

(RESEARCH ARTICLE)



Efficacy of Trataka Kriya in Improving Quality of Sleep in population aged 30-50 years: An open clinical trial

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Abstract

Background: In present era, Sleeplessness and disturbed sleep is a common disorder associated with morbidity and poor quality of life. In Ayurveda, Sleep is included under three supportive pillars of life (*trayopasthambha*). More than 50-70 million people in the United States have a sleep disorder ⁱ. In India prevalence rates are 6.5% among women and 4.3% among men. Trataka is one of the Shat Karma (yogic purificatory therapy) but is also observed to be having effects similar to meditative practices. It relieves mental stress so can improve sleep quality.

Aim: To study the effect of Trataka Kriya in improving Quality of sleep-in population aged 30- 50 years.

Objective: To evaluate the change in subjective and objective parameters on Pittsburgh Sleep Quality Index (PSQI) & WHO-QOL Bref Questionnaire.

Materials and Methodology: Part 1: Survey Study: A survey was conducted in 100 subjects to understand the distribution of sleep disorder in the population. **Part 2: Interventional Study:** From the participants of the survey 35 subjects were selected who reported sleep disturbance (decreased sleep). After Day 0 Assessment of the PSQI & WHO-QOL BREF Scales, Training session on Trataka Kriya was given to the subjects and were advised to continue the practice for 15 days. Re-assessment of the objective Scales was done on Day 15.

Results: PSQI SCORE: Based on the observations there was a significant improvement ($p < 0.001$) in PSQI Global score. WHO-QOL BREF: There was a significant improvement ($p = < 0.001$, $p = 0.016$) respectively in the Physical & Psychological Health Domains in WHO=QOL BREF questionnaire. However, no significant changes observed in overall quality of life ($p=1.000$), overall quality of general health ($p=1.000$), Domain Social Relationships ($p=1.000$), Environmental Health ($p=1.000$).

Conclusion: It can be concluded that Trataka Kriya is effective in improving the quality of sleep in population aged 30-50 years.

Keywords: Sleep disorder; Trataka Kriya; PQSI; Quality of life

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1. Introduction

Sleep affect growth and stress hormones, our immune system, appetite, breathing, blood pressure and cardiovascular health. So proper sleep is very necessary for normal function of the body and mind.

त्रय उपस्तम्भ इति- आहारः , स्वप्नो, ब्रह्मचययतिति;ⁱⁱ (cha.su.11/13)

Charaka samhita mentioned - Three pillars of life for healthy maintenance of body viz. *Ahara* (food),

SWAPANA (sleep), Brahmacharya (disciplined sexual practices). *Swapna* (or *Nidra*) is given most importance.

निद्रायत्तं सुखं दुःखं पुष्टिः काश्यं बलाबलम्।
वृषता क्लीबता ज्ञानमज्ञानं जीवितं न च ॥ ३६ ॥ⁱⁱⁱ

(cha.su.21)

Happiness, misery, nourishment, emaciation, strength, weakness, virility, sterility, knowledge, ignorance, life and death all these occur depending on the proper or improper sleep.

1.1. Normal physiology of sleep

The basic form of normal sleep organization is called sleep architecture. The sleep cycle is composed of two phases

- Non Rapid Eye Movement (NREM) Sleep
- Rapid Eye Movement (REM) Sleep

Most sleep during each night is of the NREM variety, this is the deep restful sleep that the person experiences during the first hours of sleep. Brain waves are very strong and low in frequency so it is also known as Slow-wave sleep.

REM sleep occurs in episodes.

Each episodes lasting 5-30 min, normally occurs about every 90 minutes^{iv}.

This type of sleep is not so restful, and is usually associated with vivid dreaming and the eyes undergo rapid movements despite the fact the person is still asleep.

When the person is extremely sleepy, each bout of REM sleep is short & may be absent.

1.2. Characteristics of NREM sleep

This sleep is exceedingly restful and is associated with decrease in both peripheral vascular tone and many other vegetative functions of the body. There are 10-30% decrease in Blood Pressure, Respiratory Rate and Basal Metabolic Rate.

Composed of 4 stages

- Stage 1
- Stage 2
- Stage 3
- Stage 4

Deepest portion of the NREM Sleep (stage 3&4) is sometimes associated with unusual arousal characteristic. The organization during arousal, during stage 3&4 may result in specific problems including enuresis and somnambulism.

Although slow- wave sleep is frequently called “dreamless sleep” dreams and even nightmares do occur during slow-wave sleep. The difference is that dreams that occurs in REM Sleep are associated with more bodily muscle activity, and the dreams of slow- wave sleep usually are not remembered. That is during slow-wave sleep consolidation of dreams in memory doesn't occur.

1.3. Characteristic of REM sleep

Usually associated with active dreaming & active bodily muscle movements. Most distinctive feature of REM sleep is dreaming.

Heart rate and respiratory rate usually becomes irregular, which is characteristic of the dreams state. Also called paradoxical sleep because it is a paradox that a person can still be asleep despite marked activity in the brain.

In REM sleep there is desynchronized nervous activity as found in the awoken state. So known as desynchronized sleep.

REM sleep is a type of sleep in which the brain is quite active. However brain activity is not channeled in the proper direction for the person to be fully aware of surroundings, and therefore the person is truly asleep.

1.4. Factors affecting sleep

“ तमोभूयिष्ठानामहःसु निशासु च भवति, रजोभूयिष्ठानामनिमित्तं,
सत्त्वभूयिष्ठानामर्धरात्रे।^{vi}

(सु.शा.4/33)

- *Kapha* constitution people- fond of sleep.
- Sleep of *vata* constitution people- disturbed.
- Sleep manifested naturally in persons with predominance of *tamoguna* both during day & night.
- Person with predominance of *rajoguna* – sleep occurs without any reason at any time.
- Person with predominance of *satvaguna*- sleep occurs at midnight.
- *Matra* (amount) of sleep decided with respect of *prakriti, sara, desha* etc.

1.5. Anidra (Loss of sleep)

❖ CAUSES

कायस्य शिरसश्चैव विरेकश्छर्दनं भयम्।
चिन्ता क्रोधस्तथा धूमो व्यायामो रक्तमोक्षणम्॥५५॥
उपवासोऽसुखा शय्या सत्त्वौदार्यं तमोजयः।
निद्राप्रसङ्गमहितं वारयन्ति समुत्थितम्॥५६॥
एत एव च विज्ञेया निद्रानाशस्य हेतवः।
कार्यं कालो विकारश्च प्रकृतिर्वायुरेव च॥^{vii} (च.सू. 21/55-57)

- Elimination of *dosas* from the body and head through nasal instillation
- purgation
- purificatory therapies like emesis etc
- bloodletting
- worries, anger
- smoke/ fumigation
- physical exercise
- Fasting
- uncomfortable bed
- predominance of *satva*
- suppression of *tamas*
- over work
- old age & diseases
- Increase of *vata dosha*

विरेकः कायशिरसोर्वमनं रक्तमोक्षणम्।
धूमः क्षुत्तद् तथा हर्षः शोकमैथुनभीक्रुधः॥३६६॥
चित्तोत्कठाऽसुखा शय्या सत्त्वौदार्यं तमोजयः।

रूक्षान्नं वाऽहितां निद्रां वारयन्त्यनुषङ्गिणीम् ॥३६७॥

एत एव च निद्रायाः ज्ञेया नाशस्य हेतवः ।

कालः शूलं क्षयो व्याधि वृद्धिरनिलपित्तयोः ॥^{viii} (Kaiyadeva Nighantu-7/366-368)

According to Kaiyadeva Nighantu , following factors cause loss of sleep:

- Elimination of *dosas* from the body and head through nasal instillation
- Bloodletting
- Smoke/ fumigation
- Hunger
- Thirst
- Joy
- Sorrow
- Sexual intercourse
- Fear and anger
- The bed state of mind
- Inappropriate bed
- Predominance of *satva*
- Suppression of *tamas*
- Dry food or unhealthy sleep prevents the accompanying.

Among the reasons stated above emotional factors leading to disturbed sleep is common in present scenario.

1.6. Symptoms of *nidra vega dharanam* (Suppression of Sleep)

निद्रानाशादङ्गमर्दशिरोगौरवजृम्भिकाः।

जाड्यग्लानिभ्रमापक्तितन्द्रारोगाश्च वातजाः ॥^{ix} (अ.सां.सू.9/56)

- *angamardha* (body pain),
- *sirogaaurava* (feeling of heaviness of the head)
- *jrmmbha* (yawning)
- *jadata* (stiffness)
- *glani* (Weakness)
- *bhrama* (giddiness)
- *apakti* (indigestion)
- *tandra* (stupor)
- other diseases of *Vata* origin.

1.7. Treatment

अभ्यङ्गोत्सादनं स्नानं ग्राम्यानूपौदका रसाः।

शाल्यत्रं सदधि क्षीरं स्नेहो मद्यं मनःसुखम् ॥५२॥

मनसोऽनुगुणा गन्धाः शब्दाः संवाहनानि च।

चक्षुषोस्तर्पणं लेपः शिरसो वदनस्य च ॥५३॥

स्वास्तीर्णं शयनं वेश्म सुखं कालस्तथोचितः।

आनयन्त्यचिरान्निद्रां प्रनष्टा या निमित्ततः ॥^x (च.सू. 21/52-54)

Sleeplessness can be treated by

- Massage
- Unction
- Bath
- Soup of domestic, marshy and aquatic animals
- *Sali* rice with curds, unctuous substances, milk, alcohol
- Psychic pleasure

- Smell of scents and hearing of sounds of preference
- Comfortable touch
- Application of anointments to body
- *Tarpana* therapy for eyes
- Comfortable bed, home and sleeping at proper time

शीलयेन्मन्दनिद्रस्तु क्षीरमद्यरसान् दधि।
अभ्यङ्गोद्धर्तनस्नानमूर्धकर्णाक्षितर्पणम्॥६६॥
कान्ताबाहुलताश्लेषो निर्वृतिः कृतकृत्यता।
मनोऽनुकूला विषयाः कामं निद्रासुखप्रदाः॥६७॥
ब्रह्मचर्यरतेर्प्राग्यसुखनिःस्पृहचेतसः।
निद्रा सन्तोषतृप्तस्य स्वं काले नातिवर्तते॥^{xi} (अ.ह.सू.7/66-68)

According to Ashtanga Hrudaya, those suffering from loss of sleep should indulge in the use of milk, wine, meat soup and curds, oil massage and mild squeezing of the body, bath, anointing head, ears& eyes with nourishing oils, comforting embrace by the arms of the wife, harboring the feeling of satisfaction of having done good deeds and resorting to things which are comforting to the mind as much as desired; these bring about the pleasure of good sleep. For those who follow the regimen of celibacy, and who are contented with happiness, sleep will not be very late than its regular time.

शीलयेन् मन्दनिद्रस्तु क्षीरमिक्षुरसं रसम्।
आनूपौदकमांसानां भक्ष्यान् गौडिकपैष्टिकान्॥३६९॥
शालिधान्यानि मद्यानि किलाटान् माहिषं दधि।
अम्भङ्गोद्धर्तनस्नानमूर्धश्रवणतर्पणम्॥३७०॥
चक्षुषस्तर्पणं लेपो शिरसो वदनस्य च।
प्रवाते सुरभौ देशे सुखशय्या यथोचिता॥३७१॥
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मनोनुकूला विषयाः कामं निद्रासुखप्रदाः॥३७२॥
संवाहनं स्पर्शसुखं चित्तज्ञैरनुजीविभिः।
मुष्टिभिर्हननं पथ्यं करैर्वा मर्दनं सुखम्॥३७३॥
संवाहनं मांसरक्तत्वक्प्रसादकरं परम्।
प्रीतिनिद्राकरं वृष्य कफवातश्रमापहम्॥^{xiii}(Kaiyadeva Nighantu-7/369-374)

According to Kaiyadeva nighantu,

- Those suffering from loss of sleep should indulge in the use of milk,
- Sugarcane juice, soup of marshy and aquatic animals
- *Guda vikriti* (product of jaggery)
- *Sali* rice with curds, unctuous substances, milk, alcohol
- Massage
- *Udvartana* therapy
- Bath
- *Tarpan* therapy for eye
- *Lepa* (herbal anointments)
- Comfortable bed as appropriate in a breezy fragrant country
- Psychic pleasure and give pleasure to desire and sleep
- Comfortable touch
- Rubbing with the hands is pleasant
- Massage is supremely pleasing to the *mamsa* (muscle tissue), *rakta* (blood) and *tvak* (skin)
- It is pleasantly sleepy
- *Vrushya* (aphrodisiac)
- Relieves *kapha*, *vata* and fatigue.

As mentioned above, those modalities which can calm down the mind can induce sleep. Tratak Kriya is one such practice which is known to relax the mind.

1.8. Sleep disorders

Sleep disorders are a group of conditions that affect the ability to sleep well on a regular basis. Whether they are caused by a health problem or by too much stress, sleep disorders are becoming increasingly common in the United States.

In fact, more than one-third of adults Trusted Source in the United States report getting fewer than 7 hours of sleep in a 24-hour period. More than 70 percent Trusted Source of high school students report getting fewer than 8 hours of sleep on weeknights.

Most people occasionally experience sleeping problems due to stress, hectic schedules, and other outside influences. However, when these issues begin to occur on a regular basis and interfere with daily life, they may indicate a sleeping disorder.

Depending on the type of sleep disorder, people may have a difficult time falling asleep and may feel extremely tired throughout the day. The lack of sleep can have a negative impact on energy, mood, concentration, and overall health.

They can also affect your performance at work, cause strain in relationships, and impair your ability to perform daily activities.

2. Types of sleep disorders

The International Classification of Sleep Disorders diagnostic and coding manual 2000 lists four major categories of sleep disorders: dyssomnias; parasomnias; sleep disorders associated with mental, neurologic, or other medical disorders; and proposed sleep disorders^{xiii}.

2.1. Insomnia

Insomnia refers to almost nightly complaints of insufficient amounts of sleep or not feeling rested after the habitual sleep episode. As the most common sleep-wake-related disorder, it is more common in women and has a prevalence ranging from 10% to 30%^{xiv}.

Insomnia refers to the inability to fall asleep or to remain asleep. It can be caused by jet lag, stress and anxiety, hormones, or digestive problems. It may also be a symptom of another condition.

Insomnia can be problematic for your overall health and quality of life, potentially causing:

- Depression
- Difficulty concentrating
- Irritability
- Weight gain
- Impaired work or school performance

Unfortunately, insomnia is extremely common. Up to 50 percent of American adults experience it at some point in their lives.

The disorder is most prevalent among older adults and women. Insomnia is usually classified as one of three types:

- Chronic, when insomnia happens on a regular basis for at least 1 month
- Intermittent, when insomnia occurs periodically
- Transient, when insomnia lasts for just a few nights at a time

2.2. Sleep apnea

Sleep apnea is characterized by pauses in breathing during sleep. This is a serious medical condition that causes the body to take in less oxygen. It can also cause you to wake up during the night.

There are two types:

- Obstructive sleep apnea,
- central sleep apnea

2.3. Parasomnias

Parasomnias are a class of sleep disorders that cause abnormal movements and behaviors during sleep. They include:

- Sleepwalking
- Sleep talking
- Groaning
- Bedwetting
- Nightmares
- Teeth grinding / jaw clenching

2.4. Restless leg syndrome

Restless leg syndrome (RLS) is an overwhelming need to move the legs. This urge is sometimes accompanied by a tingling sensation in the legs. While these symptoms can occur during the day, they are most prevalent at night.

RLS is often associated with certain health conditions, including attention deficit hyperactivity disorder (ADHD) and Parkinson's disease, but the exact cause isn't always known.

2.5. Narcolepsy

Narcolepsy is characterized by "sleep attacks" that occur while awake. This means that you will suddenly feel extremely tired and fall asleep without warning.

The disorder can also cause sleep paralysis, which may make you physically unable to move right after waking up. Although narcolepsy may occur on its own, it is also associated with certain neurological disorders, such as multiple sclerosis.

2.6. Symptoms of sleep disorders

The symptoms you experience can vary depending on the type of sleep disorder you have.

These are some common symptoms of sleep disorders:

- Taking over half an hour to fall asleep every night
- Waking up several times every night and having trouble going back to sleep
- Waking up too early in the morning
- Having difficulty moving when you first wake up
- Often feeling sleepy in the day or frequently taking naps
- Falling asleep at the wrong times in the day
- Snoring loudly, gasping, snorting, making choking sounds, talking, or not breathing for short periods of time while sleeping
- Experiencing creeping, crawling, or tingling feelings in your arms or legs that get better with movement or massage, particularly while trying to fall asleep
- Frequently jerking your arms or legs while sleeping
- Having vivid, dream-like experiences while falling asleep or lightly dozing
- Experiencing sudden muscle weakness when you're angry, scared, or laughing^{xv}

2.7. Causes of sleep disorders

There are many conditions, diseases, and disorders that can cause sleep disturbances. In many cases, sleep disorders develop as a result of an underlying health problem.

2.7.1 Allergies and respiratory problems

Allergies, colds, and upper respiratory infections can make it challenging to breathe at night. The inability to breathe through your nose can also cause sleeping difficulties.

2.7.2 Frequent urination

Nocturia, or frequent urination, may disrupt your sleep by causing you to wake up during the night. Hormonal imbalances and diseases of the urinary tract may contribute to the development of this condition.

Be sure to call your doctor right away if frequent urination is accompanied by bleeding or pain.

2.7.3 Chronic pain

Constant pain can make it difficult to fall asleep. It might even wake you up after you fall asleep. Some of the most common causes of chronic pain include:

- Arthritis
- chronic fatigue syndrome
- fibromyalgia
- inflammatory bowel disease
- Persistent headaches
- Continuous lower back pain

In some cases, chronic pain may even be exacerbated by sleep disorders. For instance, doctors believe the development of fibromyalgia might be linked to sleeping problems.

2.7.4 Stress and anxiety

Stress and anxiety often have a negative impact on sleep quality. It can be difficult for you to fall asleep or to stay asleep. Nightmares, sleep talking, or sleepwalking may also disrupt your sleep.

2.8. Treatment

Treatment for sleep disorders can vary depending on the type and underlying cause. However, it generally includes a combination of medical treatments and lifestyle changes.

2.8.1 Medical treatments

Medical treatment for sleep disturbances might include any of the following:

- Sleeping pills
- Melatonin supplements
- Allergy or cold medication
- Medications for any underlying health issues
- Breathing device or surgery (usually for sleep apnea)
- A dental guard (usually for teeth grinding)

2.8.2 Lifestyle changes

Lifestyle adjustments can greatly improve your quality of sleep, especially when they're done along with medical treatments. You may want to consider:

- Incorporating more vegetables and fish into your diet, and reducing sugar intake
- Reducing stress and anxiety by exercising and stretching
- Creating and sticking to a regular sleeping schedule
- Drinking less water before bedtime
- Limiting your caffeine intake, especially in the late afternoon or evening
- Decreasing tobacco and alcohol use
- Eating smaller low carbohydrate meals before bedtime
- Maintaining a healthy weight based on your doctor's recommendations

Going to bed and waking up at the same time every day can also significantly improve your sleep quality. While you might be tempted to sleep in on the weekends, this can make it more difficult to wake up and fall asleep during the work week^{xvi}.

3. Treatment

Treatment for sleep disorders can vary depending on the type and underlying cause. However, it generally includes a combination of medical treatments and lifestyle changes.

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3.3. Hypothesis

- **NULL HYPOTHESIS:** Trataka Kriya is not effective in improving the quality of sleep in population aged 30-50 years
- **ALTERNATE HYPOTHESIS:** Trataka Kriya is effective in improving the quality of sleep in population aged 30-50 years

3.4. Aims

To study the effect of Trataka Kriya in improving the quality of sleep in population aged 30-50 years.

3.5. Objectives

- To evaluate the change in subjective and objective parameters on Pittsburgh Sleep Quality Index(PSQI)
- To evaluate the change in subjective and objective parameters in WHO-QOL Bref Questionnaire

4. Materials and methods

4.1. Clinical study

- Study design : Interventional, Open clinical trial
- Sample size : 35

- Age group : 30-50 years
- Settings : RK university Ayurvedic college hospital, Rajkot
- Intervention : Trataka Kriya daily once before bedtime for 15-30 min for 2 weeks
- Assessment tool: 1) Pittsburgh Sleep Quality Index (PSQI) questionnaire

4.2. WHO – QOL Bref questionnaire

- Selection criteria: ○ **Inclusion criteria:** age 30-50 years diagnosed as having improper sleep. ○ **Exclusion criteria:** age 50 years subjects with chronic morbid sleep disorders related to any psychiatric ailments or on medication for sleep disorder. Patient having ptosis or any other neurological ailments affecting normal opening and closure of eyelids will be excluded.

5. Observations and results

5.1. Observations of survey study

5.1.1 Demographic data

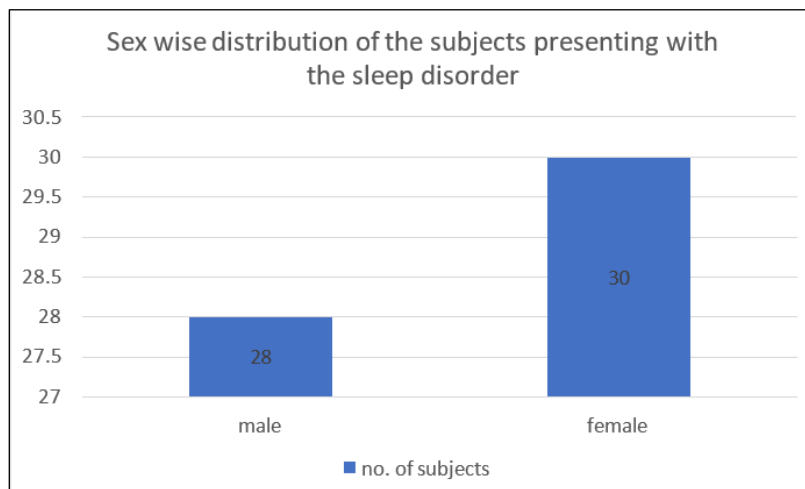


Figure 1 Sex wise distribution of the subjects presenting with the sleep disorder

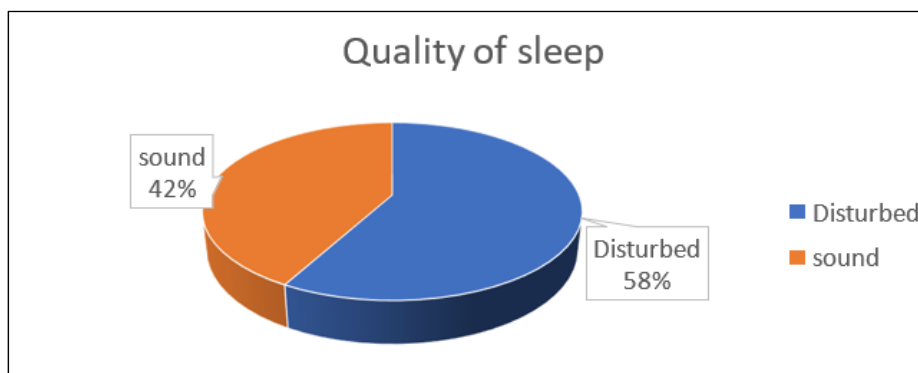


Figure 2 Distribution of study subjects based on Quality of sleep

5.1.2 Observation Quality of sleep

Among 100 patients 42% presented with sound sleep while 58% presented with disturbed sleep.

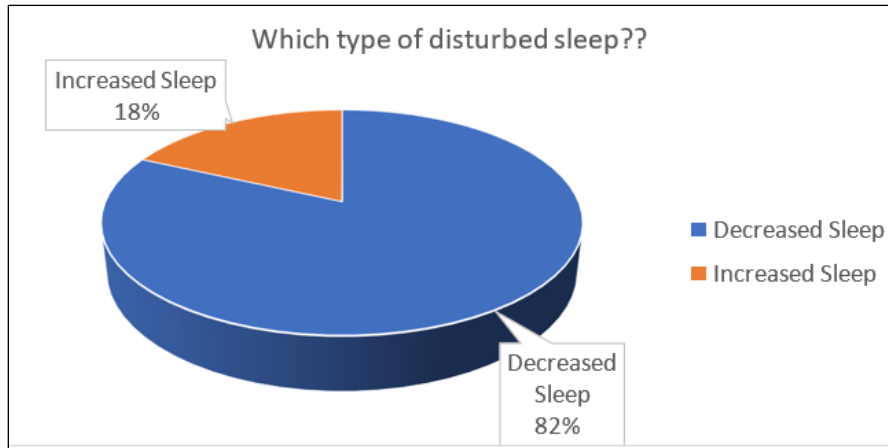


Figure 3 Distribution of study subjects based on type of sleep disturbance (increased/decreased).

5.1.3 *Observation Nature of sleep disturbance*

18% reported increased sleep while 82% reported decreased sleep.

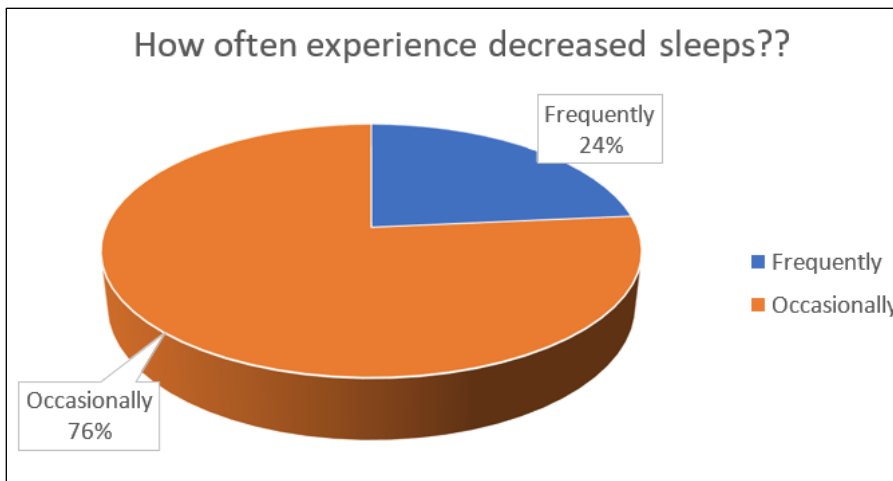


Figure 4 Distribution of study subjects based on frequency of decreased sleep

5.1.4 *Observation: Frequency of decreased sleep*

Among 54 subjects who reported decreased sleep, 76% had sleep issues only occasionally (i.e., 2 days/week) while 24% have the problem frequently (i.e., 4 days /week)

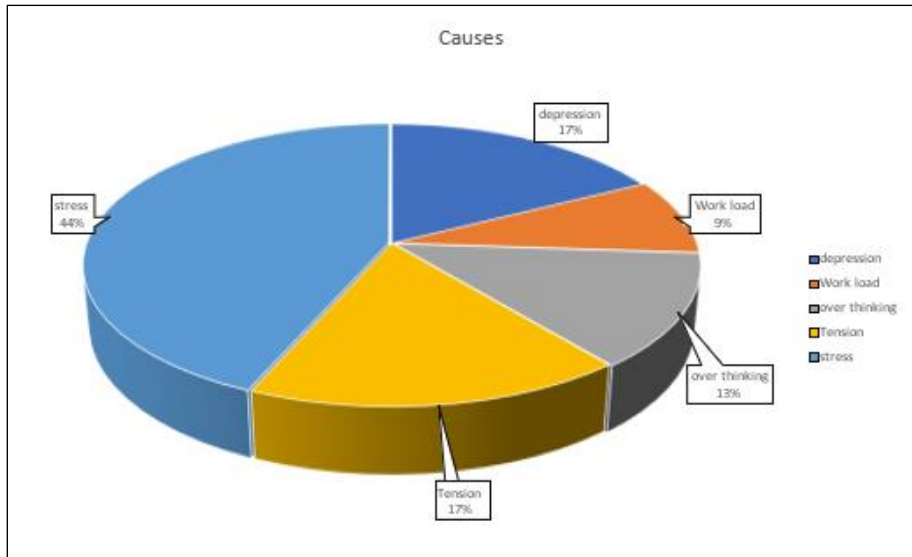


Figure 5 Distribution of study subjects based on cause of decreased sleep

5.1.5 *Observation: Causes of decreased sleep*

Out of 54 subjects having decreased sleep, 44% reported decreased sleep due to Stress; 17% each due to tension and depression; 13% due to over thinking and 9% due to workload.

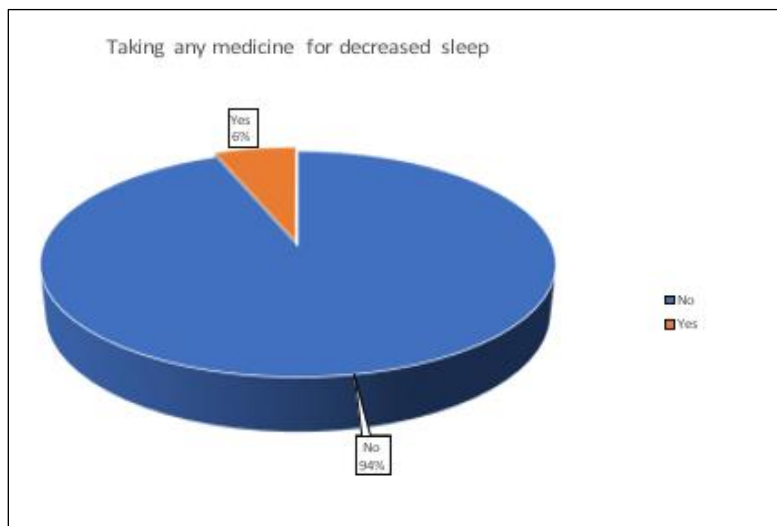


Figure 6 Distribution of study subjects based on whether/ not taking medicine for decreased sleep

5.1.6 *Observation: Taking medicine for decreased sleep*

Out of 54 subjects having decreased sleep, 6% reported taking medicines.

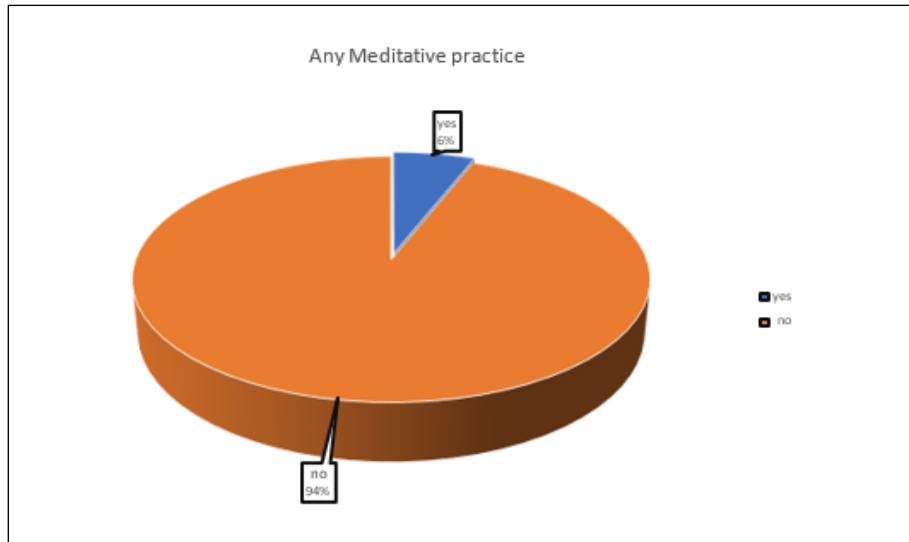


Figure 7 Distribution of study subjects based on meditative practices undertaken

5.1.7 Observation: Doing any meditative practices

Out of 54 subjects having decreased sleep, 6% reported taking medicines.

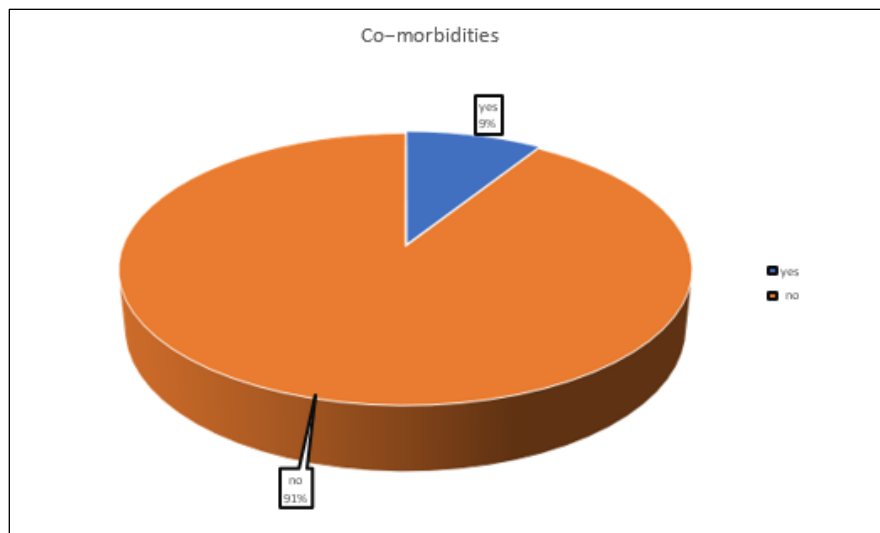


Figure 8 Distribution of study subjects based on co-morbidities

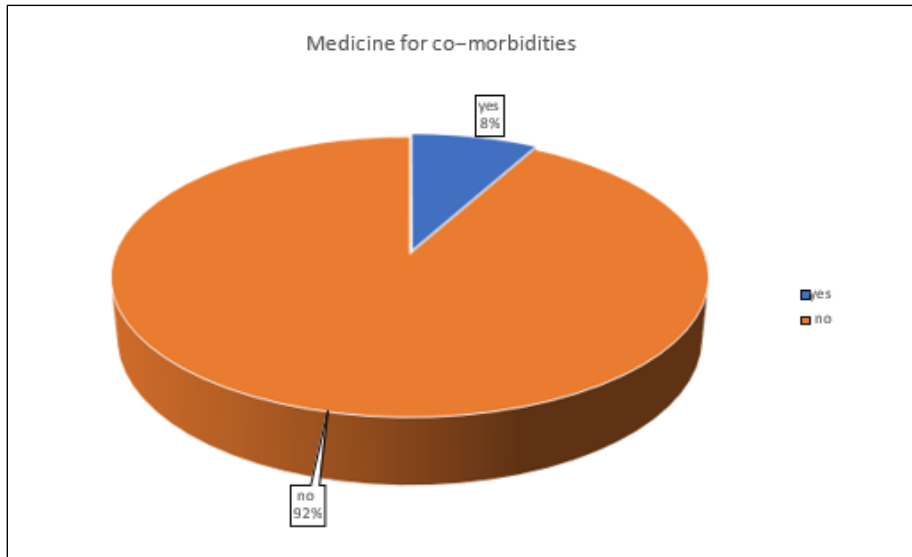


Figure 9 Distribution of study subjects based on medication for co-morbidities

5.1.8 Observation: Any co-morbidities

Out of 54 subjects having decreased sleep, 9% reported having co-morbidities like hypertension, thyroid disorders and type 2 Diabetes Mellitus. Among these, 8% were on medication for the respective co-morbidities.

Observations of changes in PSQI score and who-BREF score:

- **PSQI scale:**
- **Global score:**

Table 1 Effect of Trataka Kriya on global score in PSQI

Group	N	Missing	Median	25%	75%
BT	35	0	10.000	9.000	12.000
AT	35	0	9.000	7.250	10.000

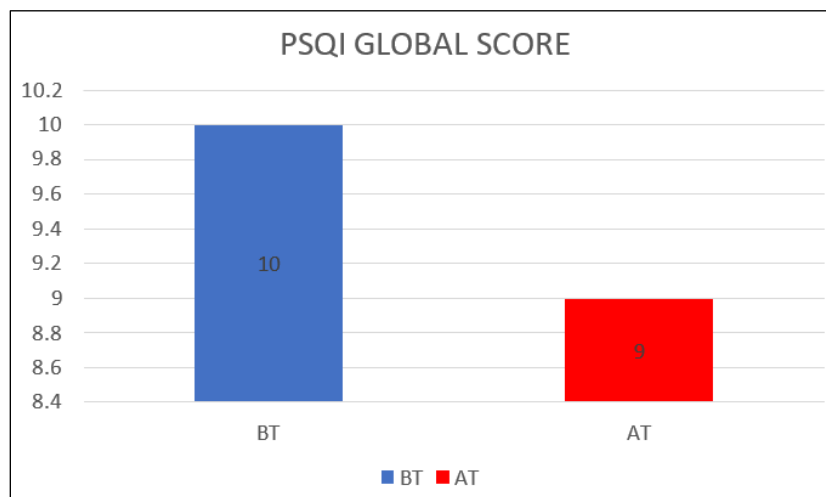


Figure 10 Effect of Trataka Kriya on global score in PSQI

Observation PSQI Global score showed significant improvement ($p < 0.001$)

WHO- QOL Bref questionnaire

COMPONENT B1: OVERALL QUALITY OF LIFE

Table 2 Effect of Trataka Kriya on overall quality of life score in WHO-QOL Bref questionnaire

Group	N	Missing	Median	25%	75%
BT	35	0	3.000	3.000	4.000
AT	35	0	4.000	3.000	4.000

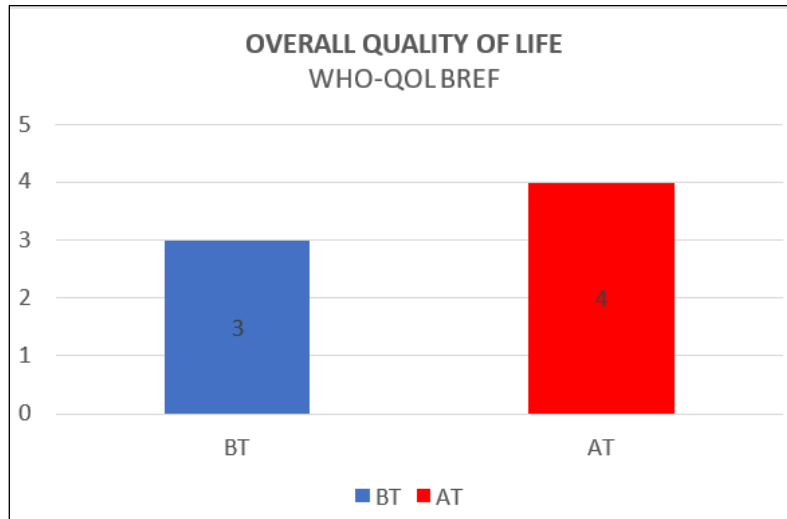


Figure 11 Effect of Trataka Kriya on overall quality of life score in WHO-QOLBREF questionnaire

Observation: No significant changes observed in overall quality of life (p=1.000)

Component b2: Overall quality of general health

Table 3 Effect of Trataka Kriya on overall quality of general health score in WHO-QOL BREF questionnaire

Group	N	Missing	Median	25%	75%
BT	35	0	3.000	3.000	4.000
AT	35	0	3.000	3.000	4.000

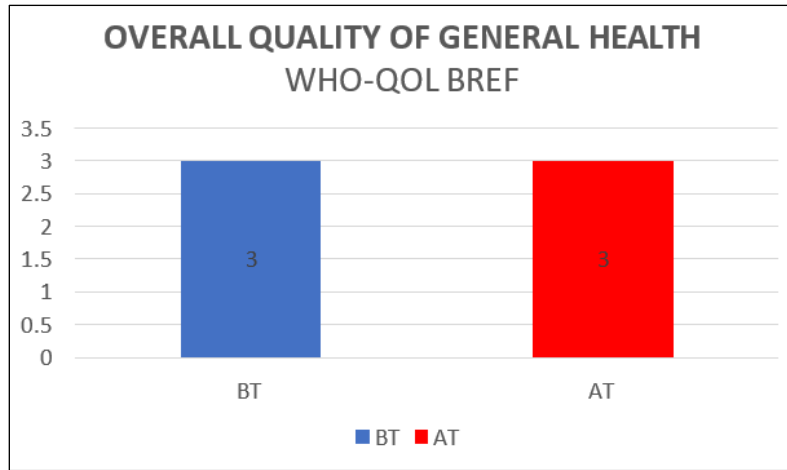


Figure 12 effect of Trataka Kriya on overall quality of general health score WHO-QOLBREF questionnaire

Observation: No significant changes observed in overall quality of general health (p=1.000)

DOMAIN 1: PHYSICAL HEALTH

Table 4 effect of trataka kriya on physical health domain score in who-qol bref questionnaire

Group	N	Missing	Median	25%	75%
BT	35	0	20.000	20.000	23.000
AT	35	0	21.000	20.000	23.750

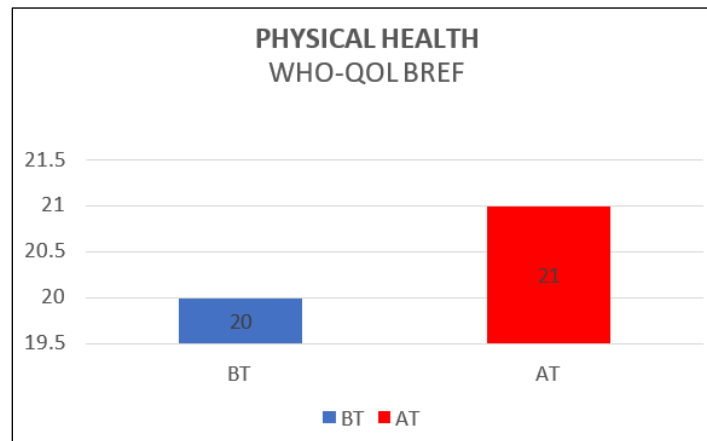


Figure 13 Effect of Trataka Kriya on physical health domain score in WHO-QOL BREF QUESTIONNAIRE

Observation: Significant improvement observed in Domain-Physical Health (p = <0.001).

Domain 2: PSYCHOLOGICAL HEALTH

Table 5 Effect of Trataka Kriya on psychological health domain score in WHO-QOL BREF questionnaire

Group	N	Missing	Median	25%	75%
BT	35	0	18.000	16.250	20.000
AT	35	0	18.000	17.000	20.000

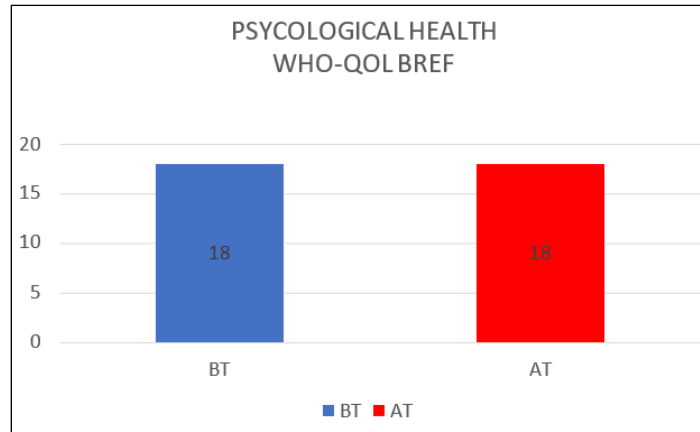


Figure 14 effect of Trataka Kriya on psychological health domain score in WHO-QOL BREF questionnaire

Observation: Significant improvement observed in Domain- Psychological Health ($p = 0.016$).

Domain 3: SOCIAL RELATIONSHIPS

Table 6 Effect of Trataka Kriya on social relationships domain score in WHO-QOL BREF questionnaire

Group	N	Missing	Median	25%	75%
BT	35	0	10.000	6.000	12.000
AT	35	0	10.000	6.000	12.000

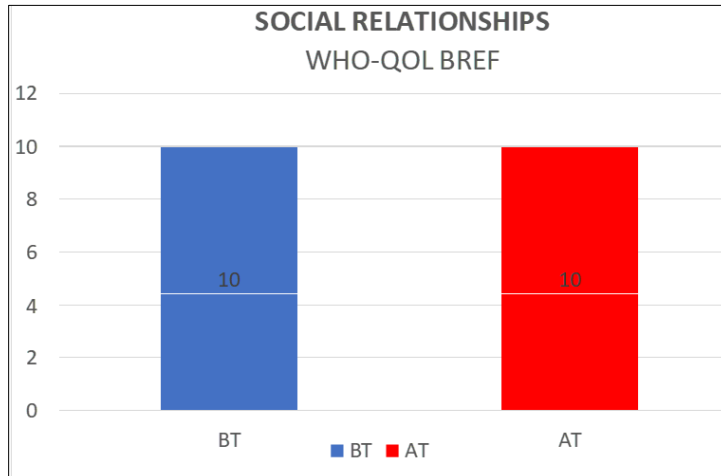


Figure 15 E ffect of Trataka Kriya on social relationships domain score in WHO-QOL BREF questionnaire

Observation : No significant changes observed in Domain-Social Relationships ($p=1.000$)

Domain 4: ENVIRONMENTAL HEALTH

Table 7 Effect of Trataka Kriya on environmental health domain score in WHO-QOL BREF questionnaire

Group	N	Missing	Median	25%	75%
BT	35	0	25.000	23.000	26.000
AT	35	0	25.000	23.000	26.000

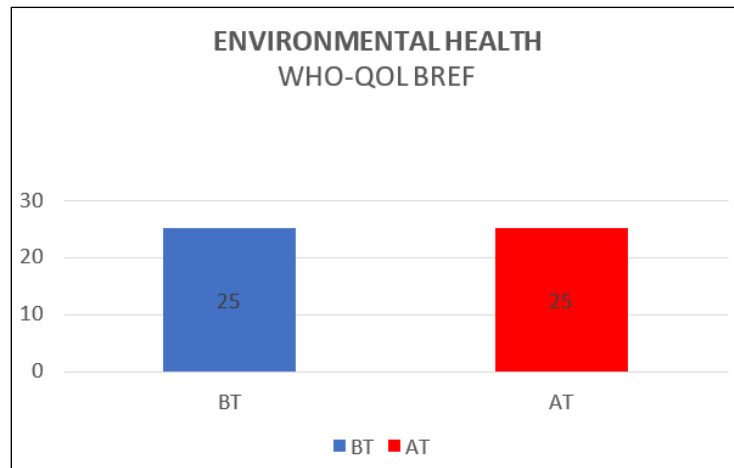


Figure 16 effect of Trataka Kriya on environmental health domain score in WHO-QOL BREF questionnaire

Observation: No significant changes observed in Domain- Environmental Health ($p=1.000$)

6. Discussions

In the survey which was conducted as a part of this study to assess the distribution of sleep disorder in the population, it was observed that 28 male and 30 female subjects presented with sleep disorder. This might be attributed to the fact that compared to the male, females are more involved into day to day family matters which might be cause of worry. Further, compared to males, females have a lower *Satva Bala* which might also be a reason for higher proportion of females having sleep disorders.

As per the classical references causes of disturbed sleep are many including the factors like worries, fear, sorrow, anger etc. In present study also it was observed that cause of sleep disturbance as reported by majority of subjects was stress, tension and depression. Thus the observation of the study aligns with the classical *Nidranasha nidan*.

In the present study, quality of sleep was assessed using the Pittsburg Sleep Quality Index (PSQI). This scale considers subjective sleep quality, sleep latency, sleep duration, sleep efficiency, and sleep disturbance, use of sleep medications and day time dysfunction. Assessment was made by considering overall score of the above mentioned components which is known as Global PSQI score. As observed in the study significant improvement was achieved in this score by this practice of Trataka Kriya. Further an assessment of quality of life was included because sleep quality has a strong influence over the quality of the life of an individual. Quality of life was assessed WHO-QOL BREF scale having components including overall quality of life, over all general health, physical health, psychological health, social relationship and environmental health. There was a significant improvement in physical and psychological health by the practice of Trataka Kriya. This supports the fact that good quality sleep can bring about improvement in the physical and psychological health of the person. This can be attributed to the homeostasis which is maintained by the good quality sleep which in turn ensures appropriate functioning of all the physiological system of the body. A good quality sleep is also known to influence the emotional expression due to neuro-endocrine responses in the body. This might be the cause for improvement in psychological health when the quality of sleep improved.

6.1. Probable mode of action of Tratak Kriya in disturbed sleep

Trataka Kriya is one among the six purificatory therapies mentioned in Yoga. However, beyond purification Trataka has been observed to provide a psychological state of meditation. Previous studies have reported a decrease in sympathetic and increase in the parasympathetic component of Autonomic Nervous System with the practice of Trataka Kriya. In previous studies, reduction has been observed in neuroticism, Galvanic Skin Resistance (GSR) and attention fluctuation alongwith increase in BSR which implies improvement in psycho-physiological health^{xx}. EEG findings from previous studies have established the mind-relaxing action of Trataka Kriya^{xxi}. Further, in a previous study done to assess the role of Trataka Kriya in hypertension decrease in Heart rate and Respiratory rate was observed which also points towards decrease in sympathetic activity^{xxii}. This is in support of the significant improvement in physical and psychological domains as observed in the present study.

Further, classically Trataka practice is advised to be done in dim light. In present study, practice was conducted in candle light in a dark room just before retiring to bed. Such dim light exposure increases the melatonin secretion. Such a melatonin surge has an influence on initiating the sleep^{xxiii}.

According to ayurvedic classic in the context of *Nidranasha chikitsa* it has been advised to adopt the measures which are comforting to the mind and bring about psychic pleasure to the individuals. As evident from the above-mentioned research works Trataka Kriya calms down the mind and inspite of being a purificatory therapy it has effects similar to meditation having creates a pleasant impact on the mind of the practitioners.

However, no significant improvement was observed in overall quality of life, overall quality of general health, Domain Social Relationships and Environmental Health. This might be due to reason that duration of intervention in the present study was short (15 days) which might not be sufficient to bring about changes in the above said domains. It is suggested that similar study may be conducted for longer durations to assess the change these domains.

6.2. Summary of results

PSQI SCORE: Based on the observations there is a significant improvement ($p = <0.001$) PSQI Global score.

WHO-QOL BREF: Based on the observations there is a significant improvement ($p = <0.001$, $p = 0.016$) respectively in the Physical & Psychological Health Domains in WHO=QOL BREF questionnaire. However, no significant changes observed in overall quality of life ($p=1.000$), overall quality of general health ($p=1.000$), Domain Social Relationships ($p=1.000$), Environmental Health ($p=1.000$) due to may be short time period.

Hence, Null Hypothesis is rejected and alternate hypothesis is accepted.

7. Conclusion

It can be concluded that Trataka Kriya is effective in improving the quality of sleep in population aged 30-50 years

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Health and Demographic Surveillance System (HDDS) site
- [2] P. V. Sharma, Charaka Samhita, Sutra Sthana. Chaukhambha Orientalia, Varanasi.2014. vol 1, Chapter 11.
- [3] P. V. Sharma, Charaka Samhita, Sutra Sthana. Chaukhambha Orientalia Varanasi, 2014. vol 1,Chapter 11.
- [4] Carskadon M, Dement W. Normal human sleep: An overview. In: Kryger MH, Roth T, Dement WC, editors. Principles and Practice of Sleep Medicine. 4th ed. Philadelphia: Elsevier Saunders; 2005.
- [5] Riemann D, Krone LB, Wulff K, Nissen C. Sleep, insomnia, and depression. *Neuropsychopharmacology*. (2020) 45:74–89. doi: 10.1038/s41386-019-0411-y, PMID
- [6] Prof. K. R. Srikantha murthy, Susruta Samhita. Sharira Sthana. Chaukhambha Orientalia Varanasi. 2016. Vol 1, Chapter 4.
- [7] P. V. Sharma, Charaka Samhita, Sutra Sthana. Chaukhambha Orientalia, Varanasi.2014. vol 1, Chapter 21.
- [8] Acharya Priyavrata Sharma evam Dr. Guruprasada Sharma. Kaiyadeva Nighantu. Chaukhambha Orientalia, 2016. Chapter 7.
- [9] Dr. Deepak Yadav 'Premchand', Astanga Hridaya. Sutrasthana.Chaukhamba surbharati prakashan Varanasi.C2019. Chapter 7

- [10] P. V. Sharma, Charaka Samhita, sutra sthana. Chaukhambha Orientalia Varanasi. 2014. vol 1, chapter 21.
- [11] Dr. Deepak Yadav 'Premchand', Astanga Hrdaya. Sutrasthana.chaukhamba surbharati prakashan Varanasi. 2019. chapter 7
- [12] Acharya Priyavrata Sharma evam Dr. Guruprasada Sharma. Kaiyadeva Nighantu. Chaukhambha Orientalia,2016. Chapter 7.
- [13] American Academy of Sleep Medicine. The International Classification of Sleep Disorders, revised: Diagnostic and Coding Manual. Rochester, Minn: American Academy of Sleep Medicine. 2000
- [14] Thorpy M. The Clinical Use of the Multiple Sleep Latency Test. The Standards of Practice Committee of the American Sleep Disorders Association.
- [15] <https://pubmed.ncbi.nlm.nih.gov/>
- [16] Sleep Disorders: Causes, Diagnosis, and Treatments (healthline.com)
- [17] Shrivastava, Y.K., Shamkuwar, S., & Nagrare, M. (2017). Trataka Meditation: Exploring its Physiological and Psychological Effects on Practitioners (ijrpr.com)
- [18] Kurup, S., Chhugani, M., & Tamang, E.L. (2017).Trataka Meditation: Exploring its Physiological and Psychological Effects on Practitioners (ijrpr.com)
- [19] Chundawat, A., & Panda, S.K. (2023). Trataka Meditation: Exploring its Physiological and Psychological Effects on Practitioners (ijrpr.com)
- [20] Gore, M. M., Bhogal, R. S., & Rajapurkar, M. V. (1990). Effect of Trataka on various psycho- physiological functions. *Yoga Mimamsa*, 29(3), 18–32.
- [21] Kumar, V. (2010). The Effect of Trataka on Mental Relaxation Through - E. E. G. *Yoga*, XLII (2), 97–102.
- [22] Raghavendra, B. R., and Ramamurthy, V. (2014). Changes in heart rate variability following yogic visual concentration (Trataka). *Heart India* 2:15.
- [23] Zisapel N. (2018). New perspectives on the role of melatonin in human sleep, circadian rhythms and their regulation. *Br. J. Pharmacol.* 175 3190–3199. 10.1111/BPH.14116