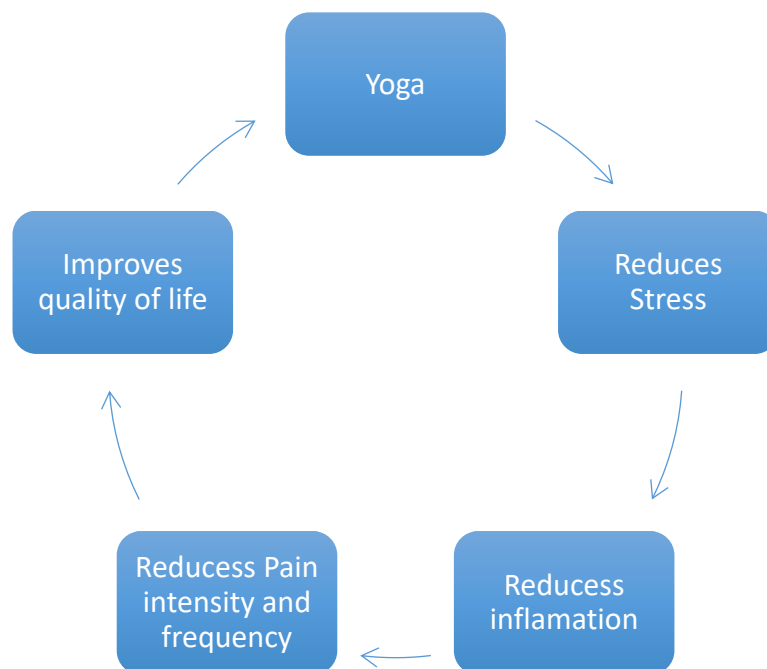


Fig 14: Role of Yoga in the management of Migraine Headache

The above illustration provides a probable mechanism through which Yoga might facilitate pain management working at the root cause both at mental and physical levels. Operating through stress management, Yoga reduces sensory hyper sensitivity, induces relaxation and hence reduces inflammation. Since, Inflammation plays an important role in vascular pain, the reduction in pain intensity and frequency are associated with reduced stress and inflammation. The end result is therefore an improved quality of life.

In order to explore the beneficial effects of yoga along with Ayurveda and to understand the complementary influence of these two ancient systems of medicine, the present study was designed.