
Chapter 7 Discussion

7.0 Discussion

A combined Ayurveda and Yoga therapy intervention for 90 days reduced symptoms, migraine related disability, levels of perceived stress, sympathetic arousal and improved quality of life. While Ayurveda believes that Yoga is part of *Swastha Vrrtta* (Preventive medicine), Yoga therapy has grown as an independent system of complimentary medicine. Ayurveda can primarily work at a physical level to bring in balance in *doṣa* (body humors), *dhatu* and *agni* (digestive fire), Yoga therapy has contributed extensively to psychological wellbeing and mental relaxation. Hence, a combination of Ayurveda and Yoga therapy given for 90 days has shown to compliment and augment the beneficial effects.

Ayurveda treatises explain different line of treatments beginning with *nidana- parivarjana* (abstinence from etiological factors). The objective is to reduce the frequency of attacks and to improve quality of life. By adapting *dinacaryā* (daily regimen) and *ṛtucaryā* (seasonal regimen) the frequency of headache episodes can be reduced. *Pitta* individuals have strong *Agni* (digestive power) and the dietary causes like overeating of spicy food aggravate pitta, leading to formation of *āma* and further can trigger headache. Therefore, they are advised to avoid *pitta* aggravating food. Lifestyle based causes (*vihāraja nidana*) such as, weather related causes, exposure to sunlight, excessive wind, inadequate sleep and excessive exercise should be avoided as mentioned in Suśruta samhita since they increase *pitta* and therefore increase the tendency of *shoola* (pain).

The description given in *Śāraṅgadhara Samhita Parishistam*, provides a comprehensive recommendation of diet (*Pathya-Apathya*) in the management of headache.

Ayurveda also explains about stress, as *manasika nidana* (mind related etiological factor) which requires *satvavajaya cikitsā* (psychological therapy) for its management. A detailed counselling restores adaptability and is essential to alleviate migraine.

Another unique concept in the management is *Sadvritta* (personal conduct). It brings in good health and control over senses and desires, therefore influencing the control and treatment of any disease including headache.

Though diet, lifestyle and code of conduct have been mentioned in the management of *Ardhāvabhedaka* (migraine), Ayurveda provides a line of treatment which involves *snehana* (internal and external oleation), *śodhana* (purificatory techniques), *shamana* (pacificatory therapy), *vamana* (therapeutic vomiting), *virecana* (therapeutic purgation), *basti* (enema) and *nasya* (nasal errhines) as *antahparimarjana cikitsā* (internal cleansing therapies). *Lepa* (medicated paste application), *upanāha* (poultice), *swedana* (fomentation) and *shirobasti* (oil retention on the head) are mentioned as *bahirparimarjana cikitsā* (external cleansing therapies) and *siravyadha* and *agnikarma* are the *shastra pranidhāna* (surgical therapies) for the management of migraine headache (Shastry, 1997). In this study the *antahparimarjana cikitsā* in the form of *virecana* has been adapted.

Yoga emphasizes on calming down the mind, eating healthy and nourishing food for the management of illness. Modern day psychosomatic diseases are fostered by the inappropriate diet and wrong eating habits. If the mind is controlled through Yoga, the craving for wrong food and the discrimination between right and wrong would be clear in individuals to bring in better health to the society (Chinmayananda, 1992).

The ‘Gita’, explains that the one who follows right diet, lifestyle, does proper actions, whose hours of sleeping and waking up are regulated can mitigate pain (disease) through Yoga.

Yama and *Niyama* enhances the internal healing capacity due to the cultivation of right habits and moral ethical living. Therefore, Yogic concepts suggest avoiding non- vegetarian food and to follow the path of ahimsa to avoid the increase in rajas leading to diseases. In this way aspects of *yama* and *niyama* can be adapted in disease management (Muktibhodananda, 1993)

Further, the beneficial effects of various components of yoga in the management of disorders has been explained in *Haṭha Yoga Pradipika*. By the practice of āsana, an individual attains steadiness of the body and mind, diseaselessness and lightness of the body. The text describes that the practice of āsana like *matsyendrāsana* (fish pose) and *pashchimottanāsana* (seated forward bend pose) improves digestive fire (jātarāgni) and therefore alleviates diseases (Muktibhodananda, 1993).

Prāṇayama practices are known to help in balancing the flow of subtle energy across the *nadi*. The three practices, right nostril breathing, left nostril breathing and alternate nostril breathing which use uni-nostril voluntarily regulated breathing aim to stimulate, relax and balance the flow of *Prāṇa* across the two main *nadis* - *Ida* and *Pingala*.

Yoga also prescribes reduced sensory stimulation and sensory withdrawal through the process called *pratyahāra* as an important technique. Intense focusing through *dharana* is shown to precipitate the onset of headache, Yoga therefore prescribes meditation which is the state of expansion and is effortless featured by alertful rest.

Haṭha Yoga Pradipika in addition talks about the internal cleansing practices called '*Kriya*'. Hence, an integrated approach involving āsana (physical postures), *Prāṇayama* (regulated breathing), *kriya* (cleansing techniques), meditation and relaxation techniques are used in the management of migraine headache.

Migraine being a disabling headache related disorder effects quality of life. Conventional line of treatment has focused on pain management aiming at symptomatic relief and is associated with drug dependency and side effects related to long term use of drugs.

Both Ayurveda and Yoga have shown benefits when used as independent interventions. There have been no long term studies and therefore our approach is to find remedial measures for longer duration. Since *pañcakarma* has such an effect, this study can be a base for further long

duration studies. An integrated approach of Ayurveda and Yoga therapy can augment the beneficial effects of each other in the management of migraine headache.

Hence, the present study was an attempt to understand the influence of an Ayurveda and Yoga based intervention in the treatment of migraine.

While there are few studies on Yoga and Migraine, the studies on Ayurveda are limited to poly-herbal combinations (Vaidya et al., 2010). Studies of Ayurveda provide scientific understanding to the *Tridoṣa* (three body humors) theory and Ayurveda studies based on phenotyping show that body constitution can be a method to understand the predisposition of individuals to certain diseases. (Prasher et.al). The traditional description says that a person with one particular *doṣa* dominance is susceptible to a health problem caused by the same (Acharya, 2006). While attempting to document and correlate body constitution with migraine related symptoms, the present study showed a clear involvement of *Pitta* in the body constitution (76.6 %) of individuals making them prone to Migraine headache. Oxidative stress is considered a key for migraine trigger (Nassini et al., 2014) and the genes related to oxidative stress pathway were up-regulated in *Pitta* individuals (Juyal et al., 2012). Evidence shows that the Phospholipase C in the Cerebrospinal fluid is increased in migraineurs (Fonteh et al., 2013). Evidence on *Pañcakarma* (mild *virecana* and *nasya* based) has shown significant reduction in certain plasma metabolites (Peterson et al., 2016). The choice of *Virecana* (therapeutic purgation) as part of bio-purificatory treatment given to AY group was customized based on the predominance of *pitta* and the positive results observed here are inline with the expected outcomes as mentioned in traditional Ayurveda texts (Shastry & Chaturvedi, 2001).

Following the intervention, changes in symptom scores observed in the present study suggest reduced frequency, lowered intensity, and the improved ability to recover from an attack. The changes observed can be attributed at modifying pain perception both at physical and mental

levels as pain is a complex sensory and emotional experience that can vary widely between people and even within an individual. A simple psychological manipulation, such as distraction, can modify perception of pain (Villemure & Bushnell, 2002), and a negative emotional state increases pain, whereas a positive state lowers the same (Villemure & Bushnell, 2009) The neuro-imaging studies in chronic pain suggest that the activity in afferent pain pathways can be altered by the attentional state, positive and negative emotions, empathy, administration of a placebo (Schweinhart & Bushnell, 2010) and also that psychological factors activate intrinsic modulatory systems in the brain, including those involved in opioid-related pain relief (Bushnell et al., 2013).

Using real time Functional MRI (rtfMRI), attempts were made in healthy volunteers to modulate the activation of their own anterior cingulate cortex (ACC) in order to alter their pain experience (deCharms et al., 2005). Several studies on Yoga and Meditation have demonstrated that areas which regulate attentional process and emotions were activated. The association between increased cortical thickness in pain-related brain regions (including ACC, bilateral parahippocampal gyrus) and lowered pain sensitivity in Zen meditators compared to non-meditators has added the much needed supporting evidence for the underlying mechanisms (Grant et al., 2010).

The MIDAS scores which were high in the present study decreased significantly in the AY group. This can primarily be attributed to the reduced severity of pain, the frequency of headache and improved quality of life. Similar changes in MIDAS were reported earlier, where Ayurveda medicines were given along with regulated diet and lifestyle. Improved digestive fire (*agni*) and better acid-alkaline balance in the digestive system were the proposed mechanisms (Vaidya et al., 2010). A mindfulness-based stress reduction program (MBSR) along with conventional prophylaxis also showed a significant reduction in migraine related disability. It was speculated that improved emotional regulation, less pain catastrophizing,

and increased pain acceptance as the reasons behind the positive results seen (Wells et al., 2014)

Stress is considered as an important factor for trigger and perpetuation of migraine headache (Moon et al., 2017). The higher perceived stress scores seen in AY and CT groups indicate the impact of stress in the present study population. The severity of perceived stress decreased significantly in the AY group with more than 60 % of the participants moving to low perceived stress levels. Similarly, significant improvement in perceived stress, marked relief in pain and reduction in salivary cortisol levels were seen in 24 women with headache or back pain following the practice of Iyengar Yoga, twice a week for 90 minute's duration (Michalsen et al., 2007). A previous report implied that a single session of *Abhyāṅga* reduced subjective stress experience, lowered heart rate and systolic blood pressure (Basler., 2011). *Abhyāṅga* which was part of Ayurveda intervention for 6-8 days in the present study, was expected to relax and rejuvenate an individual physically and mentally.

The evoked autonomic changes were recorded during the 3-minute frowning period. Reduction in the duration of recording from standard 5 minutes to 3 minutes was based on the subjective experience based on our pilot study where subjects expressed discomfort and were anxious about the onset of a migraine attack following frowning for 5 minutes. One such study validates the short-term HRV (Salahuddin et al., 2007).

An increased HF and decreased LF component of HRV along with reduced heart rate and respiratory rate in the present study gives a clear indication of sympathovagal balance shifting towards vagal dominance in the AY group. A previous study on healthy undergraduate medical students showed a significant reduction in stress, decrease in LF component and increase in HF component of HRV spectrum following two months of *prāṇāyama* practice (Bhimani et al., 2011). The changes were attributed to the inhibitory signals generated during the process of *prāṇāyama* from cardiorespiratory system leading to modulation of autonomic

system resulting in parasympathetic dominance. Heightened baroreflex sensitivity and improved oxygenation have been the proposed underlying mechanisms for the decreased heart rate, systolic blood pressure and improved oxygen consumption observed in the study (Mason et al., 2013). Brown and Gerbarg in a review reported that yoga-breathing interventions increase HRV, improve sympatho-vagal balance, and promote stress resilience. Coherent breathing and resonant breathing, using a fixed rate of three and a half to six breaths per minute (bpm), have been shown to increase HRV and parasympathetic nervous system (PNS) activity (Brown & Gerbarg, 2009). Streeter et al., in a comprehensive review have reported that *āsanas*, *prāṇāyama* and meditation including chanting can shift sympatho-vagal balance to vagal dominance, enhances activity of the gamma-aminobutyric acid (GABA) system and reduces allostatic load. It is hypothesized that the regulation of hypothalamo-pituitary-adrenal (HPA) axis through the practice of Yoga as one of the underlying mechanism (Streeter CC et al., 2012).

Furthermore, stress is also known to increase muscle activation. In chronic pain, sympathetic activity due to nociceptive stimulation may cause disturbances of blood flow regulation in the affected muscle and enhance muscle activation (Larsson et al., 1995). A previous report on Yoga in tension-type headache has shown to reduce EMG amplitude at rest and during mental activity (Bhatia et al., 2007). Reduced sympathetic activity following the practice of Yoga is also known to bring down muscle activity.

The present study demonstrated that the autonomic arousal and sEMG activity during frowning were substantially lower on day 90, inferring a positive role of Ayurveda and Yoga in an attenuated stress response.

Emphasis was on classical line of Ayurveda treatment combined with Yoga for better clinical outcome. For the process of *Virecana* (therapeutic purgation) two poly herbal combinations were used in the present study (*Kalyāṇaka ghr̥ta* for *snehapāna* (internal oleation) and

Pathyakṣadhātryādi kaṣāya as oral medicine post *virecana*). *Kalyāṇaka ghr̥ta* is one of the combinations mentioned in Bower manuscript and traditional Ayurveda texts and its HPTLC has been studied for qualitative analysis (Natsume et al., 2015). The orally administered decoction (*Pathyakṣadhātryādi Kaṣāya*) used in this study for 75 days has 7 herbs. *Triphala* (formula with 3 herbs) which has adaptogenic, antimutagenic, chemoprotective, radioprotective effects (Peterson et al., 2017), Neem which has anti-inflammatory, apoptotic and anti proliferative properties (Marc et al., 2011), Turmeric with the active ingredient Curcumin has potential therapeutic roles against many pro inflammatory diseases such as cancer, arthritis etc (Gupta SC et al., 2013), *Tinospora cardifolia* has anti-oxidant, immunomodulatory and anti-inflammatory properties (Subramanian et al., 2002) and *Andrographis paniculata* which is studied for Hepatoprotective activity, Immuno stimulant activity, anti-oxidant activity and anti inflammatory activity. (Chua, 2014). The role of the polyherbal combination is due to the combined effects of the herbs and Ayurveda principles state that the result is attributed to the *Tridoṣahāra* property of the *kaṣāya* especially it being *kapha-pittahara*. The *kaṣāya* is also *malanulomaka* (propels the *apana vayu* downwards) and *shoolahāra* (reduces pain) (Shastri, 1985).

Modern nutritionists encourage mindful eating behaviors along with restriction of carbohydrate, gluten, alcohol and caffeine. This is said to fit well with lifestyle management including stress reduction, adequate sleep, regular exercise and weight management (Slavin & Ailani, 2017).

In a study during Ramadan, the commonest triggers for headache were stress, physical activity, change in weather and fasting. While 50% achieved relief by NSAID's, 45% achieved through sleep (Ehsan & Shimmery, 2010). Another study has shown that stress management has advantages compared to pharmacological treatments and the therapeutic effects are maintained for at least 7 years (Blanchard, 1992)

This study adds much needed evidence to demonstrate the promising future of integrative medicine. The process also provides an opportunity to manage the condition in a holistic perspective than a system oriented, symptom based approach.

However, a larger sample size, and long term follow up for a minimum period of 1 year is needed. Further studies involving neuro imaging and biochemical measures are warranted for deeper scientific understanding.

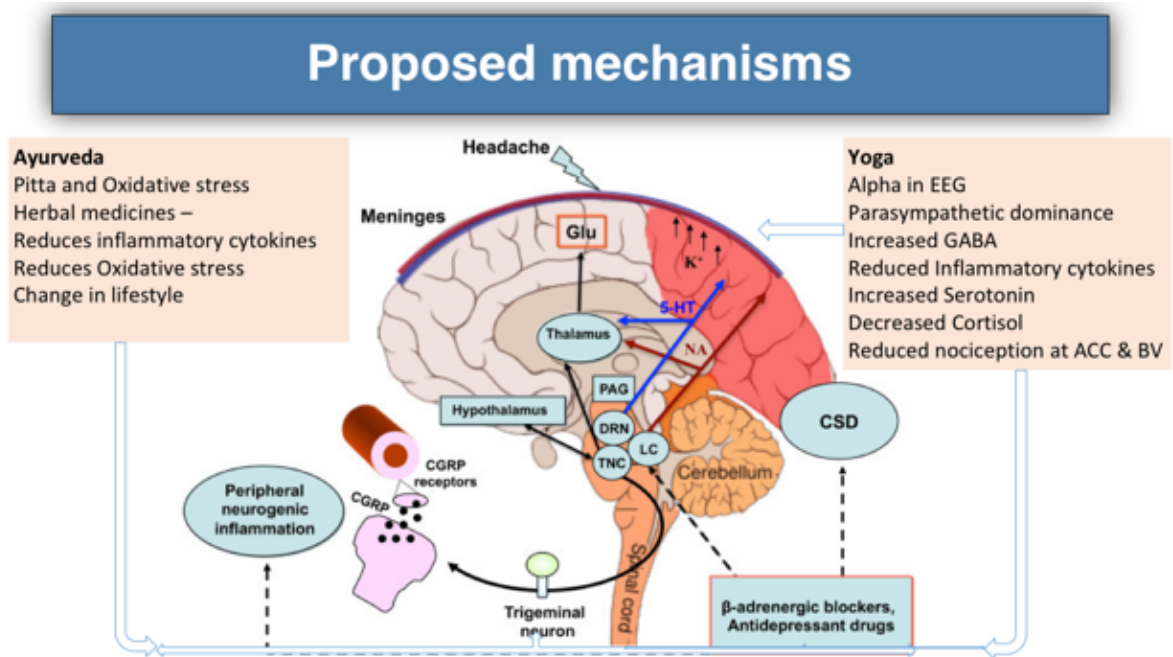


Fig.43: Proposed Mechanisms