EFFECT OF SLEEP SPECIAL TECHNIQUE ON HYPERTENSIVE PATIENTS: A RANDOMIZED CONTROLLED STUDY

TOWARDS

Partial fulfilment of Master degree in Yoga Therapy (M. Sc. YT)

SUBMITTED BY

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Under the Guidance of

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CERTIFICATE

This is to certify that Abhishek Yadav is submitting this literature review on **"concept of sleep and disease according to ancient texts"** and experimental research on **"Effect of Sleep Special Technique on Hypertensive Patients: A Randomized Controlled Study"** in partial fulfilment of the requirement for the Master of Science (Yoga Therapy) registered in **SWAMI VIVEKANANDA YOGA ANUSANDHANA SAMSTHANA (S-VYASA UNIVERSITY) BENGALURU** and this is a record of work carried out by him in this institution.

Date: Guide

Place: Bengaluru **Dr. V. Sureshbabu, B.N.Y.S., MD (Yoga & Rehabilitation)**

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DECLARATION

I, hereby declare that this study was conducted by me at Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA), Bengaluru, under the guidance of **Dr. V. Sureshbabu**, assistant professor, S-VYASA University, Bengaluru.

I also declare that the subject matter of my dissertation entitled "**Effect of Sleep Special Technique on Hypertensive Patients: A randomized Controlled Study**", has not previously formed the basis of the award of any degree, diploma, associate-ship, fellowship or similar titles.

Date: Abhishek Yadav

Place: Bengaluru (Candidate)

ACKNOWLEDGEMENT

I would to like to express my deepest gratitude to my guide, Dr. V. Sureshbabu for his guidance and encouragement. I am unable to express his contribution in by development through words.

I thank Dr.Amit, Dr. Rajesh S.K., Registrar and Padmasri Didi for their guidance and support.

I thank all the members of the faculty and my friends for their help at different stages of this work. Also I would like to thank all the participants involved in my research as subjects.

I will be always grateful to my university Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA) for its support in promoting my career.

I am indebted to my parents for their inspiration love and support.

Finally, I thank that unseen divine, without whose wish, this work wouldn't have been possible.

Date: Abhishek Yadav

Place: Bengaluru (Candidate)

STANDARD INTERNATIONAL TRANSLITERATION CODEUSED TO TRANSLITERATE SANSKRIT WORDS

a	=	**अ**	**ṅa**	=	**ङ**	**pa**	=	**प**
ā	=	**आ**	**ca**	=	**च**	**pha**	=	**फ**
i	=	**इ**	**cha**	=	**छ**	**ba**	=	**ब**
ī	=	**ई**	**ja**	=	**ज**	**bha**	=	**भ**
u	=	**उ**	**jha**	=	**झ**	**ma**	=	**म**
ū	=	**ऊ**	**ñ**	=	**ञ**	**ya**	=	**य**
ṛ	=	**ऋ**	**ṭa**	=	**ट**	**ra**	=	**र**
ṝ	=	**ॠ**	**ṭha**	=	**ठ**	**la**	=	**ल**
e	=	**ए**	**ḍa**	=	**ड**	**va**	=	**व**
ai	=	**ऐ**	**ḍha**	=	**ढ**	**śa**	=	**श**
o	=	**ओ**	**ṇa**	=	**ण**	**ṣa**	=	**ष**
au	=	**औ**	**ta**	=	**त**	**sa**	=	**स**
ṁ	=	**अ**	**tha**	=	**थ**	**ha**	=	**ह**
ḥ	=	**अः**	**da**	=	**द**	**kṣa**	=	**क्ष**
ka	=	**क**	**dha**	=	**ध**	**tr**	=	**त्र**
kha	=	**ख**	**na**	=	**न**	**jña**	=	**ज्ञ**
ga	=	**ग**	**gha**	=	**घ**			

ABSTRACT

Title: Effect of Sleep Special Technique on Hypertensive Patients: A Randomized Controlled Study.

Background: Many aspects of our life such as mood, cognitive function such as attention and working memory, homeostasis, learning, concentration etc. are determined by sleep. Sleep Deprivation shows significant increase in blood pressure and sympathetic nervous system functions and hypertension may lead cardiovascular disease. Yoga contributes to a greater extent in this regard. Yoga has been found to be useful in improving much health related problems sleep, and depression.

Aim: Aim of the study is to evaluate the effect of Sleep Special Technique (SST) on Hypertensive Patients.

Methods and Materials: A total of 60 participants at Arogyadhama both male and female; divided equally into experimental and control group. Experimental group practiced one week of Sleep Special Technique and the control group had no exposure to SST. Medical Outcome Study – Sleep Scale (MOS-SS), Chalder Fatigue Scale (CFS), Sleep Locus of Control Scale (SLCS), Short Depression & Happiness Scale (SDHS) and Sphygmomanometer were administered to the participants before and after one week of SST for experiment group and the one-week gap was given for control group.

Results: Between-group comparisons revealed that sleep disturbance, sleep adequacy, sleep short of breath/ headache, sleep somnolence, snoring, sleep problem index I, sleep problem index II, sleep quantity, mental and physical symptoms of fatigue, internal and chance sleep locus of control, systolic and diastolic blood pressure showed the significantly better change in the yoga group as compared to the control group, but optimal sleep and negative emotions scores did not show significant improvement in either of the group.

Conclusion: SST beneficial in improving sleep quality, sleep adequacy, removing physical and mental symptoms of fatigue, and sleep-related locus of control, normalizing the blood pressure in the hypertensive patients. It helps reduce snoring and various other sleep-related problems such as sleep disturbance and sleep somnolence.

Key words: Yoga, Sleep, MOS-SS, CFS, SLCS, SDHS, Sphygmomanometer, Patients.

Contents

CHAPTER- 1

1. INTRODUCTION

1.1. Health

Health is a dynamic condition of prosperity portrayed by a physical, mental and social potential, which fulfils the requested of a real existence similar with age, culture, and moral obligation. In the event that the potential is deficient to fulfil these requests, the state is malady(Bircher, 2005). The World Health Organization's (WHO) definition of health is "a condition of complete physical, mental, social and spiritual wellbeing and not just the absence of sickness or ailment"(Saracci, 2011). Clearly, in general, a healthy woman or a man has a lot more prominent future potential outcomes to respond to a wide range of difficulties that an individual in ill health or with an illness. The level of dependence is increased with illness and frailty of age. The distinctive phases of this evolution are related to age-and culture-explicit demands and difficulties to which each individual needs to respond. Interestingly, the mere presence of signs and symptoms is seen commonly to be compatible with health, since studies have shown that a great number of people who think about themselves to be healthy nevertheless experience headaches, back torments, stomach aches, etc(Bircher, 2005).

1.2. SLEEP

Sleep is one of the basic needs of human being and it is essential for maintaining good health, quality of life and for performing well throughout the day(Germany, n.d.). Sleep quality is a complicated concept that contains the objective and subjective forms. Good quality sleep is mostly associated with minute sleep disturbances(Chen et al., 2010). Sleep disturbance or sleep disorders can be described by using several indicators like sleep latency, total sleep time, repetitive nights of sleep disturbance among one week or one month, awakening during the sleep and unable to sleep(Germany, n.d.).The three most commonly sleep disturbances include difficulty in getting into sleep, maintaining sleep, and early morning awakening(Chen et al., 2010).Repeated arousal from sleep further increases blood pressure and nocturia. Resulting sleep

dissolution promotes daytime sleepiness, depression, weakened quality of life, absence at work. It increases the risk of cardiovascular disease like hypertension(Victor et al., 2019).

1.3. SLEEP DEPRIVATION

The lack of at least a four-hour period of uninterrupted sleep during the previous 24 hours is defined as sleep deprivation(Deaconson et al., 2015). An individual who is sleep deprived ill has difficulty staying awake at the point of the biological cycle where sleep is usually induced, while a well-rested person may be more capable to resist the urge of sleep(Weinger, 2015).Regardless of whether or not sleep loss is deadly, lack of sleep has two results that never neglect to happen. The first is an interruption of sleep into alertness. At the point when attentiveness is implemented, sleep pressure increases and sleep can't be kept away from, independent of stimulation(Dahl, 1999). Sleep evolved to serve the same types of metabolism in all the species. There is a question that sleep, by altering so many aspects of physiology and behaviour, affects the vast majority of body metabolism, from hormonal regulation to immunity to thermoregulation to metabolism(Abrams, 2015). Even thou the entire body is benefited from sleep, the most immediate, unavoidable effect of sleep deprivation is cognitive impairment. Sleep deprivation affects the brain the most. Prolonged deprivation in sleep leads to death(Cirelli& Tononi, 2008).

1.4. HYPERTENSION

1.4.1. DEFINITION

Hypertension is a medical condition in which the pressure in the arteries due to blood flow is persistently raised for a long span. The constant increase in this blood pressure even though an individual is resting is the symptom of hypertension("High blood pressure: key points - ScotPHO," n.d.).

1.4.2. CLASSIFICATION OF HYPERTENSTION

Primary Hypertension (HTN): It is also known as essential hypertension, the cause is unidentified for this type but it is associated with lifestyle with a genetic predisposition. 90% to 95% of patients diagnosed with hypertension fall under this type.

Secondary Hypertension: The cause for this type is known. It comprises 5% to 10% cases of hypertension existing as a secondary to the other existing disorders such as diabetes, chronic kidney disease, and others("Gaat10I2P27.Pdf," n.d.).

Table - 1: ESC/ESH classification of blood pressure level(Gabb et al., 2016).

Grade	Systolic (mmHg)	Diastolic (mmHg)
Normal blood pressure	<130	<85
High normal blood pressure	130-139	85-89
HTN (Grade I) Mild	140-159	90-99
HTN (Grade II) Moderate	160-179	100-109
HTN (grade III) Severe	180-209	110-119

Grades of HTN:

ESC/ESH classification of BP levels is based on the range of Systolic and diastolic blood pressure. These grades of HTN area is crucial parameter in determining the type of treatment, and selection of antihypertensive drug.

1.4.3. SYMPTOMS

HTN cannot be diagnosed on the basis of symptoms and is diagnosed with routine blood pressure check-up(WHO., 2011). Common Symptoms are discussed below:

Headache	Dizziness
Nausea	Anxiety
Palpitation	Insomnia
Shortness of breath	Chest Pain
Tremors	Fatigue
Vomiting	Pallor

1.4.4. PREVALENCE OF HTN

IN INDIA: National family health survey 2015-16 confirms that HTN becomes a major threat among the Indian population with a prevalence rate of~22%.

The highest prevalence of HTN was reported in a survey study, in urban male-15.1%, followed by the rural males to be 12.6%. Rural female has the lowest prevalence of HTN 8.5%(Li & Kelly, 2014).

Table – 2: Hypertension among in India (Age-15 to 49 years)

	Women			Men		
	Urban	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Mild	**7.3**	**6.5**	**6.7**	**11.4**	**9.8**	**10.4**
Moderate	**1.6**	**1.3**	**1.4**	**2.7**	**2**	**2.3**
Severe	**0.7**	**0.7**	**0.7**	**1**	**0.8**	**0.9**

The average diastolic blood pressure tends to lower in older people, although their systolic blood pressure may continue to rise. It may be due to clinical and subclinical cardiac damage resulting in reduced cardiac output. Mostly, men are diagnosed with high blood pressure until the age of 45. From age 45 to 54 both men and women are equally at risk of high BP, whereas women are more likely to have blood pressure after the age of 54(Health, 2015). Below is a table showing the illustration of the same:

Table – 3: Age and Gender wise prevalence of HTN in India

Age	Men (%)	Women (%)
20 – 34	11.1	6.8
35 – 44	25.1	19
45 – 54	37.1	35.2
55 – 64	54	53.3
65 – 74	64	69.3
75 & older	66.7	78.5

GLOBAL IMPACT OF HTN

Hypertension is a global threat due to its high frequency and associated risk of cardiovascular and renal ill health. It has been recognized as one of the main threat components for mortality and is ordered third as a cause of impaired-adjusted life-years(Kearney et al., 2005).Ethnic differences in hypertension and its types give us the strongest proof that we have for the concept that hypertension exists in two major types. As per diabetes, hypertension can usefully be classified as of type 1 and type 2, each with its own preferred treatment(Brown, 2006). Twenty percent of the adult population is affected by primary hypertension and in most cases its cause is unknown(Williams et al., 1985).

1.5. SLEEP AND HYPERTENSION

Sleep enacts a crucial part in maintaining our good physical condition and a few study sleep extension as an intervention that does not involve medication for avoiding, managing, and curing overweight/obesity and essential hypertension. The function of the autonomic nervous system and other physiological processes that effects blood pressure responses undergo major changes during sleep time(MartinezAguirre-Betolaza et al., 2019). A rise in blood pressure has been observed in both healthy and hypertensive subjects when a short term experiment was conducted, restricting sleep for as little as one night(Stampfer et al., 2003).As hypertension has high possibilities for cardiovascular disease, a result of sleep deprivation on hypertension perhaps increases the possibilities of cardiovascular complications and mortality(Redline et al., 2017). There is proof indicating the relation between the increasing commonness of hypertension and sleep deprivation(Gangwisch, 2009). A study on sleep deprivation shows a significant increase in blood pressure and sympathetic nervous system functions, where both the subjects - with normal blood pressure and high blood pressure after nights were hours of sleep was decreased to 3.6 to 4.5(Rundle et al., 2006).

1.6. YOGA

Yoga is traditional Indian science and a lifestyle which induces relaxation and brings about a stable mental state. Yogic methods involve physical postures(asanas), manual control over breathing(pranayamas), meditation and philosophical laws that help to attain a stable mental

state(Manjunath& Telles, 2005). Yoga is an integrated treatment for people with various physical and mental ailments(Tekur, Singphow, Nagendra, & Raghuram, 2008)(Tekur et al., 2008)(Sujan, Ravikiran, …, & 2010, n.d.). Yoga brings about minds-body-spirit wellbeing(Miragall& Palomo, 2014). An experiment of yoga-based interventions conducted on the healthy subject has shown declination in depression and anxiety as an effect of yoga(Chen et al., 2010). Basic research on yoga has proposed that yogic practices are successful in influencing psychological, neuroendocrine and cognitive measures(Funderburk, 1977)(Goyeche, 1979)(Khalsa, 2004).

Yoga and Physiological changes:

The pre-post design conventional study on 40 physical education teacher who already had an average range of 8 years of physical training, 3 months residential yogic training produced significant reduction in weight and blood pressure, heart rate, respiratory rate, improved lungs function(S Telles, Nagarathna, Nagendra, & Desiraju, 1993).

Yoga and Sleep:

In ancient yoga, text sleep is defined as a condition in which the mental content is absent (Patanjali yoga sutra, 1-10) (Sutras, n.d.). Regular practice of yoga improves the quality of sleep(Ebrahimi, Guilan-Nejad, & Pordanjani, 2017). Yoga also improves sleep efficiency, sleep latency, sleep duration, general wellbeing along with sleep quality(Kennedy, 2016a). Mind sound resonance technique is one of the yogic relaxation techniques that help to improve the quality of sleep(Rao, Metri, Raghuram, & Hongasandra, 2017). The parasympathetic nervous system is responsible for sleep and various yogic relaxation techniques stimulate the parasympathetic nervous system and calm down the mind(Jerath, Edry, Barnes, & Jerath, 2006).

1.7. PURPOSE OF THE STUDY

Yogic practices help improving many metabolisms in our body. According to many texts, there are specific asanas for various purposes of the study. Limited experimental statistics suggest that blood pressure is elevated acutely due to restriction of sleep. However not much is known about the connectivity between hypertension and usual sleep duration. This study estimates the relationship between hypertension, duration sleep and sleep special technique(SST)(Gottlieb et al., 1998).

CHAPTER– 2

2. ANCIENT LITERATURE REVIEW

Sleep

Sleep is dreamless and desires less condition where thoughts and thought processes are missing. The mind will be thoughtless and the individual experiences emptiness or void in a deep state of sleep.

Disease

Disease can be understood as a specific abnormal condition that affects the structure and function of a part or all of an individual, negatively and is not due to any external injury. Disease can not only affect an individual physically but also mentally as confining oneself and living with a disease can alter the affected person's perspective on life.

Methodology of study

Many ancient texts provide information about sleep, stress, disease, Nadishodana pranayama and Ujjayi pranayama. The ancient scriptures referred are as discussed below:-

Health

- Suśrutasaṁhitā
- Aṣṭāṅag hṛdayam

Sleep

- Caraka saṁhitā
- Patañjali yoga sūtra
- Māṇḍūkya upaniṣad
- Haṭha yoga pradīpikā

Stress

- Shrimad Bhagavatam
- Bhagavad gītā
- Patañjali yoga sūtra

Disease

- Haṭha yoga pradīpikā
- Aṣṭāṅag hṛdayam

Yoga

- Bhagavad gītā
- Patañjali yoga sūtra
- Yoga vāsiṣṭha
- Kaṭhopaniṣat

Nadishodhana

- Haṭha yoga pradīpikā

Ujjayi pranayama

- Haṭha yoga pradīpikā

2.1. HEALTH

2.1.1. Suśrutasaṁhitā

Suśruta saṁhitā is one of the ancient Sanskrit scripture on medicine and surgery. In India, it is one of the foundational texts of the medicinal tradition.

समदोषः समाग्निश् च समधातुमलक्रियः।

प्रसन्नात्मेन्द्रियमनाः स्वास्थ्यः इत्यभिधीयते॥ १५.४८॥

samadoṣaḥ samāagniś ca samadhātumalakriyaḥ।
prasannātmeindriyamanāḥ svasthya ityabhidhīyate।।15.48।।

"person, whose all three humor or Doshas: Vata(air), Pitta(fire) and Kapha(water) are in balance, whose digestion and appetite are in balance; whose seven body tissues(Seven dahtus; rasa, rakta, mansa, meda, asthi, majja and shukra) are working normally; whose malas (urine, faeces and sweat) are removed properly and whose spirit, senses and mind (satva, rajas, tamas), continue to exist in full of bliss is considered healthy".

2.1.2.Aṣṭāṅag hṛdayam

Aṣṭāṅag hṛdayamone of the major three texts of Ayurveda composed by eminent scholar "Vagbhata" means the heart of eight limbs (kaya chikitsa, shalya chikitsa, shalkyam chikitsa, agadtram chikitsa, bhutvidya chikitsa, kaumarbhrutyam chikitsa, rasayanam chikitsa and vaajikarnam chikitsa).

कालार्थकर्मणां योगो हीनमिथ्यातिमात्रकः।

सम्यग्योगश्चविज्ञेयोरोगारोग्यैककारणम्॥ १.४२॥

kālārthakarmaṇāṁ yogo hīnamithyātimātrakaḥ।
samyagyogaś ca vijñeyo rogārogyaikakāraṇam।।1.42।।

"Less, more or wrong unison of time, senses and functions is the main cause for disease and the right unison of above three factors is the cause of health."

2.2. SLEEP

2.2.1. Caraka saṁhitā

Physiology of sleep

यदा तु मनसि क्लान्ते कर्मात्मानः क्लमान्विताः।

विषयेभ्यो निवर्तन्ते तदा स्वपिति मानवः॥ च सं २७.३५॥

yadā tu manasi klānte karmātmānaḥ klamānvitāḥ।
viṣayebhyo nivartante tadā svapiti mānavaḥ।। ca saṁ 27.35।।

"When mind as well body is fed up with the action, then the mind becomes incompetent to focus on action and sense organs also get tired due to excessive workload. As a result, the body goes into state of sleep."

Types of sleep

तमोभवा श्लेष्मसमुद्भवा च मनःशरीरश्रमसंभवाच।

आगंतुकी व्याध्यानुवर्तिनी च रात्रिस्वभाव प्रभवा च निद्रा॥ च सू.२१॥

tamobhavā śrleṣma samudbhavā ca manaḥ śarīraṁ śramasaṁbhavā ca।
āgaṁtukī vyādhyānuvartinī ca rātrisvabhāva prabhavā ca nidrā।। ca sū .21।।

"Caraka saṁhitādescribes the six types of sleep as follows :-

1. *Tamobhavo nidra* – the sleep occurring due to predominant of tamoguna in mind.
2. *Clenmasamudbhava* nidra – the occurring due to excess kapha dosha in the body.
3. *Cramasambhava nidra* – state of sleep due to exhaustion of both body and mind.
4. *Agantuki nidra* – sleep occurring due to the injury to the body.
5. *Vyadhyanuvartine nidra* – sleep due to a specific disease.
6. *Ratrisvabhavaprabhava nidra* – the sleep that we are getting daily at night."

Effect of sleep

Acharya Charaka mentioned the advantages and disadvantages of sleep in Caraka saṁhitā.

निद्रायत्तम् सुखं दुःखं पुष्टिः कार्श्यं बलाबलम्।

वृषता क्लीबता ज्ञानमज्ञानं जीवितं न च॥ च। सं। १।२१।३६॥

nidrāyattam sukhaṁ duḥkhaṁ puṣṭiḥ kārśyaṁ balābalam।
vṛṣatā klībatā jñānamajñānaṁ jīvitaṁ na ca।। ca। saṁ। 1।21।36।।

अकालेअतिप्रसङ्गाच्च न च निद्रा निशेविता।

सुखायुशी पराकुर्यात् कालरात्रिरिवापरा॥ च। सं। १।२१।३७॥

akāleatiprasaṅagācca na ca nidrā niśevitā ।
sukhāyuśī parākuryāt kālarātririvāparā।। ca। saṁ। 1।21।37।।

सैव युक्ता पुनर्युङ्क्ते निद्रा देहं सुखायुषा।

पुरुषं योगिनं सिद्ध्या सत्या बुद्धिरिवागता॥च।सं।१।२१।३८॥

saiva yuktā punaryuṅkte nidrā dehaṁ sukhāyuṣā ।
puruṣaṁ yoginaṁ siddhyā satyā buddhirivāgatā ।a।saṁ।1।21।38।।

Sukha (happiness), *dukha* (misery), *pushti* (nourishment), *karshya* (emaciation), *vala* (strength), *avala* (weakness), *vrushta* (sexual power), *klivata* (importance), *gyan* (knowledge), *agyan*(ignorence), *jivita* (long life), *ajivita* (death) all these aspects are influenced by *nidra* (sleep). *Samyak nidra* gives us nourishment,long life,happiness, sexual power, knowledge. Misery, emaciation, weakness, ignorance, impotence,death are caused due to*Asamyak nidra*.

Excessive sleep and prolonged vigil, like the night of destruction, ultimately take away both longevity and happiness.

The sleep (*nidra*) taken at the proper time period (*saivaukta nidra)*, brings about longevity (*ayusha*) and happiness (*sukha)* in human kinds as real knowledge brings about spiritual power (*siddhi)* in a yogi.

2.2.2.Patañjali yoga sūtra

Patañjali yoga sūtra, one of the *Yoga Darshana*, where darshana literally means 'to see', can also be translated as 'Philosophy of Yoga'. It is extracted from the Sanskrit root-word 'Drish', which means 'to see'. It is linked to the word 'Drashata', meaning 'the seer'. *Darshana* means the method of seeing. *Yoga Darshana* means 'a method of seeing via yoga'. Sage Patanjali systematically describes essential yoga philosophy in 196 sutras in Patañjali yoga sūtra. The first out of four chapters in Patañjali yoga sūtra explains about the sleep (*nidra*) as the modification of mind (*vritti).*

प्रमाण विपर्यय विकल्प निद्रा स्मृतयः॥ प यो सु १.६॥

pramāṇa viparyaya vikalpa nidrā smṛtayaḥ।। pa yo su 1.6।।

Patañjali yoga sūtra describes five types of modification of mind *(vrittis)* as right knowledge, wrong knowledge, delusion, sleep and memory.

अभावप्रत्ययालम्बना वृत्तिर्निद्रा॥ प यो सु १.१०॥

abhāvapratyayālambanā vṛttirnidrā।। pa yo su 1.10।।

Mental contents are absent in the state of sleep. In a deep state of sleep, one should experience nothingness and there should not be any thought in the mind.

2.2.3.Māṇḍūkya upaniṣad

Upanishads are treasures of wisdom. Among all the hundred and eight Upanishads the smallest and the most difficult Upanishad- Māṇḍūkya upaniṣad, comprises of only twelve passages. From the waking state to the super conscious state, it discusses an entire range of human consciousness.

सर्वं ह्येतद् ब्रह्मायमात्मा ब्रह्म सोऽयमात्मा चतुष्पात्॥ २॥

sarvaṁ hyetad brahmāyamātmā brahma so'yamātmā catuṣpāt ।। 2।।

Every matter in this creation is nothing but *Brahman*. It is not merely objective existence but the subjective self within (*Atman*) is also *Brahman*. Behind the subject is present the objective reality which is nothing but the beginning of reality. This reality exhibit in the subject in four circumstances- waking state (*jagrit*), dreaming state (swapna), deep sleep state (*sushupti*) and super conscious state/ transcendent state (*turiya*).

Jagrit

जागरितस्थानो बहिष्प्रज्ञः सप्ताङ्ग एकोनविंशतिमुखः

स्थूलभुग्वैश्वानरः प्रथमः पादः॥ ३॥

jāgaritasthāno bahiṣprajñaḥ saptāṅga ekonaviṁśatimukhaḥ
sthūlabhugvaiśvānaraḥ prathamaḥ pādaḥ ।। 3।।

Vaisvanara, the first quarter, is common to all material condition and men has its field as waking state where consciousness is outward projected. Seven limbs and nineteen mouthed *Brahman* is enjoying gross objects.

Swapna

स्वप्नस्थानोऽन्तःप्रज्ञः सप्ताङ्ग एकोनविंशतिमुखः

प्रविविक्तभुक्तैजसो द्वितीयः पादः॥ ४॥

svapnasthāno'ntaḥprajñaḥ saptāṅga ekonaviṁśatimukhaḥ
praviviktabhuktaijaso dvitīyaḥ pādaḥ ।। 4।।

Taijasa "state of Brahman" is the second quarter, has its field as dream state in which the consciousness is projected inward. Seven limbed and nineteen mouthed *Brahman*, in this trans-state is enjoying subtle objects.

Sushupti

यत्र सुप्तो न कञ्चन कामं कामयते न कञ्चन स्वप्नं

पश्यति तत् सुषुप्तम्। सुषुप्तस्थान एकीभूतः प्रज्ञानघन

एवानन्दमयो ह्यानन्दभुक् चेतोमुखः प्राज्ञस्तृतीयः पादः॥ ५॥

yatra supto na kañcana kāmaṁ kāmayate na kañcana svapnaṁ
paśyati tat suṣuptam । suṣuptasthāna ekībhūtaḥ prajñānaghana
evānandamayo hyānandabhuk cetomukhaḥ prājñastṛtīyaḥ pādaḥ ।। 5।।

Prajna, where there is no desire and dreams, is the third quarter. It is the condition of deep sleep. In this state an individual is unified with cognition, a differentiated mass of consciousness is forming the gateway to all definite cognitions and is full of bliss. Here the mouth of Brahman is consciousness.

एष सर्वेश्वरः एष सर्वज्ञ एषोऽन्तर्याम्येष योनिः सर्वस्य

प्रभवाप्ययौ हि भूतानाम्॥ ६॥

eṣa sarveśvaraḥ eṣa sarvajña eṣo'ntaryāmyeṣa yoniḥ sarvasya
prabhavāpyayau hi bhūtānām ।। 6।।

The lord of all is Brahman; who is the omniscient, source of everything, the inner controller. This the beginning and the end of all Bhutas.

Turiya

नान्तःप्रज्ञं न बहिष्प्रज्ञं नोभयतःप्रज्ञं न प्रज्ञानघनं

न प्रज्ञं नाप्रज्ञम्। अदृष्टमव्यवहार्यमग्राह्यमलक्षणं

अचिन्त्यमव्यपदेश्यमेकात्मप्रत्ययसारं प्रपञ्चोपशमं

शान्तं शिवमद्वैतं चतुर्थं मन्यन्ते स आत्मा स विज्ञेयः॥ ७॥

nāntaḥprajñaṁ na bahiṣprajñaṁ nobhayataḥprajñaṁ na prajñānaghanaṁ
na prajñaṁ nāprajñam । adṛṣṭamavyavahāryamagrāhyamalakṣaṇaṁ
acintyamavyapadeśyamekātmapratyayasāraṁ prapañcopaśamaṁ
śāntaṁ śivamadvaitaṁ caturthaṁ manyante sa ātmā sa vijñeyaḥ ।। 7।।

Turiya, where the consciousness is neither outward projected nor inward projected, neither is an indefinite mass of cognition nor is both sided cognitive, neither is non-cognitive nor is collective cognitive, is the fourth quarter. It is not perceptible, indescribable, unrelated, inconceivable, uninferable, and unimaginable. Here common cognition is there in all states of consciousness and all phenomena are ceased in it. This state is free from all duality and is the state of total peace and bliss.

2.2.4. Haṭha yoga pradīpikā

अभ्यसेत् खेचरीं तावघावत् स्याघोगनिद्रितः।

संप्राप्तयोगनिद्रस्य कालो नास्ति कदाचन॥ ४.४९॥

abhyaset khecarīṁ tāvaghāvat syāghoganidritaḥ।
saṁprāptayoganidrasya kālo nāsti kadācana।।4.49।।

Swami Muktibodhananda in his work of haṭha yoga pradīpikāexplains that until yogic sleep is attained one must practice Khechari mudra and for whom attained yogic sleep time becomes non-existent. He also describes yogic sleep or yoga nidra as a state in which the

awareness remains but the conscious mind subsides. He further explains it to be a state in which the an individual is consciously aware while being in *swapnaavastha* or 'dream state' and, deeper still, conscious awareness is maintained throughout the sushupti awastha or 'deep sleep state'. Sleep is a biological factor that can be prompted psychologically and is an unforced sense withdrawal (*pratyahara*), which occurs with physical and mental relaxation. Specific changes occur in most of the bodily systems with parasympathetic nervous predominance at the time of sleep. There is a total unawareness of the ego during sleep.

2.3. STRESS

2.3.3. Shrimad Bhagavatam

विज्ञाय निर्विद्य गतं पतिं प्रजाःपुरोहितामात्यसुहृद्गणादयः।

विचिक्युरुर्व्यामतिशोककातरायथा निगूढं पुरुषं कुयोगिनः॥ ४८॥

vijñāya nirvidya gataṁ patiṁ prajāḥ
purohitāmātyasuhṛdgaṇādayaḥ ।
vicikyururvyāmatiśokakātarā
yathā nigūḍhaṁ puruṣaṁ kuyoginaḥ ।। 48।।

No wise man would invite the embodiment of delusion called a son who is the cause of untold infamy, mental worries and unrighteousness. If there is such a son, the householder's life is plagued with miseries.

अन्यदा भृशमुद्विग्नमना नष्टद्रविण इव

कृपणः सकरुणमतितर्षेण हरिणकुणक-

विरहविह्वलहृदयसन्तापस्तमेवानुशोचन्

किल कश्मलं महदभिरम्भित इति होवाच॥ १५॥

anyadā bhṛśamudvignamanā naṣṭadraviṇa iva
kṛpaṇaḥ sakaruṇamatitarṣeṇa hariṇakuṇaka-
virahavihvalahṛdayasantāpastamevānuśocan
kila kaśmalaṁ mahadabhirambhita iti hovāca ।। 15।।

Whenever an individual is unable to figure out his needs then, he would feel extremely perturbed like a miser who had lost his fortune and is in sorrow for it along with heart full of agony and overwhelmed with grief at his separation, like Bharata Maharaja on being separated from his young deer and infatuated by an inordinate longing to see it, pitifully exclaimed with great anxiety in his heart, agitated on being separated from deer-calf started continuously thinking about it and was thus sure of getting into greatest illusion while expressing it.

अर्थस्य साधने सिद्धे उत्कर्षे रक्षणे व्यये।

नाशोपभोग आयासस्त्रासश्चिन्ता भ्रमो नृणाम्॥ १७॥

arthasya sādhane siddhe utkarṣe rakṣaṇe vyaye ।
nāśopabhoga āyāsastrāsaścintā bhramo nṛṇām ।। 17।।

A lot of men engaged in accumulation of wealth, in augmenting and preserving it fall into delusion, anxiety, bodily exertion and apprehension, once it has been acquired and anxiety is involved in its expenditure, loss and enjoyment.

2.3.2. Bhagavad gītā

People are stressed by performing different types of action; therefore Krishna gives solution on how one can perform the action without getting affected by those actions:

कर्मणो ह्यपि बोद्धव्यं बोद्धव्यं च विकर्मणः।

अकर्मणश्च बोद्धव्यं गहना कर्मणो गतिः॥ ४-१७॥

karmaṇo hyapi boddhavyaṁ boddhavyaṁ ca vikarmaṇaḥ ।

akarmaṇaśca boddhavyaṁ gahanā karmaṇo gatiḥ ।। 4-17।।

One should have true knowledge about the action to discriminate between the action, inaction, and prohibited action.

कर्मण्यकर्म यः पश्येदकर्मणि च कर्म यः।

स बुद्धिमान्मनुष्येषु स युक्तः कृत्स्नकर्मकृत्॥ ४-१८॥

karmaṇyakarma yaḥ paśyedakarmaṇi ca karma yaḥ ।
sa buddhimānmanuṣyeṣu sa yuktaḥ kṛtsnakarmakṛt ।। 4-18।।

One who is able to see inaction in action and action in inaction is wise among the men; he is a yogi, who is able to perform all actions without getting stressed.

ध्यायतो विषयान्पुंसः सङ्गस्तेषूपजायते।

सङ्गात्सञ्जायते कामः कामात्क्रोधोऽभिजायते॥ २-६२॥

dhyāyato viṣayānpuṁsaḥ saṅgasteṣūpajāyate ।
saṅgātsañjāyate kāmaḥ kāmātkrodho'bhijāyate ।। 2-62।।

क्रोधाद्भवति सम्मोहः सम्मोहात्स्मृतिविभ्रमः।

स्मृतिभ्रंशाद् बुद्धिनाशो बुद्धिनाशात्प्रणश्यति॥ २-६३॥

krodhādbhavati sammohaḥ sammohātsmṛtivibhramaḥ ।
smṛtibhraṁśād buddhināśo buddhināśātpraṇaśyati ।। 2-63।।

An individual dwelling upon the sense objects develops attachment towards it; from attachment arises desire and from desire sprouts anger. From anger comes delusion; from delusion, confused memory; confused memory leads to destruction of discriminative intelligence and lack of discriminatory power completely perishes the man.

चिन्तामपरिमेयां च प्रलयान्तामुपाश्रिताः।

कामोपभोगपरमा एतावदिति निश्चिताः॥ १६-११॥

cintāmaparimeyāṁ ca pralayāntāmupāśritāḥ ।
kāmopabhogaparamā etāvaditi niścitāḥ ।। 16-11।।

Gratifying the senses till the end of life is the prime necessity of human civilization. Therefore there are endless desire and anxiety. On being bound by these endless desires, lust and anger they accumulate money by illegal means for sense gratification.

2.3.4. Patañjali yoga sūtra

Patanjali mentions the signs of mental distraction:

Symptoms of stress

दुःखदौर्मनस्यांगमेजयत्वश्वासप्रश्वासा विक्षेपसहभुवः॥ प यो सु १.३१॥

duḥkhadaurmanasyāṁgamejayatvaśvāsapraśvāsā

vikṣepasahabhuvaḥ।। pa yo su 1.31।।

Pain or unhappiness is the result of mental distractions; where unhappiness leads to depression, due to depression shaking of the body occurs and it futher results in unrhythmic breathing or breathlessness.

Causes of pain

अविद्यास्मितारागद्वेषाभिनिवेशाः क्लेशाः॥ प यो सु २.३॥

avidyāsmitārāgadveṣābhiniveśāḥ kleśāḥ।। pa yo su 2.3।।

Different mental and emotional hindrances such as ignorance of one's true nature, i-ness or egoism, liking, disliking and fear of death originate from stress. Whereas our true nature is not this but is totally stress-free and blissful, which is the source of knowledge, freedom and creativity, still we stressed due to lack of awareness, ego, desire, greed, jealousy, anger, attachment, misconception, etc. The Great Sage Patanjali beautifully brings out the basis of pain:

व्याधिस्त्यानसंशयप्रमादालस्याविरतिभ्रान्तिदर्शनालब्धभूमिकत्वानवस्थितत्वानि

चित्तविक्षेपास्तेऽन्तरायाः॥ प यो सु १.३०॥

vyādhistyānasaṁśayapramādālasyāviratibhrāntidarśanālabdhabhūmikatvānavasthitat
vāni
cittavikṣepāste'ntarāyāḥ|| pa yo su 1.30||

One encounters nine obstacles in the path of attaining mental peace namely, disease, dullness, laziness, doubt, delusion, craving for worldly pleasure, carelessness, inability to achieve the final stages and instability which leads to pain or stress.

Sage Patanjali also suggests the ways to overcome this obstacle while aiming for mental peace:

स्वप्ननिद्राज्ञानालम्बनं वा॥ प यो सु १.३८॥

svapnanidrājñānālambanaṁ vā|| pa yo su 1.38||

Stability of mind can be achieved by meditating on the knowledge that comesin dream and sleep.

2.4. DISEASE

2.4.1. Haṭha yoga pradīpikā

Cause of disease:

Swami Muktibodhananda in haṭha yoga pradīpikādescribes the cause of disease

हिक्का श्वासश्च कासश्च शिरः-कर्णाक्षि-वेदनाः।

भवन्ति विविधाः रोगाः पवनस्य प्रकोपतः॥ १७॥

hikkā śvāsaśca kāsaśca śiraḥ-karṇākṣi-vedanāḥ ।
bhavanti vividhāḥ rogāḥ pavanasya prakopataḥ ।। 17।।

The disturbance of vital air leads to hiccups, asthma, coughs, headache, ear and eye pain, and various other diseases.

प्राणायामेन युक्तेन सर्व-रोग-क्षयो भवेत्।

अयुक्ताभ्यास-योगेन सर्व-रोग-समुद्गमः॥ १६॥

prāṇāyāmena yuktena sarva-roga-kṣayo bhavet ।
ayuktābhyāsa-yogena sarva-roga-samudgamaḥ ।। 16।।

All the diseases are eradicated by practicing pranayana properly, whereas the improper practice may leads to all diseases.

2.4.2.Aṣṭāṅgahrudayam

जन्मान्तरा क्रितम् पापम् व्याधि रोपेन भादते।

तत् शन्तिहि औशधैहि दानैहि जपहोम सौरचनैहि॥ १-१९॥

janmāntarā kritam pāpam vyādhi roopena bhādate।
tat śantihi auśadhaihi dānaihi japahoma sauāracanaihi||1-19||

All the diseases are rooted in the mind, before expressing at body level. The imprints of mind are carried further to the next body, which is known as repeated births. According to

Ayurveda, the seeds of diseases are there in the mind and they express at particular times during one's life.

2.5. YOGA

One of the ancient science; Yoga, deals with the systematic study of mind body and energies hidden within the mind. It is a holistic approach used to achieve higher goals of life such as self-realization and gaining spiritual power called siddhis.

Definitions of Yoga

2.5.1. Bhagavad gītā

योगस्थः कुरु कर्माणि सङ्गं त्यक्त्वा धनञ्जय।

सिद्ध्यसिद्ध्योः समो भूत्वा समत्वं योग उच्यते॥ २-४८॥

yogasthaḥ kuru karmāṇi saṅgaṁ tyaktvā dhanañjaya ।
siddhyasiddhyoḥ samo bhūtvā samatvaṁ yoga ucyate ।। 2-48।।

Lord Krishna says: on performing duties with non-attachment and maintaining the stability of mind in success and failure is called Yoga.

बुद्धियुक्तो जहातीह उभे सुकृतदुष्कृते।

तस्माद्योगाय युज्यस्व योगः कर्मसु कौशलम्॥ २-५०॥

buddhiyukto jahātīha ubhe sukṛtaduṣkṛte ।
tasmādyogāya yujyasva yogaḥ karmasu kauśalam ।। 2-50।।

Maintain the equanimity of both good and evil in this life. Therefore one must practice yoga to maintain equanimity. Yoga is dexterity in action; maintaining awareness and relaxation during work. Action in relaxation is the skill, efficiency in action is the outcome.

2.5.2. Patañjali yoga sūtra

Sage Patanjali defines yoga as

योगश्चित्तवृत्तिनिरोधः॥ १.२॥

yogaścittavṛttinirodhaḥ ।। 1.2।।

Yoga is a process of gaining mastery over the modification of the mind.

तदा द्रष्टुः स्वरूपेऽवस्थानम्॥ १.३॥

tadā draṣṭuḥ svarūpe'vasthānam ।। 1.3।।

As a result of such mastery the sear establishes himself in his true nature.

2.5.3. Yoga vāsiṣṭha

मनः प्रशमनोपायो योगः इत्याभिधियते॥

manaḥ praśamanopāyo yogaḥ ityābhidhiyate।।

Yoga is a skillfultechnique to calm down the mind. It is a subtle process and not a brutal gross or mechanical effort to stop thoughts in the mind.

2.5.4. Kaṭhopaniṣat

तां योगमिति मन्यन्ते स्थिरामिन्द्रियधारणाम्।

अप्रमत्तस्तदा भवति योगो हि प्रभवाप्ययौ॥ ११॥

tāṁ yogamiti manyante sthirāmindriyadhāraṇām ।
apramattastadā bhavati yogo hi prabhavāpyayau ।। 11।।

Yoga is defined as a state in which all our senses are under control. Thus the real yoga is subtler state of mind characterized by steadiness. Yoga is a state of steadiness at the physical, mental, emotional, intellectual and spiritual levels.

2.6. NADI SHODHANA PRANAYAMA

2.6.1. Haṭha yoga pradīpikā

बद्ध-पद्मासनो योगी प्राणं चन्द्रेण पूरयेत्।

धारयित्वा यथा-शक्ति भूयः सूर्येण रेचयेत्॥ ७॥

baddha-padmāsano yogī prāṇaṁ candreṇa pūrayet ।
dhārayitvā yathā-śakti bhūyaḥ sūryeṇa recayet ।। 7।।

प्राणं सूर्येण चाकृष्य पूरयेदुदरं शनैः।

विधिवत्कुम्भकं कृत्वा पुनश्चन्द्रेण रेचयेत्॥ ८॥

prāṇaṁ sūryeṇa cākṛṣya pūrayedudaraṁ śanaiḥ ।
vidhivatkumbhakaṁ kṛtvā punaścandreṇa recayet ।। 8।।

येन त्यजेत्तेन पीत्वा धारयेदतिरोधतः।

रेचयेच्च ततोऽन्येन शनैरेव न वेगतः॥ ९॥

yena tyajettena pītvā dhārayedatirodhataḥ ।
recayecca tato'nyena śanaireva na vegataḥ ।। 9।।

Sit in baddha padmasana. Inhale through the left nostril and hold the breath according to your capacity, then exhale through right nostril. Next, inhale through the right nostril and gradually fill the abdomen, then perform antar kumbhaka. Slowly exhale through the left nostril.

Like this way, one should Inhale with the same nostril through which exhalation was done and hold the breath according to your capacity than slowly exhale through the other nostril.

प्राणं चेदिडया पिबेन्नियमितं भूयोऽन्यथा रेचयेत्

पीत्वा पिङ्गलया समीरणमथो बद्धा त्यजेद्वामया।

सूर्य-चन्द्रमसोरनेन विधिनाभ्यासं सदा तन्वतां

शुद्धा नाडि-गणा भवन्ति यमिनां मास-त्रयादूर्ध्वतः॥ १०॥

prāṇaṁ cediḍayā pibenniyamitaṁ bhūyo'nyathā recayet
pītvā piṅgalayā samīraṇamatho baddhvā tyajedvāmayā ।
sūrya-candramasoranena vidhināābhyāsaṁ sadā tanvatāṁ
śuddhā nāḍi-gaṇā bhavanti yamināṁ māsa-trayādūrdhvataḥ ।। 10।।

If prana is inhaled through left nostril then it should be exhaled through another nostril. When inhaling through the right nostril, then hold the breath inside and slowly exhale through another nostril. The Yamini who practice this way, alternately through right and left nostril, it purifies all the nadis within three months.

2.7. UJJAYI PRANAYAMA

2.7.1. Haṭha yoga pradīpikā

Ujjayi means ‘victorious’. *Ujjayi* is derived from the samskrit root word ‘*ujji*’ which means to conquer. *Ujjayi* affects at mind level that is why in English it is called as ‘psychic breath’.

मुखं संयम्य नाडीभ्यामाकृष्य पवनं शनैः।

यथा लगति कण्ठात्तु हृदयावधि स-स्वनम्॥ ५१॥

mukhaṁ saṁyamya nāḍībhyāmākṛṣya pavanaṁ śanaiḥ ।

yathā lagati kaṇṭhāttu hṛdayāvadhi sa-svanam ।। 51।।

पूर्ववत्कुम्भयेत्प्राणं रेचयेदिडया तथा।

श्लेष्म-दोष-हरं कण्ठे देहानल-विवर्धनम्॥ ५२॥

pūrvavatkumbhayetprāṇaṁ recayediḍayā tathā ।
śleṣma-doṣa-haraṁ kaṇṭhe dehānala-vivardhanam ।। 52।।

नाडी-जलोदराधातु-गत-दोष-विनाशनम्।

गच्छता तिष्ठता कार्यमुज्जाय्याख्यं तु कुम्भकम्॥ ५३॥

nāḍī-jalodarādhātu-gata-doṣa-vināśanam ।
gacchatā tiṣṭhatā kāryamujjāyyākhyaṁ tu kumbhakam ।। 53।।

Close your mouth, and inhale through both the nostril with control and full concentration, so that the breath is felt through the throat region to the heart region and produces the sonorous sound.

Then retain the breath until the breath diffuses to the root of the hair and tip of the nails. Then exhale through the left nostril. This helps to remove phlegm from the throat and stimulates the digestive fire.

Ujjayi pranayama can be done while moving, standing, sitting and walking. It helps to remove dropsy and disorders related to nadis and dhatus.

2.8. SUMMARY:

Yoga is an ancient method that helps to gain control over the mind *(yogaścittavṛttinirodhaḥ ||P.Y.S.1.2||)*and helps to calm down the mind*(manaḥ praśamanopāyo yogaḥ||Yoga Vasistha)*. Eight limbs of yoga as *–yama, niyama, āsana, prāṇāyāma, pratyāhāra, dhāraṇā, dhyāna and samādhi is* describes by sage Patanjali. Among which *Prāṇāyāma*and *Dhyāna* is the most

important practice to realize the stress and clam down the mind and to reach the higher state of the consciousness.

CHAPTER- 3

3. SCIENTIFIC LITERATURE

3.1. SLEEP IN HYPERTENSIVE PATIENTS:

Sleep has a very important role in our physical well-being and few defined sleep extension, as a non-medicinal intervention for the prevention management and treatment of primary hypertension and obesity(Calhoun & Harding, 2010). The current rest amount and quality example are likely due to changes in the financial condition and way of life. There is proof to recommend that a deficient sleep pattern has an adverse effect on immune function, endocrine and cardiovascular function and to increase total mortality hazard(MartinezAguirre-Betolaza et al., 2019).

In healthy teenagers, poor sleep quality is found associated with pre-hypertension. Associations are not clarified by socioeconomic, sleep apnea, obesity or known comorbidities, proposing that insufficient sleep quality is related to blood pressure(Javaheri, Storfer-Isser, Rosen, & Redline, 2008). A cross-sectional study on healthy adult population demonstrates the association between sleep apnea and hypertension independent of age, sex in a nonselected, obesity and community-based adult population(Mae Hla et al., 1994).

The connection between hypertension and normal sleep duration in a community-based cohort study was assessed by Daniel J. Gottlieb and MD, associate. An intervention, in which 2813 men and 3097 women participated, the age ranging from 40 to 100 years was given. This study shows the normal sleep duration above or below the middle of 7 to less than 8 hours of per night is related with an increased predominance of hypertension, especially at the extreme of fewer than 6 hours per night(Redline et al., 2017). Insomnia with short sleep duration is related to increased risk of hypertension, to a degree comparable to that of other common sleep disorders, e.g. sleep disorder breathing (SDB). Objective sleep duration may anticipate the seriousness of chronic insomnia a predominant condition whose therapeutic impact has been apparently underestimated(Vgontzas& Liao, 2009).

Cross-sectional epidemiologic studies show an affiliation between hypertension and sleep disorder breathing (SDB), however, only one cohort study has inspected sleep disorder as a risk factor for incident hypertension. In this cohort study, 2470 participants participated. Among the middle-aged and older people without hypertension, they show a significant relationship between apnea hypopnoea index(AHI) and the risk of incident hypertension(Redline et al., 2009).

3.2. IMPACT OF YOGA ON SLEEP

People who practice yoga are not free of well-being concerns, however most trust their wellbeing improved due to yoga. Yoga may be useful for various populaces including old ladies and those with chronic health conditions(Gangwisch, 2009). A significant diminishing in the time taken to fall asleep was found in the subjects practicing yoga as compared to non-yoga groups. Thus, yoga practice improves the distinctive parts of sleep in the geriatric population was studied to assess the fragmented sleep and reduced daytime alertness in older persons and sees the pharmacological treatment of insomnia and its side effects(Manjunath & Telles, 2005).

A significant change in the decreasing depression and in improving sleep quality was investigated to test the impacts of 6 months yoga practice program in decreasing depression and improving sleep quality in transitional frail elders. The result shows yoga group has a better result than the control group(Chen et al., 2010).Better sleep quality and modulatory action on the levels of cortisol were found in research intending to analyze the impact of long term yoga practice on several hormonal parameters of the hypothalamus, pituitary, adrenal (HPA) and Subjective Sleep Quality (SSQ). The yoga group was following the ‘Sivananda’ school of yoga showed a significant better change as compared to the control group(Vera et al., 2009).Mindfulness yoga demonstrates a guarantee for women in their second and third trimester of pregnancy to decrease an absolute number of awakening at night and improves sleep efficiency (Beddoe, Lee, Weiss, Kennedy, & Yang, 2010).

3.3. IMPACT OF YOGA ON FATIGUE

The quality of life was determined by the European organization for research and treatment of cancer quality of life questionnaire in a study aiming to see the impacts of aerobic exercise training and yoga on the functional capacity, quality of life (QOL), peripheral muscle strength

and fatigue in breast cancer survivors. According to the information from this study, yoga and aerobic exercise training improved the quality of life and functional capacity (Yalı et al., 2015).

The long term impact of isometric yoga on fatigue was assessed in a pilot study by using the chalder fatigue scale (CFS) and short term impact of isometric yoga on fatigue were assessed by using the Profile of Mood Status (POMS). This experiment proposes that isometric yoga is a feasible and adequate treatment for patients with CFS/ME(Oka, Wakita, & Kimura, 2017).A randomized controlled study proposed that a single session of isometric yoga in sitting reduces fatigue and increases energy in patients with chronic fatigue syndrome (CFS). The result also shows that yoga additionally improved vagal nerve function and change blood biomarkers in a pattern that recommended anti-inflammatory and anti-stress impacts(Oka, Tanahashi, Sudo, Lkhagvasuren, & Yamada, 2018).Yoga intervention has a significant change in fatigue and vigor among breast cancer patients with persistent fatigue symptoms was found in a 2 group randomized controlled trial study to see the efficacy and feasibility of an Iyengar yoga intervention for breast cancer patients with persistent post-treatment fatigue(Bower et al., 2011).Isometric yoga practice as an extra treatment is both feasible and successful at relieving the fatigue in patients with chronic fatigue syndrome (CFS) who are resistant to conventional treatments where the long term fatigue was assessed by Chalder fatigue scale and short term fatigue was assessed by POMS (Oka et al., 2014).

3.4. IMPACT OF YOGA ON STRESS

A significant change was observed in both Hatha yoga and African dance practitioners where the practice helped reduce perceived stress and negative impact. Cortisol level also decreased in Hatha yoga and increased in African dance. This study aimed to examine some of the neuroendocrine and psychological reactions to these activities(West, Otte, Geher, Johnson, & Mohr, 2004).Yoga improves autonomic responses to stress in healthy pregnant women and reduces perceived stress was observed in a study where the impact of combine yoga practice and yogic relaxation on perceived stress and measured autonomic response in healthy pregnant ladies was studied. 60 min of yogic practices and deep relaxation practices were given for yoga group and for the control group, standard prenatal exercises were given. The result shows that perceived stress was decreased in the yoga group and increased in the control group(Satyapriya,

Nagendra, Nagarathna, & Padmalatha, 2009). Sahaja yoga practice reduces stress was observed in a study that aimed to assess the impact of Sahaja yoga meditation on stress management in patients of epilepsy(U., H.L., S.H., W., & U.C., 1995). Iyengar yoga helps in reducing stress and psychological (Michalsen et al., 2005).

3.5. IMPACT OF YOGA ON HYPERTENSION

Yogic practices and medication plays a significant role in managing hypertension was estimated in an experiment conducted to see the impact of selected yogic practices on the organization of hypertension(Murugesan, Govindarajulu, & Bera, 2000).Both the breathing (slow and fast) exercise had a good impact on hypertension. Slow breathing exercises had a stronger impact on hypertension than fast breathing exercises was found in a study done to see the impact of slow and fast breathing exercises on autonomic functions in patients with essential hypertension where they were advised to do slow and fast breathing exercises for three months(Mourya, Mahajan, Singh, & Jain, 2009).Yogic practices have a significant effect in improving antioxidant defence and it also reduces oxidative stress in elderly hypertension patients was the outcome of an open parallel-arm randomized study was conducted by Satish G Patil and team with the purpose to see the impact of yoga practices on oxidative stress in grade-1 hypertension(Pati, Dhanakshirur, Aithala, Naregal, & Das, 2014).An assessment was done before and after 12 weeks of yoga therapy proposing a significant improvement in blood pressure, heart rate in yoga group where the control group participants received only medical therapy and the yoga group receives 12 weeks of yoga therapy along with medical therapy(Hari Krishna et al., 2014).Yoga shows a greater improvement in blood pressure, mood, stress, and sleep in older women where the assessment was done by using Pittsburgh sleep quality index, perceived stress scale, a profile of mood state(Innes & Selfe, 2012).

3.6. YOGA AND QUALITY OF LIFE

Yoga improves the quality of life and reduces stress and helps cancer patients to perform their daily routine work easily was found in an experiment done to investigate the effect of a yoga program on the quality of life in breast cancer patients. Eight sessions of yoga including breathing, warm up, asanas and relaxations were given to them (Ülger & Yağli, 2010).There is no improvement in cognitive function in both the groups but the yoga group shows a significant

change in physical measures and quality of life as compared to the exercise group and control group was seen in a randomized controlled trial aiming to determine the effects of yoga on fatigue, mood, and quality of life and on cognitive function where they had to practice yoga and exercise for 6 months (Oken et al., 2006).Yoga shows a significant improvement in the quality of life, distressed mood, fatigue and spiritual well-being in patients with breast cancer who were assigned to practice12 weeks of yoga intervention(Moadel et al., 2007).The quality of life and spinal flexibility shows better improvement than physical exercise was proposed in a randomized control trial, to assess the impact of yoga on the quality of life of chronic lower back pain (CLBP). Yoga group practiced specific yogic module and the control group practiced physical exercises for back pain for one week(Tekur, Chametcha, Hongasandra, & Raghuram, 2010).

3.7. TABLE OF SCIENTIFIC LITERATURE REVIEW

Sl. No.	Tile, Author & year of publication	Sample Size	Design	Intervention	Assessment Tool	Results	Conclusion
1.	Effects of Hatha Yoga on the Health-related aspects of physical fitness(M.D., R.G., J., & E.A., 2001)	14	Pre-post design	Pranayama, dynamic warm-up exercises, yoga postures and relaxation.	Muscular strength by LIDO Multi-Joint II, goniometer, measuring tape	All flexibility dimensions increased significantly and muscular strength increased.	The result indicates that regular practice of hatha yoga improves the health and physical fitness.
2.	Effects of Hatha yoga and omkar meditation on cardio respiratory performance, psychologic profile, and melatonin(Harinath et al.,	30	Pre- post design	Yoga group – yogic postures and pranayama, meditation Control group – flexibility exercises	Self-Well-Being inventory	Yoga group shows improvement in the psyschologic and cardiorespiratory. Night time melatonin level yoga	Yogic practices can be used for improving the sense of well-being and also use as a

	2004)					group also shows a significant correlation ($r = 0.71$, $p<0.05$).	psycho physiologic to increase melatonin secretion.
3.	A yoga intervention for young adults with elevated symptoms of depression(Woolery, 2004)	28	Pre-post design	Iyengar yoga	Spielberger Trait Anxiety Inventory (STAI), Profile of Mood States (POMS)	Between groups, t-test shows no difference in depression, anxiety but within-group t-test shows the difference in depression scores before and after the last class.	Yoga was found to be beneficial for decreasing anxiety and depression.
4.	Randomized, controlled, six-month trial of yoga in healthy	135	Randomized, controlled trial	Hatha yoga class, walking exercise class	Stroop test and electroencephalogram (EEC), SF-36 health-related quality	Out of 135 subjects, 17 subjects did not finish the study.	Results clearly, show that yoga improves

	seniors: effects on coginition and quality of life(Oken et al., 2006)				of life, profile of mood states, multiple dimensional fatigue inventory.	Yoga group shows development in physical dimensions as well as in quality of life.	the quality of life and physical measures as compared to exercise and wait-list control group.
5.	Effect of yoga based lifestyle intervention on subjective well-being(Sharma, Gupta, & Bijlani, 2008)	77	Pre-post design	Asanas, pranayama, lectures, meditation and relaxation	The subjective well-being Inventory	Subjective well-being scores are extensively higher in the experiment group at the end of the course and no change in the control group after the 10 days interval.	The result shows that yoga significantly improves lifestyle and subjective well-being.
6.	Effects of	183	Randomi	SudarshanK	PCL-17,	The impact	Yogic

	yoga breath intervention alone and in combination with an exposure therapy for post-traumatic stress disorder and depression in survivors of the 2004 south-east asia tsunami(Descilo et al., 2010)		zed waitlist controlled trail	riya Yoga	DSM-IV, beck Depression Inventory (BDI-21), The General Health Questionnaire (GHQI-12).	of treatment was significant as compared to the control group after 6 weeks ($p < 0.001$).	breathing practice can help in reducing psychological distress.
7.	Effect of toga on different aspects of mental health(Shirley Telles, Singh, Yadav, & Balkrishna, 2012)	140	Pre-post design	Kriya, pranayama, asanas, sukshmavya yamas	State Trait Anxiety Inventory (STAI), Symptom Checklist-90-R (SCL-90-R), Nijmegen Discomfort Evaluation Scale, Sleep Rating Questionnaire	There is a significant change in state anxiety, stress, change in the mental and physical component, Sleep as compared	This study proposes that yoga is beneficial in decreasing stress, anxiety, sleep, quality of life.

					(SRQ).	to the control group.	
8.	Yoga decreases insomnia in postmenopausal women: A randomized controlled trial (Afonso et al., 2012)	213	Pre-post design	Tibetan technique.	BSI, polysomnography	Yoga group had considerable change as compared to the control group in improving the quality of life, insomnia severity.	This study shows that yoga might be helpful in reducing menopause symptoms and quality of life.
9.	Effects of yoga intervention on sleep and quality –of-life in elderly: A randomozed controlled trail (Sivakumar et al., 2013)	120	Single blind controlled study	Yogasanas, pranayama, nadanusandhana	World Health Organization Quality of Life (QHOQOL), BREFF, Pittsburg Sleep Quality Index	Participant in the experimental group had a significant effect on sleep and quality of life.	Yoga programs can be used for improving the quality of life and sleep in the elderly individual.
10	Effect of yoga	52	Pre-post	Iyengar	SDS and SAS	Yoga	Yoga can

.	on arrhythmia burden, anxiety, depression, and quality of life in paroxysmal atrial fibrillation (Lakkireddy et al., 2013)		design	yoga	were used for depression and anxiety, SF-36 for quality of life	practice reduces anxiety and depression ($p < 0.001$), also improves the quality of life ($p < 0.017$), general health and mental health.	improve the symptoms of anxiety and depression, increase the quality of life and also improves mental health.
11.	Randomized, controlled trail of yoga in women with breast cancer undergoing radiotherapy (Chandwani et al., 2014)	163	Anova design	Yoga group – warm-up, asanas, pranayama, relaxation and meditation. ST program – exercises in sitting, standing and lying down position.	Medical Outcome Study, short form survey (SF-36), physical component scale (PCS), mental component scale (MCS)	Yoga group had appreciably better increase in physical functioning as compared to other groups. ST and Yoga group reduces fatigue and	Yoga improves the psychological changes and quality of life.

						general health.	
12.	The effect of yoga exercise on improving depression, anxiety, and fatigue in women with breast cancer: A randomized controlled trail (Taso et al., 2014)	60	Anova Design	Warm-up, Anusara yoga, gentle stretching and relaxation asanas, meditation.	Profile Of Mood State, Bried Fatigue Inventory (BFI)	In the experimental group, fatigue reduces significantly and most of the patients do not have any change after the 8 weeks of intervention. There is no significant change in depression.	8 weeks of Yoga practice did not reduce depression but it can reduce fatigue.
13.	Yoga for improving sleep quality and quality of life of older adults(Kennedy, 2016b)	71	Waiting-list controlled trial	Meditative yoga, yoga asanas (postures)	Karolinska Sleepiness Scale (KSS), Epworth Sleepiness Scale, Pittsburgh Sleep Quality Index, Depression	Yoga group shows significant improvement in sleep quality, sleep latency, sleep duration	Yoga was considerably improved the quality of life and improves

					Anxiety Stress Scale, Profile Mood State Short Form.	and sleep efficiency.	sleep.
14.	Impact of yoga on blood pressure and quality of life in patients with hypertension (Priya, Kanniammal, Mahendra, & Valli, 2017)	83	Three arm single center study	Group -1 - Kundalini yoga – tune in with mantra, warm-up, postures, deep relaxation, meditation. Group-2- left nostril breathing and spinal flex	WHOQOL-100	Yoga at home group, there was a decrease in diastolic blood pressure and yoga group shows no improvement in blood pressure and yoga group at home shows significant impact on QOL as compared to the control group.	Short term yoga program to practice at home has much impact on the quality of life and in managing blood pressure.

CHAPTER – 4

AIM AND OBJECTIVES

4.1. AIM

Aim of the study is to evaluate the effect of Sleep Special Technique (SST) on hypertensive patients.

4.2. OBJECTIVES

- The objective of the study is to see the effect of one-week intervention of SST on blood pressure using a sphygmomanometer in hypertensive patients.
- The objective of the study is to see the change in sleep quality (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring) by using Medical Outcome Study Sleep Scale (MOS-SS) in hypertensive patients.
- The objective of the study is to assess the effect of one-week SST intervention on the sleep-related locus of control using Sleep Locus of Control in hypertensive patients.
- The objective of the study is to see the change in the seriousness of fatigue (Physical and Mental) using the Chalder Fatigue Scale in hypertensive patients.
- The objective of the study to see the influence of one-week intervention of SST on negative and positive emotions using the Short Depression and Happiness Scale in hypertensive patients.

4.3. RESEARCH QUESTION

Does one week of SST intervention have any positive influence on various measures like sleep quality (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring), the seriousness of mental and physical fatigue, negative emotions, blood pressure and sleep-related locus of control in hypertensive patients?

4.4. HYPOTHESIS

H_a- The practice of SST intervention has a positive influence on various measures like sleep quality (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring), the seriousness of mental and physical fatigue, negative emotions, blood pressure and sleep-related locus of control in hypertensive patients.

4.5. NULL HYPOTHESIS

H_0 - The practice of SST does not have a positive influence on various measures like sleep quality (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring), the seriousness of mental and physical fatigue, negative emotions, blood pressure and sleep-related locus of control in hypertensive patients.

CHAPTER – 5

METHODOLOGY

5.1. SAMPLE

5.1.1. SOURCE OF SUBJECT

Subjects for the study have been recruited from the following source:

- Hypertensive participants who visited Arogyadhama, S-VYASA University, Bengaluru for Integrated Approach of Yoga Therapy (IAYT) treatment.

5.1.2. SAMPLE SIZE

A convenience sampling method was done to select the total of sixty (n= 60) subjects, males and females with age ranging from 30 to 80 years. Random allocation of subjects was done do divide them into two groups: Experimental group n = 30, Control group n = 30.

A previous study done on the effect of sudarshan kriya yoga on some physiological and biochemical parameters in the mild hypertensive patients (Agte, Jahagirdar, & Tarwadi, 2011) arrived at a sample size of 60 using 'G*Power.

Test-independent two group tests, Effect size = 0.7580645, Alpha = 0.05, Power = 0.80, 2 Tail(s).

Sample size obtained from calculation N = 58

5.2. STUDY DESIGN

The present study was a Randomized controlled pre-post design.

5.3. INCLUSION CRITERIA

Criteria for including the subjects were the following

- People diagnosed with high blood pressure (systolic blood pressure >140mmHg, diastolic blood pressure >90mmHg, without any medication for blood pressure).
- Under IAYT and pharmacotherapy and medication for high blood pressure.
- Willingness to practice the protocol.
- Both male and female.
- Age ranging from 30 to 80 years.
- Language: English.
- People who are able to follow and do SST through instructions (English audio version)

5.4. EXCLUSION CRITERIA

Criteria for excluding the subjects were the following

- People of age above 80 and below 30 years.
- People who cannot understand English
- Undertaking treatment for any other ailment apart from Hypertension.
- Patients with uncontrolled hypertension.
- Alcohol consumption, smoking, tobacco, etc. were excluded.

5.5. ASSESSMENT

5.5.1. MEDICAL OUTCOME STUDY- SLEEP SCALE

The Medical Outcome Study Sleep Scale (MOS-SS) was developed as a part of a bigger initiative to estimate health status in a population of more than 10,000 patient participants.

Sleep scale is a 12-item questionnaire and is only a small part of the total Patient Assessment Questionnaire (PAQ), a 20-page instrument querying a broad range of health-related issues involving physical functioning, psychological well-being, health distress and pain. The sleep scale evaluates six factors: sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring. The MOS-SS can be calculated separately, or it can also be used as a part of a complete battery of testing to provide a more general image of health. To set up the legitimacy of the questionnaire it was used on 3,000 individuals. Participants between the ages of 18 to 98 years participated in it.

Reliability and Validity

In a baseline psychometric assessment of the scale, MOS developers discovered an internal consistency ranging from .57 to .86. Measures of Sleep quality, optimal sleep and sleep disturbance were observed to be highly related to perceptions of adequacy.

Obtaining a copy

A duplicate of scale can be found in the chapter regarding sleep measures composed by Hays and Stewart. The total PAQ can be found in the book's Appendix.

Scoring

Scoring procedure of MOS-SS scale is given below(Shahid, Wilkinson, Marcu, & Shapiro, 2012)

Table - 4: Coding for MOS-SS scale

Code	Variable	total items	items	Score
slpd4	sleep disturbance	4	1,3,7,&8	Add items / total item
slpsnr1	Snoring	1	10	Add items / total item
slpsob1	sleep short of breath or headache	1	5	Add items / total item
slpa2	sleep adequacy	2	4 & 12	Add items / total item
slps3	sleep somnolence	3	6,9&11	Add items / total item
slp6	sleep problem index I	6	4,5,7,8,9&12	Add items / total item
slp9	sleep problem index II	9	1,3,4,5,6,7,8,9&12	Add items / total item
slpop1	optimal sleep(dicot)	1	2	Add items / total item
Slpqraw	sleep quality(raw)	1	2	Add items / total item

5.5.2. CHALDER FATIGUE SCALE

Designed to measure the seriousness of fatigue in adults, the 14 items instrument is demonstrated for use in both research and clinical setting. Symptoms analyzed by scale can be separated into two classifications: Mental and Physical. The scale was approved using a sample of participants aged 18 to 45.

Administration

The instrument is a self-report measure that can be managed both by meeting and by using a pencil and paper test. And it requires 3 to 5 min for complications.

Reliability and Validity

Chalder and associates broke down the scale for its psychometric properties, demonstrating an internal consistency ranging from .88 to .90 and validity of .85(Shahid et al., 2012)

Scoring

This scale can be scored in "likert" style 0, 1, 2 & 3 with range from 0 to 33.

Table- 5: Coding for Chalder Fatigue Scale

Category	Items	Score
Physical	1 to 7	Sum of all physical items
Mental	8 to 11	Sum of all mental items

5.5.3. SLEEP LOCUS OF CONTROL SCALE

The sleep locus of control is an8 item questionnaire intended to assess a respondent's sleep-related locus of control – how much a person traits his or her experience of sleep to internal or to chance intentional causes. Researchers posit that a chance locus of control might be related to experiences of learned helplessness, individuals cause to believe that there is nothing they can do to improve their sleep quality. Vice versa, studies have shown that internally

oriented faith about sleep responsibility may direct to higher anxiety about having sleep problems and may increment sleep onset delay. Thus, beliefs that fall at either great of locus of control range might be unsafe to sleep quality. The SLOC permits clinicians to distinguish problematic cognitions in their patients, improving the quality of treatment intervention.

Developers approved the scale with two sample population, an insomnia patient (sleeping disorder) group with a mean age of 50.5 ± 11.8 and adults control group with a mean age of 43.3 ± 15.0.

Administration

Requiring 3 to 5 min to complete, the scale is self-report, pencil and paper measure.

Reliability and Validity

The scale's psychometric properties have been assessed in an investigation led by Vincent and partners. Scientists found an internal consistency ranges from .47 to .73. Moreover, the insomnia (sleeping disorder) patient group authorized both external and internal loci of control of more prominent limits than the control group, suggesting that a balance between the two might be perfect.

Scoring

Using a likert – type scale that ranges from 1 to 6, respondents show the degree to which they concur with specific statement relating to their control over insomnia. Items 3, 4, and 6 are reversed scored(Vincent, Sande, Read, & Giannuzzi, 2004).

Table- 5: Coding for Sleep Locus of Control scale

Category	**Items**	**scoring**
internal sleep locus	5 items	1+2+5+7+8
chance sleep locus	3 items	3+4+6

5.5.4. SHORT DEPRESSION & HAPPINESS SCALE

Short depression and happiness scale (SDHS) is a 6 items questionnaire intended to assess a respondent's depression and happiness. It has 3 positive items and 3 negative items which describe how frequently people felt that way in the past seven days, including today. Some statements describe negative emotions and some describe positive emotions.

Scoring

The scale ranges from 0 to 3, respondents show the degree to which they concur with specific statements. Items 1, 3 and 6 are reversed scored. Then do the sum of the items(Linley, McCollam, Lewis, Joseph, & Harwood, 2004).

Reliability

Short depression and happiness scale, had the highest reliability across all the measures with values between .77 to .92.

5.5.5. SPHYGMOMANOMETER

Poiseuille presented in the mid-1800s the mercury hydrodynometer and the mmHg units. Karl Von-Vierordt portrayed in 1855 that enough pressure; the blood vessels could be obliterated. He also produced the sphygmograph, a heartbeat recorder usable for routine non-invasive observing people. In 1881, Von Basch made the sphygmomanometer and the first non-invasive Blood Pressure (BP) measurement. However, in 1896, Scipione Riva-Roccihasgrown further the mercury sphygmomanometer, as we know it today. The sphygmomanometer must be used to decide the systolic BP. Watching the pulse disappearance by means of palpation would just permit the measuring doctor to monitor the point when the blood vessel was completely tightened. Nikolai Korotkoff was the first to hear the sound made by the choking of the blood vessels in 1905(Roguin, 2006).

Figure 1-SPHYGMOMANOMETER

5.6 INTERVENTION

Table -7: Sleep Special Technique Module.

Steps to be followed before going to the bed			
Sl. No	**Practice name**	**Rounds**	**Time (in minutes)**
1.	***Walking***		***4***
	Toes walking		1
	Heel walking		1
	Side of the foot walking		1
	Sole walking		1
2.	***Cantering***		***2***
	Lean forward	1	½
	Lean backward	1	½
	Lean right	1	½
	Lean left	1	½
3.	***Abdominal Breathing***	***5***	***2***
4.	***Pranayama***		***7***
	Ujjayi	5	2
	NadiShuddi	5	5
5.	***DRT (Deep Relaxation Technique) Reverse***		***15***

5.7 DATA EXTRACTION& ANALYSIS

Data were collected before and after the practice of Sleep Special Technique (SST) for 7 days. The basic descriptive statistics such as mean and standard deviation were done using Ms-Excel (2010). The statistical analysis was done using the R (3.1.5) software.

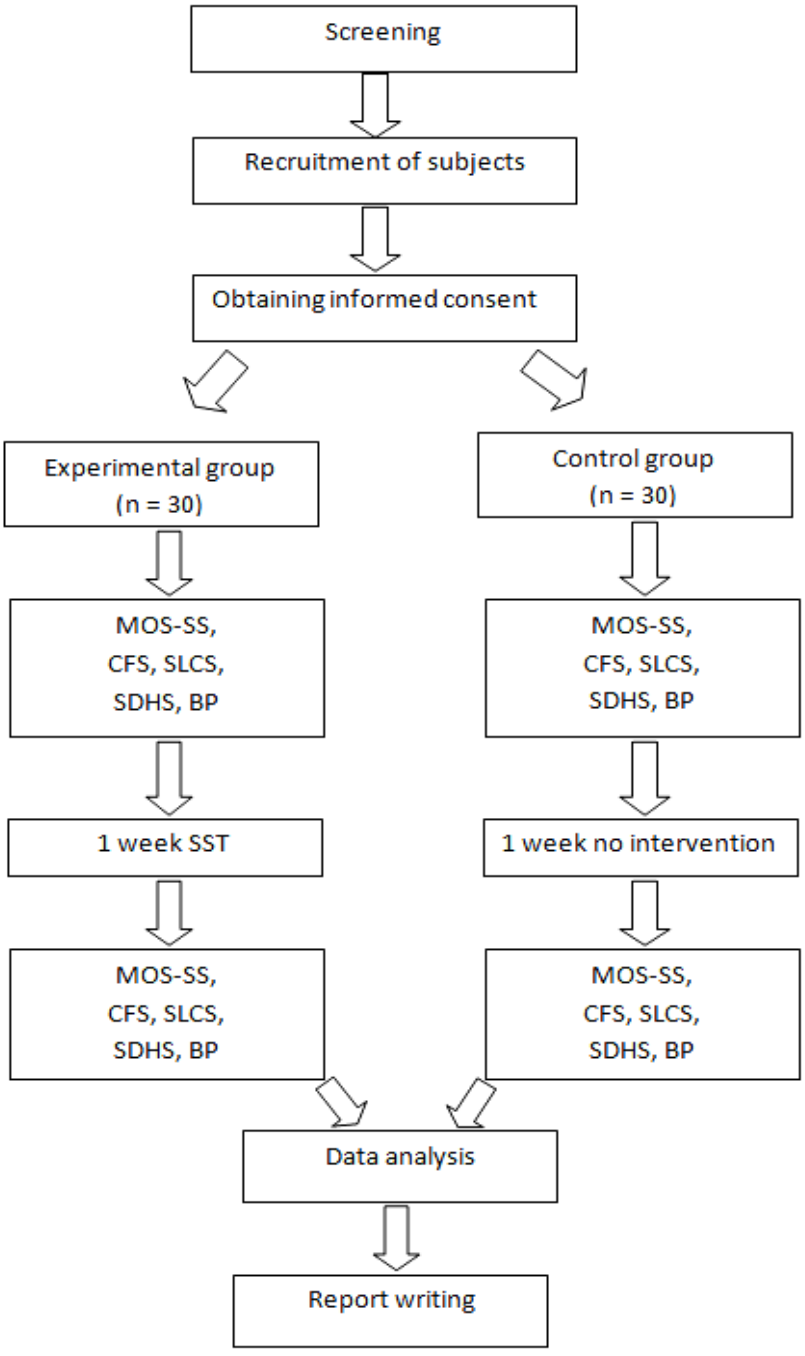
The Data was found to be not normally distributed for some of the parameters and normally for others using the Shapiro-Wilk test. So accordingly Parametric and non-parametric test has been used by doing Independent Sample t-test or Wilcoxon's sum ranks test to see the between-group result.

And similarly, a Paired sample t-test or Wilcoxon's signed rank test was usedas a test for significance to see the within-group result. Test results were considered to be significant for $P<0.05$.

CHAPTER- -6

RESULTS

Trial Profile: Pert Chart



6.1. DEMOGRAPHIC DATA

The total 60 subjects were recruited for the study, in which 17 male and 13 female subjects in the experimental group and 20 male and 10 female subjects in control group had age ranging from 30 to 80 years of age.

Table – 8: Demographic table

Groups	*Gender*	*Subjects*	*Mean ± SD (Age)*
Experiment	Male	17	48.82 ± 11.56
	Female	13	55.23 ± 11.29
Control	Male	20	54.75 ± 14.95
	Female	10	64.4 ± 9.36

6.2. WITHIN GROUP AND BETWEEN GROUP COMPARISON OF EXPERIMENTAL AND CONTROL GROUP

Table – 9: Comparison of pre-scores and post-scores within and between experimental group and control group

(Within Group & Between Group)

Sl. No.	Variables	Experimental Group			Control Group			Between Group
		Pre	Post	P-value	Pre	Post	P-value	P-value
1.	Sleep Disturbance	39.50 ± 21.87	21.83 ± 15.74	0.0007**	38.08 ± 22.04	34.29 ± 19.16	0.48	0.002*
2.	Sleep Adequacy	38.33 ± 21.19	23.33 ± 18.26	0.0047*	37.00 ± 18.60	34.67 ± 13.58	0.8624	0.008*
3.	Sleep short of Breath/headache	24.67 ± 29.09	9.33 ± 17.99	0.022*	28.67 ± 27.13	26.67 ± 23.68	0.8658	0.0007**
4.	Sleep	31.78 ±	21.78 ±	0.0192*	31.56 ±	30.44 ±	0.8107	0.0176*

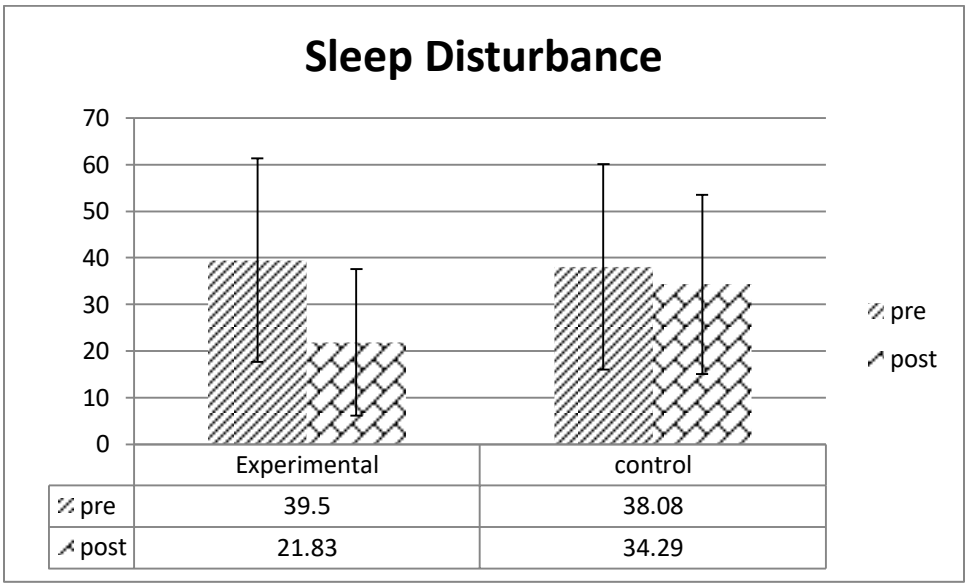
	somnolence	16.85	15.26		16.79	14.82		
5.	Snoring	24.67 ± 28.62	8.67 ± 14.56	0.0132*	26.00 ± 30.24	22.67 ± 26.12	0.8638	0.0074*
6.	Sleep problem index I	33.00 ± 15.37	16.56 ± 13.74	0.0001**	31.56 ± 17.48	29.44 ± 15.19	0.6389	0.0011**
7.	Sleep problem index II	34.67 ± 14.83	18.89 ± 11.45	5.306^{e-05}**	35.07 ± 17.24	32.28 ± 14.75	0.4916	0.0001**
8.	Optimal sleep (Dichot)	0.27 ± 0.45	0.17 ± 0.38	0.356	0.37 ± 0.49	0.37 ± 0.49	1	0.0841
9.	Sleep quantity(Raw)	6.13 ± 1.14	5.98 ± 0.58	0.672	6.27 ± 1.08	6.45 ± 0.79	0.7216	0.037*
10.	Depression	14.33 ± 2.45	15.20 ± 2.28	0.0135*	14.30 ± 2.82	14.87 ± 2.33	0.1165	0.44
11.	Physical symptoms of fatigue	9.63 ± 2.28	6.53 ± 2.98	5.096^{e-06}**	10.13 ± 2.99	9.90 ± 2.41	0.339	9.341^{e-05}**
12.	Mental symptoms of fatigue	4.53 ± 0.94	3.80 ± 1.21	0.0055*	4.63 ± 1.40	4.43 ± 1.17	0.1685	0.044*
13.	Internal sleep locus of control	19.93 ± 6.68	24.87 ± 4.75	0.0017**	20.40 ± 6.54	20.60 ± 6.36	0.9048	0.0020*
14.	chance sleep locus of control	12.03 ± 5.10	13.17 ± 3.96	0.498	10.50 ± 4.63	10.10 ± 4.07	0.7939	0.0025*
15.	Systolic blood pressure(sysbp)	140.93 ± 17.57	123.23 ± 11.74	2.793^{e-05}**	134.27 ± 19.64	131.83 ± 12.38	0.5685	0.006*
16.	Diastolic blood pressure(diabp)	94.20 ±11.81	80.47 ± 6.72	5.698^{e-06}**	88.67 ± 11.34	88.50 ± 9.37	0.9507	0.0013**

Note: *P<0.05

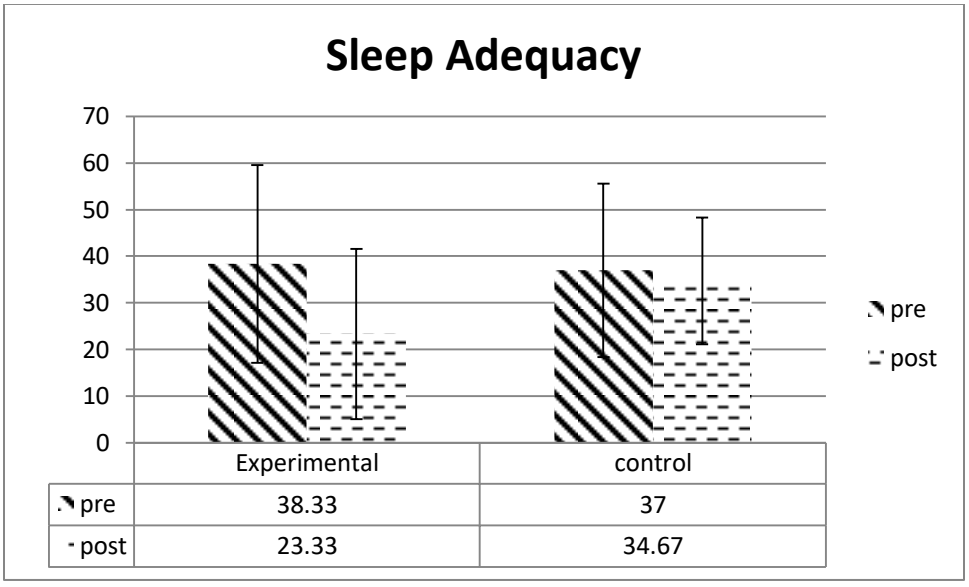
****P**<0.001

6.3. GRAPHS

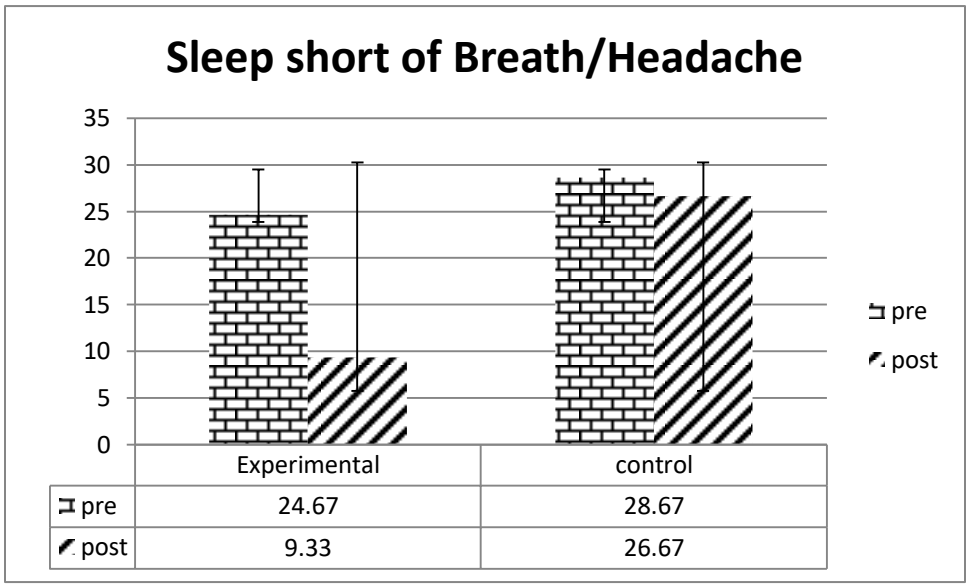
Graph 1: Comparison of Sleep Disturbance score in Experimental and Control group



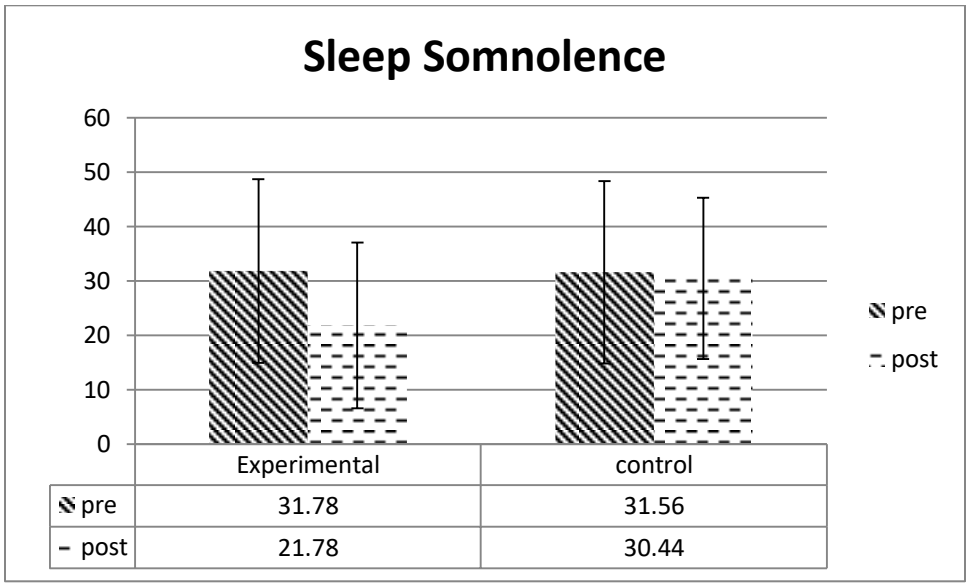
GRAPH 2: Comparison of Sleep Adequacy in Experimental and Control group



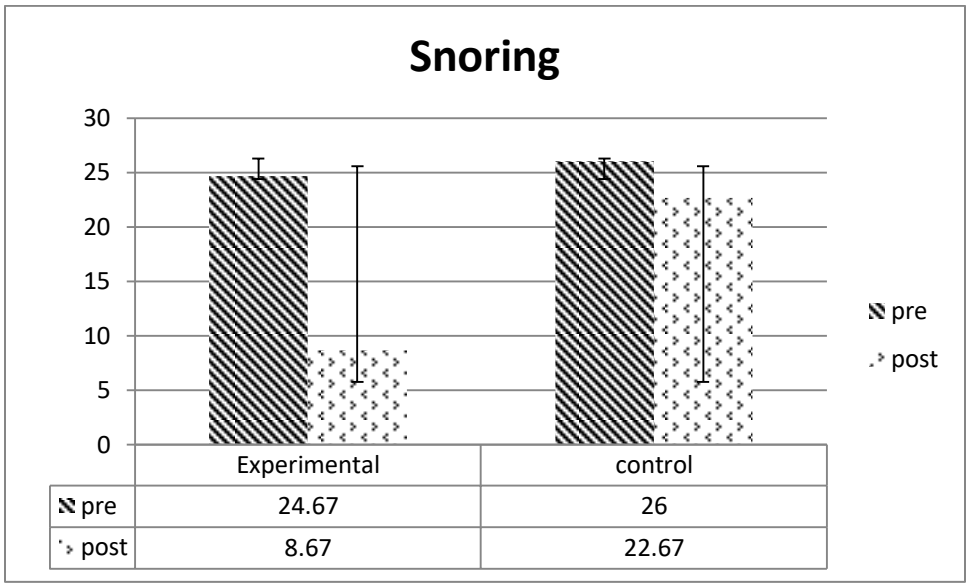
GRAPH 3: Comparison of Sleep shortness of breath or headache in Experimental and Control Group



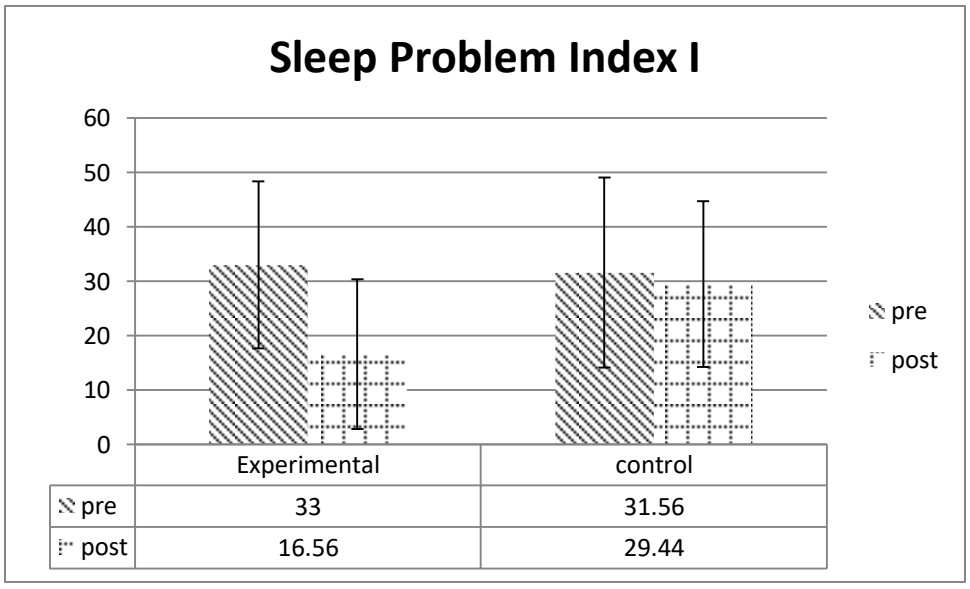
GRAPH 4: Comparison of sleep somnolence in Experimental and Control group



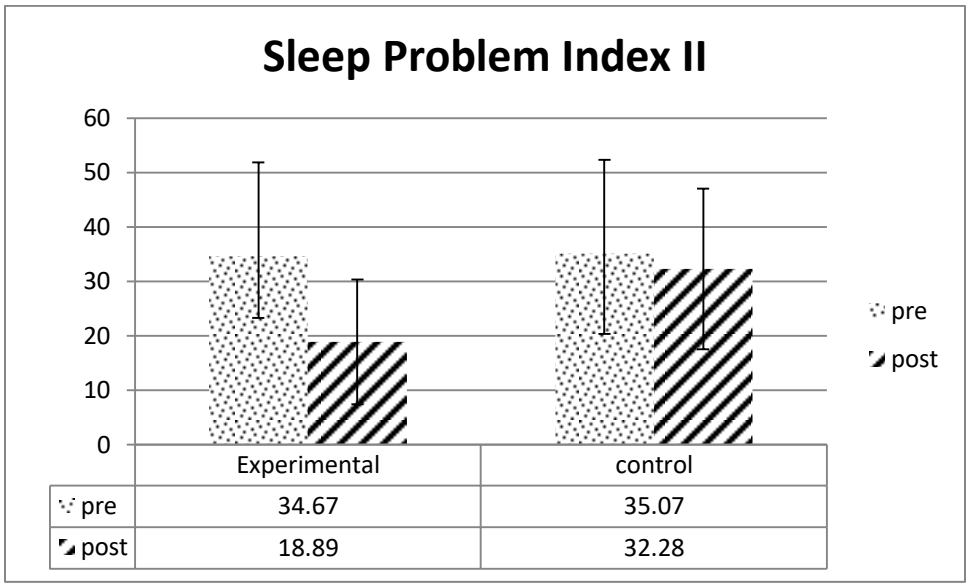
GRAPH 5: Comparison of snoring in Experimental and Control Group



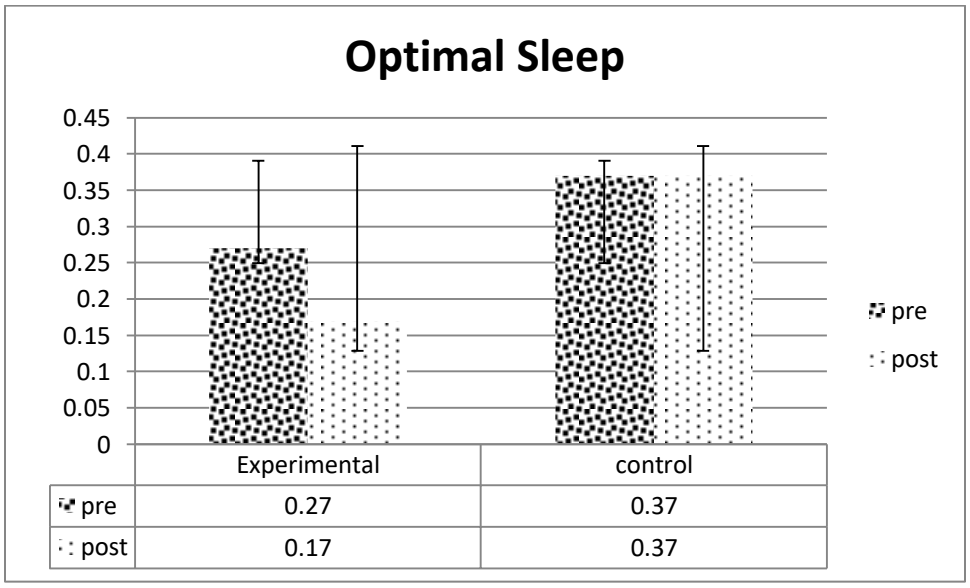
GRAPH 6: Comparison of Sleep Index I in Experimental and Control Group



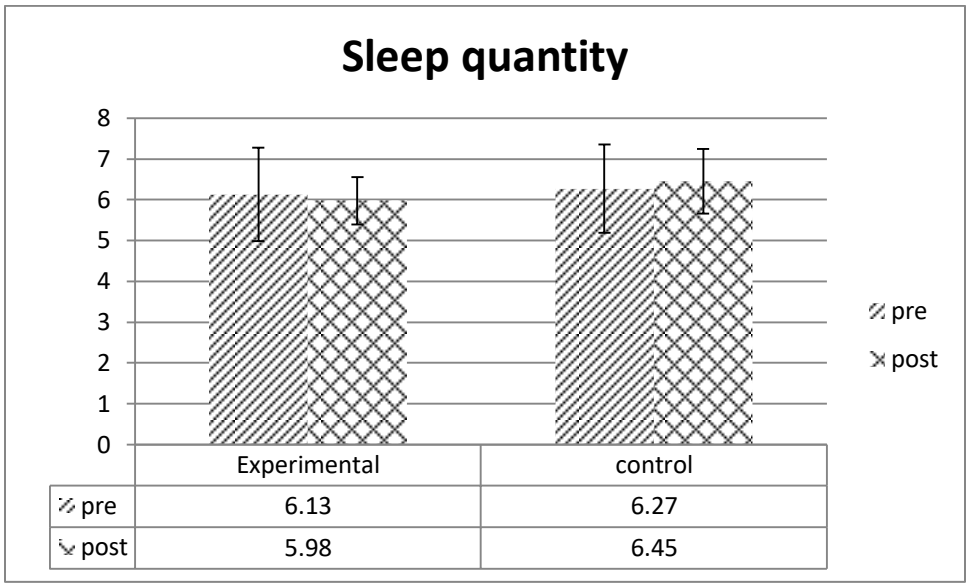
GRAPH 7: Comparison of Sleep Index II in experimental and Control Group



GRAPH 8: Comparison of Optimal Sleep in experimental and Control Group

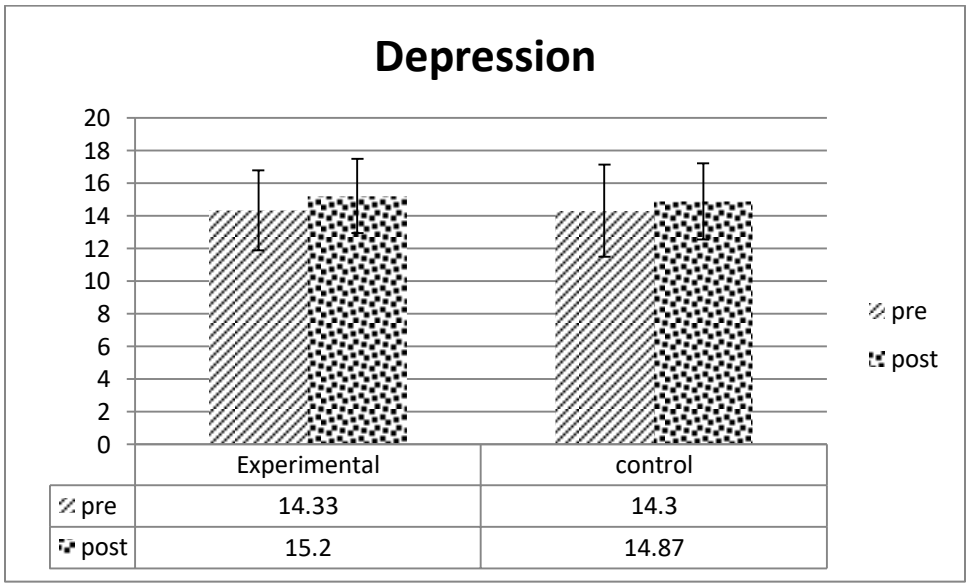


GRAPH 9: Comparison of Sleep Quantity in Experimental and Control Group



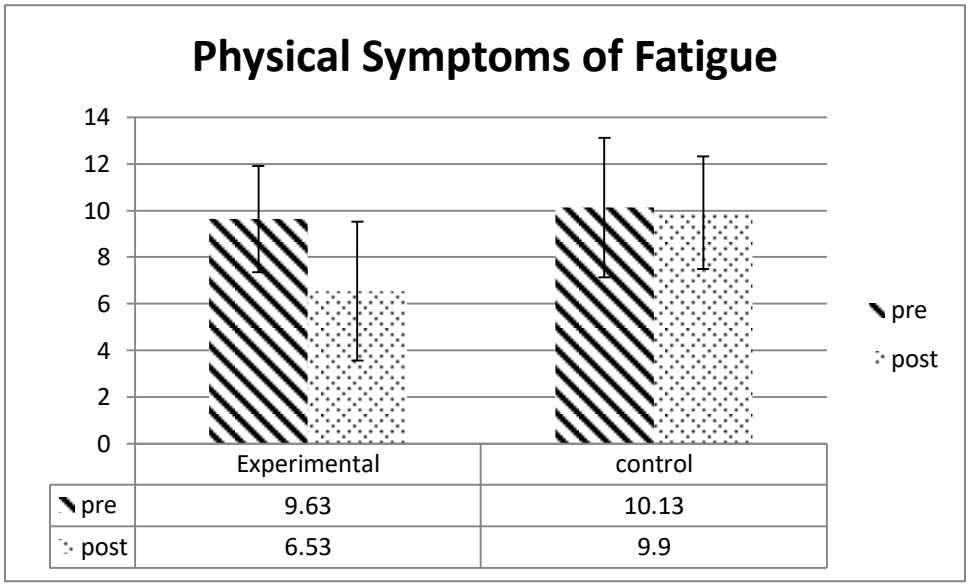
	Experimental	control
pre	6.13	6.27
post	5.98	6.45

GRAPH 10: Comparison of Depression in Experimental and Control Group

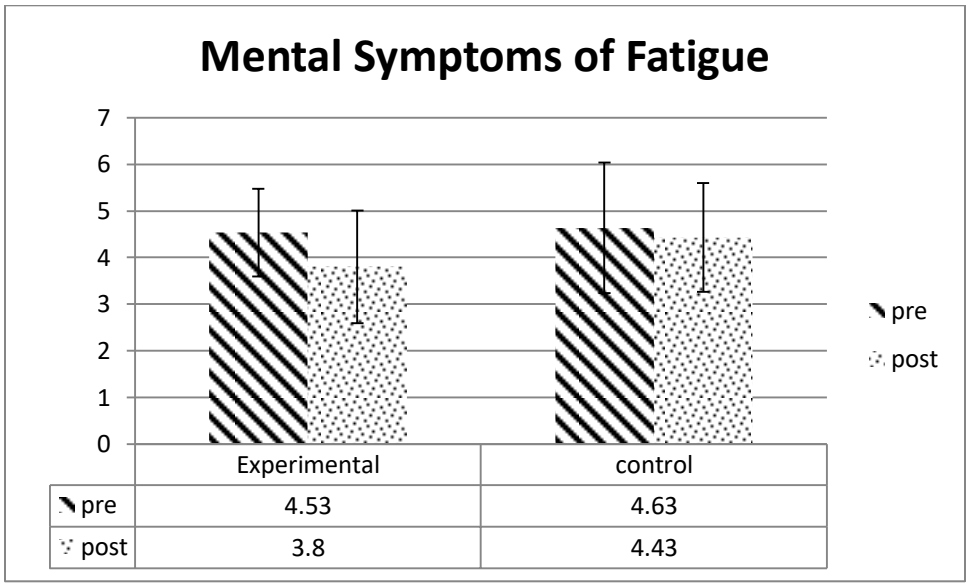


	Experimental	control
pre	14.33	14.3
post	15.2	14.87

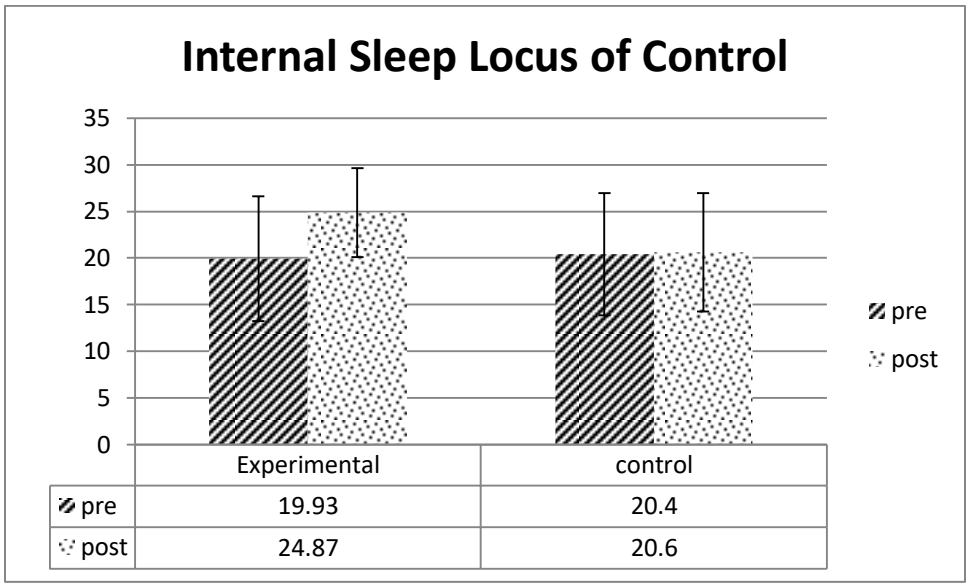
GRAPH 11: Comparison of Physical symptoms of fatigue in Experimental and Control Group



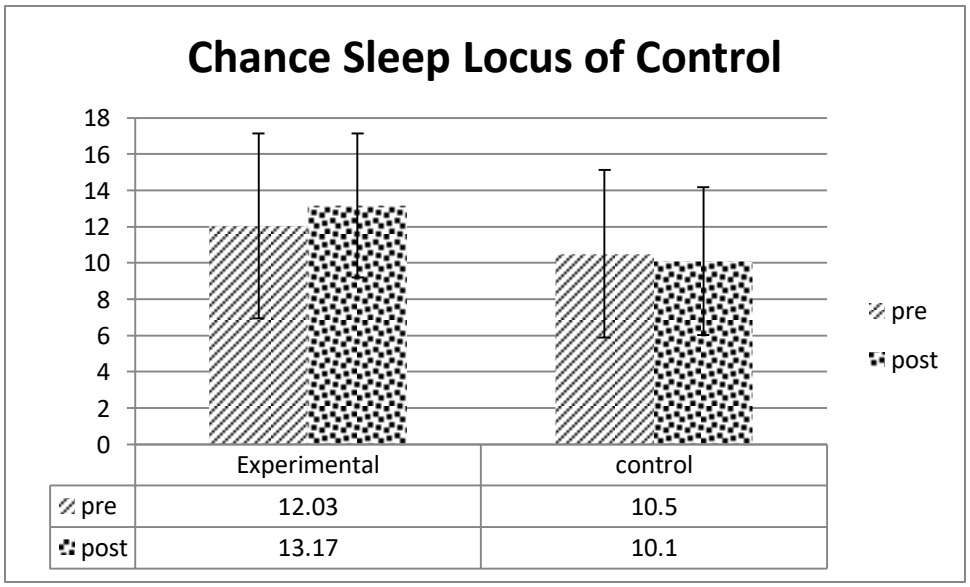
GRAPH 12: Comparison of Mental symptoms of fatigue in Experimental and Control Group



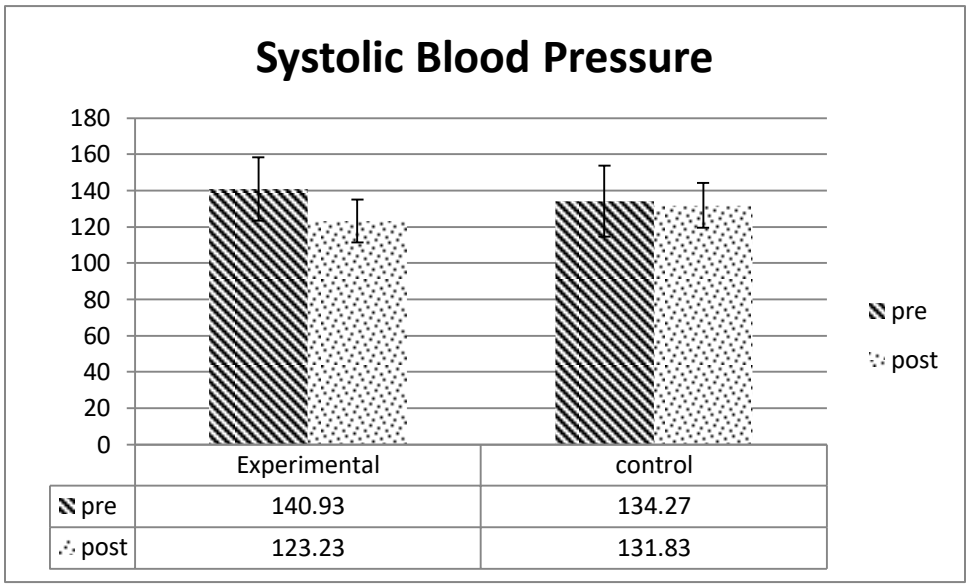
GRAPH 13: Comparison of Internal Sleep Locus in Experimental and Control Group



GRAPH 14: Comparison of Chance Sleep Locus in Experimental and Control Group



GRAPH 15: Comparison of Systolic Blood pressure (mmHg) in Experimental and Control Group



GRAPH 16: Comparison of Diastolic Blood Pressure (mmHg) in Experimental and Control Group

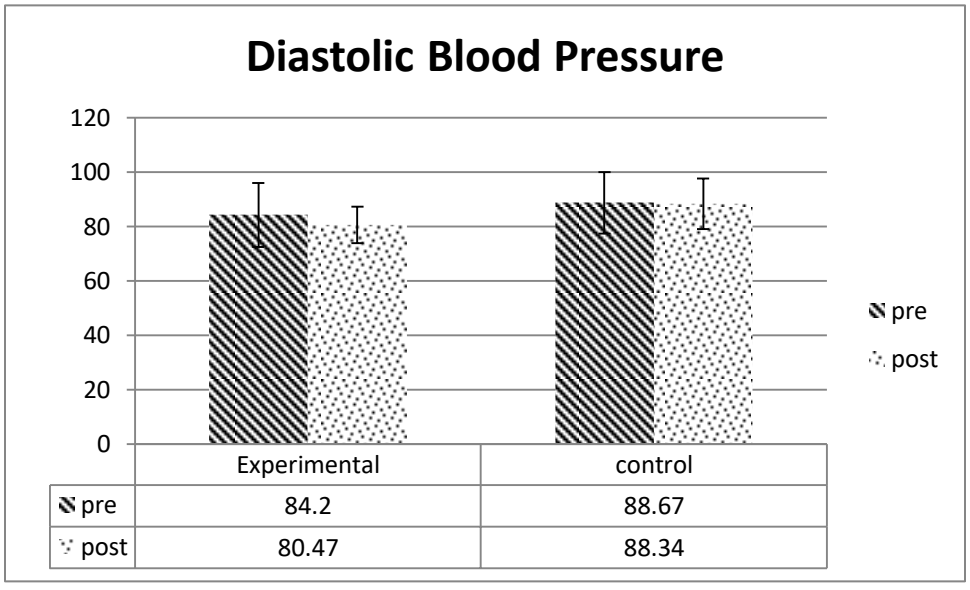


Table – 14: Cronbach's Alpha

Assessment Tool	***Cronbach's Alpha(Pre)***	***Cronbach's Alpha(Post)***
Chalder fatigue scale	0.78	0.87
Medical outcome study: sleep scale	0.68	0.75
Short depression happiness scale	0.7	0.68
Sleep locus of control	0.95	0.95

CHAPTER - 7

DISCUSSIONS

7.1 INTRODUCTION

The present study was conducted with an aim to see the effect of one-week sleep special technique on sleep quality (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring), seriousness of mental and physical fatigue, positive and negative emotions, blood pressure and sleep-related locus of control in hypertensive patients.

7.2 SUBJECTIVE SLEEP QUALITY

The present study revealed that sleep short of breath, headache, sleep problem index I, and sleep problem index II, showed highly significant change ($P<0.001^{**}$) and sleep disturbance, sleep adequacy, sleep somnolence, snoring and sleep quantity showed a significantly ($P<0.05^{*}$) better change in experimental group as compared to control group. Optimal sleep scores did not show any significant improvement in the experimental group as compared to the control group. Whereas, within group analysis shows a slight improvement in optimal sleep scores in experimental group ($P=0.356$) and no improvement in control group. An earlier study by Patra & Telles, 2009 which examine the positive impact of cyclic meditation on subsequent sleep by using polysomonography, is also in the alignment to our current result of an increase in sleep quality after cyclic meditation with a significant improvement of sleep quality in cyclic meditation group compared to supine rest group(Monit, 2009) this study also support the result of the current study significant changes in subjective sleep quality except for optimal sleep.

7.3 NEGATIVE EMOTIONS

The current study shows that there was no significant change in negative emotion in the experimental group as compared to the control group. The within group analysis shows a significant change in negative emotion in experimental group ($P<0.05^{*}$) and no significant change in control group.

The previous study by lakshaminarasimhan and R. Nagrathna, 2011 on effect of integrated yogic practices on positive and negative emotions in healthy adults showed a significant reduction in the negative effect of emotions and increase the positive effect within one week of yoga program. The present study result shows a slight improvement in negative emotion in the experimental group(Narasimhan, Nagarathna, & Nagendra, 2011).

7.4 SERIOUSNESS OF FATIGUE

There is a highly significant reduction in physical fatigue in experimental group as compared to the control with the significance (P<0.001**). There is a significant reduction in the mental fatigue in the experimental group as compared to the control group with the significance (P<0.05*). The present study shows a significant reduction in physical and mental symptoms of fatigue which coincides with the result of a study previously conducted by R.P. Vempati and S. Telles suggesting that sympathetic activity decreases after guided relaxation based on yoga, depending on the baseline levels(Levels, 2002).

7.5 SLEEP-RELATED LOCUS OF CONTROL

The results of the present study revealed that there is a significant change in internal and chance sleep locus of control in experimental group as compared to the control group with the significance (P<0.05*). The internal sleep locus of control scores showed a highly significant improvement in experimental group (P<0.001**)and no significant change in the control group and chance sleep locus of control scores showed no significant change in the experimental group as well as in the control group(P>0.05).The result of the previous study by Sat Bir S. Khalsa, proposes that the application of yoga is conventional and achievable in the secondary school setting and has the potential of playing a protective and preventive role in maintaining mental health including sleep-related locus of control. The result of the study supports the result of the current study where there is a significant improvement in both internal and chance sleep locus of control scores in the experimental group(Bir et al., 2011).

7.6 BLOOD PRESSURE

Between-group comparisons of blood pressure suggest that diastolic blood pressure showed a highly significant improvement (P<0.001**) and systolic blood pressure showed a significant

improvement (P<0.05*) in experimental group as compared to control group. Both diastolic and systolic blood pressure showed a highly significant improvement in experimental group (P<0.001*) and no significant improvement in control group. A previous study assess the positive impact of yoga and pranayama on obesity, hypertension, blood sugar, and cholesterol shows a decrease in both systolic and diastolic blood pressure after the practice of seven days of yoga and pranayama it also supports the result of the current study significant reduction in blood pressure systolic and diastolic (Gokal, Shillito, & Maharaj, 2007).

7.3 MECHANISMS

To understand the probable mechanism of action achieved by practicing yoga which relieves hypertension one must know the hypothalamic-pituitary-adrenal (HPA) axis. The most distinctive stress response on activation of the HPA axis is the release of adrenocorticotropic hormone (ACTH) and corticoids into the bloodstream. In addition to HPA axis activation, acute stress also stimulates the sympathetic division of neuro-vegetative nervous system as a part of the emergency response or the flight/fight reaction. As a result, nor-adrenaline and adrenaline are released from peripheral sympathetic nerve fibers in different tissue into the bloodstream(Cannon, 2019). It has been reported that the subject with severe hypertension had overstated cortisol responses to ACTH injection, but normal 24 hours urinary cortisol level and post-dexamethasone suppression, which proposes that hypertension may be associated with HPA axis alteration(Reynolds et al., 2014).

Yogic practices stimulate the parasympathetic nervous system thus affecting the HPA-axis and increases the activity of GABA (gamma-amino butyric-acid) system and anxiety reduction and thus also calms down the mind(Streeter, Gerbarg, Saper, Ciraulo, & Brown, 2012). The relaxation technique involved in SST like reverse DRT helps give deeper relaxation to the body thus improving the physical fatigue symptoms. Also, the parasympathetic activation also leads to decreased cardiac output via a decrease in heart rate, resulting in a tendency to lower the blood pressure(Japundzic, Grichois, Zitoun, Laude, & Elghozi, 1990). By coupling sympathetic and parasympathetic activation works thus on contraction and dilation of blood vessels thus working on the elasticity of the blood vessels which further lowers the blood pressure. One other possible mechanism is that yogic practices have been proved to increase BDNF (brain-derived neurotrophic factor) which is directly related to the antidepressant effect(Thirthalli et al., 2013).

CHAPTER – 8

APPRAISAL

8.1 STRENGTH OF THE STUDY

Novel Study: This is the first study to understand the effect of sleep special technique on sleep quality (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring), the seriousness of mental and physical fatigue, negative emotions, blood pressure and sleep-related locus of control in hypertensive patients.

Residential Subjects: Both experimental and control group subjects were residential patients of the same campus.

Large number of variables: In the present study, we have used a large number of variables including (sleep disturbance, sleep adequacy, sleep quantity, sleep problem, sleep somnolence and snoring), the seriousness of mental and physical fatigue, negative emotions, blood pressure and sleep-related locus of control.

Both the Genders: The study includes both genders.

Integration of different yogic practices: The present study is a multidisciplinary study to see the effect of SST with includes walking, balancing, breathing practices and relaxation techniques with chanting on blood pressure which no study has done before.

Easy repeatability because of standard protocol: The SST module we have selected is easy to follow.

Un-Monitored intervention: Because the SST protocol is meant to induce sleep in practitioners so they shouldn't have been disturbed after practice that is why they were asked to practice it on their own before sleeping. Interestingly, a good change was observed even though the intervention was unmonitored indicating the protocol to be very effective and friendly among the practitioners.

8.2 LIMITATION OF THE STUDY

Short term intervention: 7 days duration of intervention was not enough to support the subjective values for classical assessment tool like Pittsburg quality of sleep index, perceived stress scale, etc.

Unachieved cronbach's alpha: Standard cronbach's alpha could not be achieved for Chalder fatigue scale, Medical outcome study sleep scale, short depression & happiness scale (α <0.85).

8.3 SUGGESTIONS FOR THE FUTURE STUDY

Future Study can be done with longitudinal designs with duration of study of 3months to 1 year. With the following-

- Larger sample size
- Variety of age groups
- Different health status (Healthy , Diseased population other than hypertension)
- Additional variables associated with sleep, stress and cognition

8.4 CONCLUSIONS

The practice of SST is beneficial in improving sleep quality, sleep adequacy, removing physical and mental symptoms of fatigue, and sleep-related locus of control, normalizing the blood pressure in hypertensive patients. It helps reduce snoring and various other sleep-related problems such as sleep disturbance and sleep somnolence.

CHAPTER -9

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CHAPTER -10

APPENDIX

10.1. INFORMED CONCENT SAMPLE COPY

Certificate of Consent

This section should be written in the first person and have a statement similar to the one in bold below. If the participant is illiterate but gives oral consent, a witness must sign. A researcher or the person going over the informed consent must sign each consent. The certificate of consent should avoid statements that have "I understand…." phrases. The understanding should perhaps be better tested through targeted questions during the reading of the information sheet (some examples of questions are given above), or through the questions being asked at the end of the reading of the information sheet, if the potential participant is reading the information sheet him/herself.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant_____

Signature of Participant _____

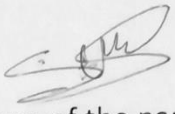
Date _____

Day/month/year

INFORMED CONSENT

S-VYASA UNIVERSITY PRASHANTI KUTIRAM, BANGLORE-560105

I have read fore going information, or it has been read to me. I have had the opportunity to ask questions about it and any question that I have been answered to me to my satisfaction. I consent voluntarily to participate in this research titled "EFFECT OF SLEEP SPECIAL TECHNIQUE ON HYPERTENSION PATIENTS".



Signature of the participant

Date: 15/01/2019

10.2 COPY OF ASSESSMENT TOOL

10.2.1 CHALDER FATIGUE SCALE

chalder fatigue scale

Name: _____ Date:_____

We would like to know more about any problems you have had with feeling tired, weak or lacking in energy in the last month. Please answer ALL the questions by ticking the answer which applies to you most closely. If you have been feeling tired for a long while, then compare yourself to how you felt when you were last well. Please tick only one box per line.

	less than usual	***no more than usual***	***more than usual***	***much more than usual***
do you have problems with tiredness?				
do you need to rest more?				
do you feel sleepy or drowsy?				
do you have problems starting things?				
do you lack energy?				
do you have less strength in your muscles?				
do you feel weak?				
do you have difficulties concentrating?				
do you make slips of the tongue when speaking?				
do you find it more difficult to find the right word?				
	better than usual	***no worse than usual***	***worse than usual***	***much worse than usual***
how is your memory?				

This scale can be scored "bimodally" with columns representing 0, 0, 1 & 1 and a range from 0 to 11 with a total of 4 or more qualifying for "caseness". Alternatively it can be scored in "Likert" style 0, 1, 2 & 3 with a range from 0 to 33. Mean "bimodal" score for CFS sufferers was 9.14 (SD 2.73) and for a community sample 3.27 (SD 3.21). Mean "Likert" score was 24.4 (SD 5.8) and 14.2 (SD 4.6).

Table- 5: Coding for Sleep Locus of Control scale

Category	**Items**	**scoring**
internal sleep locus	5 items	1+2+5+7+8
chance sleep locus	3 items	3+4+6

10.2.1.1. Coding Used for Analysis (R software:3.5.1)

Within-Group Coding:-

```
yoga<-subset(cfs_socr,cfs_socr$group == "yoga")

control<-subset(cfs_socr,cfs_socr$group == "control")

yoga$diffphy<-yoga$post_physical-yoga$pre_physical

shapiro.test(yoga$diffphy)

t.test(yoga$post_physical,yoga$pre_physical,paired = TRUE)

yoga$diffmen<-yoga$post_mental-yoga$pre_mental

shapiro.test(yoga$diffmen)

wilcox.test(yoga$post_mental,yoga$pre_mental,paired = TRUE)

control$diffphy<-control$post_physical-control$pre_physical

shapiro.test(control$diffphy)

wilcox.test(control$post_physical,control$pre_physical,paired = TRUE)

control$diffmen<-control$post_mental-control$pre_mental

shapiro.test(control$diffmen)

wilcox.test(control$post_mental,control$pre_mental,paired = TRUE)
```

Between-Group Coding:-

```
shapiro.test(yoga$pre_physical)

shapiro.test(control$pre_physical)

leveneTest(cfs_socr$pre_physical,cfs_socr$group)

wilcox.test(cfs_socr$pre_physical~cfs_socr$group)
```

```
shapiro.test(yoga$pre_mental)

shapiro.test(control$pre_mental)

leveneTest(cfs_socr$pre_mental,cfs_socr$group)

wilcox.test(cfs_socr$pre_mental~cfs_socr$group)

shapiro.test(yoga$post_physical)

shapiro.test(control$post_physical)

leveneTest(cfs_socr$post_physical,cfs_socr$group)

wilcox.test(cfs_socr$post_physical~cfs_socr$group)

shapiro.test(yoga$post_mental)

shapiro.test(control$post_mental)

leveneTest(cfs_socr$post_mental,cfs_socr$group)

wilcox.test(cfs_socr$post_mental~cfs_socr$group)
```

10.2.2. MEDICAL OUTCOME STUDY SLEEP SCALE

1. How long did it usually take for you to fall asleep during the past 4 weeks?	0-15 minutes	16-30 minutes	31-45 minutes	46-60 minutes	more than 60 minutes	
2. On an average, how many hours did you sleep each night during the past 4 weeks? (write in number of hours per night):						
How often during the past 4 weeks did you…(put * mark in the correct box)	all of the time (1)	most of the time (2)	a good bit of the time (3)	some of the time (4)	a little of the time (5)	none of the time(6)
3. feel that your sleep was not quiet (moving restlessly, feeling tense, speaking, etc.,while sleeping)?						
4. get enough sleep to feel rested upon waking in the morning?						
5. awaken short of breath or with a headache?						
6. feel drowsy or sleepy during the day?						
7. have trouble falling asleep?						
8. awaken during you sleep time and have trouble falling asleep again?						
9. have trouble staying awake during the day?						
10. snore during your sleep?						
11. take naps (5 minutes or longer) during the day?						
12. get the amount of sleep you needed?						

Scoring Coding for MOSS scale

Code	Variable	total items	items	Score
slpd4	sleep disturbance	4	1,3,7,&8	Add items / total item
slpsnr1	Snoring	1	10	Add items / total item
slpsob1	sleep short of breath or headache	1	5	Add items / total item
slpa2	sleep adequacy	2	4 & 12	Add items / total item
slps3	sleep somnolence	3	6,9&11	Add items / total item
slp6	sleep problem index I	6	4,5,7,8,9&12	Add items / total item
slp9	sleep problem index II	9	1,3,4,5,6,7,8,9&12	Add items / total item
slpop1	optimal sleep(dicot)	1	2	Add items / total item
Slpqraw	sleep quality(raw)	1	2	Add items / total item

10.2.2.1. Coding Used for Analysis (R software: 3.5.1)

Within-Group Coding:-

```
yoga<-subset(mos_final,mos_final$group=="yoga")

control<-subset(mos_final,mos_final$group=="control")

yoga$diffslpd4<-yoga$post_slpd4-yoga$pre_slpd4

control$diffslpd4<-control$post_slpd4-control$pre_slpd4

shapiro.test(yoga$diffslpd4)

t.test(yoga$post_slpd4,yoga$pre_slpd4,paried = TRUE)

shapiro.test(control$diffslpd4)

t.test(control$post_slpd4,control$pre_slpd4,paried = TRUE)

yoga$diffslpsnr1<-yoga$post_slpsnr1-yoga$pre_slpsnr1

control$diffslpsnr1<-control$post_slpsnr1-control$pre_slpsnr1

shapiro.test(yoga$diffslpsnr1)

wilcox.test(yoga$post_slpsnr1,yoga$pre_slpsnr1,paried = TRUE)

shapiro.test(control$diffslpsnr1)

wilcox.test(control$post_slpsnr1,control$pre_slpsnr1,paried = TRUE)

yoga$diffslpsob1<-yoga$post_slpsob1-yoga$pre_slpsob1

control$diffslpsob1<-control$post_slpsob1-control$pre_slpsob1

shapiro.test(yoga$diffslpsob1)

wilcox.test(yoga$post_slpsob1,yoga$pre_slpsob1,paried = TRUE)

shapiro.test(control$diffslpsob1)
```

```
wilcox.test(control$post_slpsob1,control$pre_slpsob1,paried = TRUE)

yoga$diffslpa2<-yoga$post_slpa2-yoga$pre_slpa2

control$diffslpa2<-control$post_slpa2-control$pre_slpa2

shapiro.test(yoga$diffslpa2)

t.test(yoga$post_slpa2,yoga$pre_slpa2,paried = TRUE)

shapiro.test(control$diffslpa2)

wilcox.test(control$post_slpa2,control$pre_slpa2,paried = TRUE)

yoga$diffslps3<-yoga$post_slps3-yoga$pre_slps3

control$diffslps3<-control$post_slps3-control$pre_slps3

shapiro.test(yoga$diffslps3)

t.test(yoga$post_slps3,yoga$pre_slps3,paried = TRUE)

shapiro.test(control$diffslps3)

wilcox.test(control$post_slps3,control$pre_slps3,paried = TRUE)

yoga$diffslp6<-yoga$post_slp6-yoga$pre_slp6

control$diffslp6<-control$post_slp6-control$pre_slp6

shapiro.test(yoga$diffslp6)

wilcox.test(yoga$post_slp6,yoga$pre_slp6,paried = TRUE)

shapiro.test(control$diffslp6)

wilcox.test(control$post_slp6,control$pre_slp6,paried = TRUE)

yoga$diffslp9<-yoga$post_slp9-yoga$pre_slp9

control$diffslp9<-control$post_slp9-control$pre_slp9
```

```
shapiro.test(yoga$diffslp9)

wilcox.test(yoga$post_slp9,yoga$pre_slp9,paried = TRUE)

shapiro.test(control$diffslp9)

wilcox.test(control$post_slp9,control$pre_slp9,paried = TRUE)

yoga$diffslpqraw<-yoga$post_slpqraw-yoga$pre_slpqraw

control$diffslpqraw<-control$post_slpqraw-control$pre_slpqraw

shapiro.test(yoga$diffslpqraw)

wilcox.test(yoga$post_slpqraw,yoga$pre_slpqraw,paried = TRUE)

shapiro.test(control$diffslpqraw)

wilcox.test(control$post_slpqraw,control$pre_slpqraw,paried = TRUE)

yoga$diffslpop1<-yoga$post_slpop1-yoga$pre_slpop1

control$diffslpop1<-control$post_slpop1-control$pre_slpop1

shapiro.test(yoga$diffslpop1)

wilcox.test(yoga$post_slpop1,yoga$pre_slpop1,paried = TRUE)

shapiro.test(control$diffslpop1)

wilcox.test(control$post_slpop1,control$pre_slpop1,paried = TRUE)
```

Between-Group Coding

```
shapiro.test(yoga$pre_slpd4)

shapiro.test(control$pre_slpd4)

leveneTest(mos$pre_slpd4,mos$group)
```

```
shapiro.test(yoga$post_slpd4)

shapiro.test(control$post_slpd4)

leveneTest(mos$post_slpd4,mos$group)

wilcox.test(mos$post_slpd4~mos$group)

shapiro.test(yoga$pre_slpsob1)

shapiro.test(control$pre_slpsob1)

leveneTest(mos$pre_slpsob1,mos$group)

wilcox.test(mos$pre_slpsob1~mos$group)

shapiro.test(yoga$post_slpsob1)

shapiro.test(control$post_slpsob1)

leveneTest(mos$post_slpsob1,mos$group)

wilcox.test(mos$post_slpsob1~mos$group)

shapiro.test(yoga$pre_slpa2)

shapiro.test(control$pre_slpa2)

leveneTest(mos$pre_slpa2,mos$group)

wilcox.test(mos$pre_slpa2~mos$group)

shapiro.test(yoga$post_slpa2)

shapiro.test(control$post_slpa2)

leveneTest(mos$post_slpa2,mos$group)

wilcox.test(mos$post_slpa2~mos$group)

shapiro.test(yoga$pre_slps3)
```

```
shapiro.test(control$pre_slps3)

leveneTest(mos$pre_slps3,mos$group)

t.test(mos$pre_slps3~mos$group,var.equal= TRUE)

shapiro.test(yoga$post_slps3)

shapiro.test(control$post_slps3)

leveneTest(mos$post_slps3,mos$group)

wilcox.test(mos$post_slps3~mos$group)

shapiro.test(yoga$pre_slp6)

shapiro.test(control$pre_slp6)

leveneTest(mos$pre_slp6,mos$group)

wilcox.test(mos$pre_slp6~mos$group)

shapiro.test(yoga$post_slp6)

shapiro.test(control$post_slp6)

leveneTest(mos$post_slp6,mos$group)

wilcox.test(mos$post_slp6~mos$group)

shapiro.test(yoga$pre_slp9)

shapiro.test(control$pre_slp9)

leveneTest(mos$pre_slp9,mos$group)

wilcox.test(mos$pre_slp9~mos$group)

shapiro.test(yoga$post_slp9)

shapiro.test(control$post_slp9)
```

```
leveneTest(mos$post_slp9,mos$group)

wilcox.test(mos$post_slp9~mos$group)

shapiro.test(yoga$pre_slpsnr1)

shapiro.test(control$pre_slpsnr1)

leveneTest(mos$pre_slpsnr1,mos$group)

wilcox.test(mos$pre_slpsnr1~mos$group)

shapiro.test(yoga$post_slpsnr1)

shapiro.test(control$post_slpsnr1)

leveneTest(mos$post_slpsnr1,mos$group)

wilcox.test(mos$post_slpsnr1~mos$group)

shapiro.test(yoga$pre_slpop1)

shapiro.test(control$pre_slpop1)

leveneTest(mos$pre_slpop1,mos$group)

wilcox.test(mos$pre_slpop1~mos$group)

shapiro.test(yoga$post_slpop1)

shapiro.test(control$post_slpop1)

leveneTest(mos$post_slpop1,mos$group)

wilcox.test(mos$post_slpop1~mos$group)

shapiro.test(yoga$pre_slpop1)

shapiro.test(control$pre_slpop1)

leveneTest(mos$pre_slpop1,mos$group)
```

```
wilcox.test(mos$pre_slpop1~mos$group)

shapiro.test(yoga$post_slpop1)

shapiro.test(control$post_slpop1)

leveneTest(mos$post_slpop1,mos$group)

wilcox.test(mos$post_slpop1~mos$group)

shapiro.test(yoga$pre_slpqraw)

shapiro.test(control$pre_slpqraw)

leveneTest(mos$pre_slpqraw,mos$group)

wilcox.test(mos$pre_slpqraw~mos$group)

shapiro.test(yoga$post_slpqraw)

shapiro.test(control$post_slpqraw)

leveneTest(mos$post_slpqraw,mos$group)

wilcox.test(mos$post_slpqraw~mos$group)
```

10.2.4 SHORT DEPRESSION AND HAPPINESS SCALE

A number of statements that people have made to describe how they feel are given below. Please read each one and tick the box which best describes how frequently you felt that way in the past seven days, including today. Some statements describe positive feelings and some describe negative feelings. You may have experienced both positive and negative feelings at different times during the past seven days.

		Never	Rarely	Some-times	Often
1	I felt dissatisfied with my life				
2	I felt happy				
3	I felt cheerless				
4	I felt pleased with the way I am				
5	I felt that life was enjoyable				
6	I felt that life was meaningless				

Note. Items 1, 3, and 6 are reverse scored.

Scoring

The scale ranges from 0 to 3, respondents show the degree to which they concur with specific statements. Items 1, 3 and 6 are reversed scored. Then do the sum of the items(Linley, McCollam, Lewis, Joseph, & Harwood, 2004).

10.2.4.1. Coding Used for Analysis (R software: 3.5.1)

Within-Group Coding:-

```
yoga<-subset(Book2,Book2$group=="yoga")

control<-subset(Book2,Book2$group=="control")

yoga$diff<-yoga$post_sum-yoga$pre_sum

control$diff<-CONTROL$post_sum-CONTROL$pre_sum

shapiro.test(yoga$diff)

wilcox.test(yoga$post_sum,yoga$pre_sum,paired = TRUE)

shapiro.test(control$diff)

wilcox.test(control$post_sum,control$pre_sum,paired = TRUE)
```

Between-Group Coding:-

```
shapiro.test(control$pre_sum)

shapiro.test(yoga$pre_sum)

leveneTest(Book2$pre_sum,Book2$group)

wilcox.test(Book2$pre_sum~Book2$group)

shapiro.test(control$post_sum)

shapiro.test(yoga$post_sum)

leveneTest(Book2$post_sum,Book2$group)

wilcox.test(Book2$post_sum~Book2$group)
```

10.2.5. SLEEP LOCUS OF CONTROL SCALE

Sleep Locus of Control Scale

1. If I take care of myself, I can avoid insomnia

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

2. Whether I have insomnia is entirely up to me

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

3. Good sleep is largely a matter of luck

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

4. No matter what I do, if I am going to have a sleepless night, I will

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

5. When I have insomnia, I know it is because of something I have done (e.g., not enough time to relax, worrying about things that I can't control, worrying about not sleeping)

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

6. People who never get insomnia are just plain lucky

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

7. People's insomnia results from their own carelessness

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

8. I am directly responsible for my sleep

1	2	3	4	5	6
Strongly disagree					**Strongly agree**

Scoring

Using a likert – type scale that ranges from 1 to 6, respondents show the degree to which they concur with specific statement relating to their control over insomnia. Items 3, 4, and 6 are reversed scored(Vincent, Sande, Read, & Giannuzzi, 2004).

Table- 5: Coding for Sleep Locus of Control scale

Category	**Items**	**scoring**
internal sleep locus	5 items	1+2+5+7+8
chance sleep locus	3 items	3+4+6

10.2.5.1. Coding Used for Analysis (R software: 3.5.1)

Within-Group Coding:-

```
yoga<-subset(slcs_final1,slcs_final1$group=="yoga")

control<-subset(slcs_final1,slcs_final1$group=="control")

yoga$diffisl<-yoga$post_isl-yoga$pre_isl

control$diffisl<-control$post_isl-control$pre_isl

shapiro.test(yoga$diffisl)

t.test(yoga$post_isl,yoga$pre_isl,paried = TRUE)

shapiro.test(control$diffisl)

t.test(control$post_isl,control$pre_isl,paried = TRUE)

yoga$diffcsl<-yoga$post_csl-yoga$pre_csl

control$diffcsl<-control$post_csl-control$pre_csl

shapiro.test(yoga$diffcsl)

wilcox.test(yoga$post_csl,yoga$pre_csl,paried = TRUE)

shapiro.test(control$diffcsl)

wilcox.test(control$post_csl,control$pre_csl,paried = TRUE)
```

Between-Group Coding:-

```
yoga<-subset(slcs,slcs$group=="yoga")

control<-subset(slcs,slcs$group=="control")

shapiro.test(yoga$pre_isl)

shapiro.test(control$pre_isl)
```

```
leveneTest(slcs$pre_isl,slcs$group)

wilcox.test(slcs$pre_isl~slcs$group)

shapiro.test(yoga$post_isl)

shapiro.test(control$post_isl)

leveneTest(slcs$post_isl,slcs$group)

wilcox.test(slcs$post_isl~slcs$group)

shapiro.test(yoga$pre_csl)

shapiro.test(control$pre_csl)

leveneTest(slcs$pre_csl,slcs$group)

wilcox.test(slcs$pre_csl~slcs$group)

shapiro.test(yoga$post_csl)

shapiro.test(control$post_csl)

leveneTest(slcs$post_csl,slcs$group)

wilcox.test(slcs$post_csl~slcs$group)
```

10.3 PICTURES OF INTERVENTION

10.4 RAW DATA

10.4.1 Blood Pressure

s.no	age	gender	group	pre_sys_bp	pre_dia_bp	post_sys_bp	post_dia_bp
1	44	female	yoga	138	100	118	80
2	67	female	yoga	140	90	120	84
3	33	female	yoga	160	118	128	80
4	50	male	yoga	140	110	122	90
5	66	male	yoga	116	84	120	80
6	55	female	yoga	140	100	130	90
7	65	female	yoga	120	80	110	70
8	73	male	yoga	160	90	132	72
9	42	male	yoga	140	92	130	80
10	44	male	yoga	140	90	130	82
11	54	female	yoga	142	98	122	84
12	34	male	yoga	170	120	144	90
13	53	male	yoga	140	100	124	86
14	69	female	yoga	160	80	132	80
15	62	female	yoga	170	102	110	70
16	44	male	yoga	146	110	130	80
17	47	male	yoga	104	80	100	70
18	61	female	yoga	130	90	110	72
19	45	male	yoga	130	80	120	70
20	37	female	yoga	160	110	140	90
21	33	male	yoga	130	84	116	80
22	48	male	yoga	130	90	120	84
23	54	male	yoga	152	100	120	90
24	43	male	yoga	144	80	110	80
25	52	male	yoga	110	90	110	80
26	52	female	yoga	140	90	120	80
27	63	female	yoga	180	110	160	90

28	68	male	yoga	132	90	124	80
29	34	male	yoga	130	88	120	80
30	56	female	yoga	134	80	125	70
1	64	female	control	140	94	130	90
2	79	male	control	110	80	120	82
3	58	male	control	138	86	126	90
4	80	female	control	154	84	132	80
5	69	female	control	180	100	158	98
6	70	male	control	150	90	124	88
7	75	male	control	124	82	124	86
8	65	female	control	120	80	130	80
9	33	male	control	130	98	130	90
10	39	male	control	180	120	160	110
11	56	male	control	112	84	120	90
12	52	female	control	140	90	148	96
13	56	male	control	150	106	142	100
14	40	male	control	120	90	130	90
15	63	male	control	130	90	130	80
16	32	male	control	120	90	120	90
17	53	male	control	120	80	134	84
18	51	female	control	118	80	130	80
19	71	female	control	120	70	120	80
20	57	male	control	142	100	160	116
21	34	male	control	150	100	140	91
22	73	male	control	120	76	120	80
23	72	female	control	170	100	150	100
24	45	male	control	120	90	130	94
25	73	male	control	152	100	130	80
26	55	female	control	140	90	130	80
27	65	female	control	114	70	130	80
28	62	male	control	126	80	122	80

29	57	male	control	108	70	115	80
30	40	male	control	130	90	120	90

10.4.2 Medical Outcome Study – Sleep Scale

PRE-DATA

s.no	age	gender	group	ssoms_q1	ssoms_q2	ssoms_q3	ssoms_q4	ssoms_q5	ssoms_q6	ssoms_q7	ssoms_q8	ssoms_q9	ssoms_q10	ssoms_q11	ssoms_q12
1	44	f	y	3	6	2	5	6	5	5	2	5	5	4	4
2	67	f	y	3	6	4	4	2	6	4	5	6	4	1	3
3	33	f	y	4	6	2	3	3	3	2	4	4	6	4	4
4	50	m	y	3	5	3	4	3	4	2	4	5	6	2	4
5	66	m	y	5	3	1	6	5	6	1	1	6	6	6	4
6	55	f	y	2	6	2	4	1	4	5	4	5	2	5	4
7	65	f	y	3	5	4	3	5	3	4	4	4	6	4	3
8	73	m	y	3	8	4	2	4	1	2	2	4	4	1	1
9	42	m	y	1	6	1	1	4	4	6	6	6	2	4	2
10	44	m	y	1	6	4	3	4	5	6	3	6	5	4	3
11	54	f	y	3	5	5	4	4	5	4	1	5	6	5	4
12	34	m	y	5	6	5	5	5	4	1	6	6	6	6	4
13	53	m	y	5	9	4	4	4	4	3	6	3	5	3	4
14	69	f	y	2	6	2	2	6	4	4	4	6	6	5	1
15	62	f	y	2	7	5	2	6	2	6	6	6	6	1	2
16	44	m	y	2	6	3	3	4	4	3	4	4	5	5	4
17	47	m	y	3	5	3	3	4	4	5	4	5	5	4	4
18	61	f	y	3	6	4	2	2	4	4	4	5	6	6	2
19	45	m	y	1	5	2	2	6	3	3	5	5	6	6	3
20	37	f	y	2	7	5	5	6	5	5	4	6	2	1	4
21	33	m	y	1	6	6	4	5	5	6	6	5	6	5	2
22	48	m	y	2	7	6	2	6	6	3	2	6	6	6	2

23	54	m	y	2	6	5	2	6	5	5	2	5	5	1	2
24	43	m	y	1	8	6	2	6	4	6	4	6	5	4	2
25	52	m	y	1	6	5	2	6	5	6	5	5	1	5	2
26	52	f	y	1	7	6	2	6	4	6	5	5	4	4	2
27	63	f	y	5	7	5	2	6	4	2	5	5	4	2	2
28	68	m	y	2	7	5	2	6	6	5	6	5	4	4	2
29	34	m	y	1	6	5	2	6	4	5	4	5	5	4	2
30	56	f	y	2	5	3	4	6	4	2	2	5	4	4	2
1	64	f	c	3	7	2	4	4	5	6	6	5	4	4	2
2	79	m	c	2	4	3	4	6	4	4	4	5	6	5	3
3	58	m	c	5	6	1	1	2	1	1	1	2	1	6	5
4	80	f	c	2	6	6	1	6	2	6	5	6	5	1	2
5	69	f	c	5	7	4	2	6	1	4	4	5	2	4	2
6	70	m	c	4	4	2	5	2	3	2	2	3	2	4	5
7	75	m	c	2	7	6	6	6	6	6	6	6	6	5	2
8	65	f	c	2	6	1	3	5	5	6	5	4	4	5	1
9	33	m	c	1	6	4	2	6	5	6	4	6	4	5	1
10	39	m	c	2	6	4	5	2	1	2	2	5	4	4	1
11	56	m	c	3	6	6	4	6	5	3	5	6	1	2	3
12	52	f	c	3	6	3	3	4	4	3	4	4	6	4	5
13	56	m	c	3	5	2	4	4	5	3	4	6	6	4	4
14	40	m	c	4	6	3	2	4	4	5	5	4	6	4	3
15	63	m	c	2	7	3	3	5	4	4	5	5	5	4	2
16	32	m	c	2	7	3	3	4	4	5	4	4	5	5	3
17	53	m	c	1	6	5	5	6	6	6	5	6	5	6	2
18	51	f	c	3	8	4	2	5	4	5	5	4	6	2	2
19	71	f	c	2	6	4	3	6	4	5	4	5	6	4	2
20	57	m	c	1	6	5	2	6	6	5	6	5	6	6	2
21	34	m	c	1	7	2	3	6	5	5	4	5	5	5	2
22	73	m	c	3	6	4	3	4	3	5	4	4	5	5	3
23	72	f	c	1	8	6	3	5	4	5	6	5	3	1	2

24	45	m	c	1	8	1	5	3	5	5	5	5	6	6	5
25	73	m	c	4	8	6	2	5	5	6	5	6	6	5	2
26	55	f	c	2	6	3	2	5	5	4	5	5	5	4	2
27	65	f	c	5	4	2	5	2	5	2	2	5	5	6	2
28	62	m	c	3	6	3	2	4	5	5	5	5	6	4	2
29	57	m	c	2	6	3	2	4	4	5	5	5	5	4	2
30	40	m	c	2	7	3	3	4	4	5	4	4	5	5	3

POST-DATA

s.no	age	gender	group	ssoms_q1	ssoms_q2	ssoms_q3	ssoms_q4	ssoms_q5	ssoms_q6	ssoms_q7	ssoms_q8	ssoms_q9	ssoms_q10	ssoms_q11	ssoms_q12
1	44	f	y	2	6	5	2	6	6	6	5	6	5	4	1
2	67	f	y	2	5.5	5	3	4	5	6	4	5	5	1	2
3	33	f	y	1	6	2	1	6	6	6	6	6	6	5	1
4	50	m	y	2	6	3	3	3	4	5	4	3	6	4	3
5	66	m	y	4	4	2	5	5	6	2	2	6	6	5	3
6	55	f	y	1	6	1	1	6	6	5	6	5	6	5	1
7	65	f	y	2	6	4	3	3	5	4	4	5	6	4	3
8	73	m	y	1	6.5	5	3	6	2	4	6	5	6	1	2
9	42	m	y	1	6	2	1	6	6	6	6	6	6	5	1
10	44	m	y	1	6	2	1	6	6	6	6	6	6	5	1
11	54	f	y	3	5	6	3	5	5	6	4	5	6	6	4
12	34	m	y	1	6	6	2	6	5	6	6	6	6	3	2
13	53	m	y	2	7	2	2	6	5	6	6	5	6	2	2
14	69	f	y	1	6.5	6	5	6	6	6	5	5	6	4	2
15	62	f	y	2	6	2	2	6	6	6	6	6	6	1	2
16	44	m	y	1	6	2	1	6	6	6	6	5	6	5	1
17	47	m	y	2	6	4	2	4	5	5	4	5	5	4	3
18	61	f	y	5	6	6	5	6	5	2	5	5	5	5	2

19	45	m	y	1	5	4	5	6	5	6	5	6	6	2
20	37	f	y	1	7	3	2	6	6	6	6	6	1	1
21	33	m	y	1	6	4	5	5	5	6	6	6	5	2
22	48	m	y	1	6	6	2	6	6	5	5	6	6	2
23	54	m	y	1	6	6	2	6	5	5	4	5	3	2
24	43	m	y	1	7	6	2	6	5	6	5	6	5	2
25	52	m	y	1	6	5	1	6	5	6	6	5	5	2
26	52	f	y	1	6	5	2	5	4	6	5	5	4	2
27	63	f	y	4	6	5	2	6	5	3	5	5	5	2
28	68	m	y	2	6	5	2	6	6	5	6	5	5	1
29	34	m	y	1	6	5	2	6	5	5	5	6	6	2
30	56	f	y	1	6	2	1	6	6	6	6	6	6	1
1	64	f	c	3	7	2	3	4	5	6	6	5	5	2
2	79	m	c	1	6	3	3	6	4	5	5	5	6	2
3	58	m	c	3	5.5	1	6	4	1	1	1	6	1	2
4	80	f	c	1	6	1	2	6	4	6	6	6	6	2
5	69	f	c	2	7	3	4	4	3	5	4	4	5	3
6	70	m	c	3	5	2	4	2	2	2	3	3	3	4
7	75	m	c	2	6	6	5	6	6	6	6	6	6	2
8	65	f	c	2	6	1	2	5	5	6	4	4	4	1
9	33	m	c	1	6	4	2	6	5	6	4	6	4	1
10	39	m	c	2	6	3	4	2	1	2	2	4	4	1
11	56	m	c	3	6	5	2	6	5	3	5	5	1	3
12	52	f	c	3	6	3	3	4	5	4	4	5	6	4
13	56	m	c	3	6	3	2	4	5	4	4	6	6	4
14	40	m	c	2	6	3	2	5	5	5	5	4	6	3
15	63	m	c	2	7	4	3	5	5	4	5	5	5	2
16	32	m	c	2	7	3	3	4	4	5	4	4	5	3
17	53	m	c	1	6	5	5	6	6	6	5	6	5	2
18	51	f	c	3	8	4	2	5	4	5	5	4	6	2
19	71	f	c	2	7	3	3	4	4	5	4	4	5	3

20	57	m	c	1	6	5	2	6	5	6	6	5	6	6	5
21	34	m	c	1	8	2	3	6	5	5	4	5	5	5	2
22	73	m	c	2	7	4	3	4	3	5	4	4	5	5	3
23	72	f	c	1	8	6	3	5	4	5	6	6	5	1	2
24	45	m	c	1	8	5	3	5	5	5	5	6	6	4	2
25	73	m	c	2	7	6	3	5	4	5	4	5	5	4	2
26	55	f	c	2	6	3	2	5	4	4	5	5	5	5	2
27	65	f	c	3	6	2	5	2	5	2	2	5	4	5	2
28	62	m	c	3	6	3	2	5	5	6	6	5	6	4	2
29	57	m	c	2	6	3	2	5	4	5	5	5	5	4	2
30	40	m	c	2	6	3	3	4	4	5	4	4	5	5	3

10.4.3 Chalder fatigue Scale

PRE-DATA

s.no	age	gender	group	cfs__q1	cfs__q2	cfs__q3	cfs__q4	cfs__q5	cfs__q6	cfs__q7	cfs__q8	cfs__q9	cfs__q10	cfs__q11
1	44	f	y	1	1	1	1	1	1	1	1	1	1	0
2	67	f	y	1	0	1	2	2	0	1	3	0	0	1
3	33	f	y	1	1	1	1	2	2	2	1	1	1	1
4	50	m	y	1	1	1	1	2	1	2	1	1	1	1
5	66	m	y	1	1	1	1	1	1	1	2	1	1	1
6	55	f	y	2	1	1	1	1	1	1	2	1	1	1
7	65	f	y	1	2	2	2	2	2	2	1	1	1	1
8	73	m	y	2	2	2	1	2	1	0	0	1	1	0
9	42	m	y	1	1	1	1	1	1	1	1	1	1	1
10	44	m	y	0	1	1	1	1	1	1	1	1	1	1
11	54	f	y	2	2	2	2	2	2	2	2	1	1	2
12	34	m	y	2	1	1	1	1	1	1	1	2	2	0

13	53	m	y	2	2	2	1	1	1	1	2	1	1	2
14	69	f	y	2	1	1	2	1	2	2	1	1	1	1
15	62	f	y	1	1	1	2	2	2	2	1	1	1	1
16	44	m	y	1	1	1	1	2	2	2	1	1	1	1
17	47	m	y	1	1	1	1	1	1	2	1	1	1	1
18	61	f	y	1	1	1	2	2	1	1	2	1	2	1
19	45	m	y	1	1	1	1	2	1	1	1	1	1	1
20	37	f	y	1	1	1	1	1	1	1	2	1	1	2
21	33	m	y	2	2	1	2	2	2	1	1	1	1	1
22	48	m	y	1	1	1	1	1	1	1	1	1	1	1
23	54	m	y	2	2	1	2	2	1	2	2	1	1	1
24	43	m	y	2	2	2	1	2	2	2	1	1	1	1
25	52	m	y	2	1	1	2	1	1	1	2	1	1	2
26	52	f	y	1	2	1	1	1	1	1	2	1	1	1
27	63	f	y	1	1	2	2	2	2	2	1	1	1	2
28	68	m	y	1	1	2	2	2	2	2	1	1	1	2
29	34	m	y	1	2	2	2	2	1	1	2	1	1	1
30	56	f	y	2	2	2	1	2	2	2	1	1	1	2
1	64	f	c	1	1	1	1	2	2	1	1	1	2	1
2	79	m	c	0	1	1	1	0	0	0	1	1	1	1
3	58	m	c	1	2	2	1	2	1	1	3	1	1	1
4	80	f	c	1	1	1	1	1	1	1	1	1	2	1
5	69	f	c	2	2	2	2	2	2	2	2	1	1	2
6	70	m	c	2	2	2	2	2	2	2	2	2	2	2
7	75	m	c	1	1	1	1	1	1	1	1	1	1	1
8	65	f	c	1	2	1	1	1	2	2	2	2	2	1
9	33	m	c	2	2	1	0	3	2	2	1	0	0	0
10	39	m	c	1	1	1	1	1	2	2	2	1	1	1
11	56	m	c	2	2	2	1	2	2	2	2	1	1	2
12	52	f	c	1	1	1	1	1	1	1	1	1	1	1
13	56	m	c	1	2	1	1	1	1	1	1	1	1	1

14	40	m	c	1	1	1	1	1	1	1	1	1	1	1
15	63	m	c	1	1	1	1	2	2	2	2	1	1	1
16	32	m	c	2	2	2	1	1	2	2	1	1	2	1
17	53	m	c	2	2	2	2	2	2	2	1	1	1	1
18	51	f	c	1	2	2	1	2	2	2	1	1	1	2
19	71	f	c	1	2	2	1	2	2	2	1	1	1	2
20	57	m	c	1	1	0	1	1	0	0	0	0	0	1
21	34	m	c	1	1	1	1	1	1	1	1	1	1	1
22	73	m	c	2	2	2	1	1	2	2	1	1	2	1
23	72	f	c	2	2	2	2	2	2	2	2	1	1	2
24	45	m	c	2	2	1	1	1	2	2	1	1	1	1
25	73	m	c	2	2	2	1	2	2	2	1	1	1	1
26	55	f	c	1	1	1	1	1	1	1	1	1	1	1
27	65	f	c	2	2	2	1	1	2	2	1	1	1	1
28	62	m	c	1	2	2	1	2	2	2	2	1	1	1
29	57	m	c	1	1	1	1	2	2	2	1	1	1	1
30	40	m	c	2	2	2	1	1	2	2	1	1	2	1

POST-DATA

s.no	age	gender	group	cfs__q1	cfs__q2	cfs__q3	cfs__q4	cfs__q5	cfs__q6	cfs__q7	cfs__q8	cfs__q9	cfs__q10	cfs__q11
1	44	f	y	1	1	1	1	1	1	1	1	1	1	0
2	67	f	y	2	1	1	1	2	1	1	2	1	1	0
3	33	f	y	0	1	0	1	0	1	0	1	0	0	1
4	50	m	y	1	1	1	1	1	1	1	1	1	1	1
5	66	m	y	1	1	1	1	1	1	1	1	1	1	1
6	55	f	y	0	1	1	1	0	0	0	1	0	0	1
7	65	f	y	1	2	1	2	2	2	2	1	1	1	1
8	73	m	y	1	1	2	1	1	1	1	1	1	1	0

9	42	m	y	0	1	0	1	0	0	0	1	0	0	1
10	44	m	y	1	1	0	1	0	0	0	1	0	0	1
11	54	f	y	1	2	2	1	1	1	1	2	1	1	1
12	34	m	y	0	0	0	0	1	1	0	0	1	1	1
13	53	m	y	1	0	0	0	0	1	1	1	1	1	0
14	69	f	y	1	1	1	2	2	2	1	2	1	1	2
15	62	f	y	0	1	1	1	0	0	0	1	0	1	1
16	44	m	y	0	1	0	1	0	0	0	1	0	0	1
17	47	m	y	1	1	1	1	1	1	1	1	1	1	1
18	61	f	y	1	1	0	1	0	1	1	2	1	1	1
19	45	m	y	1	1	1	1	1	1	1	2	1	1	1
20	37	f	y	1	1	1	1	1	1	1	2	1	1	2
21	33	m	y	1	1	1	1	2	1	1	1	1	1	1
22	48	m	y	1	1	1	1	1	1	1	1	1	1	1
23	54	m	y	1	1	1	2	1	1	1	2	1	1	1
24	43	m	y	1	1	1	1	2	2	1	1	1	1	1
25	52	m	y	1	1	1	2	1	1	1	2	1	1	1
26	52	f	y	1	2	1	1	1	1	1	1	1	1	1
27	63	f	y	1	1	1	2	2	2	1	1	1	1	1
28	68	m	y	1	1	1	2	2	2	2	1	1	1	2
29	34	m	y	1	1	1	2	2	1	1	2	1	1	1
30	56	f	y	0	1	0	1	0	0	0	1	0	0	1
1	64	f	c	1	1	1	0	2	2	2	1	1	1	0
2	79	m	c	1	1	1	1	1	1	1	2	1	1	0
3	58	m	c	1	2	2	1	1	1	1	2	1	1	1
4	80	f	c	1	1	1	1	1	1	1	1	1	1	0
5	69	f	c	2	2	2	1	1	2	1	1	1	2	1
6	70	m	c	2	2	2	2	2	2	2	2	2	2	2
7	75	m	c	1	1	1	1	1	1	1	1	1	1	1
8	65	f	c	1	2	1	1	2	2	2	2	1	2	1
9	33	m	c	2	2	1	0	3	2	2	1	0	0	0

10	39	m	c	1	1	1	1	1	2	2	2	0	1	1
11	56	m	c	2	2	2	1	2	2	2	1	1	1	2
12	52	f	c	1	1	1	1	1	1	1	1	1	1	1
13	56	m	c	1	2	1	1	2	1	1	1	1	1	1
14	40	m	c	1	1	1	1	1	1	1	1	1	1	1
15	63	m	c	1	1	1	1	1	2	1	2	1	1	2
16	32	m	c	2	2	2	1	1	2	2	1	1	2	1
17	53	m	c	2	2	2	2	2	2	2	1	1	1	1
18	51	f	c	1	2	2	1	2	2	2	1	1	1	2
19	71	f	c	2	2	2	1	1	2	2	1	1	2	1
20	57	m	c	1	0	1	1	1	1	0	1	1	1	1
21	34	m	c	1	1	1	2	1	2	1	1	1	1	1
22	73	m	c	2	2	2	1	1	2	2	1	1	2	1
23	72	f	c	1	1	2	2	2	2	2	1	1	1	2
24	45	m	c	1	1	1	1	1	1	2	1	1	1	1
25	73	m	c	2	2	2	1	1	1	1	1	1	1	1
26	55	f	c	1	1	1	1	1	1	1	1	1	1	1
27	65	f	c	2	2	2	1	1	2	2	1	1	1	1
28	62	m	c	1	1	2	2	2	2	1	2	1	1	1
29	57	m	c	1	1	1	1	2	2	1	1	1	1	1
30	40	m	c	2	2	2	1	1	2	2	1	1	2	1

10.4.4 Sleep Locus of Control Scale

PRE-DATA

s.no	age	gender	group	slcs_q1	slcs_q2	slcs_q3	slcs_q4	slcs_q5	slcs_q6	slcs_q7	slcs_q8
1	44	f	y	5	5	1	1	4	1	5	5
2	67	f	y	5	6	1	1	5	1	5	5
3	33	f	y	5	5	2	3	4	2	5	5

4	50	m	y	5	5	3	2	5	2	5	5
5	66	m	y	5	5	1	2	4	1	5	5
6	55	f	y	5	5	2	1	5	5	4	5
7	65	f	y	5	5	2	2	5	2	4	5
8	73	m	y	1	2	5	5	2	6	2	1
9	42	m	y	5	5	1	1	5	5	5	5
10	44	m	y	3	2	5	5	2	6	2	1
11	54	f	y	5	4	1	1	4	1	5	5
12	34	m	y	6	5	1	1	5	1	5	5
13	53	m	y	6	5	1	1	6	1	5	5
14	69	f	y	2	2	5	5	2	6	2	1
15	62	f	y	5	5	1	1	4	1	5	5
16	44	m	y	5	5	4	2	5	5	5	5
17	47	m	y	1	2	5	5	2	6	2	1
18	61	f	y	4	5	5	2	2	5	2	2
19	45	m	y	5	5	2	2	5	2	5	5
20	37	f	y	5	5	1	1	4	2	5	5
21	33	m	y	2	2	5	5	2	6	2	1
22	48	m	y	5	4	3	2	5	2	4	4
23	54	m	y	5	5	4	4	3	5	5	5
24	43	m	y	2	2	5	5	2	6	2	1
25	52	m	y	5	5	2	1	4	1	5	5
26	52	f	y	6	5	1	4	4	2	4	4
27	63	f	y	5	4	2	4	5	2	4	5
28	68	m	y	2	2	5	5	2	6	2	1
29	34	m	y	4	4	5	5	3	5	3	4
30	56	f	y	4	4	3	5	2	5	4	4
1	64	f	c	5	5	1	1	4	1	5	5
2	79	m	c	5	5	2	2	5	2	2	5
3	58	m	c	2	2	5	5	2	6	2	1
4	80	f	c	5	5	1	1	4	1	5	5

5	69	f	c	2	1	5	5	2	6	2	1
6	70	m	c	5	5	2	2	5	2	5	5
7	75	m	c	2	3	5	5	2	6	2	1
8	65	f	c	5	5	5	2	5	2	6	5
9	33	m	c	5	5	1	1	4	1	5	5
10	39	m	c	5	5	5	2	5	2	5	5
11	56	m	c	1	2	5	5	2	6	2	1
12	52	f	c	5	5	2	2	5	2	5	5
13	56	m	c	5	5	2	2	5	2	5	5
14	40	m	c	5	5	2	2	5	2	5	5
15	63	m	c	5	5	4	5	4	4	5	5
16	32	m	c	4	5	5	4	6	5	3	3
17	53	m	c	5	5	2	2	5	5	4	5
18	51	f	c	2	1	5	5	2	6	2	1
19	71	f	c	5	5	3	3	5	3	5	5
20	57	m	c	5	5	1	1	4	1	5	5
21	34	m	c	5	4	3	5	5	5	5	5
22	73	m	c	4	5	5	4	6	5	3	3
23	72	f	c	4	5	2	4	5	2	5	4
24	45	m	c	2	3	5	5	2	6	2	1
25	73	m	c	5	4	3	5	5	3	4	5
26	55	f	c	5	4	4	4	5	3	5	5
27	65	f	c	5	5	4	5	6	5	5	5
28	62	m	c	4	5	5	4	5	4	5	5
29	57	m	c	2	3	5	5	2	6	2	1
30	40	m	c	4	5	5	4	6	5	3	3

POST-DATA

s.no	age	gender	group	slcs_q1	slcs_q2	slcs_q3	slcs_q4	slcs_q5	slcs_q6	slcs_q7	slcs_q8

1	44	f	y	6	6	1	1	5	2	6	6
2	67	f	y	6	6	1	1	5	2	6	6
3	33	f	y	6	6	1	2	5	1	5	6
4	50	m	y	5	5	2	2	5	1	5	6
5	66	m	y	6	6	1	1	6	2	6	6
6	55	f	y	6	6	1	1	5	3	6	6
7	65	f	y	5	5	1	2	5	2	5	6
8	73	m	y	4	4	4	4	2	5	3	4
9	42	m	y	5	5	1	1	6	3	6	6
10	44	m	y	4	4	4	4	2	5	3	4
11	54	f	y	6	5	1	1	5	2	6	6
12	34	m	y	5	5	4	3	4	4	5	5
13	53	m	y	6	6	1	1	6	2	6	6
14	69	f	y	4	4	4	4	2	5	3	4
15	62	f	y	6	6	1	1	5	2	6	6
16	44	m	y	5	5	1	1	6	3	6	6
17	47	m	y	4	4	4	4	2	5	3	4
18	61	f	y	5	5	5	2	5	5	5	5
19	45	m	y	5	5	2	2	5	2	5	5
20	37	f	y	6	6	1	1	5	1	6	6
21	33	m	y	4	4	4	4	2	5	3	4
22	48	m	y	5	5	3	3	5	2	5	5
23	54	m	y	5	5	5	4	2	5	5	6
24	43	m	y	4	4	4	4	2	5	3	4
25	52	m	y	6	6	1	1	5	2	6	6
26	52	f	y	6	5	3	4	4	3	5	5
27	63	f	y	6	5	1	4	5	3	5	6
28	68	m	y	4	4	4	4	2	5	3	4
29	34	m	y	5	6	3	4	5	3	5	6
30	56	f	y	5	5	1	1	6	3	6	6
1	64	f	c	5	4	1	2	4	2	4	4

2	79	m	c	5	5	2	2	5	3	5	5
3	58	m	c	2	3	4	6	1	6	1	3
4	80	f	c	5	4	1	2	4	2	4	4
5	69	f	c	2	3	4	6	1	6	1	3
6	70	m	c	5	5	2	3	6	1	5	6
7	75	m	c	2	3	4	6	1	6	1	3
8	65	f	c	5	5	5	2	6	2	6	5
9	33	m	c	5	4	1	2	4	2	4	4
10	39	m	c	5	5	4	2	6	2	5	6
11	56	m	c	2	3	4	6	1	6	1	3
12	52	f	c	5	5	2	3	4	3	5	5
13	56	m	c	5	5	3	4	5	3	5	5
14	40	m	c	5	5	2	2	5	2	5	6
15	63	m	c	5	5	5	4	4	4	5	5
16	32	m	c	4	5	5	4	6	5	3	3
17	53	m	c	5	5	3	2	5	5	4	4
18	51	f	c	2	3	4	6	1	6	1	3
19	71	f	c	4	5	5	4	6	5	3	3
20	57	m	c	6	6	1	1	5	2	6	6
21	34	m	c	5	4	3	5	5	3	5	5
22	73	m	c	4	5	5	4	6	5	3	3
23	72	f	c	4	5	2	4	5	3	5	5
24	45	m	c	2	3	4	6	1	6	1	3
25	73	m	c	5	5	2	4	4	2	4	2
26	55	f	c	5	4	3	4	5	3	5	6
27	65	f	c	5	5	4	4	5	4	4	5
28	62	m	c	5	5	4	5	5	4	6	6
29	57	m	c	2	3	4	6	1	6	1	3
30	40	m	c	4	5	5	4	6	5	3	3

10.4.5 Short Depression & Happiness Scale

PRE-DATA

s.no	age	gender	group	sdhs_q1	sdhs_q2	sdhs_q3	sdhs_q4	sdhs_q5	sdhs_q6
1	44	f	y	2	2	1	2	2	1
2	67	f	y	2	3	2	3	3	2
3	33	f	y	0	3	0	3	3	0
4	50	m	y	0	3	1	3	3	1
5	66	m	y	0	3	0	3	3	0
6	55	f	y	2	3	2	3	3	1
7	65	f	y	0	3	2	3	3	0
8	73	m	y	2	3	0	3	3	0
9	42	m	y	1	3	1	3	3	0
10	44	m	y	0	3	2	3	3	1
11	54	f	y	2	2	2	2	2	2
12	34	m	y	0	3	2	2	3	0
13	53	m	y	0	3	1	3	3	0
14	69	f	y	2	3	2	3	3	0
15	62	f	y	1	3	2	3	3	0
16	44	m	y	0	3	1	3	3	0
17	47	m	y	0	3	1	3	3	1
18	61	f	y	1	3	2	3	3	0
19	45	m	y	2	2	3	2	2	1
20	37	f	y	2	3	2	3	3	0
21	33	m	y	3	3	2	3	3	3
22	48	m	y	0	3	1	3	3	0
23	54	m	y	1	2	2	3	2	0
24	43	m	y	0	2	2	2	3	0
25	52	m	y	1	3	2	2	3	0
26	52	f	y	2	3	1	3	3	1
27	63	f	y	0	3	2	2	3	0

28	68	m	y	0	3	2	3	3	0
29	34	m	y	0	3	2	3	3	2
30	56	f	y	2	3	2	2	3	2
1	64	f	c	0	3	3	3	3	0
2	79	m	c	0	2	0	2	2	0
3	58	m	c	0	3	0	3	3	0
4	80	f	c	2	3	2	2	3	0
5	69	f	c	3	1	3	2	2	3
6	70	m	c	2	2	1	3	3	1
7	75	m	c	0	3	1	3	3	0
8	65	f	c	2	3	2	3	1	0
9	33	m	c	2	3	2	3	3	0
10	39	m	c	0	3	0	2	2	0
11	56	m	c	2	2	2	3	2	1
12	52	f	c	0	3	0	3	3	0
13	56	m	c	0	3	0	3	3	0
14	40	m	c	0	3	0	3	3	0
15	63	m	c	1	3	2	3	3	0
16	32	m	c	1	3	2	3	2	1
17	53	m	c	0	3	1	3	3	0
18	51	f	c	2	2	2	2	3	0
19	71	f	c	2	2	2	2	2	0
20	57	m	c	0	3	1	3	3	0
21	34	m	c	0	3	1	3	3	0
22	73	m	c	0	3	2	3	2	1
23	72	f	c	2	2	2	2	3	0
24	45	m	c	1	3	2	2	2	0
25	73	m	c	1	3	2	2	2	0
26	55	f	c	0	3	2	3	3	0
27	65	f	c	2	2	2	3	3	0
28	62	m	c	2	3	2	3	3	0

29	57	m	c	0	3	2	3	3	0
30	40	m	c	1	3	2	3	2	1

POST-DATA

s.no	age	gender	group	sdhs_q1	sdhs_q2	sdhs_q3	sdhs_q4	sdhs_q5	sdhs_q6
1	44	f	y	1	3	0	2	3	0
2	67	f	y	2	3	2	2	3	2
3	33	f	y	0	3	0	3	3	0
4	50	m	y	0	3	0	3	3	0
5	66	m	y	0	3	0	3	3	0
6	55	f	y	1	3	2	3	3	0
7	65	f	y	0	3	2	3	3	0
8	73	m	y	1	3	0	3	3	0
9	42	m	y	0	3	1	3	3	0
10	44	m	y	0	3	1	3	3	0
11	54	f	y	1	2	1	2	2	0
12	34	m	y	0	3	2	3	3	0
13	53	m	y	0	3	1	3	3	0
14	69	f	y	1	2	2	3	2	0
15	62	f	y	0	3	1	3	3	0
16	44	m	y	0	3	1	3	3	0
17	47	m	y	0	3	0	3	3	0
18	61	f	y	1	2	2	3	3	0
19	45	m	y	1	2	2	2	2	1
20	37	f	y	0	1	2	2	2	0
21	33	m	y	3	3	2	3	3	2
22	48	m	y	0	3	2	3	3	0
23	54	m	y	2	2	2	3	2	0
24	43	m	y	0	2	2	2	2	0

25	52	m	y	1	2	2	3	3	0
26	52	f	y	2	3	1	3	3	1
27	63	f	y	0	3	2	3	3	0
28	68	m	y	0	3	2	3	3	0
29	34	m	y	0	3	2	3	3	0
30	56	f	y	0	3	1	3	3	0
1	64	f	c	0	3	2	3	3	0
2	79	m	c	0	2	0	3	3	0
3	58	m	c	0	3	0	3	3	0
4	80	f	c	3	3	0	3	3	0
5	69	f	c	1	3	2	3	2	0
6	70	m	c	2	3	1	3	3	1
7	75	m	c	0	3	1	3	3	0
8	65	f	c	1	3	2	3	2	0
9	33	m	c	2	3	2	3	3	0
10	39	m	c	0	3	0	3	3	0
11	56	m	c	1	3	2	3	2	1
12	52	f	c	0	3	0	3	3	0
13	56	m	c	0	3	1	3	3	0
14	40	m	c	0	3	0	3	3	0
15	63	m	c	0	3	2	3	3	0
16	32	m	c	1	3	2	3	2	1
17	53	m	c	0	3	1	3	3	0
18	51	f	c	2	2	2	2	3	0
19	71	f	c	1	3	2	3	2	1
20	57	m	c	0	1	0	3	3	0
21	34	m	c	0	3	1	3	3	0
22	73	m	c	0	3	2	3	2	1
23	72	f	c	2	2	2	2	3	1
24	45	m	c	1	3	2	2	2	1
25	73	m	c	1	2	2	2	2	1

26	55	f	c	0	3	2	3	3	0
27	65	f	c	2	2	2	2	2	1
28	62	m	c	0	3	2	3	3	0
29	57	m	c	0	3	2	3	3	0
30	40	m	c	1	3	2	3	2	1