

CHAPTER-1



INTRODUCTION

1. INTRODUCTION

1.1 SUBTLE ENERGY SYSTEM

In the context of health, all traditional systems of medicine give importance to subtle energy, as a primal force of nature. It encompasses the entire biological system and is responsible for maintaining all vital functions in the body (Bharathi, 2002; Nagendra, 1999a). In Yoga, the vital energy (*prāṇa*) is said to flow through energy channels called *nāḍīs* (Satyananda, 1972), which form the human vital energy system. In Traditional Chinese Medicine (TCM) the parallel concept to *prāṇa* is called Qi (Hankey, 2006; Patwardhan, Warude, Pushpangadan, & Bhatt, 2005), a form of energy flowing along subtle energy pathways, or ‘meridians’. Each meridian has many subtle energy points on the surface of the skin called acupuncture points that reflect aspects of meridian function (Longhurst, 2010).

1.2 ENERGY REGULATION

Regulation is the core concept in modern medicine and traditional systems of medicine in order to maintain health (Hankey, 2015). Health is maintained by proper regulation of *prāṇa* or Qi (Hankey, 2006; Nagendra, 1999b; Patwardhan et al., 2005). The regulation of *prāṇa* or Qi can be influenced by three aspects of the human system, physical, emotional and spiritual (Motoyama, 1988). In yoga, imbalance at physical, mental and emotional levels disturbs the flow of *prāṇa* in the *nāḍīs*. If the flow of *prāṇa* in the *nāḍīs* is above or below its optimal range, it leads to different symptoms of diseases (Nagendra, 1999b). Similarly, in TCM, blockage of the Qi flow i.e. imbalance at physical, mental and emotional level causes illness (Veith, 2002). So, the power to regulate *prāṇa* is very necessary and one of the main concepts in all yoga practices. Yoga techniques help to enliven the vital energy, reduce imbalances at these levels and restore the energy system properly (Meenakshy, Hankey, & Nagendra, 2014a; Nagilla, Hankey, & Nagendra, 2013; Sharma, Hankey, Nagilla, Meenakshy, & Nagendra, 2014). In *Yoga* and TCM, different techniques have the ability to remove

blockages and restore the free flow of *prāṇa* /Qi (Gach & Marco, 1998; L. Liu, 2009; Nagendra, 2001, 2004). At the physiological level the available methods to restore energy function properly are Yogic practices (*āsanas*, *prāṇāyāma*, meditation and *kriyās* etc) (Nagendra, 2004).

2.3 YOGA

Yoga is an ancient science that includes practices such as physical postures (*āsanas*), cleansing techniques (*Kriyās*) breathing exercise (*prāṇāyāma*) and meditation (*dhyāna*) as main techniques to control body and mind (Brennan, 1988). Asanas are an aspect of yoga that influenced the individual in totality (Ross & Thomas, 2010). A study regarding yogasana practice has found to increase the level of GABA and so induce a relaxed state body and mind (Streeter et al., 2010). In recent studies, Yogasana practice has also been found to develop brain-derived neurotrophic factor (BDNF) and oxytocin, for improved cognition (Jayaram et al., 2013; Naveen et al., 2013). Cortisol level, the biological indicator of stress (Streeter, Gerbarg, Saper, Ciraulo, & Brown, 2012) decreases due to practice of yogasana (Felver, Butzer, Olson, Smith, & Khalsa, 2015). It is reported that long term practitioners of Transcendental Meditation (TM) have lower cortisol level than short term practitioners (Infante et al., 1997). Even a single asana, Padmasana reduces EEG frequencies, shifting from beta to alpha or theta suggesting a state of mindful alertness (Cole, 1989). Yoga practices including OM chanting are found effective to reduce limbic system activity and regulate emotion (Kalyani et al., 2011). In this way, *Yogāsanas* and other components of yoga optimize central regulatory systems that includes hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system (SNS) (Streeter et al., 2012).

1.4 TRADITIONAL CHINESE MEDICINE

Traditional Chinese Medicine (TCM) has been practiced in China for many millennia and is a popular holistic medical system (Veith, 2002). It emphasizes finding energy balance in the

body. For this purpose, techniques such as acupuncture, acupressure, moxibustion and Qigong are practiced to stimulate the meridian system to remove blockages and help the Qi energy flow properly (Veith, 2002). These classical therapies have given positive results in conditions like rheumatism (M. S. Lee, Shin, & Ernst, 2008), gout (Pang et al., 2000) and neuralgic conditions (Johansson et al., 2009), abdominal cramps and colic both mental as well as physical (Landgren, Kvorning, & Hallström, 2010). TCM recognizes that mental disorders are the result of poor or inactive energy, or an imbalance between yin and yang meridians (Veith, 2002). Any disturbance in an organ system may be identified by imbalances in the meridian related to the organ (D'Amoto, 2009; Sharma, Meenakshy, Hankey, & Nagendra, 2014)

1.5 MERIDIAN ACTIVITY MEASUREMENT

Traditional Chinese doctors assess Qi energy levels in meridians by taking the pulse at acupoints with the finger tips in both healthy and diseased population. Modern science on the other hand has developed electronic machines to measure Qi energy. Electrodermal screening at acupuncture points (APs) to measure Qi energy has been utilized for many years. Nakatani (1953), Niboyet (1958) and Voll (1975) developed this technique after discovery of electrical properties of APs. From their work APs are known to have lower electrical resistance than surrounding areas of skin. When meridians are blocked or impaired, resistance of APs changes accordingly (Nakatani, 1953a; Niboyet, 1958; Voll, 1975a). Physiological function as well as mental activity affects electrical conductivity at APs (Voll, 1975a) which may be used to measure Qi energy flow. More recent reviews have summarized developments in the field (Tiller, 1989; Tsuei, 1995). The technique has more recently been used to measure the energy flows in particular pathologies (C. Te Lee et al., 2010; She et al., 2014; Turner, Linden, & Marshall, 2013), and changes induced by application of Yoga therapy

(Meenakshy, Hankey, et al., 2014a; Nagilla et al., 2013; Sharma, Hankey, Nagilla, et al., 2014).

Presently many commercial machines are available to measure electrodermal conductance at acupuncture points. Acugraph (from Meridia Technologies Inc, 2008 in Meridian, Idaho, USA), is used at S-VYASA to understand mechanisms and effects of yogic practices regarding subtle energy flow (Meenakshy, Hankey, et al., 2014a; Nagilla et al., 2013; Sharma, Hankey, Nagilla, et al., 2014).

1.6 MEASUREMENT TOOLS

Electrodermal Screening with Acugraph

Acugraph4 is a digital meridian measurement system with the following components: a zero volt 'ground bar' held by the participant; a flat ended circular metal probe with which the operator contacts selected acupoints; the last named is connected by a connector cable to a monitoring computer containing required software. The data scale is 0–200 conductance (1/Ohm) units. Ultra-low (0-40 μ A) operating current is used so that sensitivity thresholds of participants are not exceeded when measurements are made (Mist et al., 2012). Operators obtain up to 10 readings per minute. When a complete set of readings (a total of 24) have been obtained, they are projected onscreen by instrument software as bar graphs containing a green middle line representing the participant's average conductance; high (red) and low (blue) lines above and below the average line represent desired limits of deviations from the mean. Other variables derived from these 24 basic measurements are also made available on the computer screen. Acugraph should not be used in subjects with implanted electronic devices such as cardiac pacemakers or defibrillators, nor for those with skin rashes, lesions, or wounds at acupoints (Meridia Technologies Inc, 2008)

1.7 PREVIOUS WORK

Several previous studies have used various forms of the Acugraph instrument to measure effects of Yoga programs. The first assessment reported in a graduate thesis (Meenakshy, 2009) concluded that high error levels make Acugraph best suited for group measurements. A second study concluded that regular practice of Yoga programs for a period of 21 days systematically decreases imbalances in subtle energy flow, whilst improving quality of regulation of acupuncture meridian energies (Nagilla et al., 2013). Another study on a group of long term yoga practitioners showed better and more effective energy regulation than that of beginners (Sharma, Hankey, Nagilla, et al., 2014). A survey report concluded that children with HIV exhibit worse regulation of acupoint energies compared to healthy children (Meenakshy, Sharma, Hankey, & Nagendra, 2013). A study of healthy persons observed that working executives have reduced meridian energy flows, probably due to mental pressure or stress; however, a 5 day SMET program (Stress Management of Excessive Tension, a tailored Yoga program), was found to improve subtle energy (Meenakshy, Hankey, & Nagendra, 2014b). A study of persons attending Yoga-related ceremonies adopting a meditative yogic posture, observed restored flow of energy in lower meridians, perhaps due to mental calm (Meenakshy, Sushrutha, Hankey, & Nagendra, 2014). And a survey of a group of Type 2 Diabetes (T2DM) patients found low spleen meridian energy, probably due to improper functioning of the pancreas (Sharma, Meenakshy, et al., 2014).

These studies concluded that subtle energy flow is regulated in all the body's organ systems, and that Acugraph energy measurement can help understand mechanisms of yoga practices, and regulatory function regarding various pathological conditions.

This study uses two approaches; studies of healthy subjects, and studies of unhealthy ones.

- I. Healthy: Using the Acugraph tool we can begin to understand the effects of Padmasana, a sitting Yoga posture, on the subtle energy system of the body, and thus its importance.

II. Unhealthy: a) This approach helps us to understand poor regulation of prana/Qi energy in disease states, and how that may cause mental disturbance.

b) It also helps to measure organ dysfunction through respective meridians.

Yoga practices may be useful to remove the above causes that can be measured by this tool.

CHAPTER-2



REVIEW OF LITERARY RESEARCH ON SUBTLE ENERGY SYSTEM

2. REVIEW OF LITERARY RESEARCH ON SUBTLE ENERGY SYSTEM

The first part of this thesis presents a theoretical framework for understanding the equivalence between *nāḍīs* in Indian traditional knowledge and meridians in Traditional Chinese Medicine (TCM). Related concepts such as *chakras* and *prāṇa* are also presented and similarities between the two ancient traditions are brought out.

2.1 REVIEW OF WORK IN THE FIELD OF SUBTLE ENERGY MODELS ON *PRĀṆA*, *NĀḌĪS*, *CHAKRA* AND *QI*, *MERIDIAN*

In TCM subtle energy is termed Qi, which is its core concept, and said to be the basic substance that constitutes the universe. All objects in this universe are born from transformations of Qi. The structure of the universe is explained on the basis of Yin and Yang. Qi energy is described in very similar ways to *prāṇa* in the Vedic sciences. The concept has been covered in detail in an S-VYASA thesis titled “Study on electrodermal assessment of acupuncture point stimulation to increase meridian energy flow”. This study attempted to correlate Yin and Yang concepts in TCM with specific *nāḍīs* in Vedic science (Rawal, 2015).

The subtle energy model has been discussed in a Master’s thesis, “Effect of integrated yoga lifestyle module on Acugraph measures”. The work gave details about *prāṇa* from various ancient Vedic sciences (*Vedās*, *Upaniṣad*, and *Bhagavad Gītā*) and Qi from ancient Chinese sources. The thesis again made an attempt to correlate *prāṇa* and Qi, *Iḍā* and *Piṅgalā nāḍīs* with Yin and Yang. The author focused on the presence of Qi energy that is responsible for health (Nagilla, 2012).

A more detailed study of the subtle body according to Indian and Chinese concepts precisely correlated the Indian and Chinese concepts of *prāṇa* and Qi; *nāḍīs* and meridians; *chakras* and Dantians; *marma* and acupoints. Additional information was give about the definition, types, number and locations of *marmas*. The importance of *marma* therapy on facilitating the

flow of *prāṇa* was also explained, giving a list of asanas by name correlating each *yogāsana* according to its effects with *marma* points (Sharma, 2012).

Another thesis, “Electro-dermal study of acupuncture meridian endpoint energies in health and various conditions including type 2 diabetes mellitus”, contained detailed explanations of *prāṇa* from the *Upaniṣads* and *Yoga* texts, and discussed subtle energy concepts according to Indian systems of medicine (Meenakshy, 2015).

Another thesis “Efficacy of integrated Yoga practices on healthy people using Electro Photonic Imaging Technique” attempted to bring out the concept of the subtle energy according to Indian ideas. It explained the importance of *prāṇa* to sustain life processes, and also mentioned that a sensitive person can be aware of changes in *prāṇa* regulation during various kinds of practice (Kushwah, 2016).

2.2 SUMMARY OF EARLIER WORKS ON SUBTLE ENERGY MODEL

Most previous studies have focused on the subtle energy model proposed by Vedic sciences. They have all attempted to base their subtle energy models on *prāṇa*, *nāḍīs*, and *chakra*. Though the above mentioned studies are good attempts, their angles are based mostly on *Vaśiṣṭasamhitā* and *Suśruta samhitā*. Hence we attempt to correlate subtle energy system taking information from other major and minor *upaniṣads* and various *yoga* texts. Furthermore, we attempt to explain how *nāḍīs* and meridians can be stimulated and regulated by practicing *Yogāsanas*.

2.3 AIM OF THE STUDY

- To understand the subtle energy system of human body using an energy model based on *Yoga* and Traditional Chinese Medicine (TCM).

2.4 OBJECTIVES OF THE STUDY

- To understand the subtle energy system according to both *Yoga* and TCM
- To correlate Chakras with Dantians
- To correlate *nāḍīs* with Meridians
- To correlate *prāṇa* with Qi
- To understand how Yoga postures (*Asāna*) influence the meridian system

2.5 MATERIALS AND METHODS

2.5 A. Source Texts: Vedic, Classical Yoga, TCM, and Modern Texts including:

Upaniṣad(उपनिषद्)

- *Kaṭhōpaniṣat* (कठोपनिषत्)
- *Praśnopaniṣat* (प्रश्नोपनिषत्)
- *Bṛhadāraṇyakōpaniṣat* (बृहदारण्यकोपनिषत्)
- *Chāndogyōpaniṣat* (छान्दोग्योपनिषत्)
- *Jābāladarśana upaniṣat* (जाबालदर्शन उपनिषत्)
- *Śāṅḍilyōpaniṣat* (शाण्डिल्योपनिषत्)
- *Yogācūḍāmaṇi upaniṣat* (योगाचूडामणि उपनिषत्)
- *Yogaśikhā upaniṣat* (योगशिखा उपनिषत्)
- *Haṭhapradīpikā* (हठप्रदीपिका)
- *Śivasvarodaya* (शिवस्वरोदय)
- *Śivasamhitā* (शिवसंहिता)
- *Vaśiṣṭasamhitā* (वशिष्टसंहिता)
- *Nāḍīvijñāna* (नाडीविज्ञान)

Chinese system of medicine

- Essentials of Chinese Medicine
- *AcuYoga*
- Theories of *Chakras*

B – METHODS

The above traditional Indian texts along with Chinese Medicine texts were studied to obtain a

fuller understanding of the human body's subtle energy system. Traditional Indian sources were used to compile authentic information on the concepts of *chakra*, *nāḍī*, and *prāṇa*. The information was first systematically compiled and then sorted into the structure given in the sections that follow. The original Ślokas in *samskrta*, transliteration in standard international codes, and meaning are presented first. Then special features of each Śloka are explained based on relevant commentaries. Chinese Medicine texts were used to gather authentic information on the concepts of Dantian, Meridian and Qi.

2.6 INCLUSION CRITERIA

The search led to a very large number of references from many texts; we therefore introduced inclusion criteria for verses linking *chakra*, *nāḍīs*, *prāṇa* and *marmas* specially referring to *Upaniṣads* and *Yoga texts*; similarly only information linking Dantian, meridian and Qi were taken from Chinese references. We also considered books that attempt to correlate Indian and Chinese subtle energy systems.

2.7 EXCLUSION CRITERIA

Verses and references excluded were those that merely talk about the subtle energy system, but which do not explain their detailed properties relevant to the context of the present work.

2.8 THE SUBTLE SYSTEM ACCORDING TO YOGA

2.8.1 CHAKRA

Description of *Chakras* can be found in various *Upaniṣats* and *Yoga texts*. *Chakras* are subtle energy centers. Pranic energy accumulates in *chakras*, which are said to store and distribute it to all parts of the body. They are located along the spinal cord. In the subtle human body, there are seven major *chakras*.

इडापिंगलयोर्मध्ये सुषुम्ना या भेवेत्खलु।

षट् स्थानेषु च षट् शक्तिं षट् पद्मं योगिनो विदुः ॥ शि सं २।२७

iḍāpiṅgalayormadhye suṣumnā yā bhevetkhalu |

ṣaṭ sthāneṣu ca ṣaṭ śaktim ṣaṭ padmaṃ yogino viduḥ | | śi saṃ 2 | 27

The *Suṣumnā* is in between *Idā* and *Pingalā* and has six energy places known to yogis as six *chakrās*.

गुदात्तु द्वयं गुलादूर्ध्वं मेढ्रात्तु द्वयंगुलादधः।

चतुरंगुलविस्तारमाधारं वर्तते समम्॥ शि सं- २।२१

gudāttu dvayaṃ gulādūrdhvaṃ meḍhrāttu dvayaṅgulādadhaḥ |
caturāṅgulavistāramādhāraṃ vartate samam | | śi saṃ 2 | 21

Two finger widths above the rectum and two finger widths below the genital organ, there is space about four fingers area known as *Ādhāraṃ* or *Mulādhāra Chakrā*.

द्वितीयञ्च सरोजञ्च लिंगमूले व्यवस्थितम्। शि सं - ५।१०२

dvitīyañca sarojañca liṅgamūle vyavasthitam | śi saṃ- 5 | 102

The second, *Padmā* or *Svādisthan chakra* is situated at the root of reproductive organ.

तृतीय पङ्कजं नाभौ मणिपुरकसंज्ञकम्। शि सं - ५।१०८

tṛtīya paṅkajam nābhau maṇipurakasamjñakam | śi saṃ- 5 | 108

The third, *Padmā* or *Maṇipura Chakra* is located at naval region.

हृदयेऽनाहतं नाम चतुर्थ पङ्कजं भवेत्। शि सं - ५।११३

hṛdaye'nāhataṃ nāma caturtha paṅkajam bhaveta | śi saṃ- 5 | 113

In the heart, there is the fourth *Padmā* or *Anāhata Chakra*.

कण्ठस्थानस्थितं पद्मं विशुद्ध नाम पञ्चमम्। शि सं - ५।१२१

kaṅṭhasthānasthitam padmaṃ viśuddha nāma pañcamam | śi saṃ- 5 | 121

At the throat, the fifth *Padmā* or *viśuddha Chakra* is situated.

आज्ञापद्मं भ्रुवोर्मध्ये हंक्षोपेतं द्विपत्रकम्। शि सं - ५।१२७

ājñāpadmaṃ bhruvormadhye haṅkṣopetaṃ dvipatrakama | śi saṃ- 5 | 127

Between the eyebrows, the two petal *chakra* is *Ājñāpadmaṃ* or *Ājñā Chakra*.

ब्रह्मरन्ध्रे हि यत् पद्मं सहस्रारं व्यवस्थितम्। शि सं - ५।१३५

brahmarandhre hi yata padmaṁ sahasrāraṁ vyavasthitam | si saṁ- 5 | 135

At the crown of the head, is the *sahasrā Padmā* or Thousand Petalled Lotus *chakra*.

There are seven important *chakras*; *Mulādhāra*, *Svādisthan*, *Maṇipura*, *Anāhata*, *Viśuddha*, *Ājñā* and *Sahasrā*. *Shiva samhita* gives explanations regarding seven *chakras*. It is also portrays that there are more *chakras* in our subtle body. *Chakras* are the source from where *nāḍīs* originate. *Chakras* are the store house of energy from where *nāḍīs* carry *prāṇa*. *Chakras* and *nāḍīs* are entirely subtle in nature. The word *nāḍī* comes from *nāḍā* meaning to flow. *Nāḍīs* are subtle network channels through which *prāṇa* flows. The entire network of *nāḍīs* is so vast that yoga texts differ on their exact number.

2.8.2 NUMBER OF NĀDĪS

The *Upaniṣats* and *Yoga* texts describe innumerable numbers of *nāḍīs* spread all over the body. The number of *nāḍīs* give in different yoga texts is different.

Number of *nāḍī* according to *Upaniṣat*:

नाड्यो द्वासप्ततिः सहस्राणि। बृह उ-२।१।१९

nāḍyo dvāsaptatiḥ sahasrāṇi | bṛha u-2 | 1 | 19

There are 72,000 *nāḍīs*.

शतं चैका च हृदयस्य नाड्यः। छा उ-८।६।६

śataṁ caikā ca hṛdayasya nāḍyaḥ | chā u-8 | 6 | 6

There are one hundred and one *nāḍīs* connected with the heart.

शतं चैका च हृदयस्य नाड्यः। क उ- ६।१६

śataṁ caikā ca hṛdayasya nāḍyaḥ | ka u 6 | 16

There are 100+1 *nāḍīs*.

अत्रैतदेकशतं नाडीनां तासां शतं शतमेकैकस्यां

द्वासप्ततिर्द्वासप्तिः प्रतिशाखानाडी सहस्राणि भवन्ति। प्र उ-३।६

*atraitadekaśataṁ nāḍīnāṁ tāsāṁ śataṁ śatamekaikasyāṁ
dvāsaptatirdvāsaptiḥ pratiśākhānāḍī sahasrāṇi bhavanti | pra u-3 | 6*

In the heart there are one hundred and one *nāḍīs*. Each of them has a hundred branch, each of branch having again seventy two thousand sub branch.

द्विसप्ततिसहस्राणि तसां मुखाश्चतुर्दश ॥ जा उ- २।६।

dvīsaptatisahasrāṇi tasāṃ mukhāścaturdaśa ॥ jā u- 2।6।

Among 72,000 *nāḍīs*, 14 are principle ones.

तन्मूला बहवो नाड्यः स्थूलसूक्ष्माश्च नाडिकाः।

द्विसप्ततिसहस्राणि स्थूलाः सूक्ष्माश्च नाड्यः।

संखातुं नैव शक्यन्ते स्थूलमूलाः पृथग्विधाः।

यथाश्वत्थदले सूक्ष्माः स्थूलाश्च विततास्तथा। त्रि ब्र उ-१।४।११

tanmūlā bahavo nāḍyaḥ sthūlasūkṣmāśca nāḍikāḥ।

dvīsaptatisahasrāṇi sthūlāḥ sūkṣmāśca nāḍyaḥ।

saṃkhātum naiva śakyante sthūlamūlāḥ pṛthagvidhāḥ।

yathāśvatthadale sūkṣmāḥ sthūlāśca vitatāstathā। tri bra u-1।4।11

All the *nāḍīs* are both gross and subtle, and originate from energy centers called *Chakra*,. It is very difficult to differentiate each of them as with the leaves of peepul tree.

According to Yoga Texts

द्विसप्ततिसहस्राणि नाडीद्वाराणि पञ्जरे। ह यो प्र-४।१८

dvīsaptatisahasrāṇi nāḍīdvāraṇi pañjare। ha yo pra-4।18

In a bunch there are 72,000 *nāḍīs*.

नाभिस्थानात्स्कन्धोर्ध्वमङ्कुराइव निर्गताः

द्विसप्ततिसहस्राणि देहमध्ये व्यवस्थिताः शि स्व- ३२

nābhisthānātskandhordhvamaṅkurā iva nirgatāḥ

dvīsaptatisahasrāṇi dehamadhye vyavasthitāḥ śi sva- 32

Like a sprout, *Nāḍīs* originating from the navel region and extending up to the shoulders are

72,000 in number, and then spread throughout the body

तासां मध्ये दश श्रेष्ठा दशानां तिस्र उत्तमाः।

इडा च पिङ्गला चैव सुषुम्ना च तृतीयका। शि स्व- ३६

tāsāṃ madhye daśa śreṣṭhā daśānāṃ tisra uttamāḥ।

iḍā ca piṅgalā caiva suṣumnā ca tṛtīyakā। śi sva- 36

Among the 72,000 *nāḍīs* are 10 main *nāḍīs*. Among these 10 *nāḍīs*, the 3 most important are called *iḍā*, *piṅgalā* and *suṣumnā*.

सार्धलक्षत्रयं नाडयः सन्ति देहान्तरे नृणाम्। शि स-२।१३
sārdhalakṣatrayaṁ nāḍayaḥ santi dehāntare nṛṇām | śi sa-2 | 13

The human body has 350,000 *nāḍīs*.

देहे द्वात्रिंशदस्थी वंशस्य पार्श्वयोर्द्वयोः।

द्विसप्ततिसहस्राणि नाडीनामपि संस्थितिः ॥ व सं २-६
dehe dvātrīṁśadasthī vaṁśasya pārśvayordvayoḥ |
dvisaptatisahasrāṇi nāḍīnāmapi saṁsthitih | | va saṁ 2-6

There are thirty two bones in a body on the both side of the spinal cord and also seventy two thousand *nāḍīs*.

There is no general agreement about the number of *nāḍīs* which exist in our body. From above information it is well understand that the figure may be from 100 to 72 000 or it could be more, upto 340,000. The number that occurs most often is 72 000. Nevertheless, among all of them, generally 10 or 14 *nāḍīs* are said to be important. Of these, 3 are deemed most important. The table below summarizes the number of *nāḍīs* mentioned in different texts.

TABLE I : NUMBER OF NĀDĪ AS PER DIFFERENT TEXTS

Sl No	<i>Upaniṣats</i>	Number of <i>nāḍī</i>	Yoga text	Number of <i>nāḍī</i>
1	<i>Bṛhadāraṇyakopaniṣat</i>	72,000	<i>Haṭhapradīpikā</i>	72, 000
2	<i>Chāndogyopaniṣat</i>	101	<i>Śivasvarodaya</i>	72,000
3	<i>Kaṭhopaniṣat</i>	101	<i>Śivasamhitā</i>	350,000
4	<i>Praśnopaniṣat</i>	72,000	<i>Vaśiṣṭasamhitā</i>	72,000

5	<i>Jābāladarśanopaniṣat</i>	72,000		
6	<i>Triśikha brāhmaṇopaniṣat</i>	72, 000		

2.8.3 NAMES OF THE NĀDĪS

The next level of knowledge of the *nāḍī* system concerns their names and locations. The names of fourteen *nāḍīs* are given in various *upaniṣads* and yoga texts, as given below.

According to *Upaniṣat*

Śāṅḍilyopaniṣat

मध्यस्थकुण्डलिनीमाश्रित्य मुख्या नाड्यश्चतुर्दश भवन्ति।

इडा पिङ्गला सुषुम्ना सरस्वती वारुणी पूषा हस्तिजिह्वा यशस्विनी विश्वोदरी

कुहूः शङ्खिनी पयस्विनी अलम्बुसा गान्धारीति नाड्यश्चतुर्दश भवति। सा उप- १।१५

madhyasthakunḍalinīmāśritya mukhyā nāḍyaścaturdaśa bhavanti |

iḍā piṅgalā suṣumnā sarasvatī vāruṇī pūṣā hastijihvā yaśasvinī viśvodarī

kuhūḥ śaṅkhinī payasvinī alambusā gāndhārīti nāḍyaścaturdaśa bhavati | sā upa- 1 | 15

Depending on *kundalini* which is situated in the centre of the spinal cord, there are fourteen principal *nāḍīs*. They are *iḍā*, *piṅgalā*, *suṣumnā*, *sarasvatī*, *vāruṇī*, *pūṣā*, *hastijihvā*, *yaśasvinī*, *viśvodarī*, *kuhūḥ*, *śaṅkhinī*, *payasvinī*, *alambusā* and *gāndhārīti*.

Yogaśikhopaniṣat

कण्ठकूपोद्भवा नाडि शङ्खिन्याख्या त्वघोमुखी।

अन्नसारं समादाय मूर्ध्नि संचिनुते सदा ॥ यो शि उ-२५

kaṅṭhakūpodbhavā nāḍi śaṅkhinyākhyā tvaghomukhī |

annasāraṁ samādāya mūrghni saṁcinute sadā | | yo śi u-25

The *śaṅkhini nāḍi* which originates from pharynx and facing downwards collects nutrients and supply them to head region.

चित्राख्या सीविनी नाडी शुक्लमोचनकारणी।

नाडीचक्रमिति प्रोक्तं बिन्दुरूपमतः शृणु ॥ यो शि उ-२७

citrākhyā sīvinī nāḍī śuklamocanakāraṇī |

nāḍīcakramiti proktaṁ bindurupamataḥ śṛṇu | | yo śi u-27

The *Chitra nāḍi* traverses in a zig zig manner and has the function of formation and release of semen. It is also called *nāḍi chakra*.

Jābāladarsana upaniṣat

सुषुम्ना पिङ्गला तद्विदिडा चैव सरस्वती।

पुषा च वरुणा चैव हस्तिजिह्वा यशस्विनी ॥ जा उ- २।७।

*suṣumnā piṅgalā tadvidiḍā caiva sarasvatī |
puṣā ca varuṇā caiva hastijihvā yaśasvinī | | jā u- 2 | 7 |*

आलम्बुसा कुहूश्चैव विश्वोदरी तपस्विनी।

शङ्खिनी चैव गान्धारा इति मुख्याश्चतुर्दश ॥ जा उ- २।८।

*ālambusā kuhūścaiva viśvodarī tapasvinī |
śaṅkhinī caiva gāndhārā iti mukhyāścaturdaśa | | jā u- 2 | 8 |*

ब्रह्मनाडीति सा प्रोक्ता मुने वेदान्तवेदिभिः ॥ जा उ- २।९।

brahmanāḍīti sā proktā mune vedāntavedibhiḥ | jā u- 2 | 9 |

Jābāladarśana upaniṣat describes 14 major *nāḍīs*. They are *Suṣumnā Idā Piṅgalā, Sarasvatī, Pūṣā, Varuṇā, Hastijihvā, Yaśasvinī, Alambuṣā, Kuhu, Viśvodarī, Tapasvinī, Śaṅkhinī* and *Gāndhārī*. It also mentions another *nāḍī* called the *brahmanāḍī*.

According to Yoga Text:

नसां मध्ये दश श्रेष्ठा दशानां तिस्र उत्तमाः।

इडा च पिङ्गला चैव सुषुम्ना च तृतीयका। शि स्व- ३६

*nasāṃ madhye daśa śreṣṭhā daśānāṃ tisra uttamāḥ |
iḍā ca piṅgalā caiva suṣumnā ca tṛtīyakā | śi sva- 36*

गान्धारी हस्तिजिह्वा च पूषा चैव यशस्विनी।

अलम्बुषा कुहूश्चैव शङ्खिनी दशमी तथा। शि स्व- ३७

*gāndhārī hastijihvā ca pūṣā caiva yaśasvinī |
ālambuṣā kuhuścaiva śaṅkhinī daśamī tathā | 37*

Śivasvarodaya describes 10 major *nāḍīs*; of them, *Idā Piṅgalā* and *Suṣumnā* are most important, the other lesser *nāḍīs* are *Gāndhārī, Hastijihvā, Yaśasvinī, Pūṣā, Alambuṣā, Kuhu* and *śaṅkhinī*.

अथ चतुर्दश नाड्यः

सुषुम्णेडा पिङ्गला च गान्धारी हस्तिजिह्विका।

कुहुः सरस्वती पूषा शंखिनी च पयस्विनी। शि सं-२।१४

*atha caturdaśa nāḍyaḥ
suṣumṇeḍā piṅgalā ca gāndhārī hastijihvikā |*

kuhuḥ sarasvatī pūṣā śamkhinī ca payasvinī | śi saṁ-2 | 14

वरुण्यलम्बुसा चैव विश्वोदरी यशस्विनी।

एतासु तिस्रो मुख्याः स्युः पिंगलाडा सुषुम्निका ॥ शि सं-२।१५

*varuṇyalambusā caiva viśvodarī yaśasvinī |
etāsu tisro mukhyāḥ syuḥ piṅgalāḍā suṣumṇikā | | śi saṁ-2 | 15*

Shiva samhita names 14 *nāḍīs*, the *Suṣumnā*, *Idā*, *Piṅgalā*, *Gāndhārī*, *Hastijihvikā*, *Kuhuh*, *Sarasvatī*, *pūṣā Śamkhinī*, *Payasvinī*, *Varuni*, *Ālambusā*, *Viśvodarī* and *Yaśasvinī*. Among them *Piṅgalā*, *Idā* and *Suṣumnā*, are the three being most important.

तसां मध्ये गता नाडी चित्रा सा ममवल्लभा।

ब्रह्मरन्ध्रञ्च तत्रैव सुक्ष्मात्सुक्ष्मतरं शुभम ॥ शि सं-२।१८

*tasāṁ madhye gatā nāḍī citrā sā mamavallabhā |
brahmarandhraṅca tatraiva sukṣmātsukṣmataraṁ śubhama | | śi saṁ-2 | 18*

Shiva samhita also describes *Citrā nāḍī* which is more auspicious and subtler than others.

2.8.4 LOCATION OF NĀDĪS

Nāḍīs originate from lower or middle spiritual center and spread all over the body. Location of *nāḍīs* are described in *Yoga* texts and *Upaniṣats* in various way.

Śāṅḍilyopaniṣat mentions the location of 14 *nāḍīs*. It starts with *suṣumnā*.

गुदस्य पृष्ठभागे वीणादण्डाश्रिता मूर्धपर्यन्तं ब्रह्मरन्ध्रे विज्ञया व्यक्ता सूक्ष्म बैष्णवी भवति। सा उप-

१।१५

*gudasya pṛṣṭhabhāge vīṇādaṇḍāśritā mūrdhaparyantarṁ brahmarandhre vijñayā vyaktā
sūkṣma baiṣṇavī bhavati | sā upa- 1 | 15*

Suṣumnā is situated at the back of the anus. It is attached to the spinal column and extends to the *Brahmarandhra* at the head.

सुषुम्नायाः सव्यभागे इडा तिष्ठति। दक्षिणभागे पिङ्गला। सा उप- १।१५

suṣumnāyāḥ savyabhāge idā tiṣṭati | dakṣiṇabhāge piṅgalā | sā upa- 1 | 15

Idā is situated on the left of *Suṣumnā* and on the right of *Suṣumnā* is *Piṅgalā*.

पिङ्गला चोर्ध्वगा याम्यनासान्तं भवति। सा उप- १।१५

piṅgalā cordhvagā yāmyanāsāntaṁ bhavati | sā upa- 1 | 15

Piṅgalā goes upwards to the right nostril.

सुषुम्ना पृष्ठपार्श्वयोः सरस्वतीकुहू भवतः। सा उप- १।१५
suṣumnā pṛṣṭapārśvayoḥ sarasvatīkuhū bhavataḥ | sā upa- 1 | 15

To the back and on the side of *Suṣumnā* are situated *Sarasvatī* and *kuhū* respectively.

जिह्वाया ऊर्ध्वान्तं सरस्वती भवति। सा उप- १।१५
jihvāyā ūrdhvāntaṁ sarasvatī bhavati | sā upa- 1 | 15

Sarasvatī goes to the upper part of the tongue.

पूषासरस्वतीमध्ये पयस्विनी भवति। सा उप- १।१५
pūṣāsarasvatīmadhye payasvinī bhavati | sā upa- 1 | 15

Between *Pūṣā* and *Sarasvatī* lies *Payasvinī*.

याम्यकर्णान्तं पयस्विनी भवति। सा उप- १।१५
yāmyakarnaṅtaṁ payasvinī bhavati | sā upa- 1 | 15

Payasvinī goes to right ear.

पिङ्गलायाः पृष्ठतो याम्यनेत्रान्तं पूषा भवति। स उप- १।१५
piṅgalāyāḥ pṛṣṭhato yāmyanetrāntaṁ pūṣā bhavati | sa upa- 1 | 15

Pūṣā moves from behind the *piṅgalā* extending to the right eye.

कन्दमयेऽलम्बुसा भवति। सा उप- १।१५
kandamaye' lambusā bhavati | sā upa- 1 | 15

In the centre of the navel is *Ālambusā*.

पायुमूलादधोर्ध्वगालम्बुसा भवति। सा उप- १।१५
pāyumūlādadhordhvagālambusā bhavati | sā upa- 1 | 15

Ālambusā goes upwards and downwards from the root of the anus.

सुषुम्नापूर्वभागे मेढ्रान्तं कुहूर्भवति। सा उप- १।१५
suṣumnāpūrvabhāge meḍhrāntaṁ kuhūrbhavati | sā upa- 1 | 15

In front of *Suṣumnā* there is *Kuhū*, which proceeds as far as the genital organ.

यशस्विनीकुहूमध्ये वारुणी प्रतिष्ठिता भवति। सा उप- १।१५
yaśasvinīkuhūmadhye vāruṇī pratiṣṭitā bhavati | sā upa- 1 | 15

Between *Yaśasvinī* and *Kuhū* stands *Vāruṇī*.

कुण्डलिन्या अधश्चोर्ध्वं वारुणी सर्वगामिनी भवति। सा उप- १।१५

kuṇḍalinyā adhaścordhva vāruṇī sarvagāminī bhavati | sā upa- 1 | 15

Above and below *kuṇḍali* is situated *Vāruṇī*, which proceeds everywhere.

गान्धारीसरस्वतीमध्ये यशस्विनी भवति। सा उप- १।१५

gāndhārīsaravatīmadhye yaśasvinī bhavati | sā upa- 1 | 15

Between *Gāndhārī* and *Sarasvatī* is situated *Yaśasvinī*.

यशस्विनी सौम्या च पादाङ्गौष्ठान्तमिष्यते। सा उप- १।१५

yaśasvinī saumyā ca pādāṅgauṣṭhāntamipyate | sā upa- 1 | 15

Yaśasvinī which is beautiful (or belonging to the moon), goes on to the great toes.

आसव्यकर्णान्तंमूर्ध्वगा शङ्खिनी भवति। सा उप- १।१५

āsavyakarṇāntamūrdhvagā śaṅkhinī bhavati | sā upa- 1 | 15

Śaṅkhinī goes to the left ear.

इडापृष्ठभागात्सव्यनेत्रान्तरा गन्धारी भवति। सा उप- १।१५

iḍāpṛṣṭhabhāgātsavyanetrāntarā gandhārī bhavati | sā upa- 1 | 15

Gandhārī goes from the back of *Iḍā* to the left eye.

एताश्च चतुर्दशसु नाडीष्वन्या नाड्यः संभवन्ति। सा उप- १।१५

etāśca caturdaśasu nāḍīṣvanyā nāḍyaḥ sambhavanti | sā upa- 1 | 15

From these fourteen *nāḍīs*, other *nāḍīs* (minor) spring; from them, yet others originate.

Yogācūḍāmaṇi upaniṣat

Yogācūḍāmaṇi upaniṣat explains the site of 10 *nāḍīs* as follows.

एतन्नाडीमहाचक्रं ज्ञातव्यं योगिभिः सदा।

इडा वामे स्थिता भागे दक्षिणे पिङ्गला स्थिता ॥ यो चू उ-१८

etannāḍīmahācakraṁ jñātavyaṁ yogibhiḥ sadā |
iḍā vāme stitā bhāge dakṣiṇe piṅgalā sthitā | | yo cū u-18

On the left of *Suṣumnā* is situated *Iḍā*. On the right of *Suṣumnā* is situated *Piṅgalā*.

सुषुम्ना मध्यदेशे तु गान्धारी वाम चक्षुषि।

दक्षिणे हस्तिजिह्वा च पूषा कर्णे च दक्षिणे ॥ यो चू उ-१९

suṣumnā madhyadeśe tu gāndhārī vāma cakṣuṣi |
dakṣiṇe hastijihvā ca pūṣā karṇe ca dakṣiṇe | | yo cū u-19

Suṣumnā is situated in middle. *Gāndhārī* goes to the left ear and *hastijihvā* goes to the right ear. *Pūṣā* moves to the right ear.

यशस्विनी वामकर्णे चानने चाप्यलम्बुसा।

कुहूश्च लिङ्गदेशे तु मूलस्थाने तु शङ्खिनी ॥ यो चू उ-२०

yaśasvinī vāmakarṇe cānane cāpyalambusā |
kuhūśca liṅgadeśe tu mūlasthāne tu śaṅkhinī | | yo cū u-20

Yaśasvinī moves to the left ear. *Alambusā* is situated in mouth. *Kuhū* is situated in the root of genital organ and *śaṅkhinī* is situated at anal region.

Yogaśikhopaniṣat

मूलाधार त्रिकोणस्था सुषुम्ना द्वादशाङ्गुला। यो शि उ-१७

muladhāra trikoṇasthā suṣumnā dvādaśāṅgulā | yo śi u-17

In *muladhāra* there is *suṣumnā* of twelve fingers width.

मूलार्धच्छिन्नवंशाभा ब्रह्मनाडिति सा स्मृता ॥ यो शि उ-१७

mūlārdhacchinnavāṁśābhā brahmanāḍiti sā smṛtā | | yo śi u-17

It is remembered as appearing like a bamboo which is cut off at the base with hollow curvature.

इडा च पिङ्गला चैव तस्याः पार्श्वद्वये गते।

विलम्बिन्यामनुस्यूते नासिकान्तमुपागते ॥ यो शि उ-१८

iḍā ca piṅgalā caiva tasyāḥ pārśvadvaye gate |
vilambinyāmanusyūte nāsikāntamupāgate | | yo śi u-18

Iḍā, piṅgalā nāḍis which run on the either side of nose, follow *vilambini* and terminate at end of the nose.

तन्नाभिचक्रमित्युक्तं कुक्कुटाण्डमिव स्थितम्।

गान्धारि हस्तिजिह्वा च तस्मान्नेत्रद्वयं गते ॥ यो शि उ-२१

tannābhicakramityuktaṁ kukkuṭāṇḍamiva sthitam |
gāndhāri hastijihvā ca tasmānnetradvayaṁ gate | | yo śi u-21

Gāndhāri and *hastijihvā nāḍis* towards the eyes.

पूषा चालम्बुसा चैव श्रोत्रद्वमुपागते।

शुरा नाम महानाडि तस्माद्भूमध्यमाश्रित ॥ यो शि उ-२२

pūṣā cālambusā caiva śrotradvamupagate |

śurā nāma mahānāḍi tasmādbhūmadhyamāśrita | | *yo śi u-22*

Pūṣā and *ālambusā nāḍis* run towards ears. *Śurā nāḍi* resides in the center at eyebrow. It is also called *mahānāḍi*.

विश्वोदरी तु या नाडी सा भुङ्क्तेऽन्नं चतुर्विधम्।

सरस्वती तु या नाडि स जिह्वान्तं प्रसर्पित ॥ यो शि उ-२३

viśvodarī tu yā nāḍī sā bhun̄kte' nnaṁ caturvidham |
sarasvatī tu yā nāḍī sa jihvāntaṁ prasarpita | | *yo śi u-23*

Viśvodarī nāḍī which consumes four types of food. *Sarasvatī nāḍī* spreads at the tip of the tounge.

Jābāladarśana upaniṣat

स्वमुखेन समावेष्ट्य ब्रह्मरन्ध्रमुखम् मुने

सुषुम्नाया इडा सव्ये दक्षिणे पिङ्गला स्थिता ॥ जा उ- २।१३।

svamukhena samāveṣṭya brahmarandhramukham mune
suṣumnāyā idā savye dakṣiṇe piṅgalā sthitā | *jā u- 2 | 13* |

Idā and *piṅgalā* are the left and right side of *suṣumnā*

सरस्वती कुहूश्चैव सुषुम्नापार्श्वयोः स्थिते।

गान्धारा हस्तिजिह्वा च इडायाः पृषार्श्वयोः ॥ जा उ- २।१४।

sarasvatī kuhūścaiva suṣumnāpārśvayo sthite |
gāndhārā hastijihvā ca idāyāḥ pṛpārśvayoḥ | | *jā u- 2 | 14* |

Sarasvatī and *kuhūḥ* are to the side of *suṣumnā*. *Gāndhārā* and *hastijihvā* are situated at the back of the *idā*.

पूषा यशस्विनी चैव पिङ्गला पृष्ठपूर्वयोः ।

कुहोश्च हस्तिजिह्वाया मध्ये विश्वोदरी स्थिता ॥ जा उ- २।१५।

pūṣā yaśasvinī caiva piṅgalā pṛṣṭhapūrvayoḥ |
kuhośca hastijihvāyā madhye viśvodarī sthitā | | *jā u- 2 | 15* |

Pūṣā and *yaśasvinī* are situated in front and before the *piṅgalā*. Between the *kuhūḥ* and *hastijihvā* is located *Viśvodarī*.

यशस्विन्याः कुहोर्मध्ये वरुणा सुप्रतिष्ठिता।

पूषायाश्च सरस्वत्या मध्ये प्रोक्ता यशस्विनी ॥ जा उ- २।१६।

*yaśasvinyāḥ kuhormadhye varuṇā supratīṣṭhitā |
pūṣāyāśca sarasvatyā madhye proktā yaśasvinī | jā u- 2 | 16 |*

Varuṇā is located between *Yaśasvinī* and *Kuhuḥ*. *Yaśasvinī* is situated between *pūṣā* and *sarasvatī*.

गान्धारायाः सरस्वत्या मध्ये प्रोक्ता च शङ्खिनी ।

अलम्बुसा स्थिता पायुपर्यन्तं कन्दमध्यगा ॥ जा उ- २।१७

*gāndhārāyāḥ sarasvatyā madhye proktā ca śaṅkhinī |
alambusā sthitā pāyuparyantaṁ kandamadyagā | jā u- 2 | 17 |*

Śaṅkhinī is situated between *gāndhāri* and *sarasvatī*. *Alambusā* is located at the root of the anus.

इडा तु सव्यनासान्तं संस्थिता मुनिपुङ्गव ।

यशस्विनी च वामस्य पादाङ्गुष्ठान्तमिष्यते ॥ जा उ- २।१९

*idā tu savyanāsāntaṁ saṁsthitā munipuṅgava
yaśasvinī ca vāmasya pādāṅguṣṭhāntamipyate | jā u- 2 | 19 |*

Idā goes up to left nostril and *yaśasvinī* goes to the left big toe.

पूषा वामाक्षिपर्यन्ता पिङ्गलायास्तु पृष्ठतः ।

पयस्विनी च याम्यस्य कर्णान्तं प्रोच्यते बुधैः ॥ जा उ- २।२०

*pūṣā vāmākṣiparyantā piṅgalāyāstu pṛṣṭhataḥ |
payasvinī ca yāmyasya karṇāntaṁ procyate budhaiḥ | | jā u- 2 | 20 |*

Pūṣā goes from back of *piṅgalā* to the left eye. *Payasvinī* goes to right ear.

सरस्वती तथा चोर्ध्वगता जिह्वा तथा मुने ।

हस्तिजिह्वा तथा सव्यपादाङ्गुष्ठान्तमिष्यते ॥ जा उ- २।२१

*sarasvatī tathā cordhvagatā jihvā tathā mune |
hastijihvātathā savyapādāṅguṣṭhāntamipyate | | jā u- 2 | 21 |*

Sarasvatī goes to the upper part of the tongue. *Hastijihvā* goes to the toes of left leg.

शङ्खिनी नाम या नाडी सव्यकर्णान्तमिष्यते ।

गान्धारा सव्यनेत्रान्ता प्रोक्ता वेदान्तवेदिभिः ॥ जा उ- २।२१

śaṅkhinī nāma yā nāḍī savyakarṇāntamipyate |

gāndhārā savyanetrāntā proktā vedāntavedibhiḥ | | jā u- 2 | 21

It is said by wise that *śaṅkhinī nāḍī* moves to the left ear and *gāndhār nāḍī* to the left eye.

विश्वोदराभिधा नाडी कन्दमध्ये व्यवस्थिता। जा उ- २। २२

viśvodarābhidhā nāḍī kandamadhye vyavasthitājā | jā u- 2 | 22

In the centre of the navel is *viśvodarī*.

According to Śivasvarodaya

नाडीस्था कुण्डलीशक्तिर्भुगङ्गाकारशायिनी

ततो दशोर्ध्वगा नाड्यदशैवाधः प्रतिष्ठिताः ॥ शि स्व- ३३

*nāḍīsthā kuṇḍalīśaktirbhugaṅgākāraśāyīnī
tato daśordhvagā nāḍyadaśaivādhaḥ pratiṣṭhitāḥ | | śi sva- 33*

In *nāḍīs*, kundalini shakti exist. It looks like a snake. From kundalini ten *nāḍīs* move upward and ten *nāḍīs* moves downwards.

द्वे द्वे तिर्यग्गते नाड्यो चतुर्विंशतिसंख्यया।

प्रधाना दशनाड्यस्तु दश वायुप्रवाहिकाः ॥ शि स्व- ३४

*dve dve tiryaggate nāḍyo caturviṁśatisaṅkhyayā |
pradhānā daśanāḍyastu daśa vāyupravāhikāḥ | | śi sva- 34*

On each side of kundalini, two *nāḍīs* move in oblique directions. Similar to these two, there are 24 *nāḍīs*. Among them ten are significant for carrying the *prāṇa*.

इडा वामे स्तिता भागे पिङ्गला दक्षिणे स्मृता।

सुषुम्ना मध्यदेशे तु गान्धारी वामचक्षुषि ॥ शि स्व- ३८

*iḍā vāme stitā bhāge piṅgalā dakṣiṇe smṛtā |
suṣumnā madhyadeśe tu gāndhārī vāmacakṣuṣi | | śi sva- 38*

The *iḍā* is situated left side; the *piṅgalā* is situated right side and *suṣumnā* is in middle. *Gāndhārī* attaches to the left eye.

दक्षिणे हस्तिजिह्वा च पूषा कर्णे च दक्षिणे।

यशस्विनी वामकर्णे आनने चाप्यलम्बुषा ॥ शि स्व- ३९

*dakṣiṇe hastijivā ca pūṣā karṇe ca dakṣiṇe |
yaśasvinī vāmakarṇe ānane cāpyalambuṣā | | śi sva- 39*

The *hastijihvā nāḍī* connects to the right eye. *pūṣā nāḍī* connects to right ear. The *Yaśasvinī nāḍī* connects to the left ear. The *alambuṣā* connects to the mouth.

कुहूश्च लिङ्गदेशे तु मूलस्थाने तु शङ्खिनी।

एवं द्वारं समाश्रित्य तिष्ठन्ति दशनाडिकाः ॥ शि स्व- ४०

kuhūśva liṅgadeśe tu mūlasthāne tu śaṅkhinī |
evam dvāraṁ samāśritya tiṣṭhanti daśanāḍikāḥ | | śi sva- 40

Kuhū is in the reproductive organ and *śaṅkhinī* in the anal region. These are the ten opening of the body.

पिङ्गलेडा सुषुम्ना च प्राणमार्गे समश्रिता।

एताहि दशनाड्यस्तु देहमध्ये ववस्थिताः ॥ शि स्व- ४१

piṅgaleḍā suṣumnā ca prāṇamārgē samāśritā |
etāhi daśanāḍyastu dehamadhye vavasthitāḥ | | śi sva- 41

The three main *nāḍīs piṅgalā idā* and *suṣumnā* are situated in the pranic passage.

DESCRIPTIONS OF LOCATIONS OF PRINCIPAL NĀḌĪS IN THE ABOVE

Suṣumnā nāḍī

Of all the *nāḍīs*, *Suṣumnā* is said to be the most important. The *Suṣumnā nāḍī* is a channel following the spine. Descriptions of its starting point are various: *Śāṅḍilya upaniṣat* states it starts at *Mūlādhāra chakra*, whereas *Chāndogya upaniṣat* says it starts at the heart. However, most *Yoga* texts and other *upaniṣats* concur that the *Mūlādhāra chakra* is its starting point. The *Brahmān Gate* at the top of the head is always described as its terminal point.

Iḍā and Piṅgalā nāḍīs

The *Iḍā* and *Piṅgalā nāḍīs* originate at the point just below the base of spine where the *mūlādhāra chakra* is situated. *Iḍā* moves from left side of the *Suṣumnā* and *Piṅgalā* from the right side of the *Suṣumnā*. *Iḍā* passes through the left nostril extending to *Ājñā chakra*. *Piṅgalā* is passing through the right nostril and extends to *Ājñā chakra*. *Jābāladarśana upaniṣat* states that these two cover the *mūlādhāra* and *brahma* knot within it. *Yogaśikhā*

upaniṣat states that they begin at *khaṇḍasthāna* rather than at *mūlādhāra*. The *Śāṇḍilya* and *Jābāladarśana upaniṣats* say that they terminate in the nostrils.

Sarasvati nāḍī

The *Sarasvati nāḍī* is said to flow ascending on one side of the *Suṣumnā* to terminate in the tongue or mouth. *Śāṇḍilya upaniṣat* says it is at the back of *Suṣumnā*. *Jābāladarśana upaniṣats* states that it lies on one side of the *Suṣumnā*.

Vāruṇī nāḍī

The *Vāruṇī nāḍī* is described in various ways. *Śāṇḍilya* and *Jābāladarśana upaniṣats* say it flows between *yaśasvinī* and *kuhūḥ*. *Śāṇḍilya upaniṣat* gives further details that it pervades everywhere. According to *Yogaśikhā upaniṣat*, it flows down from the navel region and helps the process of excretion.

Pūṣā nāḍī

The location of *Pūṣā nāḍī* is given with varying descriptions. *Śāṇḍilya upaniṣat* states that it flows behind *Piṅgalā* extended upto to the right eye; whereas *Jābāladarśana upaniṣat* says it flows from the front of *Piṅgalā* and goes up one side to the left eye. According to *Yogācūḍāmaṇi upaniṣat*, it is connected to right eye. *Sivasvarodaya* and *Yogaśikhā* state it terminates at the left ear.

Hastijihvā nāḍī

The *Hastijihvā nāḍī* lies on the side at the back of *Iḍā* and goes to the tip of left big toes, states *Jābāladarśana upaniṣat*. *Yogācūḍāmaṇi upaniṣat* mentions it terminates in the right ear whereas *Śivasvarodaya* says it is connected to right eye.

Yaśasvinī nāḍī

The *Śāṅḍilya upaniṣat* describes *Yaśasvinī nāḍī* as lying between *Gāndhārī* and *Sarasvatī* and proceeding to the big toes. *Jābāladarśana upaniṣat* mentions that it lies in front of *Piṅgalā*, between *Pūṣā* and *Sarasvatī*. All sources agree that it extends to the left ear.

Viśvodarī nāḍī

The *Jābāladarśana upaniṣat* says the *Viśvodarī nāḍī* lies between the *Kuhūḥ* and *Hastijihvā*. It resides in the centre of the *Kandasthāna*.

Kuhūḥ nāḍī

According to *Śāṅḍilya* and *Jābāladarśana upaniṣats* the *Kuhūḥ nāḍī* lies beside the *susumna*. All sources say that it proceeds to the reproductive organs.

Śaṅkhinī nāḍī

According to *Jābāladarśana upaniṣat*, the *Śaṅkhinī nāḍī* lies between *Gāndhārī* and *Sarasvatī*. It starts from *muladhara* and moves to the left ear says other sources.

Payasvinī nāḍī

The *Śāṅḍilya upaniṣat* and *Jābāladarśana upaniṣat* describe *Payasvinī nāḍī* as lying between *Pūṣā* and *Sarasvatī* and proceeding to the right ear.

Alambusā nāḍī

The *Sāṅḍilya upanisad* says that *Alambusā nāḍī* originates from the *kandasthana* region and goes upward from root of the anus. *Yogācūḍāmaṇi upaniṣat* and *shivasvarodaya* state that it connects to the mouth.

Gāndhārīti nāḍī

According to all sources, *Gāndhārīti nāḍī* goes from the back of *Iḍā* to the left eye.

**TABLE II: SUMMARY OF *Nāḍī* LOCATIONS
ACCORDING TO DIFFERENT TEXTS**

	<i>Śāṇḍilya upaniṣat</i>	<i>Yogācūḍāmaṇi upaniṣat</i> (Ten <i>nāḍīs</i>)	<i>Yogaśikhā upaniṣat</i>	<i>Jābāladarśana upaniṣat</i> (14 <i>nāḍīs</i>)	<i>Śivasvarodaya</i> (Ten <i>nāḍīs</i>)
<i>Suṣumnā</i>	From back of the anus, it is attached to the spinal column up to the <i>Brahmarandhra</i> on the head	<i>Suṣumnā</i> is situated in middle		Up the spine, to the top of the head	In the middle
<i>Iḍā</i>	On the left of <i>Suṣumnā</i>	On the left of <i>Suṣumnā</i>		Extended to left nostril	left side
<i>Piṅgalā</i>	On the right of <i>Suṣumnā</i> , goes to right nostril	On the right of <i>Suṣumnā</i>		On the right side of the <i>suṣumnā</i>	right side
<i>Sarasvatī</i>	To the back of <i>Suṣumnā</i> goes to upper part of the tongue			On one side of <i>suṣumnā</i> , goes to upper part of the tongue	
<i>Vāruṇī</i>	Between <i>Yaśasvinī</i> and <i>Kuhū</i> , proceeds everywhere			Between <i>Yaśasvinī</i> and <i>Kuhuḥ</i>	
<i>Pūṣā,</i>	Behind <i>Piṅgalā</i> , extends upto the right eye	<i>Pūṣā</i> moves to the right eye		<i>Pūṣā</i> in front of <i>piṅgalā</i> , up one side left eye	Connects to right ear
<i>Hastijihvā</i>		Goes to the right ear		At back of the <i>iḍā</i> . goes to the tip of left big toes	Connects to the right eye
<i>Yaśasvinī</i>	Between <i>Gāndhārī</i> and <i>Sarasvatī</i> , goes on to the large toes	Moves to the left ear		Before the <i>piṅgalā</i> , between <i>pūṣā</i> and <i>sarasvatī</i> .	Connects to the left ear

<i>Viśvodarī</i>				Between the <i>kuhuḥ</i> and <i>hastijhvā</i> , In the centre of the <i>Kandasthāna</i>	
<i>Kuhūḥ</i>	In front of <i>Suṣumnā</i> and proceeds as far as the genital organ	At the root of genital organ		On one side of <i>suṣumnā</i>	In the reproductive organ
<i>Śaṅkhinī</i>	<i>Śaṅkhinī</i> goes to the left ear	<i>Mūlasthāne</i>		Between <i>gāndhāri</i> and <i>sarasvatī</i> , goes to the left ear	In the anal region
<i>Payasvinī</i>	Between <i>Pūṣā</i> and <i>Sarasvatī</i> and goes to right ear			Goes to the edge of right ear	
<i>Alambusā</i>	In the centre of the navel, goes upwards and downwards from the root of the anus	Situated in mouth		At the root of the anus.	Connects to the mouth
<i>Gāndhāritī</i>	Goes from the back of <i>Iḍā</i> to the left eye	<i>Gāndhāri</i> goes to the left eye		On the back side of the <i>iḍā</i> .	Attaches to the left eye

2.8. 5 FUNCTIONS OF *NĀDĪS*

एता भोगवहानाड्योवायुसञ्चारदक्षकाः ।

ओतप्रोतासुसंव्याप्य तिष्ठन्त्यस्मिन्कलेवरे ॥ शि।सं।२।३१

etā bhogavahānāḍyovāyusañcāradakṣakāḥ |
otaprotāsusarivvyāpya tiṣṭhantyaasminkalevare || śi | saṁ | 2 | 31

The *nāḍīs* are spread through the body crosswise and lengthwise. They transport sensation and control the movement of *vayu* throughout the body.

प्रधाना दशनाड्यस्तु दश वायुप्रवाहिकाः ॥ शि स्व- ३४

pradhānā daśanādyastu daśa vāyupravāhikāḥ | | *śi sva- 34*

It is said in *śivasvarodaya* that the principle ten *nāḍīs* carry the ten *prāṇa*.

2.8.6 MARMAS

Marma is a fundamental aspect of the subtle energy system. *Marmas* are vital energy points where *prāṇa* congregates. It is a place where internal *prāṇa* converge to promote life processes. *Marmas* are said to be linked with *chakra* and *nāḍīs*.

Marmas according to *Ayurveda* Text.

सोममारुततेजांसि रजःसत्त्वतमांसि च।

मर्मसु प्रायशः पुंसा भूतात्मा चावतिष्ठते।

मर्मस्वभिहतास्तस्मान्न जीवन्ति शरिरीणः। सु सं - ५।३५

somamārutatejāṁsi rajaḥsattvatamāṁsi ca |

marmasu prāyaśaḥ puṁsā bhūtātmā cāvatiṣṭhate |

marmasvabhihatāstasmānna jīvanti śarirīṇaḥ | *su saṁ - 5* | 35

These *marmas* forms the primary seats of the *vāyu*. They are the Soma and Teja principle as well as of the three fundamental qualities of *Satva*, *Rajas*, and *Tamas*. They are so sensitive that a person hurt in any of the *marma* does not live long.

Composition of *marma* according to *Suśruta samhita*

Marmas are five types. They are:

1. *Māmsa marmas* are related to muscle tissue structure. These are eleven in number.
2. *Shira marmas* are related to veins, lymph and fluid. These are forty one in number.
3. *Snāyu marmas* are related to tissues that bind muscle to bones.
4. *Asthi marmas* are related to bone tissue. They are eight in number.
5. *Sandhi marmas* are related to joints. They are twenty in number.

Location and number (given in bracket) of *Marmas*

The *marmas* are said to be located in the feet (22), stomach (12), waist (14), arms (22) and above clavicles (37).

In *Āyurveda*, *marmasthanas* are used for therapy. *Marma* therapy emphasises on facilitating the flow of *prāṇa*. In *marma* therapy the vital points are used for stimulation. Stimulation of these vital points facilitates flow of *Prāṇa* through the *nāḍīs*.

2.8.7 PRĀṆA

Prāṇa is the vital force which sustains life. It flows through subtle channels (*nāḍīs*) in the body. It is also identified as ‘vital energy’ that activates everything in the universe. *Prana* is a central concept in *Āyurveda* and was first elaborated in *Prasnaupanisad*.

प्राणस्येदं वशे सर्वं त्रिदिवे यत्प्रतिष्ठितम्। प्र उप - २।५।१३

prāṇasyedaṁ vaśe sarvaṁ tridive yatpratiṣṭhitam. pra upa - 2|5|13

Prāṇa controls everything that exists in the universe. It is said that the greater *prāṇa* is the cosmic *prāṇa*, all encompassing energy, which enters our body through breath as individual *prāṇa*. It takes care of all activities in sustaining life. With this brief introduction to *nāḍīs*, *chakras* and *marma* points, we can now turn our attention to Traditional Chinese Medicine and later propose a possible connection between these two ancient systems of medicines.

2.9 MERIDIAN SYSTEM ACCORDING TO TRADITIONAL CHINESE MEDICINE

2.9.1 DANTIAN

In Chinese philosophy and medicine, there are three important energy centres called Dantians. Dantians are regions in the central core of the body where Qi energy is stored, refined and dispersed. The lower Dantian (Jin Dantian) is located in the lower abdomen. It is connected with the Qi field of the physical body. The middle Dantian (Qi Dantian) is located in the centre of the chest and connected with the Qi field of the emotional body, surrounding the physical body. The third Dantian (Shen Dantian) is located in the middle of the head, and is associated with the spiritual field of Qi surrounding the physical and emotional bodies. Qi energy flows from these along acupuncture meridians to all bodily organs and tissues.

2.9.2 NUMBER OF MERIDIANS

Meridians are considered interconnected channels for circulation of Qi energy. The number of meridians may be similar to number of *nāḍīs*. The interconnections form endless closed circuits reaching every part of the body. Meridians are divided into groups based on their Yin and Yang properties, and further classified into 6 groups according to location and function: 12 are main or regular, 8 regulatory, 15 collateral, 12 divergent, 12 muscle and 12 cutaneous.

2.9.3 NAMES OF MERIDIANS

The twelve regular meridians are the Lung Meridian (Taiyin), Large intestine Meridian (Yangming), Pericardium (Jueyin), Sanjiaiao (Shaoyang), Heart Meridian (Shaoyin), Small intestine Meridian (Taiyang), Spleen Meridian (Taiyin), Stomach Meridian (Yangming), Liver Meridian (Jueyin), Gall bladder Meridian (Shaoyang), Kidney Meridian (Shaoyin) and Bladder Meridian (Taiyang).

The 8 regulatory meridians differ in important respects from the 12 regular meridians; they form the body's master homeostatic or balancing mechanism. The 8 regulatory meridians are grouped in 4 pairs: the Great Regulatory (Yinwei, Yangwei), Great Central (Governor and Conception Vessels), Great Bridge (Yinqiao and Yangqiao), and the Penetrating and Belt Meridians. Collateral meridians arise from each regular meridian and some main meridians. Both the Governor and Conception Vessels have major collateral meridians while the Spleen Meridian also has a major collateral meridian. Hence, 15 collateral meridians are named based on the regular meridian or organ from which they arise.

The 12 divergent, 12 muscle and 12 cutaneous meridians correspond to 12 regular meridians according to their function. Therefore their names are based on related regular meridians.

2.9.4 MERIDIAN LOCATIONS

The paths of the Regular Meridians are as follows:

The Lung (LU), Pericardium (PC), and Heart (HT) meridians are Yin meridians of the hand start from the chest and go down the middle of the arm to different fingertips (Fig 1).

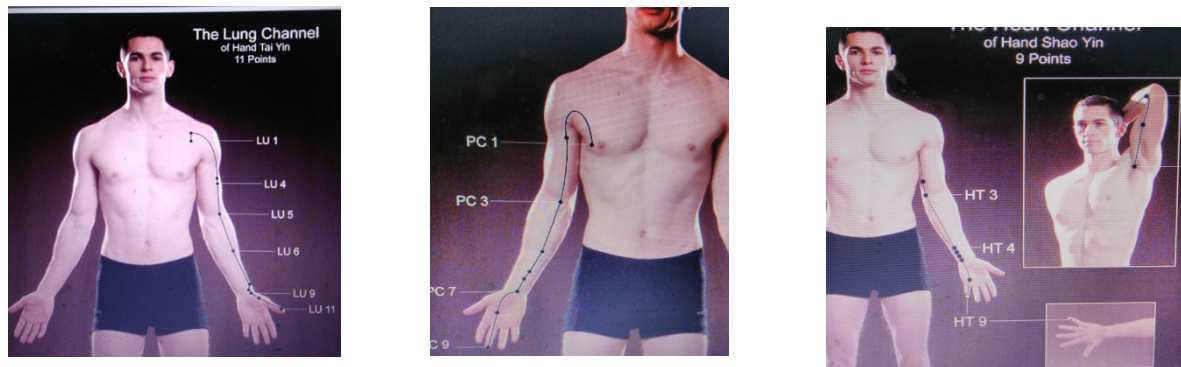


Figure 1: Pathways of the Lung, Pericardium, Heart meridians.

The Large Intestine, Sanjiao (Triple Energizer) and Small Intestine meridians are Yang meridians of the hand starting at the fingertips, and going up the lateral aspect of the upper arm to the head and face (Fig 2).

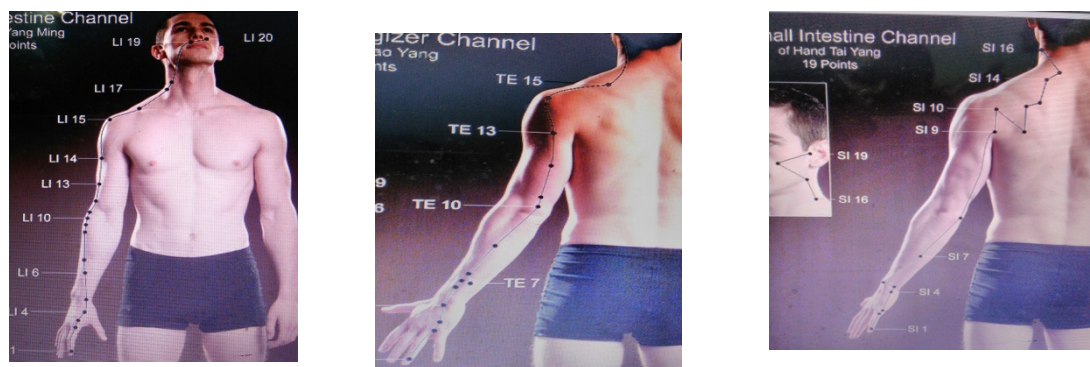


Figure 2: Pathways of the Large Intestine, Sanjiao (Triple energizer) and Small Intestine meridians

Spleen, Liver, and Kidney are Yin meridians of the foot starting from the foot and going up the middle of the lower limb through the abdomen to the chest (Fig 3).

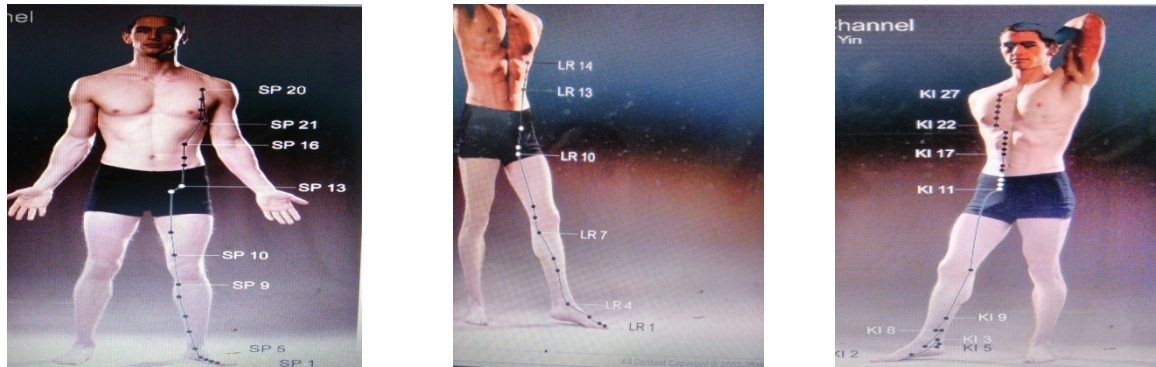


Figure 3: Pathways of the Spleen, Liver, and Kidney meridians

The Stomach, Gallbladder and Bladder meridians are Yang meridians of the foot starting from the head and face and going through the trunk and lower limb to the toe tips (Fig 4).

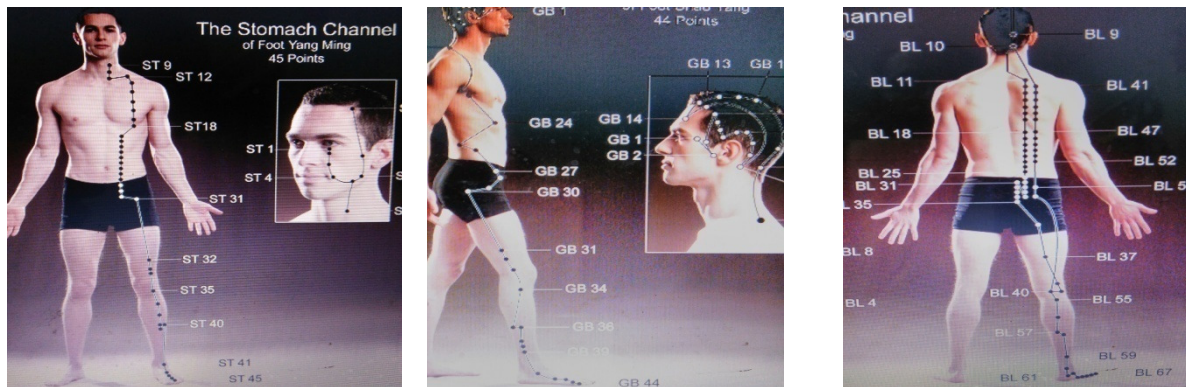


Figure 4: Pathway of Stomach, Gallbladder and Bladder Yang meridians

The Great Regulatory Meridians are called Yinwei and Yangwei. Yin indicates that a section of the meridian flows along the front of body, while Yang indicates a section along the back. Yinwei flows from both side of temple and moves down through the front of the body to the toes. Yangwei flows from the toes and then goes up the outside of the legs, ascending through the back, shoulder, neck, and up over the head where it joins with main branch (Fig 5).

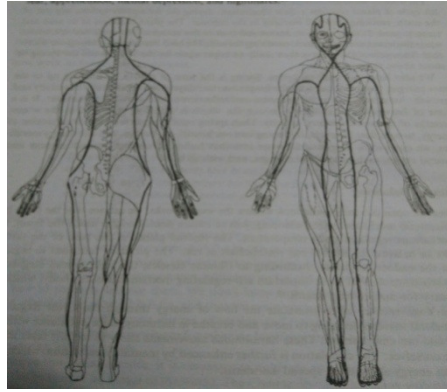


Figure:5 Pathway of Great regulatory meridians Yinwei and Yangwei

The great central meridians flow through the median line of the body. One part of the Governor Vessel courses from the perineum, runs along the spinal column to the neck, and over the head to the centre of the upper lip. Another part, the Conception vessel descends from the palate to the throat and through the sternum, abdomen and pubic bone to the perineum (Fig 6).

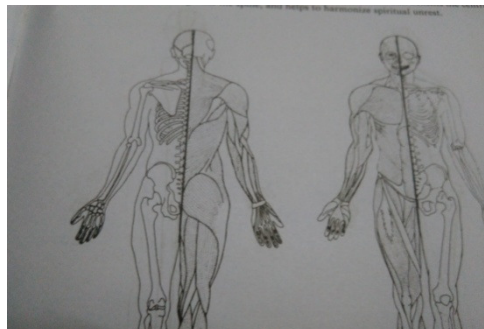


Figure:6 Pathway of great central meridians Governor Vessel and Conceptual vessel

The great bridge meridian, Yinqiao courses from above the eyes then travels through the side of throat, chest, abdomen, inside of the legs to the ankles. The Yangqiao flows up from outer back of the legs, hips, then moves over buttocks, ascending the back, neck, and over the head to the forehead (Fig 7).

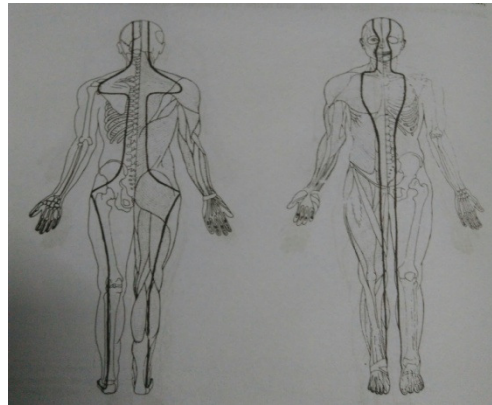


Figure:7 Pathway of great bridge meridians Yinqiao and Yangqiao

The penetrating meridian originates in the lumbar region, moving internally through the reproductive organs and penetrating up the front of the body near the spine, to above the upper lip (Fig 8).

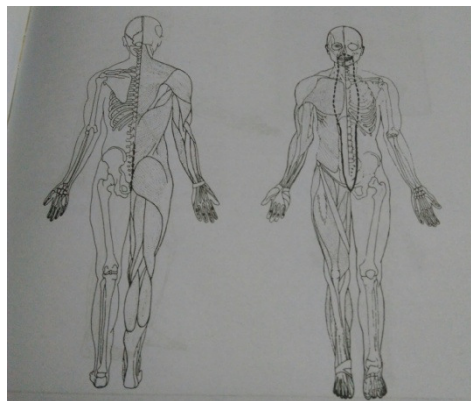


Figure:8 Pathway of penetrating meridian

The Belt meridian moves horizontally around the waist, then it drops down moving across the abdomen at a lower level and crosses the back (Fig 9).

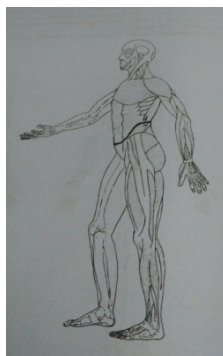


Figure:9 Pathway of Belt meridian

2.9.5 ACUPOINTS

Acupoints are points located on the body surface along meridians. Generally, Qi energy flows from internal organs along the meridians to the body surface at acupoints. They are also sites where Qi energy can get blocked when physiological functions are disturbed. Blocked Qi energy is called 'evil Qi'. In acupuncture, acupressure and moxibustion treatments, they are stimulated to promote free flow of Qi in both meridian and organ. The numerous acupoints located on the body are classified based on meridian name and uses in treatment.

NUMBERS OF ACUPOINTS

The upper three Yin meridians have 29 acupoints, while those on the upper Yang Meridians total 62. On lower yin meridians, are 62 acupoints, and on the lower Yang meridians are 156 points. The great central meridians have 52 points. TCM identifies 361 acupoints in total.

2.9.6 QI ENERGY

According to TCM, Qi is the basic substance that constitutes the universe. All objects in this universe are born from the transformation of Qi. Qi is neither abstract nor beyond sensation. It can be perceived through its various forms of existence. Further, Qi is the basic substance that makes up the human body. In its condensed form, Qi gives life to the organic body; when it is dispersed, the organic body dies. Central to TCM, Qi is divided into two major kinds, Yang Qi and Yin Qi, considered as its masculine and feminine forms. On a cosmic

level, they are responsible for the creation of all matter and energy in the universe and its transformations, changing it from one form into another.

2.10. CORRELATION OF SUBTLE ENERGY SYSTEM ACCORDING INDIAN AND CHINESE CONCEPT

2.10.1 COMPARISON BETWEEN *CHAKRA* AND DANTIAN

Chakra and Dantian are energy centres where *prāṇa* or Qi energy is stored and transported to various part of the body. Both are related to physical, emotional and higher consciousness. Studying TCM, it is obvious that the number of Dantians is different from number of *chakras*. Yogic lore explains seven major *chakras* whereas Dantians are three in number. Another way to look at this is follows: the seven *chakras* comprise three regions. The lower three *chakras* *Mulādhāra*, *Svādīsthan*, and *Maṇipura* are located between the base of the spine and the naval region. Together they are called the *Kanda* or bulb. *Kanda* is very similar to Lower Dantian (Jin Dantian) related to physical function. Similarly the three higher *chakras*, *Vishudhi*, *Ājñā* and *Sahasrā* are closely related and form the region of head. This region is related to spiritual and higher dimension of consciousness. The Upper Dantian (Shin Dantian) is located inside the middle of the head. It collects and emits refined Qi energy which is again related to the transcendental state of consciousness. Between the lower *chakras* and higher *chakras* stands the *Anāhata* *chakra* related to emotion. The Middle Dantian (Qi Dantian) is located in the centre of the chest and connected with the Qi field of the emotional body. See Fig 10 for a comparison. *Chakra* and Dantian share a similar function. Both occupy the subtle body. Both are energy centres and are able to move the energy through subtle channels.

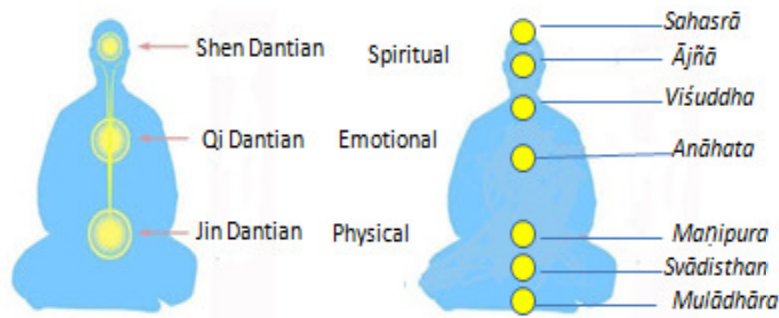


Figure 10: Correlation between Dantian and *Chakra*

2.10.2 CORRELATION BETWEEN *NĀḌĪ* AND MERIDIAN

The subtle body contains seventy two thousand *nāḍīs*. Out of 72,000 *nāḍīs*, the 14 prominent *nāḍīs* identified by major *Yoga* texts and *Upaniṣats* have been described above. TCM also recognizes 14 main meridians, namely 12 regular meridians and two extraordinary meridians. Two extraordinary meridians are Du meridian (Governor Vessel) and Ren meridian (Conceptual Vessel).

The *Upaniṣats* and *Yoga* texts say *nāḍīs* originate in the *Anāhata chakra* (chest) and *Mulādhāra chakra*, describing how major *nāḍīs* are connected to nose, eyes, ears, mouth and higher centres in the head, the “opening gates”. In TCM, six regular Yin meridians originate or terminate in the chest. The six regular yang meridians originate or terminate from head region which are nearer to *nāḍīs* points. They all are connected to hands and feet. Two central meridians originate and terminate at the base of spine or head. Therefore, *nāḍīs* and meridians are close to three chakra groups or three Dantians. According to this concept, the fourteen *nāḍīs* seems to correspond closely to the regular meridians. In addition, a few *nāḍīs* individually relate to specific meridian.

The *Suṣumnā* and Governor Vessel

The *suṣumnā*, most important, central *nāḍī*, follows the spine. Most yoga texts agree with the *upaniṣats* that the *Mulādhāra* is its starting point. Its end point is always described as the *Brahman* gate at the top of the head, where *prāṇa* and *kundali shakti* are said to enter and exit. TCM names the Governor Vessel as a central meridian (the Great Hammer Meridian) starting at the tip of the coccyx just below the *Mulādhāra chakra*, going up the centre of the back, over the top of the head and terminating in the middle of the upper lip. All 12 regular meridians are said to be linked to it, as the storage place from where Qi energy is distributed to various organs.

The Governor vessel and *suṣumnā* are most important regarding spirituality. *Tantra shadhan* says that *kundali shakti* moves upward from the *Mulādhāra* to *Ājñā* chakras along the *sushumna*. Taoist practitioners also say that circulating light is observed as Qi energy moves from the lower Dantian to upper Dantian. These aspects suggest that the *Suṣumnā* and Governor Vessel may have close correspondence to each other.

2.10.3 CORRELATION BETWEEN MARMA AND ACUPOINT

Correlations can be made between *marmas* and acupoints. Modern Ayurveda identifies 365 *marmas* in our body, whereas TCM identifies 361 acupoints along the 14 main meridians. Both *marmas* and acupoints are points in the subtle energy system of therapeutic importance. Marma therapy emphasises facilitating the flow of *prāṇa* in the body via *nāḍī*. Similarly, TCM uses acupoints to regulate flow of Qi energy through the meridians. Table III gives an overview of the location of *chakras*, *marmas* and corresponding acupoints.

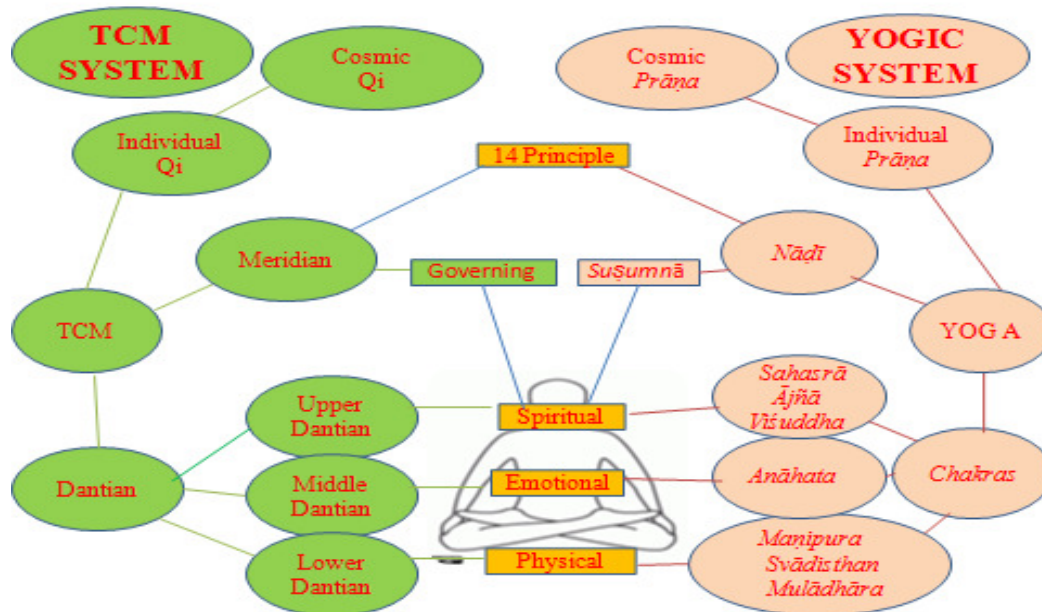
TABLE III : LOCATIONS OF ACUPOINTS AND MARMAS THANA ALONG CHAKRAS			
CHAKRA	LOCATION	MARMA STHANA	ACUPOINT
1. <i>Mulādhāra</i>	Coccyx / Perineum	<i>Guda</i> (anus)	GV- 1, 2, 3; CV-1, 2, 3; SP- 12, 13; ST- 29,

			30; LR- 12.
2. <i>Svādīsthana</i>	Sacrum/pelvis	<i>Kukundara, Vitapa</i>	KI-11,12, 13; CV-3, 4, 5, 6,7; GV-3, 4, 5; BL-23, 24, 46, 47; GB-25.
3. <i>Mañipura</i>	Upper abdomen	<i>Nābhi</i> (Naval)	KI- 17, 18, 19; CV- 10, 11, 12, 13.
4. <i>Anāhata</i>	Chest	<i>Hṛdaya</i> (Heart)	CV- 17, 18; GV-10, 11, 12.
5. <i>Vishudhi</i>	Throat	<i>Nila, Manya, Amsa</i>	ST- 9, BL-10, CV-22, 23.
6. <i>Ājñā</i>	Forehead	<i>Sthapani, Apāñga</i>	TE- 4, GV- 17, 18, 19, 24, 25; BL- 2.
7. <i>Sahasrā.</i>	Crown of the head	<i>Adhipati, Sīmanta</i>	GV-16, 17, 18, 19, 20, 21.

2.10.4 CORRESPONDENCE BETWEEN *PRĀṆA* AND *QI*

Prāṇa is the fundamental energy in the human subtle energy system recognised by Indian systems of medicine. Similarly in TCM *Qi* is considered the most fundamental constituent of the body. *Prāṇa* has major subdivisions, locations and functions. As in prana and Shakti, *Qi* comes in two major kinds, Yang *Qi* and Yin *Qi*. *Prāṇa* and *Qi* are different names for equivalent vital energies circulating in the body to maintain its balanced functioning. Fig 11 gives a comparison of the ideas presented thus far.

Figure 11. Schematic presentation theoretical frame work of Subtle Energy Model based on Traditional System of Medicine and Yogic System



2.11 CONCLUSION

According to the Vedic sciences the subtle energy system consists of *chakras*, *nāḍīs*, *marmas* and *prāṇa / shakti*. The corresponding concepts in TCM are Dantian, Meridians, Acupoints and Yang and Yin Qi energy to model regulation of the human body. This thesis presents the similarity between *chakra* and Dantian, *nāḍī* and meridian, *marma* and acupoint, *prāṇa* and Qi, and various relationships between their numbers, locations, and functions.

Both *Yoga* and TCM use specific methods to enliven *prāṇa / Qi* and promote free flow of energy through the subtle channels in order to restore or improve individual health. Major methods include *asāna*, *prāṇāyama* and meditation in *Yoga*, and acupuncture, acupressure and qigong in TCM.

In this context the meditation posture, *Padmāsana*, when practiced for a period of time, quietness the practitioner's state of mind and slows the breath. Particularly in *Padmāsana*, the practitioner keeps the spine erect so as to activate the subtle energy centers located there. It

also stimulates *marma sthana* (acupoints) located in the thighs and hips. For this reason, *Padmāsana* increases the level of *prāṇa* by stimulating and opening the *nāḍīs*. Yoga texts also state that *Padmāsana* increases an individual's subtle *prāṇa* energy (Swami Digambaraji, 1998). As *nāḍīs* are associated with meridians and *prāṇa* is related to Qi energy, *Padmāsana* practice can be expected to alter meridian energy flow and is measurable by electroacupuncture instrument, Acugraph4.

The chapters of Part 2 of the thesis present details of three experiments in which Acugraph4 was used to measure and understand both physiological and subtle energy manifestations in specific disorders. Study 1 specifically deals with the effect of *Padmāsana* on the meridian system.

CHAPTER-3



REVIEW OF SCIENTIFIC LITERATURE

3. REVIEW OF SCIENTIFIC LITERATURE

3.1 HISTORY OF ACUPUNCTURE POINTS - ACUPOINTS

3.1.1 EVIDENCE FOR ACUPUNCTURE POINTS AND MERIDIANS

TCM recognizes acupuncture meridians as subtle channels through which Qi energy flows, and along which acupuncture points are located, possessing specific electrical properties which can be used in the diagnosis and treatment of pathology. Acupuncture points and meridians are at the core of traditional acupuncture practice. As a result TCM classifies pathology in terms of various kinds of change in meridian energies, and these are used both in the diagnosis and treatment of early stages of disease, for changes in meridian energies occur long before disease manifests at a level recognized by western medicine.

According to TCM, particular kinds of blockage or alteration of Qi flow can be detected in specific meridian acupoints or combinations of acupoints. Anatomical and physiological explanations of these concepts in terms of modern science remain elusive. One widespread explanation for acupuncture meridians involves electrical activity, suggesting that meridians and acupoints possess unique electrical properties, yet this remains controversial.

Electrodermal testing of APs developed out of research in Japan, France, and Germany, beginning in the 1950s. (Becker, 1976; Nakatani, 1953b, 1956, Niboyet, 1951, 1958, Voll, 1975b, 1978) Following the work of Nakatani in Japan and Niboyet in France, Voll, (1975) reported electrical properties of acupuncture points (APs) and meridians. He demonstrated, first, that numerous points on the skin exhibit greater conductivity to remote points than surrounding points; second, that when skin positions of such points are plotted out, they correspond to positions of APs given in TCM maps. He also claimed to have confirmed that

each meridian concerns a specific organ (Lung, Stomach, Heart etc), and that abnormal conductance values at its APs indicate dysfunction in that meridian and organ (Voll, 1975a).

Despite all this early research scientists still remain skeptical. Are the electrical properties fundamental? Have electrical instruments really established that specified sets of points connect along pathways identifiable as meridians? The next section tackles these questions.

3.1.2 REVIEW OF ELECTRICAL MEASUREMENTS AT ACUPOINTS

There have been thousands of studies of electro- or electrical acupuncture, and many systematic reviews exist. However relatively few studies have been conducted on the mechanics of measurements at acupoints. As discussed above, the most recent such review summarized 18 such electroacupuncture studies. The questions on which fundamental studies of this kind need to focus are: (1) Electrical engineering of measurement of acupoints and its optimization. (2) Confirmation of the existence of electrically distinct points. (3) Means (electrical) of experimentally identifying connections between points on the same meridian. (4) Proof that Galvanic Skin Response (GSR) is not a confounding factor. Of the 18 studies, 9 explored Question (2), the existence of APs, and 9 explored Question (3), the existence of meridian pathways. No study has considered the equally fundamental Question (1), but one study discussed below mentions aspects of Question (4).

The 2007 review stated that five of the nine studies that explored the existence of acupuncture sites showed a positive association between lower electrical resistance and acupuncture points, while four did not do so with sufficient significance to be considered useful. Further, seven of the nine studies exploring the existence of a meridian system showed a positive association between lower electrical resistance and meridian pathways. However, quality of research in this area was deemed to be poor. Nevertheless evidence from

such studies correlating electrical activity at various acupuncture points definitely seems to support the meridian concept (Ahn et al., 2008). In more detail:

Three studies identified positions of acupoints by measuring variations in electrical resistance over a chosen area of skin. These three attempts to electrically locate individual APs targeted larger areas with search probes of the following areas of contact: 1.5-2.0 sq. mm (Becker, 1976), 1.5 sq. mm (Hyrvarinen, 1977), 1.0 sq. mm (Poon, Choy, & Koide, 1980), decreasing over time with study state. Surveying a larger area with many smaller probes was intended to consistently identify precise locations of low resistance. The studies reported that locations of low resistance agreed with Chinese maps of acupuncture points.

With regards to Question (4) concerning GSR interference, one article (Pearson, Colbert, McNames, Baumgartner, & Hammerschlag, 2007) has stated that the forehead and palm regions have higher sweat gland densities than other regions of body surface, and may therefore not yield accurate electroacupuncture assessments. In our own studies, skin dampness at the finger tips, and sweat levels are always inspected, and any data showing strong interference from such sources is routinely rejected.

A skill that Acugraph users have to develop is accuracy in identifying the precise locations of APs. Our studies were deliberately limited to Jing-Well points with easily identified positions at the edge of fingernails and toenails, and because Acugraph's probe is ring shaped and has a relatively large area, problems of location of APs are minimized.

3.2 CORRELATION BETWEEN QUALITIES OF FUNCTION IN MERIDIANS AND WESTERN PATHOLOGICAL CONDITIONS

The problem with assessing western pathological conditions by measuring levels of subtle energy flow in acupuncture meridians is that western pathophysiology uses a completely different, gross level of assessment that only recognizes pathology once derangement of

system regulation has grown to such an extent that pain, swelling and other symptoms manifest in particular organs – the system laid out by Claude Bernard to give pathology a scientific cause and effect basis. Chinese medicine is primarily concerned with the subtle energy changes that occur at earlier stages of pathogenesis as homeostasis and allostasis and other forms of dynamic equilibrium are lost, before gross forms of pathology arise. Hence Chinese names for pathology and their treatments concern levels of subtle energy imbalance, and have no correspondence with nomenclatures in western biomedicine. They have to be treated in their own right. For example, one referee for the report of Study 2 published in *Journal of Alternative and Complementary Medicine* points out that in TCM, depression and high blood pressure can have many subtle energy causes.

“... high blood pressure has six different Chinese medicine diagnoses. Four are deficiency conditions while two are excess conditions so they would cause either deficiency or excess readings in different channels on Acugraph. Likewise depression can be due to stagnant liver qi, spleen damp, or heart phlegm (excess conditions), or heart blood or yin xu, spleen qi xu, or kidney and heart not communicating (deficiency conditions)..... Within group variations could be due to different Chinese medicine diagnoses.”

In general lower energy levels correspond to poorer quality of health. A prospective study showed that patients diagnosed with ureteral calculus tend to have lower electrical conductance values over all acupoints than healthy subjects (C. Te Lee et al., 2010). Several studies have shown that abnormal conductance values, high or low, indicate dysfunction in related organs. For example lower spleen meridian energy has been observed in type 2 diabetes patients (Sharma, Meenakshy, et al., 2014). In general, specific patterns of meridian conductance are taken as indicators of poor regulation of meridian energy corresponding to specific pathological conditions, or incipient conditions. A study of electrodermal activity on patients with rheumatoid arthritis (RA) was compared with pain-free controls. The Bladder,

Gall Bladder, and Small Intestine meridians were observed to have consistently lower electrodermal conductances in RA patients than the controls. In TCM, these three meridians are identified as pain sensitive meridians – all are Yang meridians corresponding to ‘hollow’ organs, and are the three meridians used in treatment of RA by TCM practitioners (Turner et al., 2013). Another cross sectional study compared electrodermal skin resistance values between patients with primary dysmenorrhoea and healthy subjects. Results found three acupoints SP6, SP8 and GB39 to be significantly imbalanced in the patients. In acupuncture practice, these three points are used for pelvic pain treatment due to their effect of promoting flow of Qi energy and pain relief (She et al., 2014).

3.3 CORRELATION BETWEEN FUNCTIONS OF MERIDIANS AND INTERNAL ORGANS

TCM holds that meridians are connected to internal organs. Electrical conductance values of different acupoints on the surface of the skin give various kinds of information about the functioning of particular organs. Several studies seem to confirm that electrical conductance values of acupoints change according to the level of functioning of organs in the body. Abnormal electrodermal responses at acupoints have also been shown to indicate dysfunction of corresponding internal organs.

One study showed that conductance values of heart meridian acupoints located in the forearm change correspondingly when heart rate increases or decreases. The author claimed that his study presented the first evidence of direct correspondence between electrical activity at acupuncture points and changes in function of organs in the body (Rosenblatt, 1982).

In another study, skin conductance values at organ related meridian acupoints were compared to determine whether an electrodermal value at an acupuncture point was indeed connected with an internal organ. Skin conductances of 28 subjects with asthma and 28 subjects in

normal health were measured. Skin conductances at LU7 and LU9 points were measured on both forearms. Results suggested that patients with asthma have lower skin conductances at these points than healthy subjects. Lung acupoint conductance values change when lung associated dysfunction is present (Jones & Ngai, 2013).

In another study Acugraph was used to observe how it may reflect different organ functions in different pathologies. Diabetic patients (total 132, 64 females) were assessed by four operators using Acugraph. The result showed the strongest meridian was Lungs the weakest were Kidney and Bladder. Spleen and Gall Bladders were next weakest meridians. Spleen weakness may be significant since the spleen meridian covers pancreas (Sharma, Meenakshy, et al., 2014).

Another pilot study, where 15 subjects with symptomatic problems of the digestive tract were compared with 21 asymptomatic subjects measured at the SI4, LI4, and ST42 acupoints, the ‘source points’ for those meridians. Bilateral readings were taken from all 12 meridians. High, Low, Split and Normal reading were used for comparison. Results revealed imbalances in the SI meridian just attaining significance ($P < 0.04$) between those with digestive disorders and healthy subjects, appearing to support TCM concepts (D’Amoto, 2009).

3.4 YOGA STUDIES ON ENERGY REGULATION AND ENHANCING QI/ PRANA LEVEL

Health is closely related to the regulation of energy in an individual (Hankey, 2015). Differences in meridian energy regulation have been seen in several studies using Acugraph. In one study of effects of 3 weeks Yoga practice on 32 healthy individuals, pre post readings were taken using Acugraph. Group results were reported on Acugraph parameter: E_L values (overall Qi energy levels) and balance between Yin/Yang meridians, upper and lower, and left and right regions of the body. The overall meridians mean value of energy levels

increased by 10.5 for the 28 normal subjects and a similar amount for five hyperactive subjects. Changes in energy balance between Upper and Lower meridians and between left and right meridians were significant. The study concluded that the observed changes correspond to improvements in system regulation, and therefore of health (Nagilla et al., 2013).

Another study assessed effects of yoga-lifestyle intervention on acumeridian energy levels, and found improvements in 33 yoga novices compared with 20 long term yoga practitioner. The study reported that long term yoga practitioners have better Qi balance compared to novice yoga practitioners. It observed that the novices had higher variance than experienced practitioners. It concluded that the observed changes corresponded to improvements in system regulation, which seems to correspond to better health (Sharma, Hankey, Nagilla, et al., 2014).

Similarly, pre-post measurements on a five-day Stress Management for Executive Tension (SMET) program found energy level low in pre-practice readings, indicating that professional strain in the workplace creates mental stress affecting meridian regulation. Post-program readings, after the SMET program, showed significant improvements in E-L energy levels (mean increase 8.77 ± 2.72 points). The program was thus shown to be effective for executive stress management ($P < 0.001$) (Meenakshy, Hankey, et al., 2014a).

3.5 RELIABILITY OF ACUGRAPH

The advantages of using Acugraph require its limitations to be understood by its user. Meenakshy (2009) conducted a rigorous experimental investigation of test-retest repeatability of conductances at Jing-Well meridian endpoints, considered sufficient for preliminary testing. It concluded that variances in Acugraph readings are too large for single readings to be considered medically accurate. Another study of Acugraph3 reliability (Mist et al., 2012)

assessed test-retest repeatability in measurements on: (1) known resistors, (2) organic matter, (3) 30 participants at Jing-Well and Yuan-Source points by a single experienced operator, and (4) inter-operator variability at specific acupoints for first-time, newly trained operators.

The study found Coefficient of Variances change in the range of 17.7 to 34.8%; agreeing with the conclusion that variances in single Acugraph readings may often be too high for valid assessments to be made on individual meridians (Meenakshy, 2009).

Another study (Chamberlin, Colbert, & Larsen, 2011) published norms for Acugraph readings in the North American population, summarizing 43,088 measurements by 8,637 practitioners between 2005 and 2009. It assessed variations in values with time of day, gender and age, and finding important variations to be taken into account when comparing absolute values of measurements on different subjects.

Another inter-operator variability study was carried out on diabetic subjects at SVYASA University Health Home. Four operators made measurements at Jing-Well points on 132 individuals of both sexes (68 male and 64 female) using Acugraph3: Operator 1 (16 male, 12 female), Operator 2 (18 male, 13 female), Operator 3 (15 male, 21 female), and Operator 4 (19 male, 18 female). Readings were taken between 11 am and 12 am or 4 pm and 5 pm on patients attending the Health Home between 2008 and 2011. Age differences among subjects were not significant. Average skin conductances (EL) were: Operator 1 - 34.89, Operator 2 - 33.07, Operator 3 - 74.72 and for Operator 4 - 86.05, so large inter-operator differences in overall acumeridian energy readings were observed. Operators instinctively exerted different pressures with the probe according to their training when obtaining readings. EL values may vary between operators according to pressure exerted during measurements (Sharma, Hankey, Nagendra, & Meenakshy, 2014).

3.6 CONCLUSION

Extensive research exists on electroacupuncture, most concerning its applications to treating various pathologies. Little concerns its use to resolve the fundamental scientific questions regarding the existence of APs, their grouping into meridians, and connections between those and particular organs and organ systems. Nor is there much literature on its use in diagnosis. Chapter 3 focused on these last questions, because S-VYASA is primarily interested in using Acugraph to assess improvements in-house patients, and to investigate subtle energy mechanisms behind the cures of chronic diseases through Yoga medicine treatments.

Studies from Masters and PhD theses published by S-VYASA students were all reviewed, showing that these form a consistent body of literature on Acugraph assessments of many conditions, in both patients and healthy persons. Inherent inaccuracies in individual Acugraph readings were pointed out in the first 2009 Masters thesis. Despite this, S-VYASA students have conducted useful group studies, confirming and providing objective proof of a new, independent kind, of the value of Yoga medicine treatments and therapies. One particularly valuable idea to emerge is that *Yoga practices improve system regulation*. The reduction in group variances demonstrating this idea has been extensively discussed, and published as an Appendix to the author's paper in JACM. (Kuntal et al., 2016) It proves that Yoga medicine acts on patient physiologies in a new and unsuspected way, entirely different from drug treatments. It establishes Yoga medicine as a completely safe system, free of all the risks, indeed avoiding mortal dangers of modern allopathic biomedicine.

The Tables below summarize the results discussed thus far in this chapter.

SUMMARY TABLE OF SCIENTIFIC LITERATURE

Author and year of publication	Sample size (n)	Design/test	Variables studied	Findings
CORRELATION BETWEEN THE FUNCTIONS OF MERIDIANS AND PATHOLOGICAL CONDITIONS				
Lee et al., 2010	60 ureteral calculus or renal colic patients and 30 healthy subjects	Cross sectional design/ Independent Sample t test	24 source acupoints in the 12 left meridians and the 12 right meridians were measured with a device (MEAD, the 6th generation, Medpex Enterprises, Taiwan).	Patients diagnosed with ureteral calculus tend to have lower electrical conductance values over all acupoints than healthy subjects
Turner, Linden, & Marshall, 2013	32 rheumatoid arthritis patients and 28 control subjects	Two group repeated measurement/ANOVA test	24 Jing well acupoints in the 12 left meridians and the 12 right meridians were measured with a device The Prognos Ohmmeter	The Bladder, Gall Bladder, and Small Intestine meridians were observed to have consistently lower electrodermal conductances in RA patients than the controls. In TCM, these three meridians are identified as pain sensitive meridians
She et al., 2014	48 healthy volunteers and 46 primary	Two group pre post study/ Kruskal-Wallis	Three Xi-cleft points- SP8, LR6, and KI5, three	SP8, SP6 and GB39 were significantly imbalanced in patients

	dysmenorrhea (PD)	test	Yuan source points - SP3, LR3, and KI3 and GB 39 were measured	with dysmenorrohea than healthy
Meenakshy, et.al.,2014	43 HIV Children, .	Cross sectional design, Independent sample t test	24 Jing well Acupoint	The study suggests that HIV infection depletes the level of Qi, and Energy levels in HIV positive group were significantly lower in all meridians than healthy children (p<0.001).
CORRELATION BETWEEN FUNCTIONS OF MERIDIANS AND INTERNAL ORGANS				
Sharma, B, et.al.,2014	132 subjects with Diabetic	2-Factor ANOVAS.	24 Jing well Acupoint	Upper meridians showed higher energy levels than lower. The strongest meridian was Lungs; the weakest were Kidney and Bladder. Spleen and Gall Bladders were next weakest Spleen
Jones & Ngai, 2013	28 asthmatic and 28 Healthy	Two group/ Independent sample t test	LU7 and LU9 points in left and right forearms	Results confirmed that patients with asthma have lower skin

				conductances at these points than healthy subjects
YOGA STUDIES ON ENERGY REGULATION AND ENHANCING QI/ PRANA LEVEL				
Nagilla, et.al.,2013	32 healthy individuals	Single group Pre Post design/ Paired sample t test.	24 Jing well Acupoint and meridians groups	Significant improvements were observed in all and supporting the ideas that yoga enlivens Qi that balance in meridians constitutes health.
Sharma, B, et.al., 2014	33 volunteers of yoga instructor training, and 20 resident, experienced practitioners,.	Cross sectional design/ Independent sample t test	24 Jing well Acupoint	Energy levels significantly improved in all 24 meridians Yoga lifestyle practice can Increase and balance of acumeridian energies; long-term practice decreases group SD's.
Meenakshy, et.al.,2014	45 subjects,	pre- post study design, paired sample t test	24 Jing well Acupoint	Energy levels were significantly improved compared to pre values after the SMET program for the subject (p<0.001). The results begin to explain why

				yoga practice is clinically effective.
Meenakshy, et.al.,2014	15 subjects	Single group Pre Post design/paired sample t-tests	24 Jing well Acupoint	<i>Yajña</i> performance has positive effects on human health. Lower meridians systematically improved, upper meridians did not. Initial Upper- Lower imbalances were reversed.
RELIABILITY OF ACUGRAPH				
Mist, S.D, et.al., 2011	30 healthy volunteers	Independent Sample t test	AcuGraph3 provides repeatable readings on known resistors, non-human organic material and human acupoints recorded by a single operator.	Pressure sensor to the AcuGraph system and providing in-depth consensus training to the operators will lead to a level of interoperate variability that is acceptable for use in clinical trial.
Chamberlin, s, et.al., 2011	8637, Patients,	two sample t tests, three way analyses of variance and Linear regression	24 Jing well Acupoint	Skin conductance in general, is higher in males, in afternoons and declines with age. Skin Conductance decline with age differs at

				different acupoints between males and females.
Sharma, B, et.al., 2013	132 individuals, Operator1 (16 male, 12 female), Operator 2 (18 male, 13 female), Operator 3 (15 male, 21 female),	Normality of distributions for each meridian and average variable was assessed using the Shapiro-Wilk test	24 Jing well Acupoint	Unless inter-operator variability is taken into account, actual values will not have any meaning.

CHAPTER – 4



AIMS AND OBJECTIVES

4.0 AIMS AND OBJECTIVES

4.1 AIMS OF THE STUDIES

1. To understand the effects of Yoga practice on the body's subtle energy system and its consequent importance.
2. To understand how improper regulation of prana/Qi causes ill health.
3. To measure differences in meridian energy flows associated with organ dysfunction.
4. To examine efficacy of yoga in controlling depression.

4.2 OBJECTIVES OF THE STUDY

- To find out the effect of Lotus Posture (Padmasana) on Qi energy
- To observe dosage effects at different time durations of sitting in Padmasana due subtle energy flow
- To assess the enhancement of energy due to specific Asana practice
- To observe meridian imbalances in patients with anxiety and depression
- To observe Qi/ pranic fluctuations during disease condition
- To assess prana /Qi energy obstruction and regulation in patients with asthma
- To observe effects of asthma on meridian energy flow, particularly of lungs
- To assess differences in lung meridian energy between asthmatics and healthy
- To observe differences in energy flow between Anxiety, Depression and Healthy people
- To observed improvements in regulation of subtle energy flow due to yogic practices in those with depression

4.3 RATIONALE OF THE STUDY

1. Various forms of Yoga have been reported to affect subtle energy. The first study was carried out to understand the effect of a single meditative asana on meridian systems which are linked with Qi energy. This is the first time the practice of a single asana has been assessed in this way.

2. Studies have reported that proper energy flow induces good health, while improper flow causes various health hazards. The study attempts to verify changes in energy and their effects on health by comparing healthy and unhealthy subjects.

3. This study provides further support for the TCM thesis that meridians are connected with internal organs, and for several studies observing changes in electrodermal conductance at acupoints is in agreement with changes of physiological functioning of the body. The study was designed to observe the relationship between proper functioning of systems corresponding to particular meridian channels.

4. Certain yogic practices are evidently effective in treatment of psychosomatic ailments like depression. This study attempts to measure and understand how improvements in regulation of subtle energy flows in the body may overcome psycho-physiological problems.

4.4 RESEARCH QUESTIONS

1. Can Padmasana practice impact the meridian system?
2. Are there differences in meridian energy flow due to Padmasana practice for different time periods?
3. Does specific asana influence the practitioner's pattern of subtle energy flow?
4. Is Acugraph able to distinguish Qi energy flow in Depression, Anxiety and Asthma?
5. Do asthma patients have compromised subtle energy flow in the lung meridian?
6. What differences of energy pattern exist between healthy and unhealthy subjects?

7. Are there differences in energy regulation in healthy and unhealthy subjects?
8. Do yoga practices exert any improvements in subtle energy in depression patients?

4.5 HYPOTHESES AND NULL HYPOTHESES

Hypotheses (H_a):

- Sitting in Lotus Posture (Padmasana) may affect Qi energy levels
- Sitting in Padmasana for different lengths of practice may have observable dosage effects on subtle energy levels
- Specific Asana practice may enhance subtle energy flows
- Patients with anxiety and depression may exhibit meridian imbalances
- Disease conditions may give rise to greater Qi / prana variances
- Prana / Qi energy obstruction and regulation may occur in asthma patients
- Asthma may reduce flow of lung meridian energy
- Differences in lung meridian energy may exist between asthmatics and healthy people
- Contrasting differences in energy regulation may be observed between those with asthma and healthy people
- Anxiety, Depression and Healthy people may have observably different patterns of energy flow
- To determine whether yoga practices improve regulation of subtle energy flow

NULL HYPOTHESES (H₀):

- Sitting in Lotus Posture (Padmasana) does not affect Qi energy levels
- Different lengths of time in Padmasana will have no observable dosage effects on subtle energy levels
- Specific Asana practice may not enhance subtle energy flows

- Meridian imbalances do not exist in patients with anxiety and depression.
- Disease conditions do not give rise to greater Qi/ prana fluctuations
- Asthma patients may not exhibit obstruction in regulation Prana / Qi energy
- Asthma may not observably reduce flows of lung meridian energy
- Lung meridian energy may not be observably different between asthmatic and healthy people
- Observations will find no significant differences in energy regulation between asthmatic and healthy people
- Anxiety, Depression and Healthy people may not have observably different patterns of energy flow
- Yoga practices do not improve regulation of subtle energy flow

CHAPTER-5



METHODS

5.0 METHODS

5.1 SUBJECTS

5.1.1 Sample Size

5.1.1.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

Fifty two males with ages between 20 and 30 years (group means \pm S.D., 23.0 ± 3.2 years) were recruited as participants by announcements in the S-VYASA University's daily program called friendship meet (Maitri Milan). Statistical calculation of the sample size was done from a pilot study. According to pilot study, the sample size was 40, $\alpha = 0.05$, $\text{power} = 0.95$, Effect Size (es) = .531 and correlation = .97 (G power- 3.1.4). Ten extra participants were added to the final study to account for dropouts. Final numbers were 50.

5.1.1.2 Study 2: Acugraph4 Comparison of Depression, Anxiety and Healthy subjects

Anxiety and Depression participants were recruited from S-VYASA hospital *Ārogyadhāma*, in *Anekal Tāluka*, and Healthy residents at SVYASA University.

Twenty-one patients with Anxiety aged 20-50 years (Mean Age \pm SD, 29.39 ± 8.5 years), twenty-six patients with Depression aged 20-50years (Mean Age 32.55 ± 8.91 years), and a comparison group of forty-four healthy subjects in the same age group (Mean age 32.15 ± 7.8 years) signed up for the study.

5.1.1.3 Study 3: Acugrap4 Assessment after 7 days Yoga Intervention for Depression

Thirteen participants with depression were recruited from S-VYASA hospital *Ārogyadhāma*.

5.1.1.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph4

Seventy asthmatic patients were recruited from statistical calculation with $\alpha = 0.05$, $\text{power} = 0.95$, $es = 0.33$ based on a previous study (Meenakshy et al., 2013). Subjects were recruited from three clinics in West Bengal and from S-VYASA's *Arogyadhama* health centre in Bengaluru. Twenty subjects were excluded from the study due to age limitation.

Data was obtained from fifty asthma patients aged from 20 to 50 years (Mean Age \pm SD 35.36 \pm 8.68 years) and a comparison group of fifty healthy similarly aged (Mean age \pm SD 34.11 \pm 7.29 years) recruited from the same locations.

5.1.2 Inclusion Criteria

5.1.2.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

Subjects were male Yoga instructors with more than 1 year residential experience of regular yoga practice at S-VYASA Yoga University.

5.1.2.2 Study 2: Comparison of Depression, Anxiety and Healthy subjects

Subjects were recruited from anxiety patients and depression patients attending S-VYASA's Arogyadhama Section C for those with mental disturbances; those included were willing to participate in the study and without severer problems e.g. schizophrenia. Controls were of similar age, willing to participate, with no diagnosis of mental problems, nor on medication.

5.1.2.3 Study 3: Acugrap4 Assessment after 7 days Yoga Intervention for Depression

Inclusion criteria were diagnosed mental disturbance of depression by a general practitioner, confirmed by the local health centre physician; willing to participate in study.

5.1.2.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph

Subjects had been diagnosed with asthma; those included agreed to participate in the study. Control group: similar age, willing to participate, not having been diagnosed with mental problems, nor on any medication.

5.1.3 Exclusion Criteria

5.1.3.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

Exclusion criteria were females, any physical disability, mental disturbance, or inability to sit in Lotus Posture.

5.1.3.2 Study 2: Comparison of Depression, Anxiety and Healthy subjects

Exclusion criteria included severe psychiatric problems such as bipolar disorder and schizophrenia. Control group: age limitation; under medical treatment or on medication.

5.1.3.3 Study 3: Acugrap4 Assessment after 7 days Yoga Intervention for Depression

Exclusion criteria: severe psychiatric problems such as bipolar disorder and schizophrenia.

5.1.3.4 Study 4: Comparison of Asthma and Healthy subjects

Exclusion Criteria: Serious mental problem; hypertension. Control group: age limitation; under medical treatment, or on medication.

5.1.3.5 Common Exclusion Criteria For All Studies

Cuts or mole on or close to Jing-Well meridian points; finger or toe missing; implanted electronic devices.

5.1.4 Ethical Consideration

The Institutional Ethics Committee reviewed and approved all the studies. Informed consent was presented during a briefing session (See appendix). Participants were explained the aim and method of each study; those giving voluntary consents were considered for each study.

5.2 STUDY DESIGNS

5.2.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

The design was a two arm controlled study. Subjects reporting on the first day were assigned alternately to two different groups: one sitting in Lotus Posture and the other sitting in a chair. The first group sat in Lotus Posture for periods of 10, 20 and 30 minutes on consecutive days, while the second group sat for the same periods of time on a chair. Before and after each session, Acugraph readings were taken. Assessments were taken between 6.00 am and 7.30 am. Consort flow diagram is displayed in Appendix 5.

5.2.2 Study 2: Comparison of Depression, Anxiety and Healthy subjects on Acugraph4

The design was a three arm cross sectional study. All data from anxiety and depression patients were taken on the first day of their admission to the S-VYASA health home. Data from the healthy group was taken at the same location between 10 am and 12.30 pm.

5.2.3 Study 3: Acugrap4 Assessment after 7 days Yoga Intervention for Depression

The design was a single group pre-post and data collected before and after 7 days of intensive yoga program for depression in S-VYASA health home. Acugraph pre and post readings were taken at the same time namely, between 10 am and 12.30 am (Yoga program is presented in appendix 7).

5.2.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph4

The study was a two group cross sectional design. Acugraph and Mini Asthma quality of questionnaire and PEFr readings were taken in the same session.

5.3 ASSESSMENT TOOL

5.3.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

Acugraph4: Assessments were made using the Acugraph Digital Meridian Imaging system. The Acugraph system consists of a probe, ground bar, connection cable, software CD, user manual and computer. Participants hold the ground bar in one hand while the probe is pressed to acupuncture points one at a time on the opposite hand and the electrodermal conductance is measured. To measure possible pain experienced while sitting in Lotus Posture, a visual analogue pain scale from 1 to 10 was presented to each subject after each session (Appendix 6).

5.3.2 Study 2: Comparison of Depression, Anxiety and Healthy subjects on Acugraph4

The same assessment tool, namely Acugraph4, was used as mentioned in Section 5.3.1.

5.3.3 Study 3: Acugrap4 Assessment after 7 days Yoga Intervention for Depression

The same assessment tool, namely Acugraph4, was used as mentioned in Section 5.3.1.

5.3.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph4

In this study, in addition to Acugraph4, Peak expiratory Flow rate (PFER) and the Mini Asthma Quality of Life Questionnaire (Mini AQLQ) were measured.

Peak expiratory Flow rate (PFER): This tool is used in asthma diagnosis and assessment. Maximum flow rate generated during forceful exhalation reflects lung capacity. It depends on both voluntary effort and muscular strength (Hetzel & Clark, 1980).

The Mini Asthma Quality of Life Questionnaire (Mini AQLQ): a shorter and simpler version of the Quality of Life Questionnaire for Asthma patients. Here the fifteen items measure functional problems (physical, emotional, occupational and social) that are most troublesome to adults with asthma. It is used extensively throughout the world and is available in many languages. Mini AQLQ is a self-administered questionnaire asking patients to recall their experiences during the last two weeks and to respond to each question on 7 point scale (7 = no impairment, 1= severe impairment) capable of measuring severity of the condition (Juniper, Guyatt, Cox, Ferrie, & King, 1999).

5.4 PRIMARY OUTCOME MEASURE

In all studies, the outcome measures are the acupuncture meridian conductances of all 12 major meridians; Appendix 4 provides details on these measures.

5.5 DATA EXTRACTION AND ANALYSIS

5.5.1 DATACOLLECTION

All data were collected using Acugraph4 under direction of its computer software program installed for numerical measurement of conductance. Questionnaire, consent forms and demographic data were obtained to collect data. To account for possible variability in

atmospheric temperature and humidity, a hygrometer (Equinox, EQ 310 CTH) was used during data collection. PEFr readings were manually recorded in separate record sheet.

5.5.2 DATA SCORING

The Acugraph4 program automatically generates and stores subject information and data under the heading, 'subject'. The output for each subject can be converted into a pdf file.

5.5.3 DATA ANALYSIS

Data were variously analyzed using SPSS 19.0, MS Excel 2007 and GraphPad Quick Cals.

5.5.3.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

Significances of differences between pre-post changes observed in the two groups for each time value, 10 mins, 20 mins, and 30 mins; within group analyses were carried out using paired sample t-tests. Independent sample t-tests was carried out to see the between group difference in 10 min, 20 min, 30 min sessions. Further, Repeated Measures Analysis of Variance (RMANOVA) was used for within group difference in three time intervals.

5.5.3.2 Study 2: Acugraph4 Comparison of Depression, Anxiety and Healthy subjects

Independent Sample 't' tests compared means to evaluate between groups differences; Fisher's 'F' test was employed to compare variances (SDs).

5.5.3.3 Study 3: Acugraph4 Assessment after 7 days Yoga Intervention for Depression

Within group pre-post changes were evaluated using paired sample 't' tests, while pre-post changes in variance were evaluated using Fisher's 'F' test.

5.5.3.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph4

To compare group means of Asthma and Healthy, independent samples 't' tests were performed, Fisher's 'F' test was carried out to compare variances (SDs).

In the next chapter, the results of all four studies are presented.

CHAPTER – 6



RESULTS

6. RESULTS

6.1. Study 1: Effect of Lotus Posture on acupuncture meridian energies

This study's results are set out in Tables 6.1.1, 6.1.2, 6.1.3, 6.1.4, 6.1.5 and Figure 6.1.1. Tables 6.1.1, 6.1.2, 6.1.3 display group means and standard deviations for conductances at each of the twenty four acupuncture meridian Jing-Well points before and after respectively 10, 20 and 30 minute time periods of sitting in Lotus Posture (Padmasana) and in a chair. These tables include within group and between group statistical significance of changes in each meridian for 10, 20 and 30 min sessions. Within group changes in overall mean of all meridians together are consistent for the six experimental conditions (2 groups x 3 time values) and are of most interest. For sitting in a chair, overall means changed from 57.46 ± 27.78 to 49.99 ± 26.37 for 10 min, from 57.31 ± 27.51 to 53.79 ± 25.75 for 20 min and from 52.54 ± 25.36 to 48.25 ± 25.05 for 30 min i.e. *decreased* for all time periods; for Padmasana, means changed from 57.92 ± 31.25 to 57.09 ± 30.29 for 10 min, from 51.19 ± 28.44 to 56.37 ± 29.57 for 20 min, and from 48.51 ± 30.88 to 57.68 ± 31.42 for 30 min, a completely different pattern of change with increasing time; not changing for 10 minutes, but increasing for 20 and 30 min time periods.

Between group comparison of individual meridians for 10 min sitting in Padmasana and 10 min sitting in Chair found significant differences in upper meridians LU_R, SI_R, LI_L, and in lower meridians SP_L, LR_L, KI_L&R. For 20 min Padmasana compared to 20 min sitting in a Chair, significant differences were seen in upper meridian LU_R, and in all lower meridians except KI_L, and BL_R. For 30 min sitting in Padmasana compared to 30 min sitting in Chair, upper meridian LU_R and all lower meridians showed significant differences.

Table 6.1.1: Acupuncture Meridian Energies within group and between groups results in 10 min sitting in Padmasana and in a Chair

10 mins	PADMASANA			CHAIR SITTING			PADMA/CHAIR
VARIABLE	PRE	POST	p value	PRE	POST	p value	p value
LU_L_10	57.52±26.88	55.76±23.51	0.54	60.80±27.01	54.56±29.61	0.03*	0.27
LU_R_10	53.60±25.03	57.6±30.26	0.27	58.40±27.71	52.08±28.95	0.09	0.05*
PC_L_10	50.08±26.89	46.80±23.13	0.29	46.08±20.49	41.76±20.85	0.17	0.81
PC_R_10	48.72±23.34	47.04±22.20	0.57	48.24±19.57	39.44±16.29	0.01**	0.09
HT_L_10	48.80±22.05	45.84±25.23	0.30	48.72±22.14	40.08±18.23	0.003**	0.16
HT_R_10	50.96±21.02	45.92±22.98	0.08	47.92±20.96	39.28±19.66	0.004**	0.37
SI_L_10	49.76±27.86	51.12±27.97	0.67	52.32±24.53	44.08±23.42	0.01**	0.04*
SI_R_10	52.00±27.04	47.36±23.26	0.11	54.16±26.70	45.04±23.23	0.003**	0.28
TE_L_10	48.80±23.78	49.04±26.11	0.94	48.00±22.55	41.12±21.75	0.04*	0.12
TE_R_10	47.20±23.40	43.36±22.40	0.17	48.64±23.03	40.16±20.30	0.003**	0.24
LI_L_10	58.56±23.25	61.60±24.81	0.29	59.20±23.25	52.88±25.36	0.03*	0.02
LI_R_10	55.44±24.15	54.16±24.10	0.64	53.60±22.85	47.12±22.66	0.02*	0.18
SP_L_10	63.76±31.12	66.00±32.18	0.40	58.72±27.79	52.96±26.22	0.04*	0.03*
SP_R_10	66.24±37.98	67.36±34.08	0.73	59.76±30.46	52.48±26.45	0.03*	0.07
LR_L_10	68.08±37.04	71.04±36.61	0.39	63.76±33.80	54.72±33.31	0.01**	0.02*
LR_R_10	66.64±38.80	66.88±33.50	0.94	63.60±36.12	57.92±30.91	0.07	0.17
KI_L_10	50.08±28.22	52.56±26.64	0.42	55.84±29.99	45.52±26.57	0.001***	0.01**
KI_R_10	52.56±36.22	52.48±31.24	0.98	55.52±28.46	45.84±24.64	0.0001***	0.01**
BL_L_10	63.68±34.01	62.00±30.62	0.58	66.24±31.90	57.92±29.79	0.001***	0.13
BL_R_10	66.48±38.74	63.12±36.11	0.20	68.32±33.49	60.88±28.79	0.01**	0.27
GB_L_10	63.92±34.63	62.88±33.20	0.73	66.88±29.40	60.24±30.38	0.29	0.19
GB_R_10	65.84±39.03	62.32±31.07	0.25	65.52±30.57	59.92±27.96	0.07	0.63
ST_L_10	71.44±33.10	70.96±33.77	0.88	65.60±26.88	57.92±28.45	0.02*	0.11
ST_R_10	70.32±40.12	69.12±37.72	0.71	62.24±28.85	56.00±28.52	0.06	0.27

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.1.2: Acupuncture Meridian Energies within group and between groups results in 20 min sitting in Padmasana and in a Chair

20 mins	PADMASANA			CHAIR SITTING			PADMA/CHAIR
VARIABLE	PRE	POST	p value	PRE	POST	p value	p value
LU_L_20	47.2±30.33	55.28±26.76	0.64	57.44±26.40	56.4±27.87	0.81	0.14
LU_R_20	43.84±27.56	54.72±25.55	0.007**	56.32±25.79	57.52±28.51	0.70	0.03*
PC_L_20	42.72±24.19	43.92±22.70	0.67	48.00±20.41	42.24±16.91	0.05*	0.09
PC_R_20	41.52±21.41	43.52±21.18	0.53	48.16±19.80	45.92±21.77	0.48	0.34
HT_L_20	40.00±21.69	43.44±23.33	0.41	47.84±19.54	46.40±20.55	0.73	0.40
HT_R_20	38.80±18.62	43.04±19.04	0.18	47.36±19.86	48.56±22.87	0.70	0.49
SI_L_20	43.52±26.59	47.76±25.94	0.23	51.04±22.47	46.32±19.92	0.18	0.07
SI_R_20	41.60±22.26	50.08±25.80	0.03*	50.24±24.29	49.28±21.71	0.80	0.08
TE_L_20	41.44±22.60	44.08±21.93	0.40	45.84±22.60	45.92±21.70	0.98	0.56
TE_R_20	40.40±21.90	41.84±20.49	0.64	47.92±22.51	50.64±26.23	0.38	0.77
LI_L_20	51.76±28.03	56.24±25.05	0.20	58.96±24.51	58.88±20.34	0.98	0.35
LI_R_20	47.36±24.49	50.40±24.20	0.29	50.80±20.67	53.92±24.29	0.28	0.98
SP_L_20	59.36±31.41	66.24±33.49	0.02*	56.16±29.61	53.52±27.08	0.38	0.03*
SP_R_20	61.52±31.52	70.56±38.34	0.01*	60.56±29.43	51.52±26.91	0.01**	0.001***
LR_L_20	61.68±28.53	70.40±30.04	0.01*	60.64±31.86	58.00±31.98	0.40	0.01**
LR_R_20	58.96±26.68	67.12±32.38	0.03*	60.24±29.75	56.08±23.49	0.26	0.02*
KI_L_20	50.16±26.06	55.28±24.84	0.19	58.40±31.78	54.80±29.15	0.35	0.11
KI_R_20	44.96±24.97	51.76±28.17	0.06	55.36±30.27	47.60±22.92	0.03*	0.001**
BL_L_20	61.52±28.46	64.24±28.35	0.32	67.68±31.74	60.08±27.96	0.01*	0.01**
BL_R_20	58.32±29.40	62.56±35.85	0.23	67.28±32.80	63.20±27.81	0.25	0.09
GB_L_20	61.04±32.54	66.80±32.98	0.06	69.44±29.44	63.12±29.56	0.04*	0.01**
GB_R_20	60.00±31.14	63.84±32.11	0.22	67.28±29.56	61.36±29.23	0.06	0.03*
ST_L_20	67.68±35.24	70.16±33.82	0.47	71.92±30.07	61.60±29.74	0.004**	0.01**
ST_R_20	63.76±33.76	69.68±35.70	0.04*	65.84±28.60	57.76±25.90	0.01**	0.001***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6.1.3: Acupuncture Meridian Energies within group and between groups results in 30 min sitting in Padmasana and in a Chair

30 mins	PADMASANA			CHAIR SITTING			PADMA/CHAIR
VARIABLE	PRE	POST	p value	PRE	POST	p value	p value
LU_L_30	42.24±27.03	60.00±26.10	0.00001***	53.44±24.85	54.96±26.18	0.67	0.001**
LU_R_30	38.88±23.54	58.56±26.87	0.000001***	48.56±25.41	53.60±25.44	0.15	0.001***
PC_L_30	42.48±21.86	42.48±19.54	1.00	44.32±18.57	40.08±19.53	0.12	0.267
PC_R_30	39.60±21.94	45.12±19.91	0.01	44.88±17.32	38.80±12.70	0.01	0.001***
HT_L_30	39.76±22.00	43.28±22.52	0.32	45.04±17.57	41.52±17.29	0.32	0.162
HT_R_30	38.08±20.54	43.44±18.78	0.06	43.84±17.25	39.12±13.82	0.09	0.01**
SI_L_30	37.12±24.13	47.68±22.03	0.001***	45.04±20.79	46.08±24.93	0.74	0.03*
SI_R_30	41.68±24.72	46.96±21.60	0.08	45.68±21.82	43.28±20.54	0.42	0.07
TE_L_30	40.32±26.16	43.92±18.06	0.27	45.84±20.86	41.36±23.56	0.17	0.08
TE_R_30	36.24±24.53	41.92±18.94	0.08	45.04±19.71	40.00±15.85	0.12	0.02*
LI_L_30	46.64±24.06	54.16±20.53	0.03*	56.16±22.02	51.04±23.35	0.14	0.01**
LI_R_30	45.12±25.39	51.20±20.32	0.04*	48.72±19.73	46.00±17.51	0.35	0.03*
SP_L_30	53.44±31.01	65.36±31.83	0.001***	50.96±25.57	45.68±26.95	0.14	0.001***
SP_R_30	55.92±33.69	67.60±37.92	0.001***	52.88±24.24	49.28±26.00	0.28	0.01**
LR_L_30	58.80±32.62	75.92±39.31	0.0001***	57.04±30.62	49.76±32.14	0.78	0.0001***
LR_R_30	57.20±31.43	72.96±36.26	0.00002***	55.12±27.36	50.24±26.40	0.14	0.0001***
KI_L_30	49.92±36.06	55.68±34.55	0.14	51.36±30.99	44.16±22.66	0.07	0.02*
KI_R_30	45.60±33.11	57.12±34.38	0.00004***	46.24±21.49	43.84±22.03	0.35	0.001***
BL_L_30	57.84±35.72	66.16±30.76	0.01**	64.00±33.97	53.44±29.66	0.002**	0.001***
BL_R_30	58.56±35.50	65.12±40.60	0.05*	66.16±34.83	56.24±31.06	0.004**	0.001***
GB_L_30	61.28±40.64	70.16±40.19	0.03*	65.92±26.74	57.12±30.17	0.03*	0.01**
GB_R_30	57.20±37.55	67.12±36.13	0.01**	62.00±28.57	60.96±30.13	0.76	0.03*
ST_L_30	60.80±38.81	72.00±37.82	0.01**	61.76±25.43	55.68±28.85	0.12	0.01**

ST_R_30	60.00±36.99	70.40±37.43	0.003**	60.00±27.06	60.00±32.66	1.00	0.03*
* <i>p</i> <0.05, ** <i>p</i> <0.01, *** <i>p</i> < 0.001							

Table 6.1.4 displays Acupuncture Meridian Energies changes within group sitting in Padmasana and sitting in a Chair across time interval of 10, 20 and 30 minutes sessions. In upper meridians: LU_L & R, HT_R, and SI_R, and in lower meridians: all meridians except SP_L&R and, KI_L were found to be differing significantly across the three time points in Padmasana. For sitting in Chair, upper meridian: only right LU, HT, SI, TE and, LI were found to be differing significantly across the three time points.

Table 6.1.4: Within Group Changes in Acupuncture Meridian Energies after sitting in Padmasana and a Chair for time periods of 10, 20 and 30 minutes

VARIABLE	PADMASANA				CHAIR SITTING			
	10 min	20 min	30 min	P value	10 min	20 min	30 min	P value
LU_L	-1.76	8.08	17.76	0.0001***	-6.24	-1.04	1.52	0.291
LU_R	4	10.88	19.68	0.001***	-6.32	1.2	5.04	0.032*
PC_L	-3.28	1.2	0	0.357	-4.32	-5.76	-4.24	0.906
PC_R	-1.68	2	5.52	0.133	-8.8	-2.24	-6.08	0.096
HT_L	-2.96	3.44	3.52	0.116	-8.64	-1.44	-3.52	0.335
HT_R	-5.04	4.24	5.36	0.007**	-8.64	1.2	-4.7	0.025*
SI_L	1.36	4.24	10.56	0.123	-8.24	-4.7	1.04	0.081
SI_R	-4.64	8.48	5.28	0.025*	-9.12	-9.6	-2.4	0.03*
TE_L	-0.24	2.64	3.6	0.718	-6.88	0.08	-4.48	0.232
TE_R	-3.84	1.44	5.68	0.059	-8.48	2.72	-5.04	0.012*
LI_L	3.04	4.48	7.52	0.539	-6.32	0.08	-5.12	0.386
LI_R	-1.28	3.04	6.08	0.083	-6.48	3.12	-2.72	0.038*
SP_L	2.24	6.88	11.92	0.063*	-5.7	-2.64	-5.28	0.65
SP_R	1.12	9.04	11.68	0.063*	-7.28	-9.04	-3.6	0.317
LR_L	2.96	8.72	17.12	0.01**	-9.04	-2.64	-7.28	0.325
LR_R	0.24	8.16	15.76	0.005**	-5.6	-4.16	-4.88	0.913
KI_L	2.48	5.12	5.76	0.678	-10.32	-3.6	-7.2	0.425

KI_R	-0.08	6.68	11.52	0.006**	-9.68	-7.76	-2.4	0.136
BL_L	-1.6	2.72	8.32	0.007**	-8.32	-7.6	-10.56	0.742
BL_R	-3.36	4.24	6.56	0.023*	-7.74	-4.08	-9.92	0.245
GB_L	-1.04	5.76	8.88	0.037*	-6.64	-6.32	-8.8	0.834
GB_R	-3.52	3.84	9.92	0.008**	-5.6	-5.92	-1.04	0.432
ST_L	-0.48	2.48	11.2	0.007**	-7.68	-10.32	-6.08	0.686
ST_R	-1.2	5.92	10.4	0.008**	-6.24	-8.08	0	0.138
	* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$							

Table 6.1.4 displays Acupuncture Meridian Energy changes within group sitting in Padmasana and sitting in a Chair across time intervals of 10, 20 and 30 min sessions. In upper meridians: LU_L & R, HT_R, and SI_R and in lower meridians: all meridians except SP_L&R and KI_L were found to be differing significantly across the three time points sitting in Padmasana. For sitting in a Chair, upper meridian: only right LU, HT, SI, TE and LI were found to differ significantly across the three time points.

Figure 6.1.1 displays the result of influence of Padmasana and Chair sitting on meridian readings at three time points.

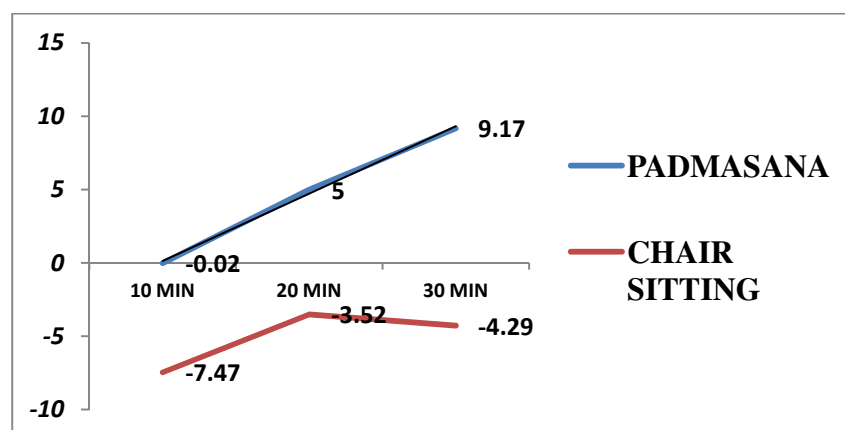


Fig 6.1.1: Influence of Padmasana and Chair sitting on meridian readings at three time points. The values are overall meridians' mean differences (post – pre at each time point) at 10, 20 and 30 min session.

Table 6.1.5 summarizes the number of increases and decreases in these mean values in the form of contingency tables for each group of measurements, pre and post 10 min, pre and, post 20 min and pre and, post 30 min. It is striking that the 20 minutes and 30 minutes contingency tables are very highly significant with $p < 0.0001$.

Table 6.5: Contingency Tables for Increase / Decrease in Meridian Energies						
	10 MINUTES		20 MINUTES		30 MINUTES	
	INCREASE	DECREASE	INCREASE	DECREASE	INCREASE	DECREASE
PADMASANA	8	16	24	0	23	0
CHAIR SITTING	0	24	6	18	3	20
p value	<i>0.0039</i>		<i><< 0.0001</i>		<i><< 0.0001</i>	

6.2. Study 2: Comparison of Depression, Anxiety and Healthy subjects on Acugraph4

Tables 6.2.1 to 6.2.3 display comparisons of participants' Acugraph readings in Anxiety, Depression and in Healthy groups.

Table 6.2.1 displays means and standard deviations of 24 meridian readings for the Anxiety (A), Depression (D), and Healthy (H) groups and between group comparisons. Anxiety Patients exhibited the highest levels of both Jing-Well point conductances (81.84) and group SDs (38.63) of the three groups. Depression Patients showed lowest energy (53.36) levels, but intermediate SDs (33.48). Healthy participants showed intermediate energy levels (62.61), but lowest SDs (27.05) of the three groups. Comparing individual meridians between the three groups, mean values of all meridians but Bladder-Left (BL_L) were ordered Anxiety > Healthy > Depression (Bladder-Left gave H > A > D).

Group(s) →	Anxiety	Depression	Healthy	A - D	A - H	D - H
Meridian ↓	Mean ± SD	Mean ± SD	Mean ± SD	t value	t value	t value
LU_L	109.90±39.96	63.88±40.44	80.05±26.65	3.9***	3.6***	-2.0*
LU_R	90.76±33.57	58.04±38.22	71.27±25.76	3.0**	2.6*	-1.73
PC_L	83.71±33.74	56.42±30.43	58.41±18.87	2.9**	3.9***	-0.34
PC_R	70.90±26.36	52.81±29.64	58.50±17.89	2.2*	2.2*	-1.00
HT_L	83.14±39.28	46.62±31.59	55.50±19.13	3.6***	3.8***	-1.47
HT_R	78.05±38.29	52.46±34.31	55.32±17.13	2.4*	3.3***	-0.46
SI_L	94.86±40.81	53.58±28.88	60.41±18.95	4.1***	4.7***	-1.20
SI_R	83.00±46.98	57.46±34.27	58.27±23.19	2.2*	2.9**	-0.12
TE_L	79.86±41.57	49.12±27.09	54.00±20.90	3.1**	3.4***	-0.85
TE_R	84.38±46.45	49.65±34.07	52.77±19.08	3.0**	3.9***	-0.49
LI_L	96.24±32.51	59.92±31.34	68.41±21.23	3.8***	4.1***	-1.35
LI_R	78.57±32.51	53.58±27.61	61.95±17.94	3.0**	2.8**	-1.54
SP_L	75.48±33.47	46.58±28.34	61.05±28.28	3.2**	1.8	-2.07*
SP_R	84.52±45.95	55.38±38.66	59.18±30.42	2.4*	2.6**	-0.46
LR_L	90.24±49.64	55.73±28.31	64.23±31.71	3.0**	2.61*	-1.13
LR_R	89.90±46.14	58.38±40.89	61.73±32.92	2.5*	2.8**	-0.38
KI_L	65.95±46.14	50.15±38.32	57.41±27.88	1.5	1.1	-0.91
KI_R	63.95±31.34	46.08±37.26	51.09±25.31	1.8	1.7	-0.67
BL_L	73.67±31.29	47.77±35.92	72.23±32.84	2.6*	0.17	-2.9**
BL_R	66.00±30.03	45.62±34.17	72.32±34.99	2.1*	-0.71	-3.1**
GB_L	78.67±37.65	57.31±33.35	69.50±30.41	2.1*	1.05	-1.56
GB_R	75.86±38.13	50.23±30.42	68.59±30.99	2.6*	0.82	-2.4*
ST_L	91.90±41.14	57.27±34.64	66.09±31.95	3.1**	2.8**	-1.08
ST_R	74.57±34.95	56.50±36.08	64.34±33.09	1.7	1.1	-0.92
Overall (E_L)	81.84±38.63	53.36±33.48	62.61±27.05	13.28***	11.38***	6.19***
Upper	86.12±38.37	54.46±32.33	61.24±21.98	10.63***	11.47***	3.61**
Lower	77.56±38.49	52.25±34.64	63.98±31.52	8.21***	5.23***	5.02***

Table 6.2.1 presents between group t values with statistical significances indicated by: * $p < 0.05$, ** $p < 0.001$, and *** $p < 0.0001$. The last three lines display means and SDs for all meridians and upper and lower groups of meridians, with corresponding enhanced t and p values.

Table 6.2.2 displays the averages of means and standard deviations given in Table 6.2.1 for the blocks of upper (LU to LI) and lower (SP to ST) meridians, and within group differences.

Table 6.2.2: Group Means and SDs for Upper and Lower Meridians				
Group \ Meridians	Upper	Lower	t value	p value
Anxiety (21)	86.12±30.19	77.56±32.60	3.06	<i>0.0023</i>
Depression (26)	54.46±32.32	52.25±34.70	0.82	<i>0.411</i>
Healthy (44)	61.24±20.56	63.98±30.90	1.70	<i>0.090</i>

Table 6.2.2 displays averages of means and standard deviations for upper and lower groups of meridians for Anxiety, Depression and Healthy Groups together with t values and p values

Table 6.2.3 displays group comparisons of variances for pairs of groups, treating all values in the data sets individually, i.e. 504/252 readings for the Anxiety group (21 members with total 24 meridians and 12 upper or lower meridians), 624/312 readings for the Depression group (26 members), and 1056/528 for the Healthy group (44 members). Since data was treated by block rather than by individual meridians, F values in this table bear little relationship to the average SD values given in Table 6.2.2.

Table 6.2.3: Comparison of Standard Deviations for Groups of Meridians						
Meridians →	Overall		Upper		Lower	
Group Pairs ↓	F value	p value	F value	p value	F value	p value
Anxiety/Depression	1.331	<i>0.0001</i>	1.409	<i>0.002</i>	1.235	<i>0.0038</i>
Anxiety/Healthy	2.039	<i>0.0001</i>	3.047	<i>0.0001</i>	1.491	<i>0.0001</i>
Depression/Healthy	1.531	<i>0.0001</i>	2.163	<i>0.0001</i>	1.208	<i>0.0293</i>

Table 6.2.3 displays Fisher's F and corresponding p values for group comparisons of variances for all meridians and the upper and lower groupings of 6 left and 6 right meridians.

6.3 Study 3: Acugrap4 Assessment after 7 days Yoga Intervention for Depression

Table 6.3.1 presents Pre-post changes over a 7 day Integrated Approach of Yoga Therapy (IAYT) program in Acugraph parameters for 24 Meridians. This shows clearly variances are reduced after yoga program.

Table 6.3.1: Pre post Meridian Energy Mean and SD				
MERIDIAN	PRE MEAN	POST MEAN	PRE SD	POST SD
LU_L	52.92	56.39	35.59	22.75
LU_R	41.62	44.62	23.17	21.78
PC_L	48.15	51.08	25.98	23.53
PC_R	45.62	46.61	24.32	22.92
HT_L	34.15	39.53	25.68	22.21
HT_R	39.07	37.86	25.89	19.89
SI_L	44.76	54.00	28.26	25.39
SI_R	44.54	43.53	26.94	25.91
TE_L	43.84	41.96	27.02	26.61
TE_R	37.38	36.92	23.48	20.55
LI_L	50.23	51.69	27.2	22.61
LI_R	45.53	43.84	20.59	16.7
LOWER MERIDIANS				
SP_L	40.53	44.00	34.23	23.64
SP_R	53.23	43.23	46.59	30.47
LR_L	25.08	52.46	30.92	35.96
LR_R	59.30	47.69	51.04	33.57
KI_L	50.00	45.23	48.12	32.01
KI_R	47.77	41.38	48.8	33.93
BL_L	53.00	48.76	49.03	29.59
BL_R	39.38	44.00	43.02	25.59
GB_L	54.69	48.76	42.34	32.99
GB_R	48.23	38.15	37.86	25.49
ST_L	49.31	55.69	35.85	37.33
ST_R	52.53	46.15	42.64	31.1

Table 6.3.1 displays mean and SD values before and after 7 days of IAYT program.

Table 6.3.2 summarizes the number of increases and decreases in the mean and SD values over a 7 day IAYT program in the form of contingency table. It shows 22 out of 24 meridians standard deviation decreased after 7 days of IAYT program.

Table 6.3.2: Contingency Tables for Increase / Decrease Mean and SD				
PRE-POST	MEAN		SD	
MERIDIAN	INCREASE	DECREASE	INCREASED	DECREASE
UPPER	6	6	0	12
LOWER	3	9	2	10

6.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph4

Results of measurements on Asthma and Healthy groups are presented in Tables 6.4.1 to 6.4.4.

Table 6.4.1 displays group means and standard deviations for measurements of individual meridians and Table 6.4.3 shows corresponding values for various meridian averages. All group mean conductance levels were higher for the healthy group as expected. Also, 10 out of 12 standard deviations were smaller for the upper meridians of the healthy group, while all 12 standard deviations were smaller for the group's lower meridians.

Table 6.4.1: Comparison of Group Means for the 24 Organ Linked Meridians				
	ASTHMA	HEALTHY	t VALUE	p VALUE
UPPER MERIDIANS				
LU_L	69.16 ± 34.45	87.92 ± 28.67	2.96	0.004**
LU_R	64.64 ± 28.49	76.00 ± 25.36	2.11	0.038*
PC_L	62.88 ± 29.59	63.40 ± 23.83	0.097	0.923
PC_R	57.07 ± 23.16	60.88 ± 22.12	0.827	0.41
HT_L	56.68 ± 27.45	63.04 ± 23.26	1.25	0.214
HT_R	58.92 ± 30.97	62.00 ± 24.16	0.554	0.581
SI_L	66.32 ± 26.55	70.72 ± 26.22	0.834	0.406
SI_R	56.60 ± 24.86	65.56 ± 25.88	1.765	0.081
TE_L	59.04 ± 29.03	64.40 ± 26.40	0.966	0.337
TE_R	53.32 ± 23.84	60.40 ± 25.88	1.423	0.158
LI_L	68.56 ± 31.75	74.44 ± 25.50	1.021	0.31
LI_R	62.84 ± 26.77	67.76 ± 21.37	1.015	0.312
LOWER MERIDIANS				
SP_L	53.60 ± 31.17	58.48 ± 25.61	0.855	0.394
SP_R	52.20 ± 33.92	58.80 ± 27.45	1.07	0.287
LR_L	62.60 ± 33.04	65.36 ± 29.88	0.438	0.662
LR_R	57.56 ± 37.15	61.24 ± 27.27	0.565	0.574
KI_L	47.40 ± 27.59	57.76 ± 25.86	1.937	0.056
KI_R	44.32 ± 26.85	50.68 ± 23.18	1.268	0.208
BL_L	55.72 ± 32.45	72.64 ± 29.83	2.714	0.008
BL_R	50.76 ± 31.07	72.60 ± 29.63	3.597	0.001*
GB_L	58.84 ± 37.14	72.20 ± 26.77	2.063	0.042
GB_R	54.48 ± 33.49	70.84 ± 25.94	2.731	0.007
ST_L	60.80 ± 34.83	69.44 ± 26.95	1.387	0.169

ST_R	53.40 ± 31.35	70.58 ± 28.42	2.87	0.005
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Table 6.4.2 displays Means and SDs of Acugraph conductance readings at Jing Well points for the Asthma and Healthy groups. This table also gives t and p values for independent t tests comparing group means for each meridian

Table 6.4.2 displays means and SDs of groups of meridians for Acugraph conductance readings at Jing Well points and Peak Expiratory Flow Rate (PEFR) for the Asthma and Healthy groups. It shows various kinds of imbalance in meridians in Asthma group compared to healthy group. It also shows PEFR readings are higher in the healthy group than the Asthma group. .

Table 6.4.2: Comparison of Group Mean Conductance values and Standard Deviations for Asthma and Healthy Groups				
VARIABLE	ASTHMA	HEALTHY	t VALUE	p VALUE
LOW	47.8 ± 23.61	54.90 ± 18.56	1.67	0.98
MEDIUM	56.94 ± 24.63	66.16 ± 20.59	2.03	0.045
HIGH	64.66 ± 27.25	77.22 ± 22.12	2.53	0.013
YIN	57.10 ± 24.72	63.96 ± 20.33	1.515	0.133
YANG	58.28 ± 25.06	69.38 ± 21.16	2.393	0.019
FIRE	57.78 ± 22.46	63.42 ± 22.61	0.86	0.214
EARTH	54.98 ± 30.70	64.08 ± 23.75	0.098	0.101
METAL	65.96 ± 27.87	76.76 ± 23.15	2.108	0.038
WATER	49.28 ± 27.32	63.18 ± 24.59	2.673	0.009
WOOD	58.16 ± 32.07	67.00 ± 24.69	1.544	0.126
PIE	60.78 ± 12.01	63.86 ± 10.07	1.389	0.168
E_L	57.34 ± 24.64	66.16 ± 20.39	1.95	0.054
E_S	75.66 ± 11.48	74.50 ± 7.17	0.606	0.546
U_L	15.78 ± 27.65	7.96 ± 24.30	1.502	0.136
L_R	6.78 ± 10.93	3.78 ± 9.14	1.489	0.14
YANG_YIN	2.40 ± 11.74	7.00 ± 9.58	2.146	0.34
PEFR	273.91 ± 90.44	397 ± 84.92	6.89	0.0001***

Table 6.4.2 displays Means and SDs of groups of meridians for Acugraph conductance readings at Jing Well points and Peak Expiratory Flow Rate (PEFR) for the Asthma and Healthy groups. Between Groups ‘t’ and p values are given in the last two columns.

Table 6.4.3 presents comparison of standard deviations for the Asthma and Healthy group, for groups of meridians, Upper, Lower and Overall. This shows very clearly that variances are significantly higher for the Asthma group.

Table 6.4.3: Comparison of Standard Deviations for Groups of Meridians

MERIDIAN↓	ASTHMA	HEALTHY	F VALUE	p VALUE
UPPER	61.33 ±28.45	68.04 ±25.97	1.20	0.013
LOWER	54.30 ±32.75	65.05 ±27.97	1.37	< 0.0001
OVERALL	57.8 ± 30.85	66.51 ± 27.02	1.31	< 0.0001

Table 6.4.3 gives F values and corresponding p values for 600 readings in each of the Upper and Lower blocks of meridians and for 1200 overall meridian readings for each group.

Peak Expiratory Flow Rate and The Mini Asthma Quality of Life Questionnaire were administrated to Asthma patients.

Table 6.4.4: PEFr Means and SDs by Gender in Asthma and Healthy Groups

GENDER	ASTHMA	HEALTHY	't' VALUE	p VALUE
MALE	(30) 311.67 ± 102.73	(24) 448.33 ± 61.14	6.07	< 0.0001
FEMALE	(20) 232.73 ± 50.63	(22) 320.5 ± 50.72	5.6	< 0.0001

Table 6.4.4 compares PEFr data for the Asthma and Healthy groups separated by gender. As indicated, the Asthma group contained 30 males and 20 females, while the Healthy group contained 24 males and 22 females. The data clearly demonstrates that, as hypothesized, PEFr values were much higher in the healthy group.

The Mini Asthma Quality of Life Questionnaire, only given to the Asthma group, showed a mean of 4.17 ± 0.87 (range 2.53 to 5.46), that is, average to moderately severe asthma.

6.5 RECAPITULATION

Study 1 investigating the effects sitting in Padmasana, the yoga posture traditionally said to enliven the subtle energy, showed that subtle energy flow increased in all meridians, after sitting for periods of more than ten minutes. The discovery that sitting in a chair causes decreases in energies was unexpected. Level of Qi energy is not instantly changed by sitting in Lotus Posture, but begins to increase several minutes after taking the posture.

Study 2 comparing anxiety patients and depression patients with healthy controls found lowest subtle energy levels in the depression group, and highest values in the anxiety group, higher than the healthy controls. More importantly, overall meridian standard deviations (SDs) were significantly higher in anxiety and depression groups than the healthy group. Higher SD values suggest more imbalances in subtle energy.

Study 3, a pilot study of the effects of seven days yoga program on depression, showed reduced standard deviations for the upper and lower groups of meridians and for all meridians together. These achieved significance, although the means of meridian energies did not change significantly. This suggests that changes in SDs can sometimes be a more powerful means of measuring the effects of Yoga programs than changes in means.

Study 4 comparing Asthma and Healthy groups found lower mean conductance in the Lung Left and Right meridians as hypothesized. Overall energy level, E_L, was also lower for the asthma group while the SD's of their individual meridians were larger. The lower meridian energy flows observed in both left and right meridians of the bladder and gall bladder were not hypothesized. The significance of these unusual findings is taken up in the next chapter.

Study 4 also categorized patients with asthma by PEF_R and the Mini Asthma Quality of Life Questionnaire, finding PEF_R readings to be significantly lower in the Asthma group. The mini Asthma QoL questionnaire confirmed that participants in the study had only moderately severe asthma, as required by the study protocol.

CHAPTER-7



DISCUSSION

7. DISCUSSION

7.1 Study 1: Effect of Lotus Posture on acupuncture meridian energies

In Yoga, a science with eight limbs (angas), asanas use particular positions of the body combined with recommended attitude of mind, to exert a profound influence on a person's physiological and health parameters (Mohanty, Venkata, Murty, Pradhan, & Hankey, 2015; Ross & Thomas, 2010). Asanas also promote revitalization of specific muscle groups and activate prana, increasing pranic energy (Krippner, 1988).

In terms of Traditional Chinese Medicine (TCM), various joint and spine movements involved in yoga asanas are thought to facilitate, alter or even stimulate meridian energy flow. Regular practice of Yoga asanas increases the availability of prana in the body by balancing meridian energies (Motoyama, 1988). The text *Acuyoga* (Gach & Marco, 1998) gives detailed descriptions of effects of various asanas on each meridian.

In this context, results of Study 1 clearly indicate that cross leg, spine erect Lotus Posture has completely different effects on the human physiology from that of simply sitting in a chair. The study corroborates the subjective experience that sitting in the Yoga asana, Lotus Posture, has an energizing effect on the human physiology at a subtle level. Experienced Yoga practitioners report that they can feel an energizing effect.

In this light, it is significant that the energy took time to increase enough to be clearly observed. More Jing-Well point conductances decrease than increase in the Lotus-Posture group at 10 minutes, while all decreased in the Chair sitting group, suggesting that just sitting and resting does not in itself immediately increase levels of subtle energy. Summary in Table 6.1.2 shows that while this decreasing trend continued for the group of controls sitting in a chair, it decisively reversed for the group in Lotus Posture, which showed post measurements on all meridians greater than or equal to pre measurements, for the 20 and 30

minute time periods. The experimental group sitting in Padmasana showed completely different trends in values of subtle energies from controls sitting in chair for these two time periods; this agrees with statements in the ancient literature about the value of sitting in Lotus posture (Swami Digambaraji, 1998), which state that it is most suitable for meditation because it tends to increase subtle energy levels more strongly than any other asana positions. Study 1 results clearly support our experimental hypothesis that Padmasana increases subtle energy level, but suggest that the increase takes time to build up. One would however expect that resting by sitting in a chair would also restore depletion of subtle energy levels caused by activity such as walking. It was therefore unexpected to observe that energy levels of the second group showed a tendency to decrease after sitting in a chair, and equally interesting to observe that the energy levels in the Lotus Posture group showed a similar tendency over the first ten minutes, and took twenty minutes to reverse the decreasing trend. It follows that energy levels are not instantly changed by sitting in Lotus Posture, but that they build up steadily once the posture has been adopted over a short time.

7.2 Study 2: Comparison of Depression, Anxiety and Healthy subjects on Acugraph4

The purpose of Study 2 was to observe meridian energy patterns in anxiety and depression patients with the goal of distinguishing between them. Our results (Table 6.2.1) were analyzed in terms of both the means and variances of the two experimental groups, and those of the controls: anxiety patients had the highest levels of both mean acupoint conductances (81.84) and group SDs (variances) (38.63) of the three groups; they also showed significant Upper-Lower imbalances ($p < 0.05$) favoring upper meridians. Depression Patients showed lowest energy (53.36) levels, but intermediate SDs (33.48). Healthy participants showed intermediate energy levels (62.61), but recorded lowest SDs (27.05) of the three groups.

Comparing individual meridians between the three groups, mean values of all meridians but Bladder-Left (BL_L) were ordered Anxiety > Healthy > Depression (Bladder-Left gave H >

A > D). The consistency of this result has a significance $p < 0.0001$. We can state with certainty that groups of anxiety patients have higher mean meridian energies than groups of normal persons, who have higher mean meridian energies than depression patients.

Comparison of the Anxiety group with the Depression group found significant between group differences ($p < 0.05$) for all meridians except KI_L, KI_R and ST_R where p values lay in the range $0.137 > p > 0.086$. These reasonable trends suggest that for all would reach significance for groups with larger numbers. Comparison of Anxiety and Healthy groups showed significant differences in all upper meridians ($p < 0.05$), but because of upper-lower imbalances in the Anxiety group, (Table 6.2.2), not in all lower meridians. Between Depression and Healthy groups, all individual meridians yielded higher values for the Healthy group, a result for which the 2-tailed sign test yields $p < 0.0001$, even though for individual meridians, only LU_L among the upper meridians, and SP_L, BL_L, BL_R and GB_L among the lower meridians showed differences that attained $p < 0.05$ significance or better.

Concerning variances in meridian values within each group, previous studies have observed that values of meridian energies for healthy subjects tend to cluster more closely and thus show smaller variance (Meenakshy et al., 2013; Nagilla et al., 2013; Sharma, Hankey, Nagilla, et al., 2014). This result suggests that meridian energies are better regulated in healthy subjects, consistent with equating better regulation with better health (Hankey, 2015). Study 2 data gives lowest SDs for the Healthy group for all meridians except LR_L, BL_L and BL_R for which they were second lowest. Again this result is highly significant with $p < 0.001$, providing further support for this theory of health (Hankey, 2015).

Table 6.2.3 shows that treating data from the three groups in blocks yield variances that are significantly different from each other; for upper and lower meridian blocks taken separately, and for all meridians together. The Healthy group exhibited significantly lower variances

(SDs) while the other two groups had significantly higher variances, with the Anxiety group SDs tending to be higher than those for the Depression group. Once again this supports the idea that improved regulation corresponds to improved health (Hankey, 2015). For energies of individual meridians, Table 6.2.1 shows kidney meridians to have lowest meridian energies for pathology groups, accompanied by bladder meridian for the Anxiety group. Since the aggravating emotion associated with the kidney and blocking its meridian is said to be fear (Veith, 2002), for Anxiety prone participants to show weakness in kidney meridians seems natural. Meridian-based medicine holds that a sense of well-being is a natural result of healthy Qi energy levels (Veith, 2002). Lower meridian energy levels may decrease personal feelings of well-being, an aspect of depression. Low meridian energies in the Depression group may point to this association, but to prove it, further study is required e.g. correlating meridian values with State-Trait Anxiety scores, and / or a suitable depression scale.

TCM holds that a sense of well-being is a natural result of healthy Qi energy levels (Veith, 2002). Lowering meridian energy levels decreases the sense of well-being, as is experienced in Depression. The Depression group's low meridian energies may confirm this association.

The Anxiety group's reduced energies in lower meridian may also be significant. Muscle tension is often considered a key factor in reducing Qi energy flow. Tension in the diaphragm area, typical of anxiety, would therefore tend to reduce energies in the lower meridians as suggested in previous studies (Meenakshy, Hankey, et al., 2014a; Sharma, Meenakshy, et al., 2014).

7.3 Study 3: Acugraph4 Assessment Pre-Post 7 days Yoga for Depression Intervention

Study 3 was a small pilot study of data derived from Study 2, for which post intervention data was obtained from 13 of the 26 depression patient subjects. The aim was to assess effects of the 7 day remedial yoga program that these depression patients were attending, with the goal

of showing that mean values of electrodermal conductance increased as depression decreased. Possible reductions in variance were not expected to reach significance.

As described above, studies on normal subjects have found that yoga practice increases Jing-Well point conductances, improving meridian energy flows and reducing variances, with the latter observation being interpreted as improved regulation of meridian energies (Meenakshy, Hankey, et al., 2014a; Nagilla et al., 2013). Variance reduction was suggested to demonstrate that in a very general sense, Yoga practices improve health.

Values of Jing-Well point conductances for upper meridians increased from 43.99 to 45.64. For lower meridians, however, conductances decreased from 50.01 to 46.29, meaning that Upper-Lower imbalances were considerably reduced. This suggests that, as is often the case, depression patients were also afflicted by anxiety and that a week of Yoga treatment reduced anxiety, but had little effect on the depression; not surprising as depression is usually regarded as less susceptible to treatment, and thus may require longer treatment.

With regard to the variances: upper meridians block variance reduced from 25.97 to 22.75 ($p=0.05$), that for the lower block of meridians reduced from 41.35 to 30.47 ($p<0.0001$). For individual meridians, variances reduced in 22 meridians out of 24, sign test significance, $p = 4.4 \times 10^{-5} < 0.0001$. We can say with certainty, even for this small group of subjects, that Yoga practice reduces the variance of conductance values at Jing-Well points in patients for depression.

Study 3 therefore supports results of studies at NIMHANS, India's National Institute for Mental Health and NeuroScience in Bengaluru, that yoga practice benefits depression (Gangadhar, Naveen, Rao, Thirthalli, & Varambally, 2013; Naveen et al., 2013). It confirms that remedial yoga programs reduce variances in measured variables. In light of the idea that better quality of regulation corresponds to better health (Hankey, 2015); and with quality of regulation as an indicator of health, this shows that yoga practice improves health.

7.4 Study 4: Comparison of Asthma and Healthy subjects on Acugraph4

Study 4 results show that measured AP conductance values for the two groups – namely Asthma and Healthy – are very different and that they conform to the general principle that healthy individuals exhibit better controlled, higher values of acupoints conductances / energies. Our study hypothesis anticipated changes in all meridian pairs forming part of our exploratory analyses, but particularly the lung meridian pairs. Table 6.4.1 shows that for individual meridians, the asthma group values were lower in all meridians, a result with a sign test significance of $p = 2^{-24} \ll 0.0001$. In asthma, the key meridians should be the pair of lung meridians: these were among the 3 pairs of meridians that were significantly lower in value. Between group significance of LU_L was $p=0.004 < 0.01$, and for LU_R $p=0.038 < 0.05$. Further, among the other 11 meridian pairs, the pairs of bladder BL_L and BL_R and Gall Bladder GB_L and GB_R meridians were significantly different, all $p < 0.01$ except GB_L for which p was 0.042. Here the differences in Lung meridian conductances between the two groups may be interpreted as due to impairment of function in lung, bronchioles and bronchi due to the pathology.

Another significant observation is lower standard deviations for 22 out of 24 meridians for the healthy group, a result with binomial test significance of $p < 0.0001$. Measurements of variables for a group tend to have narrower distributions in healthy individuals compared to those with pathology, because variables tend to be better controlled in healthy individuals.

Loss of health can in general be equated with loss of quality of regulation of key variables, e.g. blood pressure in hypertension and blood sugar levels in diabetes. Hypertensives and diabetics will in general exhibit poorer regulation of such variables, which may in turn be taken to correspond to lower quality of health of the group. Health can in general be equated with optimized regulation (Hankey, 2015) and poorer quality of regulation will always be found in a pathology group. Here, asthma seems to reduce quality of regulation of all 24

measured variables, resulting in higher variances in acupoint conductances at each acupoint for the asthma group. Lower standard deviation may therefore be taken as an indication of better energy regulation for the healthy group as a whole, confirming the identification of quality of regulation as an indicator of health, namely better quality of regulation corresponds to better health (Hankey, 2015).

Table 6.4.2 shows results for selected groups of meridians, various kinds of imbalance and PEFR. Again note that for the meridians, the same points hold as in Table 6.4.1: means for the Asthma group are all lower, while standard deviations are all higher – as might be expected since Table 6.4. 2 results are derived from Table 6.4.1 (except PEFR). Upper-Lower (U_L) and Left-Right (L_R) imbalances were both higher for the asthma group. A hypothesis has suggested that such imbalances are a measure of stress (Sharma, Meenakshy, et al., 2014); these imbalances are consistent with this idea and the general observation that asthma is an ongoing cause of stress to the sufferer.

Table 6.4.3 shows that the variances of the two groups were significantly different according to Fisher's F test. This was applied to three blocks of data; two groups of (12 x 50) data points for both upper and lower meridians, and a third group of 1200 data points consisting of all 24 meridians. In all three cases, the asthma group showed significantly higher variances, thus confirming the more informal comparison of standard deviations in Table 6.4.1 and the conclusion that lower quality of regulation corresponds to lower quality of health.

Table 6.4.4 displays results of PEFR tests by group and gender, confirming results of Table 6.4.2. Considering PEFR results by gender is important because mean female PEFR values are lower than corresponding male values and it is important to show that differences between asthma and healthy groups on the PEFR scale are not due to gender differences.

In contrast to these results, TCM identifies not only the Lung meridians, but also the Large Intestine meridians as being compromised in asthma. Of these two, the study only found the former to be significantly disturbed, but not the latter. With regard to the Bladder and Gall Bladder meridians, the former are related to anxiety (Veith, 2002), so lower values observed for the Asthma group may be indicative of the stress experienced by the group.

We can understand this more deeply as follows. Asthma itself does not directly affect either the bladder or gall bladder, but creates emotional problems which manifest in the *manomayakoṣa*, and from there create influences in the *prāṇamayakoṣa*, which consists of the *nāḍīs* and the prana energy flows moving along them. A problem in *manomayakoṣa* causes blockages in the *nāḍīs*.

In terms of the *prāṇamayakoṣa*, i.e. the system of *nāḍī* / meridians, pathology in asthma manifests directly in the lung meridian, but the side effects of the pathology tend to influence the patient's emotions, which influence the corresponding meridians in the *prāṇamayakoṣa* causing blockages in those meridians. Specifically, anxiety blocks the bladder meridian and frustration blocks the gall bladder meridian. This can be more mechanically understood by looking at specific muscle sets through which each meridian passes. Patterns of tension due to anxiety cause tension and tightness in the muscles through which the bladder meridian passes, while the patterns of tightness due to frustration cause rigidity in the neck and shoulder muscles through which the gall bladder meridian passes.

Treatment of the pathology of asthma that is limited to action on the bronx and bronchi will still leave the patient susceptible to diseases associated with lack of meridian energy flow in the bladder and gall bladder meridians, which logically should manifest as asthma associated pathologies. Specifically, the medical literature states, psychological disorders are also more common, with anxiety disorders occurring in 16–52%, and mood disorders in 14–41%. .

These facts point to the powerful advantages of understanding the subtle energy system, and its relationship with the emotions on one hand and the physical body (*annamayakoṣa*) on the other, for gaining deeper insights into patterns of etiology of various diseases.

7.5 OVERALL ASSESSMENT

Results of the Study 1 experiment on Padmasana, where the yoga posture traditionally said to most enliven the subtle energy, Prāṇa, was maintained for varying periods of time, confirms that sitting in Padmasana enlivens the subtle energy measured by Acugraph: values of skin conductance at Jing-Well acupuncture meridian points increased. It also indicates that energy levels are not instantly changed by sitting in Lotus Posture, but that they build up steadily once the posture has been adopted.

The Study 2 comparison of measurements on anxiety patients, depression patients and healthy controls showed that anxiety patients have higher mean meridian energies than groups of normal persons, while depression patients have lower mean meridian energies than healthy controls. The Healthy group exhibited significantly lower variances (SDs) while the other two groups exhibited significantly higher variances, with the Anxiety group SDs tending to be higher than those for the Depression group.

Similarly Study 4 comparison of Asthma and Healthy group found higher means for the healthy group, and larger SD's for the asthma group. Lung meridian conductances had significantly lower energy in the Asthma group than healthy group, while the PEFV readings were significantly lower in the Asthma group. The significant difference in Lung meridian conductances between the two groups could be interpreted as due to impairment of function in lung, bronchioles and bronchi due to the pathology, while imbalances in other meridians, the bladder and gall bladder, were secondary imbalances.

The results confirm the relationship between the emotions and health of various organs central to the understanding of Yoga medicine. They also provided support for the ideas that lower quality of regulation corresponds to lower quality of health, and that yoga practices can improve quality of regulation and thus quality of health. Results also confirmed the benefits of Yoga programs for those with depression.

The Connection between Poor Regulation and High Group Variances: A closely reasoned explanation of this relationship was given in the paper published in the Journal of Alternative and Complementary Medicine. We present this in to whole. The need for detailed explanation arises because variability within a group can never explain *individual* dysregulation, and our proposed criterion for the health of individuals within a group depends on analysis of *group* variances.

We are not intending to *explain* individual dysregulation. The reasoning is rather that high variability within a group is indicative (or symptomatic) of *failure of regulation*, probably in successive stages, of variables measured, *for the group as a whole*. Such variables can be very simple, or relatively obscure, as in the case of electrodermal measurements of skin conductance at acupuncture points presented in this thesis. From the general perspective we are adopting, loss of quality of regulation will be indicated by *increased variance for the group as a whole*.

The fundamental assumption behind all the work we have performed on variances in measurements on various groups depends on an underlying law of biology and medicine that has been stated elsewhere: *health requires, and may be equated with, optimal regulation of the entire organism, including all its various subsystems*.

Interestingly, the Acugraph Digital Meridian Measuring System incorporates this idea into its analysis. The manual states that all conductance values in healthy individuals should remain

between stated limits above and below the mean, indicated by a Green line in the output graph – a Red line representing the healthy upper limit above the mean, and a Blue line representing the healthy lower limit below the mean. Too many values outside these Red and Blue limits, i.e. high overall variance about the mean for the 24 meridians, indicate or at least suggest pathology. This means that in a single *cross sectional* measurement of 24 meridians, *high variance about the mean is taken to indicate poor quality health*. This implies that for healthy subjects, variations in meridian energies should stay between stated limits. *Variances of healthy subjects may be expected to be low.*

From this property of Acugraph measurements, the results we are inferring follow: if each member of a particular group of subjects being measured exhibits a higher variance in their AcuGraph measurements than members of a second group, *then the group as a whole will exhibit greater variances in group means of electrodermal conductances at the acupoints being measured.*

The proposal is based on a new scientific definition of health (Hankey, 2015). Health equates with optimal regulation and corresponding optimal function in response to environmental challenge. All organisms have ecological niches within which their functioning is optimal, and within which they thrive. Remove an organism from its optimal adaptive range, and it will not compete adequately to contribute meaningfully to the ecosystem concerned. It may even become extinct if global climate changes enough.

Health and survival require organisms to maintain optimal functioning through means identified in complexity biology, by maintaining loci of control at ‘Edge of Chaos’. Should variable regulation be compromised, quality of control departs from optimal, and higher variances obtain for variables suffering from dysregulation.

For example, consider blood pressure: SBP and DBP have optimal ranges. Patients may develop either high or low blood pressure. Stress leads to high blood pressure, with hypertension at various possible levels, pre-hypertension, stage 1, stage 2 etc. For these variables, a group of healthy subjects of a given age will have SBP and DBP in a narrow range indicative of healthy regulation. The range will be relatively small and characterized by relatively low standard deviation / variance. However, a group that includes subjects with various levels of hypertension will show higher standard deviations in blood pressure measurements. Each individual may be confined to a narrow range, but higher group variances indicate that *blood pressure regulation for the group as a whole has been compromised*.

In this light, a cross sectional study of blood pressure for a group of participants may validly claim that higher variance in group blood pressure measurements corresponds to lower quality of health of the group. *Higher variance indicates poorer quality of regulation and departure from an ideal state of health without excessively high or low blood pressure values*.

A recent paper (Datey and Hankey, 2016) described narrowing of ranges of blood pressure variables back to normal following 3 months regular Yoga practice (Fishers F statistics all $p < 0.0001$). All will accept that such before-and-after group changes in variance may be attributed to improvement in regulation. By a small extension, we may also accept that a cross-sectional study observing higher variances in pathology groups is observing loss of quality of regulation in those groups, as our new law of health proposes.

Onset of hypertension scatters SBP/DBP measurements, some subjects being more affected than others. A *cross sectional study* of hypertensives will observe higher group variances than in healthy subjects. *Higher group variances indicate loss of quality of regulation* – and by our reasoning above, *loss of quality of health*. Thus, in general, from the perspective of group

measurements, *higher levels of variance for a group can be attributed to failure to hold values of a variable within its optimum range*, and can be said to signify that quality of regulation of that variable has been compromised for the group as a whole.

Actual pre-post observations of variance changes, either departing from optimal range, or restoration of optimal range, make these points most unequivocally. That requires a repeated measures design inspecting variability of conductance over time as in Study 3. The reasoning that health equates with optimal regulation immediately translates into the observations that we have made: *healthy groups exhibit more accurate control of measured variables*.

We conclude that relative variances for two groups tend to indicate relative states of health: higher variances suggest lower quality of regulation of a variable for a group considered as a whole, relative to another group exhibiting lower variances also considered as a whole.

CHAPTER – 8



APPRAISAL

8.0 APPRAISAL

To understand the limitations of the present study as well as to obtain insight into new ideas for future research, a critical review of the work reported in this thesis is performed. The appraisal is presented under the following headings:

1. Summary of the findings
2. Implications of the studies
3. Applications of the studies
4. Strengths of the studies
5. Limitations of the studies
6. Suggestions for future studies
7. Conclusion

8.1 SUMMARY OF THE FINDINGS

Results of the studies discussed separately in previous sections can be summarized in the following way.

1. Lotus Posture increases conductances at Jing-Well points on the acupuncture meridians, meaning that it has an energizing effect at subtle levels of the human physiology.
2. Sitting in Lotus Posture has a completely different effect on the human physiology from simply sitting in chair, which does not seem to help subtle energy levels in the meridians.
3. Although sitting in Padmasana (Lotus Posture) increases levels of subtle acumeridian energy, the RM-ANOVA results suggest that the increase takes time to build up.
4. Comparing measurements on groups of Anxiety, Depression and healthy subjects suggest that mean values of conductance, i.e. energy levels, for the three groups, are ordered Anxiety > Healthy > Depression (only Bladder-Left gave H > A > D), a result with significance $p <$

0.0001. Anxiety patients have higher mean meridian energies than groups of normal persons, who have higher mean meridian energies than groups of depressed patients.

5. In this study, analysis of SDs showed that the Anxiety and Depression groups had larger variances than the healthy group, with Anxiety group SDs tending to be greater than those for the Depression group, with those for the Healthy group significantly lower.

6. This result of higher variances for the pathology groups was taken to imply poorer quality regulation at physical and mental levels, providing further support for the idea that meridian energies are better regulated in healthy subjects, i.e. better regulation means better health.

7. Study 3's analysis of post intervention data for 13 participants in Study 2's Depression group showed reduced variance following 7 days yoga therapy program. This suggested that yoga practice is beneficial for Depression in agreement with studies at NIMHANS ((Naveen et al., 2013)

8. Study 4 data, comparing patients with asthma with persons in normal health, showed significant difference in Jing-Well point conductances between the two groups in the Lung meridian, and also the Bladder and Gall Bladder meridians. While the former may be interpreted as due to pathology associated with the lung, the latter can be interpreted as due to associated emotional problems – anxiety affecting Bladder meridian energies, and frustration affecting those of the Gall Bladder. (This result supports the general philosophy of Yoga Medicine that Manomayakosha governs Pranamayokosha.)

9. The asthma group showed significantly higher variances than the healthy group, again confirming that lower quality of regulation corresponds to lower quality of health.

8.2 IMPLICATIONS OF THE STUDY

These four studies suggest that measurement of electrodermal conductivity at human Jing-Well acupuncture meridian points can be used for several purposes:

1. to evaluate effects of individual asanas on human subtle energies;

2. to identify meridian energy characteristics of specific pathologies;
3. to evaluate differences between various populations, with or without pathology;
4. to confirm the concept that health is associated with good subtle energy regulation;
5. to evaluate restoration of energy regulation brought about by Yoga practices;
6. to investigate how emotions that block meridians cause pathogenesis.

More generally they confirm the value of measuring all patients and groups of patients taking Yoga treatment programs so that results of treatment can be transmitted to the individual and the group.

8.3 APPLICATIONS OF THE STUDY

The four studies suggest many potential applications of Yoga practices, and of assessments of effect of Yoga practices, including *āsanas*, *prāṇāyāma* and different kinds of meditation by Acugraph measurements. They confirm that valuable feedback can be given to patients attending health care clinics like S-VYASA's Arogyadhama Health Home, especially when such feedback can be used to bring greater compliance with treatment programs.

More specifically, each of the four numbered implications in section 8.2 has its own potential application, viz.

1. Evaluation of effects of individual Yoga practices on human subtle energies.
2. Further identification of all pathologies' subtle energy characteristics.
3. Evaluation of differences between various populations, both those with pathologies and those without pathology but living under different conditions.
4. Proof of the hypothesis that optimal regulation of subtle energy results in health.
5. Investigation of how Yoga practices restore quality of subtle energy regulation; also
6. Identification of precise benefits of Yoga practices on each stage of chronic disease;

7. Particularly, the relationship between specific emotional problems in the *manomayakoṣa*, pathogenesis in the *prāṇamayakoṣa* and disease in the *annamayakoṣa*.

8.4 STRENGTHS OF THE STUDIES

1. The Padmasana study was the first study to document physiological changes – subtle energy changes – due to practice of a single asana. It obtained definite results with good statistical significance and high power. The ability of Lotus Posture to increase acupuncture meridian energies with time interval is well documented by this study.
2. The two pathology related studies, Study 2 and Study 3, confirmed Acugraph's ability to correctly distinguish various pathologies and populations by measuring skin conductances at Jing-Well acupuncture meridian points. Study 2 in particular obtained highly significant and robust results, while Study 3 gave a new angle on a known use of Yoga medicine, treatment of depression.
3. In the pathology groups, variances in Jing-well point conductance levels was significantly higher than the Healthy group. If higher variances are interpreted to mean poor regulation, these results support the idea that improved regulation improves health, and thus the very general relationship recently proposed between health and regulation.
4. Study 4 obtained excellent characterization of a group of asthma patients. Identification of weaknesses in the Bladder and Gall Bladder meridians as well as the Lung meridian showed that Acugraph can assess both primary and secondary aspects of chronic disease.
5. In this context, Study 4's identification of secondarily affected meridians begins the step of empirically establishing the main thesis of S-VYASA's approach to understanding the aetiology of chronic disease, namely that much is caused by emotional imbalances. By identifying specific emotional imbalances through meridian energies, Acugraph may be able to investigate the mechanics of disease generation proposed in the *prāṇamayakoṣa* model.

8.5 LIMITATIONS OF THE STUDIES

1. Participants in Study 1 were not formally randomized. Nevertheless alternating assignment of participants to the two groups, when potential participants arrived at random times, seems equivalent to a form of randomization. There was no particular subject selection according to known abilities in Yoga or length of experience in meditation etc. Also, the important result that just sitting in a chair tends to decrease Acumeridian energies was not hypothesized, but was a post hoc discovery from analysis of the data, so a second study, with that as the study hypothesis needs to be done to confirm the result.

2. In Study 2 numbers in the groups of Anxiety and Depression patients were relatively small. Larger group sizes would have made the results more robust i.e. improved values of Cohen's d and β .

3. Numbers in Study 3 resulted in relatively un-robust conclusions. Nevertheless, consistency of the results, and elucidation of a new way to evaluate the important application of Yoga medicine to depression makes this a potentially useful pilot study.

4. Study 4 was only a cross sectional cohort study with no second measurements to assess potential improvements due to Yoga medicine treatment. Having identified primary and secondary meridian energy characteristics of asthma and potential complications, future Acugraph studies are now awaited to assess how the well known Yoga-for-Asthma treatments improve the pathology's subtle energy problems.

In general, possible inaccuracies in Acugraph measurements themselves constitute possible limitations of these kinds of study. Any such inconsistencies will contribute to SDs, so they would degrade significances of the results. The low p values obtained are robust against any such interference and accusation. However, an intrinsically more accurate instrument might have resulted in more changes reaching significance.

8.6 SUGGESTIONS FOR THE FUTURE STUDIES

1. Further studies of single asanas should be performed, observing effects on acupuncture meridian energies of sitting in other single *āsanas*. First might be *Siddhāsana*, the ‘perfect posture, the much recommended alternative for meditation to *Padmāsana*, because it causes less strain, and can be held more comfortably for longer periods of time. Similarly, *Vajrāsana*, Diamond Posture, a simple kneeling position, and others like *Jānuśīrāsana* or *Paścimottāsana* that can similarly be held for lengthy periods of time.
2. Extension of Study 2 to assess more severe mental problems like schizophrenia and bipolar disorder with larger groups from more varied populations. Long-term effects of yoga practice on these population should be assessed by Acugraph with robust study designs.
3. Perform further yoga interventional studies to confirm the new concept of health and subtle energy regulation using the Electrophotonic Image (GDV) tool as well as Acugraph, and the idea that Yoga practice directly improves health by improving regulation.
4. To extend the work of Study 4, by identifying meridian energy characteristics of more populations, including those living in different climates and seasons etc., and more pathologies, and to begin to look at mechanisms by which Yoga improves the condition of their sufferers and restores them to health.
5. To further investigate how emotions that block meridians cause pathogenesis, and to use questionnaires to assess changes in emotions at the same time as assessing changes in meridian characteristics.
6. To identify in more detail, the precise benefits of Yoga practices on each stage of chronic disease, both for prevention of further pathogenesis, and for restoration of health. This could also be extended to similar studies of other modalities used at S-VYASA such as Ayurveda and Naturopathy, and even electroacupuncture therapies in practice of Chinese medicine.

7. This last could be extended to studies of the theory of Yoga medicine used in S-VYASA: that emotional problems in the *manomayakoṣa* cause pathogenesis in the *prāṇamayakoṣa* leading to disease in the *annamayakoṣa*. This approach might even be extended into a means of assessing and reversing disease before it manifests, *Heyam Dukham Anagatam, as the Yoga Sutras of Patanjali states.*

8.7 CONCLUSIONS

Study 1 on Padmasana: Sitting in different positions affects subtle energies in different ways. Sitting in a chair tends to decrease them, while sitting in Lotus Posture universally energises them, but only after a time period of more than 10 minutes or so.

Study 2 on Depression and Anxiety: Different kinds of mental disturbance correlate with different patterns of meridian activity. Anxiety and agitation correlate with high meridian energy levels while depression correlates with lower levels of subtle energy. The latter may be partly responsible for lower levels of well-being and wellness, naturally tending to leave a person feeling depressed. Variances appeared to correlate more definitely. In the pathology groups variances of Jing-well point conductance levels was increased: the Anxiety group showed the highest, with the Healthy group lowest. If high variances are taken to indicate poor regulation, these results support the idea that poor regulation correlates with poor health, and better regulation with better health. This seemed to be confirmed by results of Study 3.

Study 4 on Asthma: Lower standard deviations were a significant sign of higher quality of regulation, and thus of higher quality health in the 'healthy' controls. Lung meridian activity is compromised in asthma and the pathology generates high levels of imbalances, notably upper-lower and left-right imbalances



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APPENDIX- 1:

DEMOGRAPHIC SHEET AND CONSENT FORM

**Swami Vivekananda Yoga Anusandhana Samsthana(SVYASA)
19, Ekanath Bhavan, Gavipuram Circle, KG Nagar, Bengaluru – 19
Ph: (080) 2661 2669, (08110) 309 2900
Registration Form - BIO ENERGY EXAMINATION**

Acugraph

1. Name : _____

2. Date of Birth : _____ **Age :** _____ **Gender :** M / F

3. Education : _____

4. Occupation : _____

5. Marital status Married Unmarried

6. Address : _____

7 Phone No : _____

Email ID. : _____

8. Do you have earlier experience of yoga practice?

No experience 0- 6 months 1- 3 years

9. Any major Ailments/Diseases:

I give my consent to allow Acugraph recording to be taken and use by the university, as they see fit. The university will take all the necessary steps to protect the data and the identity of the individual. It will only be released if requested by law/Government. The university will not be held responsible for any variation/error in reporting. The information given is considered correct at the time of release.

Date:

Place: Signature: _____

APPENDIX -2: INSTITUTIONAL ETHICS COMMITTEE APPROVAL

APPENDIX - 3 = ABBREVIATIONS OF YOGA TEXTS

प्र उ	=	प्रश्नोपनिषत्	शि स	=	शिवसंहिता
<i>pra u</i>	=	<i>Praśnopenisat</i>	<i>śi sa</i>	=	<i>śivasamhitā</i>
क उ	=	कठोपनिषत्	ह यो प्र	=	हठयोगप्रदीपिका
<i>ka u</i>	=	<i>Kaṭhopeniṣat</i>	<i>ha yo pra</i>	=	<i>haṭhayogapradīpikā</i>
बृह उ	=	बृहदारण्यकोपनिषत्	ना वि	=	नाडीविज्ञान
<i>br̥ha u</i>	=	<i>Bṛhadāraṇyakopeniṣat</i>	<i>nā vi</i>	=	<i>nāḍīvijñāna</i>
छा उ	=	छान्दोग्योपनिषत्			
<i>chā u</i>	=	<i>Chāndogyopeniṣat</i>			
जा उ	=	जाबालदर्शन उपनिषत्			
<i>jā u</i>	=	<i>Jābāladarśana upaniṣat</i>			
शा उप	=	शाण्डिल्योपनिषत्			
<i>śā up</i>	=	<i>Śāṇḍilyopeniṣat</i>			
यो चू उ	=	योगाचूडामणि उपनिषत्			
<i>yo cū u</i>	=	<i>Yogācūḍāmaṇi upaniṣat</i>			
यो शि उ	=	योगशिखा उपनिषत्			
<i>yo śi u</i>	=	<i>Yogaśikhāupaniṣat</i>			
त्रि ब्र उ	=	त्रिशिख ब्राह्मण उपनिषत्			
<i>tri bra u</i>	=	<i>triśikha brāhmaṇa upaniṣata</i>			
यो चू उ	=	योगाचूडामण्युपनिषत्			
<i>yo cū u</i>	=	<i>yogācūḍāmanyupaniṣat</i>			

APPENDIX 4: ABBREVIATIONS

Primary outcome measure: Acugraph4 Terminologies

All major acupuncture meridians; 6 on each hand 6 on each foot, corresponding to the left and right meridians for the 12 major organs in the body:

ON HANDS

LU_L	Lung left
LU_R	Lung right
PC_L	Pericardium left
PC_R	Pericardium right
HT_L	Heart left
HT_R	Heart right
SI_L	Small Intestine left
SI_R	Small Intestine right
TE_L	Triple Warmer left
TE_R	Triple Warmer right
LI_L	Large Intestine left
LI_R	Large Intestine right

ON FEET

SP_L	Spleen left
SP_R	Spleen right
LR_L	Liver left
LR_R	Liver right
KI_L	Kidney left
KI_R	Kidney right
BL_L	Bladder left
BL_R	Bladder right
GB_L	Gall Bladder left
GB_R	Gall Bladder right
ST_L	Stomach left
ST_R	Stomach right

APPENDIX-7: DAILY SCHEDULE OF YOGA GROUP FOR RESIDENTIAL PROGRAM

S.No	TIME	PARTICULARS
1	4 30 – 5.30 am	Wake Up, Bath & Wash
2	5.30 – 6.00 am	Om meditation
3	6.00 - 7.0 am	Yoga based special technique
4	7.00 – 8.00 am	Break Fast (vegetarian diet)
5	8.15 – 8.45 am	Chanting of yogic hymns
6	9.00 –10.00 am	Assessments and counselling
7	10.00 –11.00 pm	Pranayama (Yogic breathing)
8	11.00 – 12.00 noon	Yoga based special technique
9	12.00 – 01.00 pm	Lecture
10	1.00 – 2.00 pm	Lunch (vegetarian diet)
11	2.00 – 2.55 pm	Rest and Library
12	3.00 – 4.00 pm	Cyclic meditation
13	4.00 –5.00 pm	Yoga based special technique
14	5.00 – 5.55 pm	Tuning to Nature
15	6.00 – 6.30 pm	Divine hymns session (Bhajan)
16	6.30 – 7.30 pm	M.S.R.T. (Mind Sound Resonance Technique)
17	7.30 – 8.15 pm	Dinner (vegetarian diet)
18	8.15 – 9.00 pm	Happy assembly
19	10.00 pm	Lights off

APPENDIX- 8: MINI ASTHMA QUALITY OF LIFE QUESTIONNAIR

(Self administered)

.....

In General, how much of the time during the last 14 days did you:

	All of the time	Most of the time	A lot of time	Some of the time	A little of the time	Hardly any of the time	None of the time
1. Feel short of Breath as a result of your asthma							
2. Feel bothered by or have to avoid Dust in the environment?							
3. Feel Frustrated as a result of your							
4. Feel bothered by coughing							
5. Feel afraid of not having your asthma medication available?							
6. Experience a feeling of chest tightness and / or chest heaviness							
7. Feel bothered by or have to avoid cigarette smoke in the environment?							
8. Have difficulty greetings a good night sleep as a result of your asthma							
9. Feel concerned about having asthma							
10. Experience wheezing in chest?							
11. Feel bothered by or have to avoid going outside because of weather or air pollution							
12. Strenuous activities (such as hurrying, exercising, running up stairs, sports)							
13. Moderate activities (such as walking, housework, gardening)							
14. Social activities (such as talking, playing with pets/ children							
15. Work related activities							

APPENDIX- 9: RAW DATA

Sl. No	NAME	LU_L	LU_R	PC_L	PC_R	HT_L	HT_R	SI_L	SI_R	TE_L	TE_R	LI_L	LI_R
1	ABHAY	56	36	42	58	52	54	42	48	72	48	52	42
2	AKASH	88	86	122	70	50	54	56	56	72	64	86	78
3	AMIT	8	6	8	10	8	8	6	8	8	12	12	8
4	ANIRODH	84	62	68	58	62	62	70	52	56	48	76	60
5	ASHIRVADAM	96	98	88	102	62	88	70	98	82	94	108	96
6	CHINGA	92	84	54	42	64	60	68	58	54	52	62	64
7	DARSAN	44	30	24	16	26	30	36	40	24	26	34	22
8	DIPAK	48	50	72	36	62	62	76	74	42	60	56	82
9	GOWTHAM	50	52	52	54	54	48	52	56	62	46	54	62
10	KRISHNA	40	36	34	32	46	52	24	36	40	40	52	50
11	NARESH	20	30	24	26	30	24	32	26	32	20	36	20
12	NAROTTAM	86	102	46	64	82	78	76	74	64	74	64	78
13	PASSA	70	54	64	52	82	56	84	56	66	62	56	70
14	RAJU	106	82	80	90	74	82	104	108	90	66	102	96
15	RAUSHAN	24	30	28	28	24	30	26	32	36	32	40	32
16	SANATAN	92	62	82	58	70	58	64	48	74	58	92	76
17	SANJAY	70	68	38	66	46	52	48	46	58	50	68	62
18	SHOMIT	38	28	22	28	20	34	20	22	20	24	40	36
19	SHREERAM	38	30	40	26	28	18	26	38	26	22	56	34
20	SRINIVAS	52	44	32	44	48	44	12	16	16	12	56	36
21	SUBHAS	38	54	46	38	26	42	32	48	32	38	34	50
22	SUDHIR	34	48	26	36	42	48	28	38	30	28	36	34
23	SUJAY	74	80	76	82	60	64	90	76	64	70	80	74
24	TANKU	30	24	16	30	16	34	14	30	18	34	38	44
25	YOGA NANDU	60	64	64	72	86	92	88	116	82	100	74	80
	Post												
26	ABHAY	44	36	40	36	40	34	38	34	44	26	40	42
27	AKASH	80	68	70	52	58	38	60	40	70	56	74	74
28	AMIT	8	6	8	8	6	8	6	8	6	6	12	6
29	ANIRODH	58	66	72	66	62	72	76	60	74	60	84	60
30	ASHIRVADAM	76	92	80	98	78	78	74	86	84	80	102	80
31	CHINGA	92	112	68	52	72	62	86	68	70	60	62	72
32	DARSAN	40	48	24	20	26	40	34	32	26	28	40	38
33	DIPAK	66	52	80	70	82	78	86	72	74	70	78	92
34	GOWTHAM	44	36	48	30	50	38	40	30	40	32	50	50
35	KRISHNA	60	72	58	72	62	78	66	58	68	60	84	82
36	NARESH	22	36	32	40	30	28	30	26	26	22	28	28
37	NAROTTAM	90	92	58	56	66	82	68	72	78	68	82	68
38	PASSA	92	74	68	62	54	58	70	62	60	60	92	56
39	RAJU	90	102	70	68	58	52	92	82	64	66	92	88

40	RAUSHAN	22	36	22	30	14	28	40	32	46	32	60	34
41	SANATAN	102	74	64	62	66	60	74	56	64	50	94	70
42	SANJAY	72	84	24	70	50	54	46	48	56	40	70	86
43	SHOMIT	46	40	26	26	20	26	28	24	22	26	48	36
44	SHREERAM	46	42	38	32	24	24	38	46	30	30	54	34
45	SRINIVAS	32	32	28	36	20	28	24	28	20	20	52	28
46	SUBHAS	42	32	24	28	16	24	24	28	22	24	30	34
47	SUDHIR	28	38	24	26	30	28	22	34	24	26	38	22
48	SUJAY	52	42	56	54	42	26	26	38	36	34	64	58
49	TANKU	8	10	12	14	16	20	16	20	14	16	26	28
50	YOGA NANDU	82	118	76	68	104	84	114	100	108	92	84	80
	20 pre												
51	ABHAY	58	36	44	52	68	48	42	64	48	50	46	52
52	AKASH	88	68	62	60	62	48	80	46	70	72	74	74
53	AMIT	8	6	8	10	10	8	6	10	8	10	10	8
54	ANIRODH	92	70	76	88	76	70	78	60	76	70	80	72
55	ASHIRVADA M	44	62	76	70	52	60	44	74	42	76	46	76
56	CHINGA	78	102	62	52	62	58	86	72	68	62	92	72
57	DARSAN	20	12	16	16	14	18	16	10	14	14	18	18
58	DIPAK	10	18	42	32	44	44	30	38	22	18	22	24
59	GOWTHAM	24	28	30	28	26	30	24	32	28	34	26	26
60	KRISHNA	70	84	76	76	60	70	78	74	72	58	94	80
61	NARESH	26	20	28	34	20	22	22	38	12	20	30	16
62	NAROTTAM	20	18	14	22	18	30	26	30	20	38	26	48
63	PASSA	100	52	70	58	62	42	92	50	72	56	94	74
64	RAJU	94	76	68	60	70	58	84	88	76	70	100	84
65	RAUSHAN	44	30	30	36	36	24	26	36	42	26	34	24
66	SANATAN	106	96	80	62	64	64	54	58	54	64	102	70
67	SANJAY	46	52	22	56	36	54	34	46	42	42	44	62
68	SHOMIT	16	16	20	26	12	10	16	12	16	14	44	24
69	SHREERAM	22	20	38	20	30	12	40	24	42	20	58	32
70	SRINIVAS	40	16	16	12	12	32	12	16	12	12	36	12
71	SUBHAS	50	64	78	48	60	44	62	54	56	56	58	58
72	SUDHIR	20	26	22	20	14	22	14	14	18	14	20	24
73	SUJAY	34	38	36	44	32	36	30	34	30	34	50	40
74	TANKU	42	40	24	38	34	26	34	38	44	32	42	66
75	YOGA NANDU	28	46	30	18	26	40	58	22	52	48	48	44
	20 Post												
76	ABHAY	52	34	34	28	38	24	42	42	52	28	40	40
77	AKASH	62	66	56	54	42	50	52	58	40	60	52	72
78	AMIT	12	6	6	8	8	16	6	10	12	10	18	6
79	ANIRODH	62	70	72	74	60	66	58	74	60	66	80	76
80	ASHIRVADA	64	76	72	86	74	66	64	74	64	72	80	96

	M												
81	CHINGA	92	104	72	52	74	62	88	68	76	58	94	68
82	DARSAN	38	20	20	20	24	26	24	18	16	18	24	20
83	DIPAK	28	52	72	42	54	54	68	70	32	46	44	60
84	GOWTHAM	34	50	40	32	34	42	24	24	54	38	50	42
85	KRISHNA	92	90	74	78	60	70	74	72	74	58	76	76
86	NARESH	16	28	18	24	14	24	20	28	14	16	24	22
87	NAROTTAM	32	22	14	30	24	36	24	40	20	30	32	44
88	PASSA	76	66	62	64	52	46	72	68	60	58	78	74
89	RAJU	72	88	62	54	96	64	82	80	66	56	94	80
90	RAUSHAN	44	48	30	30	40	38	56	42	44	42	58	26
91	SANATAN	118	78	54	54	62	72	50	66	50	50	86	60
92	SANJAY	56	84	26	66	48	50	42	50	46	48	70	72
93	SHOMIT	52	34	28	34	26	22	28	26	26	22	46	30
94	SHREERAM	38	36	36	24	30	24	44	42	48	34	50	34
95	SRINIVAS	48	32	28	16	28	20	28	20	28	12	32	16
96	SUBHAS	66	50	54	34	30	30	36	44	40	28	38	44
97	SUDHIR	18	36	14	16	14	18	12	20	16	14	12	22
98	SUJAY	70	60	48	56	40	40	44	52	36	52	74	46
99	TANKU	42	52	26	52	24	40	40	40	30	42	64	66
100	YOGA NANDU	98	86	80	60	90	76	116	124	98	88	90	68
	30 PRE												
101	ABHAY	56	26	30	30	56	30	34	36	36	30	38	32
102	AKASH	76	66	60	48	56	48	70	50	66	64	84	72
103	AMIT	12	12	18	14	16	20	10	14	10	16	20	16
104	ANIRODH	46	56	72	62	44	50	54	42	58	48	64	58
105	ASHIRVADA M	66	78	64	88	68	78	68	88	74	86	76	82
106	CHINGA	110	100	58	46	68	68	68	68	74	54	68	66
107	DARSAN	24	18	16	10	16	16	16	12	14	8	18	8
108	DIPAK	34	14	34	28	28	18	22	30	18	10	20	30
109	GOWTHAM	18	18	20	28	30	20	14	20	16	16	26	24
110	KRISHNA	26	34	38	38	42	42	34	48	46	32	50	60
111	NARESH	24	50	34	38	34	34	26	30	20	24	26	46
112	NAROTTAM	14	26	12	14	10	18	16	18	14	16	20	26
113	PASSA	82	42	68	46	70	50	72	52	66	60	80	54
114	RAJU	66	56	78	96	86	86	92	110	88	102	78	120
115	RAUSHAN	24	14	18	20	10	14	12	22	14	24	28	18
116	SANATAN	92	70	66	50	64	54	54	48	74	46	92	74
117	SANJAY	26	36	68	56	20	48	16	30	26	42	36	48
118	SHOMIT	30	24	26	30	22	24	18	24	22	16	32	34
119	SHREERAM	22	20	38	20	30	12	40	24	42	20	58	32
120	SRINIVAS	36	16	24	16	28	24	12	28	16	16	24	12
121	SUBHAS	40	60	68	44	28	42	28	62	52	42	58	56

122	SUDHIR	38	30	26	36	30	30	24	36	20	22	32	30
123	SUJAY	24	40	40	50	42	48	36	48	26	30	50	38
124	TANKU	8	14	18	20	22	20	22	20	26	16	20	40
125	YOGA NANDU	62	52	68	62	74	58	70	82	90	66	68	52
	30 POST												
126	ABHAY	56	26	30	30	56	30	34	36	36	30	38	32
127	AKASH	76	66	60	48	56	48	70	50	66	64	84	72
128	AMIT	12	12	18	14	16	20	10	14	10	16	20	16
129	ANIRODH	46	56	72	62	44	50	54	42	58	48	64	58
130	ASHIRVADA M	66	78	64	88	68	78	68	88	74	86	76	82
131	CHINGA	110	100	58	46	68	68	68	68	74	54	68	66
132	DARSAN	24	18	16	10	16	16	16	12	14	8	18	8
133	DIPAK	34	14	34	28	28	18	22	30	18	10	20	30
134	GOWTHAM	18	18	20	28	30	20	14	20	16	16	26	24
135	KRISHNA	26	34	38	38	42	42	34	48	46	32	50	60
136	NARESH	24	50	34	38	34	34	26	30	20	24	26	46
137	NAROTTAM	14	26	12	14	10	18	16	18	14	16	20	26
138	PASSA	82	42	68	46	70	50	72	52	66	60	80	54
139	RAJU	66	56	78	96	86	86	92	110	88	102	78	120
140	RAUSHAN	24	14	18	20	10	14	12	22	14	24	28	18
141	SANATAN	92	70	66	50	64	54	54	48	74	46	92	74
142	SANJAY	26	36	68	56	20	48	16	30	26	42	36	48
143	SHOMIT	30	24	26	30	22	24	18	24	22	16	32	34
144	SHREERAM	22	20	38	20	30	12	40	24	42	20	58	32
145	SRINIVAS	36	16	24	16	28	24	12	28	16	16	24	12
146	SUBHAS	40	60	68	44	28	42	28	62	52	42	58	56
147	SUDHIR	38	30	26	36	30	30	24	36	20	22	32	30
148	SUJAY	24	40	40	50	42	48	36	48	26	30	50	38
149	TANKU	8	14	18	20	22	20	22	20	26	16	20	40
150	YOGA NANDU	62	52	68	62	74	58	70	82	90	66	68	52
	Chair	10 pre											
151	AMALESH	66	34	42	46	50	34	56	42	42	28	58	52
152	KAUSHAL	88	94	66	86	64	60	70	68	62	62	96	94
153	NABA	24	12	18	14	8	10	12	8	16	12	30	14
154	NIRBHAY	26	32	14	22	22	18	20	24	20	20	22	26
155	PAPPU	34	36	26	24	16	20	20	12	14	28	26	44
156	PEMA	48	58	34	50	34	54	46	54	44	40	52	56
157	PRAJWAL	62	60	56	54	50	46	60	62	44	50	60	64
158	RAJESH	58	78	78	68	90	84	78	80	64	78	94	82
159	RAJIB	48	48	30	36	36	46	66	54	48	46	62	52
160	RANI	42	34	42	42	40	34	46	30	42	32	54	36
161	RANJAN	46	54	24	30	38	48	32	36	16	28	40	30
162	SAHIN	30	46	30	64	24	42	28	40	32	42	44	52

163	SANATAN	38	44	40	40	56	38	42	36	34	26	58	58
164	SUDIP	78	110	90	86	74	86	80	90	68	80	96	102
165	SUJIT	76	60	56	52	70	60	82	68	80	50	66	60
166	YUVA	82	54	68	68	54	50	72	86	82	78	88	66
167	BINAMRA	90	58	62	44	60	56	72	52	56	52	68	44
168	CHINMAY	36	26	36	40	30	22	24	42	44	34	38	34
169	DIPANSHU	80	88	50	32	64	40	62	68	60	54	70	32
170	HARDIK	80	52	26	38	26	42	24	50	26	56	40	50
171	PUNIT	18	14	18	20	30	30	12	14	16	16	20	16
172	SURYADAY	60	84	60	66	76	84	62	84	54	68	72	48
173	RAMP	94	80	66	52	70	50	80	60	80	72	68	64
174	SHYAM	134	112	66	64	84	82	86	116	82	104	96	82
175	KALYAN	92	92	54	68	52	62	76	78	74	60	62	82
	10 post												
176	AMALESH	84	34	58	46	42	38	40	56	40	38	64	68
177	KAUSHAL	64	78	42	54	50	30	54	46	40	38	68	62
178	NABA	22	14	8	10	10	12	8	10	12	6	20	12
179	NIRBHAY	26	36	20	26	18	24	24	30	16	22	20	26
180	PAPPU	26	20	30	34	34	20	26	20	34	34	30	22
181	PEMA	58	40	34	44	38	36	48	40	46	40	56	42
182	PRAJWAL	38	22	34	20	24	22	30	36	28	18	38	26
183	RAJESH	54	94	52	52	48	50	70	62	50	64	84	72
184	RAJIB	40	46	30	28	28	36	58	46	42	38	56	48
185	RANI	18	12	16	28	8	14	16	14	16	10	20	22
186	RANJAN	58	44	36	24	46	28	32	34	24	42	42	36
187	SAHIN	14	38	14	40	20	38	22	24	28	38	28	48
188	SANATAN	56	54	48	30	42	42	50	38	36	28	66	50
189	SUDIP	76	82	76	62	52	56	56	52	42	60	98	78
190	SUJIT	82	74	76	66	84	80	82	80	92	76	78	64
191	YUVA	66	70	42	50	44	46	50	64	48	60	68	66
192	BINAMRA	92	56	60	42	56	70	66	64	68	62	78	72
193	CHINMAY	10	12	14	16	24	14	8	16	10	14	20	14
194	DIPANSHU	68	52	34	30	36	16	34	54	36	32	30	28
195	HARDIK	56	72	48	46	42	38	40	34	46	30	48	54
196	PUNIT	12	10	16	16	20	26	12	16	14	12	18	12
197	SURYADAY	64	62	52	42	60	70	48	62	40	52	56	32
198	RAMP	80	76	58	56	58	54	64	70	78	70	68	80
199	SHYAM	124	118	70	58	64	72	100	108	80	70	102	72
200	KALYAN	66	86	76	66	54	50	64	50	62	50	66	72
	20	PRE											
201	AMALESH	70	50	52	44	28	30	38	38	38	28	60	48
202	KAUSHAL	80	92	72	78	82	62	68	74	68	64	88	66
203	NABA	34	22	26	16	16	18	24	16	12	28	22	24
204	NIRBHAY	58	44	42	40	52	40	52	38	34	32	52	48

205	PAPPU	18	16	14	14	20	14	16	14	18	18	14	16
206	PEMA	62	66	56	62	54	66	58	72	62	50	80	60
207	PRAJWAL	26	20	34	18	18	24	26	22	12	16	34	20
208	RAJESH	58	90	64	66	60	64	74	68	46	74	86	84
209	RAJIB	26	32	20	32	22	36	36	32	20	28	30	32
210	RANI	26	18	22	34	30	18	32	22	20	18	26	24
211	RANJAN	40	34	30	24	46	28	32	18	20	20	46	24
212	SAHIN	20	42	30	72	60	48	30	30	32	44	30	48
213	SANATAN	42	68	46	42	44	54	40	62	36	44	68	66
214	SUDIP	106	102	94	84	92	90	96	84	84	76	88	84
215	SUJIT	64	74	66	60	80	70	76	90	88	72	70	70
216	YUVA	76	64	62	66	50	48	54	62	52	60	86	70
217	BINAMRA	76	68	62	52	64	54	72	56	62	94	78	68
218	CHINMAY	48	42	36	60	76	44	30	40	56	44	58	38
219	DIPANSHU	88	84	64	38	60	46	70	56	60	44	66	54
220	HARDIK	54	46	30	44	48	54	38	56	34	70	62	54
221	PUNIT	32	30	32	26	24	26	28	26	28	20	36	28
222	SURYADAY	70	84	46	54	82	76	68	68	64	64	52	44
223	RAMP	72	74	54	48	52	46	60	48	66	64	60	62
224	SHYAM	118	84	74	60	66	70	94	98	70	74	108	80
225	KALYAN	72	62	72	70	56	58	64	66	64	52	74	58
	20	Post											
226	AMALESH	50	38	42	30	28	36	40	50	36	36	50	54
227	KAUSHAL	70	72	42	46	46	36	46	48	46	40	60	46
228	NABA	12	14	28	12	40	18	14	10	16	12	24	18
229	NIRBHAY	58	46	42	30	42	38	46	48	24	32	44	38
230	PAPPU	18	12	14	24	24	14	14	12	14	12	18	18
231	PEMA	70	52	46	46	36	36	52	48	48	46	70	52
232	PRAJWAL	28	22	32	24	30	50	34	34	32	20	54	34
233	RAJESH	72	82	52	50	42	44	66	60	44	54	84	72
234	RAJIB	28	36	16	28	24	38	40	36	20	26	46	38
235	RANI	42	24	14	12	26	32	24	26	18	32	46	24
236	RANJAN	62	60	32	56	44	54	36	38	42	34	52	64
237	SAHIN	62	60	32	56	44	54	36	38	42	34	52	64
238	SANATAN	28	44	44	30	44	36	32	48	30	32	64	44
239	SUDIP	86	76	54	78	48	80	50	66	62	66	72	84
240	SUJIT	70	94	54	94	80	92	88	80	72	96	70	110
241	YUVA	72	54	60	60	66	36	62	56	66	56	80	56
242	BINAMRA	90	82	62	54	66	62	90	62	78	90	86	76
243	CHINMAY	12	8	32	28	14	18	22	18	26	44	20	20
244	DIPANSHU	48	84	36	38	44	24	40	64	58	90	60	54
245	HARDIK	84	74	42	50	46	50	46	56	66	72	68	76
246	PUNIT	30	36	30	30	38	46	40	36	30	32	42	22
247	SURYADAY	98	92	64	64	94	80	68	64	72	66	68	50

248	RAMP	38	96	36	86	34	92	40	72	82	94	90	86
249	SHYAM	118	100	78	52	90	86	68	108	82	90	92	78
250	KALYAN	64	80	72	70	70	62	88	54	42	60	60	70
	30	PRE											
251	AMALESH	60	28	54	42	44	40	46	48	48	34	72	50
252	KAUSHAL	74	82	58	78	78	52	54	68	52	66	76	68
253	NABA	30	12	18	16	38	18	10	10	12	12	18	16
254	NIRBHAY	40	40	26	40	32	30	48	32	28	36	36	30
255	PAPPU	42	38	44	40	46	38	38	26	38	38	36	52
256	PEMA	78	54	40	48	42	60	52	58	58	48	64	48
257	PRAJWAL	26	26	30	28	22	30	32	26	30	18	42	30
258	RAJESH	58	74	66	60	64	66	80	62	60	76	84	78
259	RAJIB	22	24	14	24	24	34	26	26	38	26	34	52
260	RANI	30	20	40	42	34	22	24	16	26	16	40	34
261	RANJAN	42	32	14	16	32	24	22	22	18	32	50	22
262	SAHIN	48	74	48	72	72	62	50	52	50	68	64	68
263	SANATAN	32	60	48	42	54	52	46	64	30	48	76	52
264	SUDIP	72	74	80	84	82	78	76	70	76	68	84	78
265	SUJIT	56	58	60	54	66	62	82	70	88	54	66	72
266	YUVA	32	22	38	48	38	26	32	52	36	40	48	42
267	BINAMRA	70	46	68	44	52	42	72	48	66	48	78	46
268	CHINMAY	26	22	30	42	24	26	12	14	24	26	26	32
269	DIPANSHU	68	70	34	40	30	40	52	66	72	52	46	32
270	HARDIK	74	68	42	40	46	66	40	58	56	70	66	68
271	PUNIT	14	12	16	20	14	16	14	14	14	14	20	18
272	SURYADAY	68	38	52	38	44	48	36	48	32	58	40	40
273	RAMP	76	76	58	56	56	48	58	38	64	60	62	46
274	SHYAM	122	108	70	46	46	60	66	88	70	58	100	88
275	KALYAN	76	56	60	58	46	56	58	66	60	60	76	56
	30	POST											
276	AMALESH	48	26	28	32	26	24	46	34	30	26	54	36
277	KAUSHAL	54	68	28	44	36	38	36	38	36	32	56	52
278	NABA	22	10	18	30	28	16	12	18	14	14	24	28
279	NIRBHAY	38	48	40	32	48	38	50	38	34	34	38	42
280	PAPPU	26	24	22	24	34	24	28	26	32	30	24	32
281	PEMA	74	60	46	46	42	52	54	68	54	50	62	52
282	PRAJWAL	28	22	32	20	24	36	32	36	30	26	36	34
283	RAJESH	82	72	48	56	44	52	82	58	48	56	84	80
284	RAJIB	54	44	30	32	38	30	54	30	36	32	62	48
285	RANI	16	24	28	34	10	16	14	24	8	20	12	22
286	RANJAN	60	48	20	20	28	38	24	20	20	34	36	24
287	SAHIN	36	46	26	44	34	44	30	26	36	38	36	36
288	SANATAN	64	80	30	30	52	52	36	40	32	20	46	52
289	SUDIP	96	74	74	62	56	50	60	64	50	46	78	56

290	SUJIT	64	62	60	56	54	66	76	68	86	62	76	80
291	YUVA	68	56	40	54	66	42	62	66	64	56	78	62
292	BINAMRA	78	66	62	42	54	50	70	56	58	54	76	50
293	CHINMAY	16	30	18	32	26	20	12	12	18	22	24	34
294	DIPANSHU	80	88	50	32	64	40	62	68	60	54	70	32
295	HARDIK	38	60	26	36	18	44	16	40	12	58	22	66
296	PUNIT	24	26	20	24	28	18	26	26	24	20	26	22
297	SURYADAY	54	30	38	28	32	34	24	28	18	38	30	24
298	RAMP	68	106	84	58	74	52	78	48	92	68	74	58
299	SHYAM	120	94	80	50	76	60	104	96	86	60	90	68
300	KALYAN	66	76	54	56	46	42	64	54	56	50	62	60
	ANXIETY												
301	VASUDEV	34	22	28	34	34	28	56	32	34	26	30	34
302	ASWANI	154	84	102	74	42	94	130	70	122	100	96	66
303	BHANSAD	66	56	58	32	42	32	36	40	16	46	82	44
304	RAGHVENDRA	142	114	136	114	104	80	84	110	72	74	122	128
305	MAHESH	94	106	110	86	70	76	90	72	48	46	114	80
306	SHIVSHANKAR	106	68	102	95	80	107	92	99	91	94	121	90
307	SHREEVIDYA	186	134	104	92	158	108	154	152	140	138	142	106
308	VIDISHA	174	148	148	126	156	154	178	168	110	132	136	142
309	AKSHYA	130	86	114	50	170	142	176	200	154	144	126	84
310	BHAGYA LAXMI	34	48	12	26	20	24	26	32	16	18	32	30
311	KORTESH	158	94	104	80	80	28	92	62	152	98	134	98
312	NAVEEN J	88	84	94	74	80	120	98	66	70	76	88	86
313	PARIMALA	98	58	52	62	50	28	62	22	54	38	76	76
314	PRIYADARSHANI	98	124	88	60	70	68	110	96	82	78	102	62
315	RAJESHREE	88	54	40	34	90	64	94	72	94	22	52	72
316	RATHNA	118	132	96	78	94	44	112	26	118	190	136	30
317	SHANKAR	98	66	64	80	74	74	74	50	42	72	80	80
318	HARITHA	136	116	78	82	68	84	94	96	66	108	98	106
319	ROHINI	106	94	74	52	94	76	78	88	50	62	86	74
320	HARISH BABU	88	132	70	76	92	116	112	112	96	148	92	88
321	RESHMA	112	86	84	82	78	92	44	78	50	62	76	74
	DEPRESSION												
322	DIVYA	34	46	60	32	30	32	38	42	48	26	82	68
323	HEMANTH	108	78	94	60	108	84	94	94	110	94	102	72
324	ASWIN	98	116	66	60	72	82	64	62	68	50	56	66
325	BALACHANDRAN	58	42	46	50	36	54	70	90	30	78	56	54
326	CHANCHALA	48	56	38	36	38	24	30	50	42	52	50	46
327	GOWTHAM	54	68	48	22	48	52	46	74	30	52	32	46

328	MANJULA	46	76	58	46	26	36	50	26	36	36	72	32
329	MILAND	76	50	78	68	92	62	104	58	70	40	100	82
330	TANUJA	106	70	70	76	68	68	50	78	68	48	64	52
331	SUVARNAL ATHA	190	192	158	156	122	168	112	166	102	176	146	154
332	SUNITHA	46	60	56	34	36	34	66	30	44	26	36	60
333	BHARATHI	13	16	15	28	6	16	9	13	9	19	17	27
334	CHANDRASE KER	30	28	24	70	12	66	14	44	42	46	40	38
335	CHINMAY	18	20	36	22	12	10	24	20	26	12	16	28
336	MITHUN	14	8	16	14	12	16	8	8	14	12	12	14
337	SANTOSH	76	104	56	70	68	92	64	98	36	74	100	70
338	SIDHARTH	62	42	58	16	50	28	44	36	20	34	46	20
339	SRIDARI	36	38	64	46	28	32	76	40	66	42	54	56
340	VENKAT R	48	39	22	25	14	22	30	33	20	26	51	38
341	NATARAJAN	132	76	86	60	56	50	92	110	98	84	82	62
342	CHANDRAS HEKAR	30	28	24	70	12	66	14	44	42	46	40	38
343	NAVEEN	58	66	34	50	32	30	50	52	32	34	32	70
344	RAJASHIMA	50	18	48	74	30	32	50	70	56	16	50	40
345	RAVISUNDA R	94	72	94	74	86	92	74	62	74	74	90	54
346	SANJAY	96	70	68	82	76	82	76	52	66	62	82	78
347	ASHWIN	40	30	50	32	42	34	44	42	28	32	50	28
		HEALT HY											
348	ABHISEK	70	76	52	46	62	50	50	72	52	42	44	52
349	AMALESH	102	98	76	70	42	52	60	74	52	66	64	88
350	ARCHNA	118	134	66	68	68	56	88	88	70	58	82	90
351	ARUN	26	22	44	20	20	30	30	16	14	14	20	26
352	ASIM	88	64	34	46	50	50	46	50	52	52	66	50
353	BABU	126	100	108	88	98	92	72	90	78	62	112	90
354	BHEIGYAJIT	98	76	64	42	66	32	70	68	62	54	78	46
355	BIPLOB	102	74	62	62	80	68	100	58	72	66	82	52
356	BISWAJIT	84	98	102	108	58	74	92	140	96	110	106	86
357	CHIRANJIT	66	48	66	60	54	68	46	40	58	56	70	64
358	DILIP	130	100	78	54	64	92	78	96	84	78	86	72
359	DIVIA	96	76	68	62	66	50	66	52	78	58	92	74
360	ANJALI	50	42	36	40	48	32	42	44	28	36	48	40
361	GADAI	48	42	40	50	30	32	38	34	28	28	50	48
362	JEENA	90	98	58	52	86	64	86	82	74	72	76	58
363	LALITHA	76	46	64	46	44	68	50	62	62	46	60	56
364	MADHUMAN TI	56	52	38	40	44	44	52	40	42	36	66	66
365	MAHESH	70	56	56	60	56	46	70	62	40	36	70	60
366	MAMATA	96	60	60	50	66	60	70	74	66	64	56	52
367	MEGHANA	76	58	50	40	52	40	64	22	36	30	70	54

368	NIMAI	68	54	32	32	28	30	44	30	18	32	48	40
369	PINTU	44	52	42	32	32	36	40	48	34	42	52	38
370	PRAHLAD	80	98	60	64	42	44	50	66	52	64	80	70
371	PRAJEESH	84	64	76	64	80	50	66	50	68	54	64	60
372	PRASHANT	72	86	42	70	54	62	72	54	34	52	56	56
373	RIMI	116	124	70	58	60	64	54	70	52	70	104	86
374	TULASI	84	68	70	48	54	70	56	48	54	38	70	58
375	SAHIN	72	78	48	58	42	52	46	40	70	54	60	70
376	SAIKAT	66	82	54	80	48	60	58	74	48	62	66	84
377	SAMIRAN	44	60	38	50	42	46	48	50	40	40	52	68
378	SANGEETA	26	16	22	40	16	30	30	18	18	22	20	26
379	SASMITA	74	62	56	48	66	60	64	52	50	46	56	40
380	SAURABH	46	46	24	56	40	38	22	26	38	36	58	46
381	SETHULAXMI	108	98	82	76	82	72	76	72	42	60	82	82
382	SHIVADITYA	68	78	68	92	84	68	82	76	76	60	92	74
383	SUKESH	86	64	52	58	46	48	72	56	48	38	70	60
384	SURENDRA	110	100	90	82	70	78	82	86	70	94	114	98
385	SURESH	52	46	50	62	56	62	32	40	40	44	60	46
386	SUVAS	74	68	56	60	32	44	68	70	54	50	40	54
387	TABASUN	120	110	74	80	70	80	66	62	78	72	102	78
388	UJJAL	136	88	80	90	78	64	94	64	96	62	88	94
389	USHA	92	88	68	74	80	82	80	62	88	84	60	62
390	VIKHAT	56	44	40	40	22	26	36	34	24	24	54	50
391	VIVEK	76	42	54	56	64	68	50	52	40	58	64	62
	ASTHMA												
392	VIJAYLAXMI	50	92	70	70	72	88	96	92	96	80	70	74
393	VIDYASHREE	96	80	68	68	84	100	62	56	68	64	70	64
394	UTTAM	58	28	38	34	32	30	56	32	22	24	36	28
395	TAPAS	142	144	88	78	82	100	94	112	106	98	128	120
396	SUNIL	36	46	38	52	42	42	52	44	42	42	32	52
397	Vidhu	118	88	122	84	94	76	112	66	104	82	118	96
398	SUMANA	16	10	18	12	12	22	14	12	10	12	26	12
399	SUBENDU	138	104	116	104	94	74	112	68	126	80	138	104
400	SHYAMAL	22	20	16	22	10	18	24	12	16	12	18	18
401	SAVITA	56	54	60	46	58	58	64	66	74	62	70	52
402	SANJUKTA	70	60	48	58	64	74	66	54	66	40	62	54
403	SAJANI	160	132	88	56	94	98	68	54	68	74	106	72
404	SAI MADHAV	52	42	70	56	92	58	64	62	70	50	74	50
405	SATI	52	56	44	60	38	26	38	58	36	24	58	54
406	RUPASI	62	68	60	78	46	100	122	142	72	104	60	92
407	RATESHWAR	26	46	42	32	26	32	34	32	28	24	22	32

408	RASANA	90	70	88	62	80	58	84	70	78	78	78	74
409	RAJESH	72	94	94	94	72	94	70	86	84	98	82	104
410	RAFIKA	54	52	42	44	30	54	42	46	42	46	54	60
411	RADHAKA	56	74	62	52	58	66	86	56	64	58	66	52
412	PRITAM	50	46	58	42	58	40	44	36	40	40	62	64
413	PRATIMA	62	66	44	58	52	40	44	42	36	28	34	42
414	PATHIK	82	100	60	64	54	54	98	64	84	70	76	72
415	PALASH	90	76	58	86	62	80	80	64	106	58	80	90
416	MRUTUNJO Y	46	64	66	62	66	68	52	46	44	60	74	64
417	KHUDIRAM	96	86	66	56	44	60	60	72	64	52	114	70
418	Kaveri	42	64	62	72	50	56	52	66	46	42	60	74
419	KAJAL	154	114	138	94	76	64	122	54	120	98	154	70
420	KHADIM	44	18	14	18	26	12	26	30	18	22	24	18
421	JEET SINGH	54	54	94	42	58	50	60	50	50	56	74	56
422	JATSANA	46	36	54	58	72	46	72	54	40	52	58	64
423	JAHARNA	36	44	22	28	16	18	22	24	12	22	40	24
424	HAREKISOR	48	50	42	56	46	56	60	52	54	46	50	48
425	GOPAL	42	40	68	26	62	40	54	34	52	34	72	70
426	GANESH M	16	36	18	20	22	22	40	24	10	38	18	20
427	DIPAK	104	52	86	56	92	78	98	66	98	42	114	106
428	BUDDHAN	48	68	46	48	70	58	60	56	46	44	44	74
429	BIVAS	62	58	52	52	34	52	52	44	48	52	54	58
430	BHRISPATI	56	60	58	50	44	52	54	56	56	38	58	48
431	BHAGIRATH I	64	64	72	56	42	40	88	66	78	54	82	64
432	BABLU	108	98	64	54	52	42	52	42	52	80	80	60
433	ATAMAMAD HU	88	62	64	44	42	52	64	54	38	68	56	64
434	ASIMA	84	92	90	96	106	128	100	68	92	62	96	84
435	APARNA	70	60	58	56	48	70	68	68	48	42	62	64
436	ANUPRIYA	54	44	52	48	44	40	54	46	24	30	46	40
437	ANJU	62	56	30	46	30	56	60	50	58	40	36	52
438	AKASH	142	118	160	142	158	188	114	126	82	100	136	152
439	SUBHA	64	24	40	46	32	32	36	22	30	24	54	48
440	RITA	54	58	64	58	54	44	82	68	76	66	70	54
441	BHARATI	64	64	72	56	42	40	88	66	78	54	82	64
	HEALTHY												
442	ABHISEK	70	76	52	46	62	50	50	72	52	42	44	52
443	AMALESH	102	98	76	70	42	52	60	74	52	66	64	88
444	ARCHNA	118	134	66	68	68	56	88	88	70	58	82	90
445	ARUN	26	22	44	20	20	30	30	16	14	14	20	26
446	ASIM	88	64	34	46	50	50	46	50	52	52	66	50
447	BIPLOB	102	74	62	62	80	68	100	58	72	66	82	52
448	BISWAJIT	84	98	102	108	58	74	92	140	96	110	106	86
449	CHIRANJIT	66	48	66	60	54	68	46	40	58	56	70	64

450	DILIP	130	100	78	54	64	92	78	96	84	78	86	72
451	GADAI	48	42	40	50	30	32	38	34	28	28	50	48
452	JEENA	90	98	58	52	86	64	86	82	74	72	76	58
453	MADHUMAN TI	56	52	38	40	44	44	52	40	42	36	66	66
454	MAHESH	70	56	56	60	56	46	70	62	40	36	70	60
455	MAMATA	96	60	60	50	66	60	70	74	66	64	56	52
456	MEGHANA	76	58	50	40	52	40	64	22	36	30	70	54
457	PINTU	44	52	42	32	32	36	40	48	34	42	52	38
458	PRAHLAD	80	98	60	64	42	44	50	66	52	64	80	70
459	PRAJEESH	84	64	76	64	80	50	66	50	68	54	64	60
460	PRASHANT	72	86	42	70	54	62	72	54	34	52	56	56
461	TULASI	84	68	70	48	54	70	56	48	54	38	70	58
462	SAMIRAN	44	60	38	50	42	46	48	50	40	40	52	68
463	SASMITA	74	62	56	48	66	60	64	52	50	46	56	40
464	SAURABH	46	46	24	56	40	38	22	26	38	36	58	46
465	SETHULAX MI	108	98	82	76	82	72	76	72	42	60	82	82
466	SHIVADITY A	68	78	68	92	84	68	82	76	76	60	92	74
467	SUKESH	86	64	52	58	46	48	72	56	48	38	70	60
468	SURENDRA	110	100	90	82	70	78	82	86	70	94	114	98
469	SURESH	52	46	50	62	56	62	32	40	40	44	60	46
470	TABASUN	120	110	74	80	70	80	66	62	78	72	102	78
471	UJJAL	136	88	80	90	78	64	94	64	96	62	88	94
472	USHA	92	88	68	74	80	82	80	62	88	84	60	62
473	VIKHAT	56	44	40	40	22	26	36	34	24	24	54	50
474	MALLIKA	80	64	50	56	64	70	72	76	70	56	70	46
475	NARENDRA	64	52	28	28	26	32	30	32	46	30	42	46
476	RAJJISV	88	80	34	40	66	54	78	66	74	46	50	50
477	SATENDRA	94	66	50	52	58	64	50	58	82	40	62	70
478	CHAINJA	120	100	118	70	120	130	138	120	122	94	108	100
479	PAPU	74	68	72	52	82	50	58	72	62	66	72	58
480	DIVYALAX MI	110	108	66	70	60	70	78	86	66	84	90	88
481	SNEHA	120	84	54	48	70	60	94	102	90	92	92	88
482	CHANJAPPA	74	58	60	50	50	42	56	54	66	48	72	70
483	JYOTI	142	120	108	106	124	102	130	94	108	114	148	114
484	RASHMI	84	90	66	60	60	76	108	78	52	92	88	96
485	ROOPA	120	68	84	56	70	64	98	68	84	60	80	78
486	ANCY	172	152	148	158	140	164	134	140	144	148	166	140
487	BINDU	68	64	30	38	64	44	68	64	44	48	44	58
488	RANI	86	58	70	62	60	78	100	70	96	78	98	64
489	AMITANSHU	112	102	70	70	68	74	74	60	80	70	60	92
490	PARAM	98	60	76	40	62	48	68	60	52	42	68	58
491	JJO	112	74	92	76	78	66	94	84	114	94	94	74

	DEPRESSIO N	PRE											
492	DIVYA	34	46	60	32	30	32	38	42	48	26	82	68
493	BHARATHI	16	18	16	28	6	16	6	10	8	18	16	26
494	CHANDRASE KER	30	28	24	70	12	66	14	44	42	46	40	38
495	CHINMAY	18	20	36	22	12	10	24	20	26	12	16	28
496	MITHUN	14	8	16	14	12	16	8	8	14	12	12	14
497	SIDHARTH	62	42	58	16	50	28	44	36	20	34	46	20
498	SRIDARI	36	38	64	46	28	32	76	40	66	42	54	56
499	VENKAT R	48	39	22	25	14	22	30	33	20	26	51	38
500	NATARAJAN	132	76	86	60	56	50	92	110	98	84	82	62
501	NAVEEN	58	66	34	50	32	30	50	52	32	34	32	70
502	RAJASHIMA	50	18	48	74	30	32	50	70	56	16	50	40
503	RAVISUNDA R	94	72	94	74	86	92	74	62	74	74	90	54
504	SANJAY	96	70	68	82	76	82	76	52	66	62	82	78
	DEPRESSION	POST											
505	DIVYA	68	36	76	50	68	34	60	36	74	38	78	52
506	BHARATHI	34	30	46	28	42	18	44	16	14	20	28	28
507	CHANDRASE KER	56	78	40	30	32	48	48	44	14	48	56	44
508	CHINMAY	46	30	50	46	50	52	52	58	44	36	66	40
509	MITHUN	48	24	16	28	8	20	16	26	12	8	24	20
510	SIDHARTH	52	52	48	30	44	22	62	54	28	38	76	36
511	SRIDARI	86	38	80	90	30	26	84	82	60	30	44	50
512	VENKAT R	14	24	20	22	14	16	12	12	14	18	20	32
513	NATARAJAN	83	62	70	66	54	48	64	76	68	48	68	70
514	NAVEEN	50	36	28	32	22	46	62	10	42	22	40	38
515	RAJASHIMA	70	70	76	72	54	80	72	66	78	74	68	74
516	RAVISUNDA R	92	82	82	80	82	62	100	70	76	76	80	60
517	SANJAY	34	18	32	32	14	20	26	16	18	24	24	26
			LOW ER	MERIDIA N									
		SP_L	SP_R	LR _L	LR _R	KI _L	KI _R	BL _L	BL _R	GB _L	GB _R	ST _L	ST _R
1	ABHAY	52	52	48	46	30	30	40	44	42	46	56	50
2	AKASH	108	124	98	100	74	136	126	116	122	134	144	120
3	AMIT	32	42	32	26	16	24	36	26	34	24	42	32
4	ANIRODH	68	62	60	42	46	48	56	60	68	52	58	54
5	ASHIRVADA M	56	68	92	76	76	72	78	76	66	78	80	76
6	CHINGA	98	104	98	108	70	46	78	86	106	88	106	98
7	DARSAN	24	12	30	22	28	22	36	24	26	22	30	26
8	DIPAK	80	60	86	82	54	36	82	54	76	78	70	84
9	GOWTHAM	84	114	120	134	84	118	98	98	98	94	128	148
10	KRISHNA	32	34	26	26	18	14	24	28	26	22	44	38

11	NARESH	34	46	30	38	26	24	26	38	26	38	42	32
12	NAROTTAM	112	98	116	108	62	64	74	68	74	84	66	70
13	PASSA	96	70	76	88	66	62	102	98	86	78	92	86
14	RAJU	72	84	74	98	78	70	82	88	94	94	96	94
15	RAUSHAN	8	12	8	12	6	12	6	10	16	24	34	22
16	SANATAN	98	92	90	78	58	52	98	102	98	90	90	104
17	SANJAY	70	66	66	66	44	46	90	66	94	86	76	66
18	SHOMIT	40	44	42	68	54	48	74	64	52	50	48	62
19	SHREERAM	46	56	34	38	36	32	42	54	42	48	48	48
20	SRINIVAS	28	16	20	12	12	12	12	28	12	16	60	16
21	SUBHAS	28	24	50	52	34	30	34	44	38	52	48	42
22	SUDHIR	44	30	54	36	32	22	42	24	18	12	32	24
23	SUJAY	96	156	150	148	116	140	128	176	116	166	122	158
24	TANKU	82	68	78	42	32	54	42	62	60	50	50	74
25	YOGA NANDU	106	122	124	120	100	96	86	128	108	120	124	134
	10 MIN POST												
26	ABHAY	40	48	42	54	24	18	30	30	30	34	48	40
27	AKASH	110	110	96	96	92	126	120	108	122	114	140	108
28	AMIT	36	48	40	24	24	18	36	26	38	26	42	20
29	ANIRODH	76	72	64	58	62	60	78	64	74	74	66	58
30	ASHIRVADA M	64	56	88	66	70	72	58	64	50	64	72	80
31	CHINGA	116	118	118	98	74	60	80	88	114	106	118	104
32	DARSAN	28	24	44	44	40	42	64	46	46	46	48	36
33	DIPAK	102	80	120	100	76	58	86	64	94	82	102	104
34	GOWTHAM	70	100	108	112	64	76	68	76	74	74	104	114
35	KRISHNA	52	66	48	50	42	36	50	42	38	50	66	54
36	NARESH	46	46	34	40	22	30	30	44	34	34	46	36
37	NAROTTAM	96	72	114	92	60	62	74	64	72	78	58	68
38	PASSA	106	92	112	86	92	70	106	98	108	88	108	92
39	RAJU	82	56	66	56	60	62	52	68	80	76	78	66
40	RAUSHAN	8	10	20	18	8	10	8	8	14	24	34	22
41	SANATAN	102	88	88	78	62	46	98	100	102	72	94	86
42	SANJAY	94	72	84	58	42	38	76	44	86	78	78	62
43	SHOMIT	32	56	36	68	54	58	74	66	48	52	52	52
44	SHREERAM	48	66	42	62	40	36	40	54	48	54	54	60
45	SRINIVAS	12	32	12	16	12	12	8	12	6	6	6	10
46	SUBHAS	34	28	44	44	16	26	28	42	32	48	40	40
47	SUDHIR	58	42	58	50	40	30	42	22	26	10	36	20
48	SUJAY	82	156	134	152	108	134	108	158	96	128	116	150
49	TANKU	54	34	40	36	48	44	32	40	34	38	38	88
50	YOGA NANDU	102	112	124	118	82	88	96	138	100	96	124	148
	20 MIN PRE												

51	ABHAY	54	36	66	48	28	24	52	34	58	46	60	48
52	AKASH	90	120	74	92	82	96	106	76	102	102	150	118
53	AMIT	32	46	36	32	28	20	42	28	42	28	46	34
54	ANIRODH	104	110	84	80	78	62	94	90	86	96	72	68
55	ASHIRVADAM	44	50	72	56	54	34	60	52	32	58	62	66
56	CHINGA	98	94	98	102	80	54	78	72	114	106	106	104
57	DARSAN	16	10	20	30	16	24	26	22	18	16	20	20
58	DIPAK	26	34	26	52	16	10	32	24	34	34	20	16
59	GOWTHAM	60	106	80	106	44	86	68	90	72	80	92	112
60	KRISHNA	94	74	74	60	60	64	66	56	66	70	94	78
61	NARESH	36	40	36	34	34	30	30	34	32	30	40	38
62	NAROTTAM	52	50	50	58	40	38	42	36	34	40	40	42
63	PASSA	122	118	124	106	94	66	118	110	130	86	124	104
64	RAJU	72	84	82	64	70	82	66	88	102	86	110	82
65	RAUSHAN	8	10	12	12	6	18	8	12	14	14	22	18
66	SANATAN	112	80	104	84	68	34	122	104	100	96	98	94
67	SANJAY	66	64	68	58	28	28	66	48	78	72	64	60
68	SHOMIT	50	40	44	56	52	34	68	50	34	42	58	60
69	SHREERAM	60	70	54	44	58	56	60	76	66	54	50	62
70	SRINIVAS	20	36	12	20	12	12	32	28	20	16	32	12
71	SUBHAS	42	46	78	70	48	40	42	58	68	64	50	62
72	SUDHIR	32	20	50	14	24	12	38	16	20	10	20	12
73	SUJAY	38	58	40	64	64	64	76	80	70	80	78	76
74	TANKU	72	58	70	62	98	70	70	86	64	66	98	108
75	YOGA NANDU	84	84	84	70	68	66	76	88	70	108	86	100
	20 MIN POST												
76	ABHAY	64	36	80	64	30	32	48	34	50	42	62	46
77	AKASH	104	134	86	102	90	118	104	96	112	108	156	134
78	AMIT	40	64	50	40	42	36	48	32	40	30	42	32
79	ANIRODH	108	112	86	70	74	58	92	86	96	92	68	70
80	ASHIRVADAM	56	64	84	64	70	56	54	54	40	66	60	86
81	CHINGA	104	104	114	104	52	50	60	86	106	102	108	92
82	DARSAN	30	18	46	36	38	38	64	38	52	36	48	36
83	DIPAK	58	68	88	68	38	22	52	30	64	70	52	50
84	GOWTHAM	62	90	78	102	58	70	60	60	80	70	98	98
85	KRISHNA	58	68	64	56	52	52	56	54	64	60	86	66
86	NARESH	38	50	30	50	30	32	36	36	32	28	40	38
87	NAROTTAM	60	56	68	70	44	36	56	44	52	42	50	44
88	PASSA	140	142	140	114	118	90	124	114	138	100	134	124
89	RAJU	70	76	76	70	62	74	62	74	78	74	84	72
90	RAUSHAN	6	16	30	22	18	14	24	14	18	20	36	26
91	SANATAN	108	102	104	94	74	58	122	126	100	108	98	104

92	SANJAY	80	86	72	66	40	38	72	52	86	82	78	70
93	SHOMIT	60	46	66	66	66	52	74	66	66	48	74	80
94	SHREERAM	80	80	58	50	60	52	60	68	70	62	62	56
95	SRINIVAS	16	16	12	16	12	16	20	16	12	20	16	12
96	SUBHAS	30	32	50	50	34	20	30	40	40	46	30	42
97	SUDHIR	54	22	48	16	40	12	32	12	18	8	30	24
98	SUJAY	50	88	48	88	82	80	84	136	98	90	80	110
99	TANKU	54	48	56	46	66	88	64	70	50	62	52	88
100	YOGA NANDU	126	146	126	154	92	100	108	126	108	130	110	142
	30 MIN PRE												
101	ABHAY	52	52	62	50	30	32	46	48	54	48	52	46
102	AKASH	120	112	104	90	98	106	106	104	124	130	130	116
103	AMIT	20	32	26	22	24	20	34	24	42	30	38	40
104	ANIRODH	78	84	66	66	74	62	80	70	86	96	80	74
105	ASHIRVADA M	72	78	76	64	72	52	72	70	64	70	72	86
106	CHINGA	82	72	86	56	70	48	80	72	102	86	100	96
107	DARSAN	14	24	16	18	24	20	20	28	14	18	24	30
108	DIPAK	22	24	32	36	10	10	22	18	18	18	18	12
109	GOWTHAM	54	52	62	80	28	30	36	58	48	56	54	74
110	KRISHNA	14	26	16	26	20	14	30	28	30	20	32	26
111	NARESH	58	58	48	58	36	46	42	56	36	48	50	48
112	NAROTTAM	38	30	40	52	28	20	40	32	28	24	28	26
113	PASSA	108	102	106	82	64	36	90	74	114	98	118	104
114	RAJU	92	102	76	72	66	74	66	82	94	96	102	80
115	RAUSHAN	6	6	8	16	8	8	6	8	8	14	10	14
116	SANATAN	84	102	116	102	74	62	116	116	116	108	96	100
117	SANJAY	36	26	46	44	18	20	36	42	22	22	28	24
118	SHOMIT	42	34	40	50	46	34	54	44	34	40	46	42
119	SHREERAM	60	70	54	44	58	56	60	76	66	54	50	62
120	SRINIVAS	12	12	16	16	12	16	16	20	24	16	16	12
121	SUBHAS	52	52	78	64	42	44	36	62	70	68	70	60
122	SUDHIR	40	30	56	48	38	34	54	34	26	12	26	18
123	SUJAY	52	122	94	152	150	142	150	162	140	130	112	156
124	TANKU	40	28	30	30	30	46	40	38	42	40	28	50
125	YOGA NANDU	88	68	116	92	128	108	114	98	130	88	140	92
	30 MIN POST												
126	ABHAY	52	52	62	50	30	32	46	48	54	48	52	46
127	AKASH	120	112	104	90	98	106	106	104	124	130	130	116
128	AMIT	20	32	26	22	24	20	34	24	42	30	38	40
129	ANIRODH	78	84	66	66	74	62	80	70	86	96	80	74
130	ASHIRVADA M	72	78	76	64	72	52	72	70	64	70	72	86
131	CHINGA	82	72	86	56	70	48	80	72	102	86	100	96

132	DARSAN	14	24	16	18	24	20	20	28	14	18	24	30
133	DIPAK	22	24	32	36	10	10	22	18	18	18	18	12
134	GOWTHAM	54	52	62	80	28	30	36	58	48	56	54	74
135	KRISHNA	14	26	16	26	20	14	30	28	30	20	32	26
136	NARESH	58	58	48	58	36	46	42	56	36	48	50	48
137	NAROTTAM	38	30	40	52	28	20	40	32	28	24	28	26
138	PASSA	108	102	106	82	64	36	90	74	114	98	118	104
139	RAJU	92	102	76	72	66	74	66	82	94	96	102	80
140	RAUSHAN	6	6	8	16	8	8	6	8	8	14	10	14
141	SANATAN	84	102	116	102	74	62	116	116	116	108	96	100
142	SANJAY	36	26	46	44	18	20	36	42	22	22	28	24
143	SHOMIT	42	34	40	50	46	34	54	44	34	40	46	42
144	SHREERAM	60	70	54	44	58	56	60	76	66	54	50	62
145	SRINIVAS	12	12	16	16	12	16	16	20	24	16	16	12
146	SUBHAS	52	52	78	64	42	44	36	62	70	68	70	60
147	SUDHIR	40	30	56	48	38	34	54	34	26	12	26	18
148	SUJAY	52	122	94	152	150	142	150	162	140	130	112	156
149	TANKU	40	28	30	30	30	46	40	38	42	40	28	50
150	YOGA NANDU	88	68	116	92	128	108	114	98	130	88	140	92
	SITTING IN CHAIR												
151	AMALESH	48	32	34	28	24	22	54	46	48	38	38	30
152	KAUSHAL	82	92	114	104	52	68	90	92	82	90	82	88
153	NABA	8	8	16	20	20	14	24	16	16	10	18	10
154	NIRBHAY	24	24	26	22	44	28	70	56	64	56	50	44
155	PAPPU	24	26	24	14	14	10	32	34	32	24	40	36
156	PEMA	60	60	58	44	66	62	66	82	68	62	54	60
157	PRAJWAL	66	62	54	34	48	40	52	36	38	36	64	64
158	RAJESH	92	68	92	84	46	50	62	60	84	70	72	54
159	RAJIB	64	60	78	96	18	28	18	36	84	64	38	44
160	RANI	50	46	60	42	24	42	48	52	52	54	62	48
161	RANJAN	50	60	58	64	50	52	72	74	80	58	70	60
162	SAHIN	86	90	80	126	80	88	78	96	74	96	86	72
163	SANATAN	68	44	52	66	48	40	74	84	60	62	68	58
164	SUDIP	84	118	116	132	138	102	142	156	126	116	108	130
165	SUJIT	110	118	132	102	96	112	108	110	116	104	120	98
166	YUVA	86	90	76	116	82	88	92	110	94	120	92	116
167	BINAMRA	58	66	74	80	74	86	50	62	34	48	68	64
168	CHINMAY	24	48	14	10	50	64	30	24	22	24	20	12
169	DIPANSHU	32	38	32	66	34	50	48	54	56	60	82	72
170	HARDIK	38	20	30	36	34	22	16	30	50	38	40	50
171	PUNIT	16	36	26	28	28	26	38	42	32	38	38	46
172	SURYADAY	54	38	62	62	80	66	92	90	80	76	58	56
173	RAMP	84	100	92	82	88	88	92	108	116	112	90	98

174	SHYAM	58	54	112	86	88	68	98	74	86	92	108	86
175	KALYAN	102	96	82	46	70	74	110	92	78	90	74	64
	10 MIN POST												
176	AMALESH	56	46	46	44	16	22	54	54	58	54	46	58
177	KAUSHAL	64	80	110	94	48	60	86	82	84	82	86	88
178	NABA	8	10	14	14	14	6	16	14	8	6	12	6
179	NIRBHAY	24	24	26	26	48	36	76	68	70	68	56	56
180	PAPPU	24	26	32	26	18	10	42	50	66	46	64	54
181	PEMA	62	70	52	42	72	52	78	88	84	70	46	62
182	PRAJWAL	48	30	20	22	18	14	20	18	22	20	24	18
183	RAJESH	98	76	100	102	58	50	64	66	86	74	66	70
184	RAJIB	58	62	68	60	14	20	24	32	74	60	30	52
185	RANI	28	26	20	18	18	22	18	28	24	32	26	24
186	RANJAN	42	42	38	46	44	46	58	58	62	50	56	54
187	SAHIN	58	70	28	102	32	52	42	60	40	62	52	44
188	SANATAN	70	58	48	64	48	46	64	82	70	68	72	58
189	SUDIP	98	98	90	100	96	84	110	120	108	96	108	94
190	SUJIT	84	96	108	96	110	92	92	92	118	108	116	114
191	YUVA	78	88	88	102	70	86	90	86	84	114	88	106
192	BINAMRA	42	42	48	54	54	64	44	48	28	26	72	32
193	CHINMAY	12	24	6	14	24	38	24	20	14	18	14	8
194	DIPANSHU	36	46	54	76	42	58	62	58	52	72	64	54
195	HARDIK	48	44	34	44	36	26	18	30	46	36	42	46
196	PUNIT	28	34	22	38	18	24	30	38	30	38	30	42
197	SURYADAY	38	20	46	44	38	46	56	70	44	54	42	32
198	RAMP	98	98	98	92	78	88	102	118	116	92	96	88
199	SHYAM	42	38	116	84	76	48	70	64	52	76	92	88
200	KALYAN	80	64	56	44	48	56	108	78	66	76	48	58
	20 MIN PRE												
201	AMALESH	70	48	42	52	30	32	50	54	58	44	70	56
202	KAUSHAL	66	88	110	100	52	62	86	88	96	96	86	106
203	NABA	36	26	30	36	30	28	38	40	44	42	56	26
204	NIRBHAY	36	90	24	46	68	52	88	86	72	90	68	80
205	PAPPU	16	22	10	8	10	8	32	28	24	20	44	36
206	PEMA	50	56	52	40	52	36	78	68	72	54	70	54
207	PRAJWAL	46	46	24	24	24	20	26	22	34	34	36	34
208	RAJESH	84	50	96	90	42	46	68	70	96	90	72	66
209	RAJIB	26	24	46	66	14	14	16	16	50	38	22	26
210	RANI	48	34	26	26	30	30	30	28	48	42	50	42
211	RANJAN	34	46	38	34	38	32	54	52	54	42	52	52
212	SAHIN	50	44	46	48	38	44	34	58	44	52	52	46
213	SANATAN	58	50	62	70	42	42	68	92	72	70	66	56
214	SUDIP	124	120	122	116	110	94	134	152	112	98	128	120
215	SUJIT	56	88	82	84	84	76	82	96	98	96	116	92

216	YUVA	140	132	108	110	120	94	132	132	144	150	138	128
217	BINAMRA	42	54	80	86	100	66	88	50	36	66	100	84
218	CHINMAY	24	78	26	24	110	108	60	44	46	42	32	28
219	DIPANSHU	34	50	56	84	46	56	60	62	60	82	82	68
220	HARDIK	38	24	48	36	42	34	26	50	42	36	48	60
221	PUNIT	44	48	46	38	88	74	72	52	76	76	94	78
222	SURYADAY	88	64	92	74	92	128	92	96	80	72	78	76
223	RAMP	88	94	96	88	70	88	84	96	108	102	104	96
224	SHYAM	50	50	96	80	82	60	90	80	104	84	116	88
225	KALYAN	56	88	58	46	46	60	104	70	68	64	44	52
	20 MIN POST												
226	AMALESH	38	38	36	24	24	24	36	40	34	42	28	42
227	KAUSHAL	58	80	100	84	38	48	72	90	82	80	80	84
228	NABA	34	24	16	46	36	34	28	28	30	28	34	26
229	NIRBHAY	44	60	46	50	64	48	96	72	82	102	66	84
230	PAPPU	8	14	8	12	14	6	16	18	20	26	36	30
231	PEMA	62	48	60	62	48	44	72	84	62	62	50	52
232	PRAJWAL	36	42	22	30	38	20	30	24	32	36	22	26
233	RAJESH	66	60	94	86	46	40	72	58	100	94	70	50
234	RAJIB	24	26	48	58	12	10	14	18	48	32	18	20
235	RANI	40	30	36	26	36	38	48	50	62	38	56	50
236	RANJAN	50	52	58	56	50	52	48	58	60	68	66	50
237	SAHIN	50	52	58	56	50	52	48	58	60	68	66	50
238	SANATAN	38	26	30	36	26	48	38	66	50	50	38	60
239	SUDIP	108	88	130	94	86	76	96	100	110	104	114	100
240	SUJIT	56	72	68	72	94	78	82	104	104	94	108	96
241	YUVA	138	132	104	96	112	98	124	126	132	138	120	112
242	BINAMRA	66	74	82	92	86	54	68	42	40	44	76	68
243	CHINMAY	22	28	14	36	18	24	54	82	18	14	6	8
244	DIPANSHU	50	36	52	72	38	46	52	58	50	68	66	52
245	HARDIK	62	34	54	68	66	36	36	54	50	54	70	62
246	PUNIT	32	32	24	30	72	42	40	38	44	42	50	46
247	SURYADAY	70	48	80	60	120	92	86	82	64	62	72	62
248	RAMP	80	70	86	48	72	72	66	90	94	44	74	86
249	SHYAM	40	34	96	66	70	60	86	70	92	80	92	88
250	KALYAN	62	88	48	42	54	48	94	70	58	64	42	48
	30 MIN PRE												
251	AMALESH	62	32	42	26	32	22	66	46	68	46	48	38
252	KAUSHAL	64	76	96	96	38	50	76	92	72	86	84	84
253	NABA	10	12	14	22	16	12	34	38	22	26	28	16
254	NIRBHAY	60	78	54	72	86	72	114	118	106	106	92	98
255	PAPPU	28	34	26	20	16	6	32	46	26	20	42	40
256	PEMA	52	50	64	42	40	36	62	74	70	50	44	56
257	PRAJWAL	26	28	24	24	22	22	28	28	24	20	26	20

258	RAJESH	78	48	66	80	40	42	94	82	80	102	58	52
259	RAJIB	22	40	52	56	6	16	10	12	58	48	30	32
260	RANI	28	36	30	36	24	30	38	28	42	54	48	60
261	RANJAN	28	32	32	34	30	38	58	50	52	28	46	40
262	SAHIN	70	66	66	62	74	62	64	74	70	68	72	50
263	SANATAN	70	50	50	50	46	48	78	86	64	68	62	50
264	SUDIP	106	96	130	84	136	80	162	164	102	88	90	84
265	SUJIT	68	94	86	70	96	82	96	86	112	106	110	94
266	YUVA	84	102	82	94	34	42	80	76	88	92	90	104
267	BINAMRA	38	52	48	94	52	50	32	58	42	74	62	80
268	CHINMAY	20	42	14	18	38	54	30	20	24	18	20	18
269	DIPANSHU	36	46	44	66	38	56	48	64	62	82	72	74
270	HARDIK	30	34	46	38	60	36	26	30	52	44	62	66
271	PUNIT	26	32	24	20	72	42	46	36	66	36	54	32
272	SURYADAY	72	42	78	58	104	76	88	72	104	60	90	70
273	RAMP	94	94	94	86	74	78	80	108	100	104	90	100
274	SHYAM	48	90	114	96	66	60	60	68	76	60	104	72
275	KALYAN	54	56	50	34	44	44	98	70	66	64	50	56
	30 MIN												
276	AMALESH	36	26	26	26	24	16	46	36	44	36	32	32
277	KAUSHAL	50	72	84	76	34	40	72	78	76	74	72	84
278	NABA	18	24	20	24	24	20	28	30	16	28	26	24
279	NIRBHAY	50	88	38	54	60	84	92	120	68	102	74	92
280	PAPPU	14	22	18	18	20	14	38	46	40	48	50	50
281	PEMA	70	54	60	42	50	42	64	84	70	58	42	56
282	PRAJWAL	32	26	20	18	40	22	24	24	20	26	24	22
283	RAJESH	50	72	88	92	58	58	92	78	98	106	78	62
284	RAJIB	34	34	48	62	6	16	12	18	74	58	20	34
285	RANI	18	30	18	16	10	16	18	22	36	34	14	24
286	RANJAN	40	34	36	44	40	34	54	58	54	46	52	46
287	SAHIN	42	42	40	38	46	44	38	54	50	54	58	40
288	SANATAN	40	34	26	32	28	36	46	62	44	42	38	38
289	SUDIP	120	86	124	90	80	86	102	106	114	110	100	96
290	SUJIT	72	96	98	70	104	78	98	78	108	100	108	98
291	YUVA	102	100	96	98	60	54	96	74	96	104	96	110
292	BINAMRA	44	52	48	66	48	50	28	40	34	54	60	64
293	CHINMAY	10	28	12	22	24	44	10	14	16	12	10	8
294	DIPANSHU	32	38	32	66	34	50	48	54	56	60	82	72
295	HARDIK	34	30	36	52	44	44	28	16	34	40	42	58
296	PUNIT	26	32	22	34	60	24	28	22	24	30	34	34
297	SURYADAY	46	32	36	24	38	36	40	34	30	46	34	30
298	RAMP	92	96	102	92	78	84	98	114	112	110	96	110
299	SHYAM	36	34	80	70	60	58	66	74	64	94	92	92
300	KALYAN	34	50	36	30	34	46	70	58	50	52	32	50

	ANXIETY												
301	VASUDEV	38	72	36	72	38	42	34	56	42	56	44	62
302	ASWANI	124	140	170	128	108	104	124	50	104	56	158	68
303	BHANSAD	46	64	34	60	36	40	52	54	48	48	48	52
304	RAGHVENDRA	86	88	94	76	76	86	68	66	94	60	82	76
305	MAHESH	150	162	182	182	160	168	148	158	192	196	188	188
306	SHIVSHANKAR	55	41	45	76	51	55	73	80	110	47	78	74
307	SHREEVIDYA	118	120	100	56	118	56	150	76	130	92	112	92
308	VIDISHA	40	52	74	76	68	46	62	50	90	50	78	58
309	AKSHYA	88	68	92	60	48	48	52	44	74	88	74	66
310	BHAGYA LAXMI	12	14	16	18	20	20	44	18	16	34	18	14
311	KORTESH	68	62	70	90	62	48	54	60	84	62	94	62
312	NAVEEN J	102	194	198	158	86	76	74	106	98	124	166	134
313	PARIMALA	54	38	60	50	40	46	60	52	44	40	52	48
314	PRIYADARS HANI	46	52	106	102	64	84	66	92	64	72	90	72
315	RAJESHREE	90	128	126	184	82	90	68	60	68	108	120	76
316	RATHNA	70	52	104	36	58	40	58	42	54	52	120	56
317	SHANKAR	68	60	78	64	64	50	90	72	86	80	80	62
318	HARITHA	98	120	138	144	50	68	86	102	68	82	90	82
319	ROHINI	54	74	66	72	66	44	46	32	42	34	76	46
320	HARISH BABU	108	122	50	120	48	62	68	58	88	98	76	102
321	RESHMA	70	52	56	64	42	70	70	58	56	114	86	76
	DEPRESSION												
322	DIVYA	46	30	46	24	44	36	56	24	54	48	44	30
323	HEMANTH	70	72	70	54	40	46	34	30	46	34	62	54
324	ASWIN	72	56	80	82	36	52	36	62	54	54	70	60
325	BALACHANDRAN	52	38	26	48	40	34	36	52	36	50	38	42
326	CHANCHALA	52	50	46	42	14	16	16	18	46	24	44	44
327	GOWTHAM	56	82	88	78	88	68	42	72	92	82	128	94
328	MANJULA	74	68	54	50	62	46	44	50	64	72	64	56
329	MILAND	52	82	96	102	56	36	42	36	62	52	76	72
330	TANUJA	40	78	56	46	42	52	46	94	62	54	68	54
331	SUVARNALATHA	38	48	58	50	100	88	70	68	104	92	100	72
332	SUNITHA	64	26	56	50	60	52	42	38	88	62	80	80
333	BHARATHI	6	10	18	9	6	17	11	6	9	13	18	14
334	CHANDRASEKER	24	22	32	24	18	6	28	24	22	20	14	20
335	CHINMAY	18	14	20	18	18	20	20	26	30	12	18	22
336	MITHUN	18	44	52	64	58	52	40	32	58	38	46	54
337	SANTOSH	80	118	96	114	80	62	54	66	52	58	92	124
338	SIDHARTH	22	22	34	38	14	8	20	26	18	14	20	20

339	SRIDARI	26	66	24	60	22	28	30	16	34	26	28	18
340	VENKAT R	25	22	27	31	16	15	23	22	37	45	29	39
341	NATARAJAN	50	40	62	38	52	18	70	36	24	34	50	54
342	CHANDRASHEKAR	24	22	32	24	18	6	28	24	22	20	14	20
343	NAVEEN	144	162	114	190	182	166	194	176	128	100	102	100
344	RAJASHIMA	46	116	84	114	104	116	104	62	138	136	130	156
345	RAVISUNDAR	54	28	76	52	58	44	42	22	100	64	70	58
346	SANJAY	44	110	90	110	58	96	48	38	62	80	74	100
347	ASHWIN	14	14	12	6	18	18	66	66	48	22	10	12
348	ABHISEK	30	26	26	24	20	26	58	50	36	38	38	28
349	AMALESH	58	40	52	52	48	40	78	62	52	44	62	66
350	ARCHNA	112	80	114	102	100	102	72	112	106	88	114	84
351	ARUN	18	24	8	12	20	22	44	52	28	40	16	20
352	ASIM	62	54	80	68	46	32	40	74	64	68	50	70
353	BABU	98	116	64	112	100	96	116	116	136	144	152	166
354	BHEIGYAJIT	76	84	76	100	72	76	100	120	96	104	86	106
355	BIPLOB	42	38	24	24	38	28	38	40	48	36	44	28
356	BISWAJIT	124	90	104	78	78	92	94	108	100	100	94	80
357	CHIRANJIT	64	62	70	58	54	38	68	50	80	70	82	62
358	DILIP	100	140	124	110	122	78	146	116	100	104	124	106
359	DIVIA	84	70	110	102	58	58	86	60	88	78	78	90
360	ANJALI	34	24	30	20	36	20	32	24	34	34	32	30
361	GADAI	30	26	42	34	52	52	44	52	42	56	46	44
362	JEENA	74	106	68	48	94	86	120	110	114	92	94	80
363	LALITHA	42	22	50	30	38	44	34	34	34	34	40	32
364	MADHUMANTI	22	32	20	32	14	22	30	28	26	30	24	40
365	MAHESH	78	88	34	58	66	76	84	114	72	108	54	52
366	MAMATA	48	42	48	42	46	46	48	46	68	66	60	62
367	MEGHANA	54	58	44	76	30	16	42	60	26	38	40	64
368	NIMAI	84	66	74	58	66	60	80	88	74	74	66	14
369	PINTU	24	26	54	52	46	30	62	72	72	60	54	50
370	PRAHLAD	46	42	60	48	30	36	22	48	50	42	40	40
371	PRAJEESH	102	98	112	122	106	92	136	142	106	96	104	82
372	PRASHANT	94	84	124	124	80	52	94	74	90	86	72	96
373	RIMI	98	92	116	130	56	40	100	84	88	58	116	48
374	TULASI	32	22	78	62	38	38	52	34	32	60	66	76
375	SAHIN	62	82	74	94	84	84	106	132	92	104	84	70
376	SAIKAT	72	70	42	38	52	70	88	96	88	80	44	52
377	SAMIRAN	58	78	52	52	44	38	48	72	62	74	44	54
378	SANGEETA	12	32	34	24	20	8	18	16	22	18	30	18
379	SASMITA	72	52	38	36	46	44	84	90	54	52	54	60
380	SAURABH	40	38	50	36	50	20	78	46	44	40	84	58
381	SETHULAXMI	72	90	88	78	84	84	98	80	84	82	82	86

382	SHIVADITYA	32	30	72	60	96	36	86	76	92	74	60	56
383	SUKESH	94	96	112	64	106	76	94	96	84	72	56	104
384	SURENDRA	76	62	80	68	72	68	132	140	102	84	74	98
385	SURESH	26	16	28	20	18	38	32	22	28	34	20	24
386	SUVAS	48	24	30	26	26	40	22	18	50	42	14	26
387	TABASUN	92	96	110	130	74	66	90	98	114	124	120	148
388	UJJAL	70	58	82	70	78	84	106	102	124	150	114	88
389	USHA	66	52	56	64	62	32	66	48	68	54	86	94
390	VIKHAT	40	30	30	32	18	26	62	52	42	28	54	31
391	VIVEK	24	46	42	46	42	36	48	28	46	58	40	48
	ASTHMA												
392	VIJAYLAXMI	24	24	28	20	40	30	54	48	30	26	40	26
393	VIDYASHREE	34	54	50	46	36	34	36	40	26	30	30	28
394	UTTAM	22	24	30	26	26	28	14	28	16	18	18	26
395	TAPAS	108	114	70	78	48	64	86	68	86	58	92	92
396	SUNIL	8	12	18	24	14	30	32	12	16	30	14	26
397	Vidhu	74	92	70	80	40	38	68	68	92	80	78	76
398	SUMANA	24	22	26	12	14	12	10	8	8	12	8	14
399	SUBENDU	112	68	98	80	76	84	68	70	74	90	88	60
400	SHYAMAL	10	16	12	14	8	18	8	8	14	18	24	12
401	SAVITA	24	22	50	36	30	18	34	18	30	26	42	26
402	SANJUKTA	54	46	110	76	60	56	48	30	64	56	102	86
403	SAJANI	78	64	98	58	38	24	52	48	76	52	80	52
404	SAI MADHAV	40	64	54	52	92	82	64	38	58	52	56	56
405	SATI	50	30	32	24	54	28	44	64	72	48	72	46
406	RUPASI	64	48	110	94	46	56	56	52	44	52	52	42
407	RATESHWAR	44	34	40	30	34	20	44	40	52	40	46	54
408	RASANA	50	48	78	64	48	54	68	60	84	54	72	58
409	RAJESH	86	102	84	126	124	94	138	144	114	130	146	142
410	RAFIKA	22	34	34	22	32	14	24	14	18	20	38	36
411	RADHAKA	28	40	54	36	28	58	34	54	30	48	40	30
412	PRITAM	34	30	52	62	42	28	32	18	48	30	50	54
413	PRATIMA	72	50	70	58	64	48	58	64	62	56	50	46
414	PATHIK	86	86	80	86	60	70	86	58	88	80	96	80
415	PALASH	132	116	124	158	92	88	104	96	142	140	128	92
416	MRUTUNJOY	100	136	106	120	76	54	90	72	100	102	122	124
417	KHUDIRAM	38	24	30	36	34	10	26	20	32	34	18	20
418	KAVERI	12	14	14	26	20	20	22	24	10	16	40	34
419	KAJAL	74	58	116	62	94	76	126	104	178	122	156	80
420	KHADIM	28	6	28	28	20	8	8	16	12	24	36	34
421	JEET SINGH	86	120	136	136	72	80	80	90	78	88	100	104
422	JATSANA	70	72	70	56	40	40	88	66	82	76	62	78
423	JAHARNA	18	16	28	18	12	10	22	14	22	14	18	26
424	HAREKISOR	68	54	56	82	56	62	32	48	88	70	60	52

425	GOPAL	72	66	66	54	40	46	84	84	70	60	60	42
426	GANESH M	14	10	18	8	6	6	6	6	16	24	26	20
427	DIPAK	24	66	84	82	62	24	54	20	20	22	24	38
428	BUDDHAN	30	18	36	20	38	38	26	38	36	26	54	42
429	BIVAS	32	30	56	42	32	54	68	70	76	82	54	34
430	BHRISPATI	34	24	32	32	38	32	64	26	72	36	62	32
431	BHAGIRATHI	82	66	100	58	52	58	96	86	40	58	68	50
432	BABLU	60	48	56	54	44	46	40	66	70	48	52	54
433	ATAMAMADHU	42	28	50	46	56	32	68	50	76	60	48	64
434	ASIMA	124	148	108	162	134	134	86	98	100	124	124	150
435	APARNA	70	72	82	64	88	88	110	92	98	96	90	70
436	ANUPRIYA	36	38	60	54	26	36	46	46	58	46	34	26
437	ANJU	30	34	32	20	18	22	12	8	26	18	36	28
438	AKASH	80	78	116	118	44	40	94	90	122	110	92	84
439	SUBHA	60	34	34	26	22	24	22	30	20	12	24	22
440	RITA	34	44	44	54	48	42	58	40	56	52	50	52
441	BHARATI	82	66	100	58	52	58	96	86	40	58	68	50
	HEALTHY												
442	ABHISEK	30	26	26	24	20	26	58	50	36	38	38	28
443	AMALESH	58	40	52	52	48	40	78	62	52	44	62	66
444	ARCHNA	112	80	114	102	100	102	72	112	106	88	114	84
445	ARUN	18	24	8	12	20	22	44	52	28	40	16	20
446	ASIM	62	54	80	68	46	32	40	74	64	68	50	70
447	BIPLOB	42	38	24	24	38	28	38	40	48	36	44	28
448	BISWAJIT	124	90	104	78	78	92	94	108	100	100	94	80
449	CHIRANJIT	64	62	70	58	54	38	68	50	80	70	82	62
450	DILIP	100	140	124	110	122	78	146	116	100	104	124	106
451	GADAI	30	26	42	34	52	52	44	52	42	56	46	44
452	JEENA	74	106	68	48	94	86	120	110	114	92	94	80
453	MADHUMANTI	22	32	20	32	14	22	30	28	26	30	24	40
454	MAHESH	78	88	34	58	66	76	84	114	72	108	54	52
455	MAMATA	48	42	48	42	46	46	48	46	68	66	60	62
456	MEGHANA	54	58	44	76	30	16	42	60	26	38	40	64
457	PINTU	24	26	54	52	46	30	62	72	72	60	54	50
458	PRAHLAD	46	42	60	48	30	36	22	48	50	42	40	40
459	PRAJEESH	102	98	112	122	106	92	136	142	106	96	104	82
460	PRASHANT	94	84	124	124	80	52	94	74	90	86	72	96
461	TULASI	32	22	78	62	38	38	52	34	32	60	66	76
462	SAMIRAN	58	78	52	52	44	38	48	72	62	74	44	54
463	SASMITA	72	52	38	36	46	44	84	90	54	52	54	60
464	SAURABH	40	38	50	36	50	20	78	46	44	40	84	58
465	SETHULAXMI	72	90	88	78	84	84	98	80	84	82	82	86
466	SHIVADITYA	32	30	72	60	96	36	86	76	92	74	60	56
467	SUKESH	94	96	112	64	106	76	94	96	84	72	56	104

468	SURENDRA	76	62	80	68	72	68	132	140	102	84	74	98
469	SURESH	26	16	28	20	18	38	32	22	28	34	20	24
470	TABASUN	92	96	110	130	74	66	90	98	114	124	120	148
471	UJJAL	70	58	82	70	78	84	106	102	124	150	114	88
472	USHA	66	52	56	64	62	32	66	48	68	54	86	94
473	VIKHAT	40	30	30	32	18	26	62	52	42	28	54	31
474	MALLIKA	40	52	44	32	58	40	70	26	88	82	66	70
475	NARENDRA	46	70	44	62	32	48	42	70	68	96	48	56
476	RAJJISV	30	46	86	102	80	44	88	78	82	60	68	56
477	SATENDRA	74	74	80	76	88	58	96	114	92	72	96	96
478	CHAINJA	92	106	108	72	72	58	68	68	84	104	126	136
479	PAPU	40	80	84	66	56	26	94	84	96	80	106	114
480	DIVYALAXMI	32	46	58	66	52	42	80	84	60	84	70	88
481	SNEHA	62	56	90	92	76	70	92	94	110	94	94	86
482	CHANJAPPA	56	52	50	34	40	34	78	60	76	56	54	44
483	JYOTI	78	62	62	80	68	82	64	74	70	58	70	88
484	RASHMI	58	60	72	64	32	50	52	48	62	72	54	70
485	ROOPA	56	92	76	58	58	74	82	80	104	98	92	98
486	ANCY	90	78	112	90	78	92	108	108	108	96	100	122
487	BINDU	28	34	34	46	52	46	36	46	46	66	60	44
488	RANI	50	42	56	58	28	28	48	64	60	58	50	58
489	AMITANSHU	50	46	40	52	50	40	48	46	72	60	72	60
490	PARAM	36	20	28	26	34	24	22	24	40	40	48	42
491	JJO	54	48	60	50	58	62	116	96	82	76	72	70
	DEPRESSION												
492	DIVYA	46	30	46	24	44	36	56	24	54	48	44	30
493	BHARATHI	10	16	16	8	6	16	14	8	6	10	16	12
494	CHANDRASEKER	24	22	32	24	18	6	28	24	22	20	14	20
495	CHINMAY	18	14	20	18	18	20	20	26	30	12	18	22
496	MITHUN	18	44	52	64	58	52	40	32	58	38	46	54
497	SIDHARTH	22	22	34	38	14	8	20	26	18	14	20	20
498	SRIDARI	26	66	24	60	22	28	30	16	34	26	28	18
499	VENKAT R	25	22	27	31	16	15	23	22	37	45	29	39
500	NATARAJAN	50	40	62	38	52	18	70	36	24	34	50	54
501	NAVEEN	144	162	114	190	182	166	194	176	128	100	102	100
502	RAJASHIMA	46	116	84	114	104	116	104	62	138	136	130	156
503	RAVISUNDAR	54	28	76	52	58	44	42	22	100	64	70	58
504	SANJAY	44	110	90	110	58	96	48	38	62	80	74	100
	DEPRESSION												
505	DIVYA	20	18	28	26	22	14	32	34	16	14	24	16
506	BHARATHI	58	98	54	70	60	76	40	34	102	70	114	82
507	CHANDRASEKER	26	24	40	66	10	14	24	62	14	14	12	28
508	CHINMAY	48	58	48	42	34	46	56	40	58	38	56	30

509	MITHUN	64	36	44	32	26	18	56	42	50	40	78	60
510	SIDHARTH	40	36	30	42	70	54	100	50	80	72	62	48
511	SRIDARI	30	24	64	36	62	24	40	28	18	24	54	54
512	VENKAT R	12	8	8	8	8	14	20	14	12	8	8	8
513	NATARAJAN	94	70	118	108	110	106	112	116	92	70	80	92
514	NAVEEN	36	22	24	12	42	10	36	34	32	10	28	16
515	RAJASHIMA	48	60	68	52	40	52	14	28	42	40	48	30
516	RAVISUNDA R	74	96	130	112	92	98	68	62	92	74	130	106
517	SANJAY	22	12	26	14	12	12	36	28	26	22	30	30

APPENDIX- 10: PUBLICATIONS FROM DOCTORAL WORK

1. Ghosh, K., Hankey, A., Srinivasan, T.M. (2017). Effect of lotus posture on acupuncture meridian energies: A controlled trial, *International Journal of Yoga*. In press.
2. Ghosh, K., Hankey, A., Srinivasan, T.M. (2017). Acupuncture Meridian Energies in Patients who are Mentally Disturbed. *Journal of Alternative and Complementary Medicine*. In press.
3. Ghosh, K., Hankey, A., Srinivasan, T.M. (2017). Electrodermal Screening of Asthmatics with Acugraph 4. *Journal of Acupuncture and Meridian Studies*. In press.