

Impact of Yoga on Adult Men

BY

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Introduction

I INTRODUCTION

What a time to be alive. Never has mankind known such an evolutionary explosion. We have accomplished things beyond the wildest dreams of our ancestors. Our cosmopants have eclipsed Icarus. Our Scientists have penetrated to the heart of atom and from it have torn the most closely guarded secrets of nature. Thanks to our educationist, scientist and technologist, well clothed and nourished, we live in luxury. New products for our comfort and pleasure, endless numbers of 'gadgets' aimed at making our lives ever more comfortable and full of ease.

But..... there is a but.....consider the anonymous multitude passing through our teeming streets, their dejected, anxious faces, their tired, unsmiling features, their shoulders are hunched, their chests constricted, their stomachs bulge. Civilized may be, but happy? Most of them are no longer cold nor hungry, but they need pills to send them to sleep, medicine to help evacuate their lazy bowels, they ease their aching heads with aspirin, and swallow tranquillizers to make their lives more bearable (Lysebeth, 1988).

Yogi Raja (1985) exhorts that life is full of miseries. Desire is the basic and fundamental reason for

all our miseries. If desires can be removed, miseries can be removed. Brown (1987) rightly tells that control over the activities of the mind, heart and its function can remove desires and add immensely to a person's comforts and increase his life expectancy.

In this context, Swami Pavitrananda (1974) proclaims that the dominant factors in our lives are feeling, thought and action, the mind being the motivating force behind all. Because there is the feeling factor, we feel misery and run after pleasure. If we could control our feelings and emotions and give them the right direction we would seek real happiness instead of sense pleasure and attain joy.

The solution rests with the individual, Yoga bestos on him health and long life, by means of its asanas which give suppleness to the spine—our very life-axis by calming over-wrought-nerves, by relaxing muscles, by reviving organs and nervous centres, Pranayama (the Breathing Exercise) brings oxygen and energy to energy cells, cleanses the organism by burning up waste products, expels the toxins: while relaxation guards against-neurasthenia and insomnia (Lysebeth, 1988).

According to Iyengar (1983) yoga is one of the six orthodox systems of Indian philosophy. It was collated,

coordinated and systematised by Patanjali in his classical work, the yoga sutras. When the restlessness of the mind, intellect and self is stilled through the practice of yoga, the yogi by the grace of the spirit within himself finds fulfilment.

Ramkumar (1986) and Brown (1987) are of the opinion that yoga is an ancient Indian system for the improvement of body and mind. It was practiced 4,000 years ago and the fact that today it enjoys an ever increasing popularity even in the western world, indicates its values.

Sitadevi Yogendra (1972) and Adishesaih (1985) exhort that the ancient India has bequeathed to the world a variable treasure, in fact the cream of Indian culture, in the ideology and technology of yoga. This art and science of healthy living-physically, mentally, emotionally, morally and spiritually has been handed down to us from time immemorial.

Sri Ananda (1985) tells that through yoga one can achieve a healthy body, calm nerves, mental strength, peace of mind, wisdom and hence happiness. Yoga controls the mind and five senses (Yogi Raja, 1985). It is meant for self identification and to reveal the secrets lying deep in our psychic being (Goswami, 1961; Sircar, 1974 and Swami Tapasyananda, 1979).

Rajneesh (1987) proclaims that yoga is a perfect science. It is a way to come to the truth. To the monks of Ramakrishna Order (1986) it is communication with God. It is an applied Psychology, not only means to achieve the purpose of life, but enables to do everything in the world, with great energy (Swami Munuvariyagi, 1976; Singh, 1980 and Yogi Raja, 1985). Masui (1981) and Iyengar (1983) state that yoga is nothing but the total experience of human life. It is a science of the integral man and of human personality. It considers the whole field of personality such as physical, physiological, emotional, behavioural, environmental and social aspects (Joshi, 1985).

Asrani (1971) calls yoga as Raj-Yoga because it relates mainly to mind and mind considered as 'King' - that rules the sense - organs and the body. Yoga is the love of God. Loving God with all one's heart and soul, would quickly bring about the cessation of all mental function. Yoga is the restraint of mental modifications. Cognitive also termed as yoga (Sinha, 1976; and Vasu, 1978).

Swami Tapasyananda (1979) stresses that the yogas of work, of wisdom and of devotion are all capable of serving as direct and independent means for attainment of Moksha. For mental poise and peace, Yoga is penance (Mangal and Chadha, 1983). Yoga is complete philosophy of life - which

embraces physical, mental and spiritual domains (Women's Era, 1987). It creates an awareness of real self and its ultimate goal.

Swami Munuvariyagi (1976) affirms that yoga is the art of life. It is the wisdom of life, an experience, the realisation of hidden powers, the intelligent and self conscious effort of man towards achieving universal existence. It is the search for and the realization of the truth. It is the method of training the mind and developing its powers of subtle perception. It encourages fine forms of concentration. Yoga teaches order and discipline in life and actual day to day living, Das (1981).

Yoga can be of immense benefit in treating stress related diseases, as well as in learning to relax, as a preventive measure (Sinha, 1985 and Women's Era, 1987). Ramasubbaiah (1985) views that yoga is a natural remedy for many diseases, like obesity with arthritis, hypertension, diabetes and many digestive disorders. It helps in developing mind, body and there by help individuals in preventing many emotional disorders. It is a natural chemotherapy for the mind. In this context Mangal and Chandha (1983) also opine that yogasanas are a cure and prevention of many diseases especially those of stomach or digestion. It is a simplest form of relaxation. People who follow a yogic

way of life establish a homeostatic balance and achieve mind relaxation and control. Yoga asanas practised over a regular period of time can prevent spinal complaints because they strengthen the muscles and ligaments of the spinal region. Asanas are gentle and an ideal form of exercise to maintain mobility of the arthritic joints (Blitz, 1987).

Hewitt (1987) affirms that yoga can be practised by men and women of all ages, but youth is the ideal period for its perfection. It is a way to greater energy, better health, a more youthful figure and relaxed living.

In the recent years, medical research has begun to pay attention to the impact of yoga. Studies have shown for instance, that relaxation in the corpse pose effectively relieves high blood-pressure and help in the cure of ailments. Laboratory tests have also confirmed yogis' ability to consciously control automatic or involuntary functions such as temperature, heart beat and blood-pressure. Research in such line has not been taken up from the inception of our department, hence the investigator was keen on taking up this topic 'Impact of Yoga On Adult Men' with the following objectives:

- i. To know the attitude of the participants towards yoga
- ii. To find out the physical and physiological changes due to yoga, and
- iii. To trace out the changes in memory power due to yoga

The investigator hopes that the findings would contribute through its insights to help people to know about yoga the intricate way in which all parts work together to keep in health.

Reviews of Literature

II REVIEW OF LITERATURE

The related literature pertaining to the 'Impact of Yoga on Adult Men' is reviewed under the following headings:

- A. Definition and meaning of Yoga
- B. History of Yoga
- C. Types of Yoga
- and D. Values of Yoga - Physical development, physiological functions, mental power and spiritual values

A. Definition and meaning of Yoga

According to monks of Ramakrishna Order (1986), yoga is the sanskrit word meaning to join or to yoke. The word yoga is derived from Sanskrit root "Yuj" means union or combining. Yoga is a union or combination of body, mind and thought. It is a communication, consummation abstraction, realisation, absorption or meta physical philosophizing of the highest type that promises to bring close proximity between the soul and the over soul (Singh, 1980 and Yogi Raja, 1985).

Iyengar (1983) explains that the word yoga means to merge, join or unite. Yoga is the union of the soul with

the eternal truth, a state of unalloyed bliss, arising from conquest of qualities. It is "to go to trance, to mediate" (Prasad, 1978). Yoga is often used as a suffix to indicate that the reasoning and conclusion are 'Spiritual' (Dhopeshwarkar, 1976).

Shekhawat (1979) states that yoga certainly carries the sense of collation, coming together, joining, uniting and adding. However, collation or coming together is brought about by an effort, an effort is presupposed in joining, uniting and adding. Yoga appears to mean a specific kind of action for a coming together.

Feverstein (1975) refers the word Yoga to that enormous body of spiritual precepts and techniques which grew up in India over several millennia and which may be regarded as the very substratum of the cultural life of Indian man. Yoga is thus the generic name for the various Indian paths of Unification or the transformation of consciousness.

Singh (1980) quotes Patanjali's definition of yoga as elimination of the vritis or modulations that always keep surging in the mind stuff or chit in the form of ripples.

According to Bahadur (1977) the word yoga has several senses. One is the union of the personal self and

impersonal self. The other senses in which yoga is to be understood are, shaking off the fetters of sorrow, concentrating the mind on the higher self, control of the mental processes, dispassion, union of the individual self with the universal self and so forth.

Some imply by yoga, different types of disciplines to which the senses are to be subjected. To others it means a series of intellectual practices (a symposium on various aspects of yoga, 1982).

B. History of Yoga

Yoga is as old as Hindu culture. We have no other historical source except widely scattered references to yoga in the ancient sanskrit literature. Excavations at the Mohenjodaro reveal that yoga was practised in India at early 3,000 B.C. Much of the vedic literature is supposed to have been written some time in 2,100 B.C. where yoga has been frequently referred to as 'a way of life', afterwards the oldest ten of the 180 upanishads explained the philosophy, laws and the principles governing yoga. The knowledge and wisdom which these upanishads contain was collected, classified and assimilated some time between 1,000 B.C. The Bhagawat Gita which was written approximately in 400 B.C. contains ample discussion on yoga and its practices. It considers yoga as the only means of

renunciation and emancipation. In the Ramayana and the Mahabharata ages, yoga has been understood to have reached all the sundry and much has been written on the yogic exercises and concentration of mind.

Patanjali has been thought to be one of the leading most yogis. This should then be understood that Patanjali was not the profounder of yoga system but only a treatiser, classifier or codifier. It is also said that Patanjali was responsible for bringing Yoga into the status of science (Mangal and Chandha, 1983).

From the Yajna Valkya Smriti, we learn that Hiranyagarbha (Brahma) was the original teacher of Yoga. But the Yoga as a system was first expounded by Patanjali, the great thinker and philosopher, in his Yoga sutras, some time before the christian era. The Yogic system is one of the six schools of Indian Philosophy that were systematized and developed to set in order Indian thought concerning the cosmos, the individual soul, and their inter relationship (Gupta, 1979 and Singh, 1980).

Fazalbhoy (1976) opines that yoga was first practised and preached by the yogis in ancient times who taught it to young aspirants. The relationship between the yogi and the aspirant was that of a Guru and Sisya. Some of the sisyas, in turn become Gurus and taught this art and

science to succeeding generations. It has thus come down to us from generation to generation.

Hewitt (1983) explains that the origin of this life science - yoga a system of bodily, mental and spiritual training whose origins are lost in remotest Indian history.

Yoga as it is known today is the development of several millennia. The earliest beginnings are lost in the obscurity of ancient history. Rightly the Bhagavad Gita designates Yoga as 'archaic'. The studies of Haver and Falk have supplied positive proof that Yoga is not only a product of the late upanisadic period but it reaches back to the times of the Rig Veda.

C. Types of Yoga

Yoga has never been used in a narrow sense, rather it is all pervading; no aspect of life seems to be devoid of yogic approach for the welfare of the humanity. If the aim of yoga is the union of the individual soul with the supreme soul, it can be understood that there are many ways and methods to effect that union. Hence yoga is of numerous types, depending upon one's inclination, resources and capacity. The main types of yoga are Gyan Yoga, Karma Yoga, Ashtanga Yoga, Raja Yoga, Hatha Yoga, Kundli Yoga and Sama Yoga. All lead to the same destination -

salvation or union with the supreme being (Trask, 1973; Mangal and Chandha, 1983).

Feverstein (1975) says that there are five types of Yoga such as Raja Yoga, Hatha Yoga, Jnana Yoga, Bhakti Yoga and Karma Yoga.

1. Raja Yoga: The term Raja Yoga means royal yoga. It is most commonly used in distinction to Hatha Yoga, yoga of force. Raja Yoga consists of eight spheres of application which are called the eight members. These are:

Yama: It denotes abstention from vices and from entertaining any evil thoughts or accepting any negative impressions which may tend to weaken the mind and the will.

Niyama: On the contrary, signifies acceptance, cultivation, observance and development of positive virtues, harboring good feelings, and absorbing these virtues into one's system.

Thus these two words connote the simultaneous rejection of evil, and the assiduous cultivation and acceptance of good, respectively. Patanjali enumerates these absinences and observances as ahimsa, satya, asteya, brahmacharya and aprigreha.

Asanas: The term Asana literally means easy and comfortable. Patanjali enjoined a posture both simple and pleasant.

Steadiness in asana gives steadiness to the body and in its turn to the mind (Singh, 1980).

Pratyahara: To Vishnu Devanada (1983), Pratyahara means drawing the senses inward in order to still the mind, in preparation for dharna or concentration. Dharana leads to dhyana or meditation, culminating in samadhi or super consciousness.

2. Hatha Yoga: The word Hatha has the literal meaning of force, power, exertion. It is a system of finely elaborated Psycho-somatic techniques which serve as a means to the transformation of the human body into a 'divine body'.

The techniques of Hatha Yoga are designed to enable the adept to gain full control over the so-called autonomous nervous system (Feverstein, 1975).

Hewitt (1983) describes that physical exercises, hygiene and breathing practices are all part of Hatha Yoga. The superiority of this system over others lies in the fact that it aims at developing not only muscular strength or size, but the health and efficiency of the internal organs such as the heart, lungs, glands and nerves.

Adisheshaiah (1985) lists out the four parts of Hatha Yoga namely - Asanas, pranayama, mudras and nada nusandhana. He views that it acts as a stair case and ultimately leads

the student of this yoga to the goal of Raja Yoga. The asanas activate the body, remove the impurities, reduce the excessive fat and make body supple. The next two parts, namely pranayama and mudra are meant for purifying the respiratory system and aimed at making the breath silent there by activating certain dormant areas of our nervous system.

3. Jnana Yoga: It signifies knowledge insight and employed to express the highest truth bearing, illumination. Feverstein (1975) tells that Jnana yoga consists of seven parts: Viveka, Vairagya, Tapas, Numuksutva, Sravana, Manana and Nididhyasana.

Selvarajan (1984) opines that Jnana yoga is concerned to the mind, the intelligence can be mastered by constant practice. This is also called as Raja Yoga because it occupies the highest place among yogas. In this context, Singh (1980) states that the light of the true knowledge, as visualized by Jnana Yoga, may be able to dispel the darkness of ignorance, just as a lighted candle may dispel darkness from a dark room.

4. Bhakti Yoga: Feverstein (1975) expresses that the term bhakti, derived from the root bhaj means 'devotion, love'. It is the yoga of total dedication to the divine. According to the Bhagavata-purana, Bhakti yoga is compounded of the following stages:

Sravaṇa, Kīrtana, Smarana, Pada-sevana, Arcana, Vandana, Dasya, Sakhya and Atmanivedana.

Singh (1980) explains that by the Bhakti Yoga one may be able to change the course of hearted separateness and quality into that of live for all. Swami Satprakashananda (1981) exhorts that Bhakti yoga is path of devotion. It is the direct approach to Saguna Brahman, the Supreme being in relation to the universe constituted of the three gunas.

Swami Vijnanda (1984) and Arunachalam (1987) call Bhakti Yoga as Asthanga Yoga - which is the internal worship of siva the formless. The ashtanga Yoga with eight steps is merely a pathway to the Yoga which seeks to vitalise the Sakti inherent in the individual and take it to the higher levels and make it experience the divine presence called Prasaada Yoga. Meditation is an important limb of Ashtanga Yoga.

5. Karma Yoga: The word Karman or Karma signifies action, work, deed, product, effect and so on. The Karma Yoga covers Pratyahara and is the science of action (Feverstein, 1975 and Adisheshaiah, 1985).

According to Anand (1982) yoga is of three kinds:

(a) Mano Yoga (activity of the mind). It has four species:

1. Satya (true)-mind thinks a thing that is true
2. Asatya (untrue)-mind thinks a thing that is untrue.

3. Satyamrsa (true and untrue)-mind thinks a thing which is partly true and partly untrue

4. Asatyamrsa (neither true nor untrue) - mind thinks a thing which is neither true nor untrue

(b) Vag Yoga (Activity of speech) - It has also four species which correspond to those of the manoyaga.

(c) Kaya Yoga (Activity of the body) - It has seven species.

1. Ovdarik Kaya Yoga - Activity of the Physical body.

2. Vaikriy Kaya Yoga - Activity of the transformation body.

3. Aharik Kaya Yoga - Activity of translocation body

4. Karmana Kaya Yoga - Activity of the Karman body

5. Ovdarika Misra Kaya Yoga - Activity of the transformation body mixed with Karman body

6. Vaikriya Misra Kaya Yoga - Activity of the transformation body mixed with Karman body or ovdarika body

7. Aharika Misra Kaya Yoga - Activity of the translocation body mixed with physical body

Haribhadra Suri enumerates five kinds of Yoga:

1. Sthana - Practice of proper posture

2. Urna-Varna - Correct utterance of sound, hymns and japas etc.

3. Artha - proper understanding of the meaning of words like 'Eye'

4. Alambana - Concentration on the image of a tirthankara in his full glory
5. Rahita - Concentration on his abstract attributes

D. Values of Yoga

1. Physical development

Yoga mov-asanas (moving, postures) will bring miracle health by overcoming the four Natural Health Wreckers which ruin from without and within. These are,

1. The clutch of gravity on us
2. The tortures of our conscious thinking
3. Our volcanic emotions and
4. Our - bio-cosmit instability

In one way or another, these four health villains undermine our every moment of the day, convert into an inferior person, age prematurely and shorten our life markedly. But we can resist their scourages amazingly with yoga mov-asanas (Young, 1987).

Swami Vishnudevananda (1983) opines that Asanas work on all the systems of the body, creating suppleness in the spine and joints and toning the muscles, glands and integral organs. Hewitt (1987) shared his experiences as--

"The postures made my muscles firmer and better shaped. I felt stronger and more supple. My posture became more upright and my physique more athletic. My weight dropped by ten pounds in three months and my waist-line was reduced one inch. The abdominal muscles became firmer and more defined. Bowel elimination became regular.

Sharma (1976) voices that the various asanas may be regarded as physical exercise. They are useful for maintaining physical health. It has been said in Yoga Cudamani Upanishad that asanas remove physical ailments, Pranayama remove sins, and the mental abnormalities are removed by pratyahara, pranayama is necessary for keeping the vital forces in a healthy condition.

Swami Sivananda (1977) and Vishnudevananda (1983) opine that the yoga asanas exercise every part of the body, stretching and toning the muscles and joints, the spine and the entire skeletal system. And they work not only on the body's frame but on the internal organs, glands and nerves as well, keeping all systems in radiant health.

A comprehensive project for studying the effects of yogic practices on the body functions which has been financed by ICMR and executed by a team of workers led by Anand at the AIIMS. The investigations carried out on subjects attending classes regularly at the yoga centres in Delhi

both before the start of practices and as they continued the training upto a maximum period of 3½ years. The second type of subjects were accomplished both for the control of body functions and meditation. The beginners showed improvement in their physical efficiency and a tendency towards a more relaxed physical and mental state. The tension relaxing effect of the yogic exercises seemed to be more marked than the purely physical exercises. They also indicated a shift in the activity of involuntary nervous system towards parasympathetic dominance which normally favours energy conservation and relaxation in the body (Chinna, Singh and Baldev, 1976).

Based on his own experience and the observations he made, Hewitt (1987) suggests that whether one is a businessman, a farmer, a factory worker, a university student or a housewife, yoga has something to offer. Whatever be the age, sex, creed or race, one can achieve the same results by following this wonderful life science—glowing health, increased energy and stamina, a shapelier body, relaxation, improved concentration and peace of mind.

2. Physiological Functions

In stressing the physiological values of Yoga, Swami Tapasyananda (1979), Ghorpade (1980) and Hewitt (1987) proclaim that many thousands of men and women, from all walks

of life are now practising the yoga postures and testify that their practice will rejuvenate the body, reduce obesity, strengthen and tone the muscles, make the spine and the body more supple, tone the nervous system, keep diseases at bay, prevent constipation and dyspepsia, keep the skin glowing and healthy, and promote mental alertness and serenity.

Yoga has been shown to stabilize the responses of the nervous system to stress, removing the constant muscular tension produced by repeated alerts from the central nervous system and calming the involuntary symptoms of threat racing heart sweating, anxiety re-used by the sympathetic nervous system (Ghoshal, 1987).

Sinha (1976), Kameswara Rav (1984) and Wangoo (1986) expound that asanas tone and massage different parts of the body, particularly the stomach is an excellent condition and the spine is made elastic. All muscles and nerves are strengthened. Pranayama controls the vital air, with this a person is cured chest and lung troubles and the blood pressure is regulated. The gastric fire increased thus improving digestion and appetite. Asanas cure piles, and rheumatism in the legs and shoulder joints, the back and thigh muscles and sciatica. Laziness is completely remedied. Thyroid gland is nourished properly. It promotes peristalsis

and helps evacuation of bowels and cures constipation (Hewitt, 1983 and Blitz, 1987). The spinal column is well nourished and is made elastic (Swami Sivananda, 1977).

Young (1987) enlists the physiological values of yoga as the postures tone up every thing in the internal organs - the liver, the spleen, the pancreas, the intestines, the heart, the lungs, the brain and the important inner glands. The secretions of inner glands flowing into the blood, bring about the growth of cells and tissues and body development.

Cleansing breath clears the nasal passages and cleanses the sinuses. It enriches the blood stream and improves blood circulation. It also purifies and enriches the blood stream and has a cleansing and concentrating effect on the mind (Riekar, 1972; Sinha, 1976 and Swami Sivananda, 1977). Yoga asanas and abdominal breathing improve all the respiratory function-increasing vital capacity, developing strong muscles, elastic tissues, breath control and keeps air passages clear (Singh, 1980 and Mangal and Chandha, 1983).

In this context Hewitt (1987) narrates his own experience as "when I first took up daily yoga practice many years ago, I kept a record of my reactions in a little note book. Looking at it now, I see the following results.

Almost immediately there was definite increase in vitality. Stamina was also greatly increased and I felt quite fresh even at the end of a busy day. I rarely gave way to anger or the other negative emotions.

Chinna, Singh and Baldev (1976) refer few research activities that physiologist from Calcutta and French clinical neurophysiologist studied EEG during meditation which consisted of high voltage, fast frequency waves in some stages and brain waves of theta frequency which also accompany early sleep. At about the same time, Gundu Rao and his colleagues at the All India Institute of Mental Health, Bangalore tried to study the effects of underground burial in a Yogic subject. The results indicated an increase in oxygen during the passage of time rather than its decrease in the air sampled from the pit.

While studying the effects of underground burial at Rabindra Nath Tagore Medical College, Udaipur, research workers showed very unusual observation of no electrical activity of heart, lasting for several hours. This however has not been confirmed. Several aspects of the hatha yoga exercises also have been studied. These relate to the effects on Cardio-respiratory functions, metabolic activities in the body and Psychological functions.

In recent years medical research has begun to pay attention to the effects of yoga. The remarkable results

shown by the three experimental camps recently organised by the Yoga Institute, Santa Cruz, prove that a disciplined way of living and higher levels of thinking can do a lot in curing arthritis, arteriosclerosis, chronic fatigue, asthma, varicoseveins, diabetes and heart related diseases (Pradeep Kumar, 1987).

3. Mental Power

When we examine the writings of the forefathers of yoga, we find that most of their teachings are related to the power, functioning and qualities of the mind and very few are related to the body. This becomes evident when we scrutinize closely the steps recommended by Patanjali in his Yoga Sutra. There-in we find that out of eight steps, which together constitute the Ashtanga Yoga of Patanjali, five (Yama, niyama, dharama, dhyana and samadhi), are exclusively related to the mind. One step (Pratyahara) relates to both mind and body, and only two steps (Asana and Pranayama) are concerned with the body.

Similarly, in the recommendations of Kapila we find that out of his two steps, Samyaka Jnana is concerned with the mind and his theory of satkaryavada involves both the mind and body. The teachings of Vyasa are also related more to the mind than the body. His theme of Karamashu Kaushalama is primarily concerned with the mind and only

secondarily concerned with the action organs of the bodily system. Thus we find that the teachings of all the three early thinkers (Patanjali, Kapila and Vyasa) of yoga science relate to the mind more than they relate to the body (Sinha, 1985).

The postures and breathing exercises have a calming influence on the mind. Hatha Yoga is the preparation for the conquest of consciousness, the mind's turbulence being easiest curbed and its energy is concentrated when the body is strong and alert. The daily yoga practice has beneficial influence on the mind. The steady, natural postures and smooth measured pranayama have a calming and controlling effect on thought and emotion. It teaches mastery of one's mind and self by psychic exercises aimed at controlling and subduing the thought waves.

All the Yoga practice has the effect of stilling the minds' turbulence and holding the flame of the passions steady (Hewitt, 1987). Joshi (1985) denotes the Gita abounds and references to the behaviour of a Yogi. Particularly with stabilized intellect behaviour in every day life. It is said that his mind is diverted of all cravings, and remains at peace with himself and with world.

"Life is in the breath, therefore he who only half breaths, half lives" This Yogic proverb attempts to impress

upon us that the way in which we breath, directly affects our physical and mental well being and determines to a great extent the length and quality of our lives (Hittleman, 1971). When breath is slow and rhythmic, anxieties and tensions lessen or dissolve completely and control of the mind for purposes of concentration is greatly increased (Swami Sivananda, 1977).

According to Swami Tapasyananda (1979), in the practice of concentration, nerve currents will have to go through new channels and the main part of this activity of a very subtle nature will lie along the spinal column. Yogi Raja (1985) states the five senses which man possesses are responsible for all the trials and tribulations which he under goes. Mind is the king which controls these five senses. An ordinary person cannot control the mind easily. Yoga, if properly practised, controls the mind and thus the five senses. 'I found that my mind had become more tranquil and my temp more placid. I was master of my emotions. Concentration was much improved and I could work more efficiently and for long stretches without experiencing mental fatigue due to regular yoga practice says, Hewitt (1987).

Swami Vishnudevananda (1983) exhorts by releasing physical and mental tension, they also liberate vast

resources of energy. The Yogic breathing exercises known as Pranayama revitalize the body and help to control the mind, leaving you feeling calm and refreshed. Patanjali, affirms that the conquest of mind is achieved through four additional Sathanas. They are meant for higher reaches in yoga, for, it has been said that he conquers the world who conquers the mind (Shri Yogendra, 1966).

Kameswara Rav (1984) explains that Asanas improves the memory. In inverted position semen instead of flowing down is forced to go up and is converted into ojas and thus helps concentration.

4. Spiritual values

Kameswara Rav (1984) voices that practising Padmasana leads to great spiritual advance. The Bhavad Gita gives explanations of the term Yoga and lays stress upon karma yoga. It is said: "Work alone is your privilege, never the fruits there of. Never let the fruits of action be your motive and never cease to work. Work in the name of the Lord, abandoning selfish desires. Be not affected by success or failure" (Iyengar, 1985).

Iyengar (1983) describes that the study of yoga discipline sharpens the power of discernment and leads to words understanding the true nature of the soul which cannot

be fully comprehended by the senses or the intellect alone. The study of yoga enables one to obtain the pure state of consciousness and to realise the inner self.

Wangoo (1986) tells that yoga is not a religion, but a possibility, based on psychological act, for developing the human self and unifying with God. There is only one God and only one self, no matter what names we are accustomed to using for the path of the human soul towards God....names and forms are only the outer garment which clothe the same fact, the same truth.

Sri Ramakrishna explains so luminously, out of the same food the mother prepares different dishes to suit the appetites and digestive capacities of her different children, Gita the mother also presents different yogas tailored to the needs of different types of personalities.

Hewitt (1987) points out that Bhakti Yoga - Union by devotion involves faith and worship. It is the yoga of devotion. Involving concentration and meditation on the devine. It is as much the way of the emotions as Jnana is of the intellect. It asks for service to your fellowmen and unselfishness. To Joshi (1985) yoga is the union of individual with God.

Experimental Procedure

III EXPERIMENTAL PROCEDURE

The study on "Impact of Yoga on Adult Men" was carried out in Tirupati and Coimbatore. The experimental procedure of the study comprises

- A. Selection of the area
- B. Selection of the sample
- C. Methods used to collect the data
- and D. Analysis of the data

A. Selection of the Area

Sri Venkateswara Institute of Yoga and Allied Sciences, Tirupati in Andhra Pradesh was selected to carryout this study. The certificate course on yoga for two months, twice in a year is conducted by this Institute, where the training in yoga is imparted to the trainees daily. It is a known fact that intensive training will have an immediate effect and that was the primary reason to select this area for this study. To avoid the language problem of the investigator and the assurance of the head of the Institute to render help to collect the data for the study were the other reasons for the selection of this area.

Maruthi College of Physical Education, Sri Ramakrishna Mission Vidyalaya, Coimbatore in Tamil Nadu was

also selected to find out the Impact of Yoga in terms of attitude towards yoga.

B. Selection of the samples

Since the required number of samples were not available in Sri Venkateswara Institute of Yoga and Allied Science, Tirupati, the investigator selected two different groups to collect the data.

A group of 100 men (Group A) in the age range of 20 to 25 years who finished the basic course on yoga and practice yoga regularly for the past 1½ years were chosen from Maruthi College of Physical Education, Sri Ramakrishna Mission Vidyalaya, Coimbatore, to find out the 'Impact of Yoga' in terms of their attitude towards yoga. They are the students of Bachelor of Physical Education course.

An another group of 35 men (Group B) in the age range of 20-25 years who have joined the certificate course on yoga at Sri Venkateswara Institute of Yoga and Allied Sciences, Tirupati were chosen to trace out the "Impact of Yoga" in terms of changes in attitude, physical dimensions, Physiological functions and memory power.

Group A .. 100 men - to collect the data regarding attitude towards yoga



1. PADMA SANA



2 PRANAYAMA



3 SARVANGASANA

Group B .. 35 men - to find out the impact of yoga in terms of changes in attitude physical, dimensions physiological functions and memory power (60 days of training in yoga)

Schedule of the course

<u>Time</u>	<u>Training in yoga</u>
6 to 8 a.m.	Practicals
4.30 to 5.30 p.m.	Meditation
5.30 to 7.30 p.m.	Theory (Plate 1,2,3)

C. Methods used to collect the data

Yoga aims to increase control over psycho-physiological and social functions of the individual with the technique of meditation and psychotherapy (Shetty, 1987).

Since yoga enables to overcome almost every serious handicap of the individual, the "Impact of Yoga" on the selected adult men for this study was assessed. Initially, the investigator introduced herself to the head of the Institutions, explained the purpose of the study and got the permission to carry out the study. Then she established a rapport with the selected subjects, briefed them about the study and requested to render help, to carryout the study. The data was collected for the following aspects to assess the Impact of Yoga on Adult Men'.

1. General information of the selected individuals
2. Impact of yoga in terms of attitude towards yoga
3. Changes in physical dimensions
4. Changes in physiological functions
- and 5. Changes in memory power

Tools used

1. Interview schedule
2. Attitude scale
3. Anthropometry
4. Physiological norms
- and 5. Wechsler's memory scale

1. General Informations of the Selected Individual

To have a over view of the general information of the selected individuals, they were interviewed, since the interview schedule is especially appropriate to collect the data from the respondents quickly (Gupta, 1981 and Sukhia et al., 1976). The schedule used to collect the necessary information is given in Appendix A.

2. Attitude Towards Yoga

Attitude towards yoga was collected through the attitude scale. Morgan, King and Robinson (1982) say that

an attitude scale attempts to obtain a precise index of a person's attitude in a narrowly defined area. The most common way of measuring attitude is the self report method, which includes elaborate attitude questionnaire.

PGI Adaptation of Yoga Attitude Scale - a Standardised tool developed by Department of Psychiatry, Post Graduate Institute of Medical Education and Research, Chandigarh was used, which is given in Appendix B. Out of sixteen statements, twelve depict the positive attitude and four of them reveal negative attitude. Each was rated on a five point scale which was assigned weightage as follows:

Positive Attitude:	Strongly agree	..	4
	Agree	..	3
	Uncertain	..	2
	Disagree	..	1
	Strongly disagree		0
Negative attitude:	Strongly agree	..	0
	Agree	..	1
	Uncertain	..	2
	Disagree	..	3
	Strongly disagree		4

Test item was given individually. The subjects were asked to express their opinion freely and frankly by marking the items given. To find out the attitude of the selected subjects, based on the above ranking, each statement was

assigned the suitable scores and was totalled up. The maximum score is 64.

3. Changes in Physical Dimensions

Anthropometric measurements were used as reliable parameter in paediatric practice to measure the variations of the physical dimensions and the gross composition of the human body at different age limits (Jelliff, 1971).

Hence, the investigator used the Anthropometry to assess the physical changes due to yoga practice. Height, weight and chest circumference were measured twice, at the onset and the completion of the course to make out the differences due to yoga course for two months.

a) Height

Height was measured with a good steel measuring tape against a scale marked on a flat wall surface. The height was measured from the floor to the head nearest to 0.1cm.

b) Weight

The weighing was done in the morning with a minimum clothings on with the beam type weighing scale which is more accurate (Davidson, Passmore and Brock, 1973).

c) Chest Circumference

A narrow flexible non stretch steel or fibre glass tape was used and measurement made at the nipple line preferably in mid inspiration (Jelliffe, 1971).

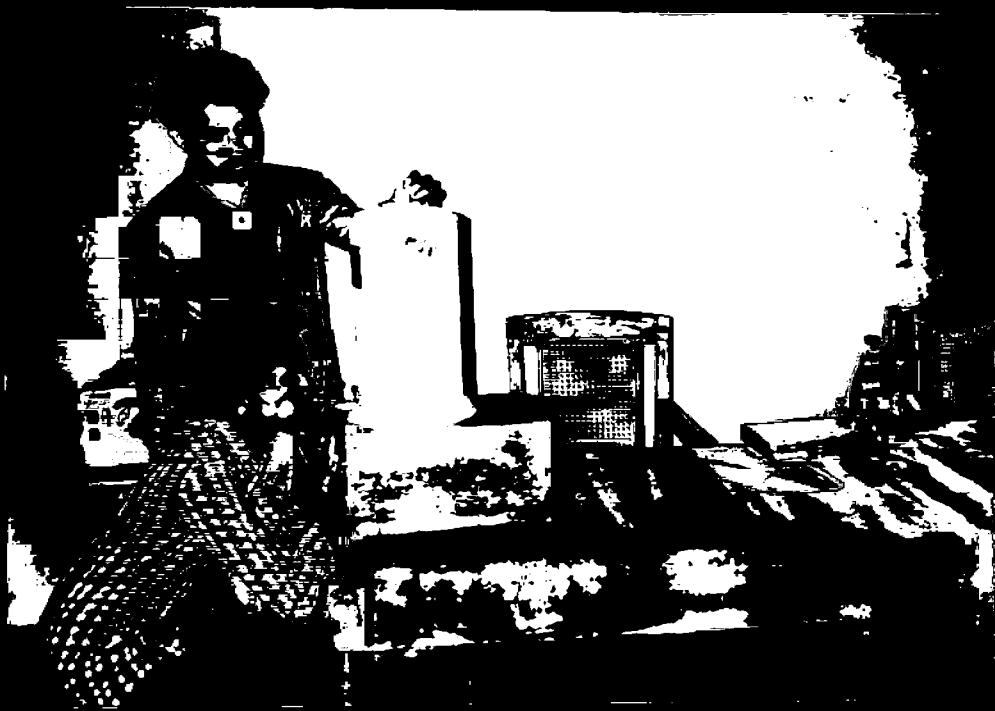
4. Changes in Physiological Functions

The blood stream is the body's major transport system carrying RBC to ferry oxygen to the tissues and remove carbon-di-oxide, white cells to fight infection, and so on. Efficient circulation depends on a healthy heart and an elastic and unobstructed blood vessels from the major arteries and veins to the tiny capillaries. All the asanas of yoga are beneficial to circulation, particularly the inverted poses (Swami Vishnudevananda, 1983).

In order to assess the changes in physiological functions of the men due to 60 days of yoga training, the investigator had the physician's help to measure

- a) Red blood cell count
- b) Vital capacity
- c) Rate of heart beat
- d) Blood pressure
- and e) Pulse rate

before and after the onset of the certificate course in yoga. About 25 minutes were taken for testing each individual.



A. VITAL CAPACITY

a) Red blood cell count

Guyton (1982) tells that the major function of RBC is to transport haemoglobin which in turn carries oxygen from the lungs to the tissues and transport oxygen to all other cells in the body (Antony and Thibodeau, 1984). Enumeration of Redblood cell was made by means of Thomazeiss haemocytometer with Neubauer ruling (Chatterjee, 1972).

b) Vital capacity

The largest amount of air that we can breath in and out in one inspiration and expiration is known as vital capacity (Shepard, 1982 and Antony and Thibodeau 1984). A special device called spirometer was used to measure the amount of air exchanged in breathing (Anthony and Thibodeau, 1984) (Plate 4).

c) Rate of heart beat

The heart beat rate is the number of ventricular beats/minute (Shepard, 1982). Heart beats may be felt by placing the hand flat over the region of the apex of the heart, that is, in the area just under the left breast about three and one half inches from the mid line (Solomon and Davis, 1978).



5. PULSE RATE



6. BLOOD PRESSURE

d) Blood pressure

Blood pressure means, the force exerted by the blood against any unit area of the vessel wall. Blood pressure is almost always measured in millimeters of mercury (mm.Hg) because, the mercury manometer has been used as a standard reference for measuring blood pressure. Clinically blood pressure is measured with a sphygmomano meter and stethoscope (Solomon and Davis, 1978) (Plate 5).

e) Pulse rate

Pulse rate is the frequency of pressure waves transmitted to a peripheral artery (Shepard, 1982). To feel the pulse, you must place your finger tips over an artery that lies near the surface of the body and over a bone or other firm background (Antony and Thibodeau, 1984).

The radial artery in the wrist is most frequently used to measure pulse. The number of pulsations counted per minute indicates the number of heart beats/minute (Solomon and Davis, 1978) (Plate 6).

5. Changes in Memory Power

Intelligence covers all cognitive processes which is inherent in human nature (Garrette, 1964). Memory (one of the cognitive aspects) is the storage and retrieval information of the perceived informations (Wilson et al. 1974 and Mussen et al. 1984).



7. MEMORY TEST

Yoga Mimamsa (1967) rightly quotes Patanjali's talk about five forms of cognition, because this obviated the cumbersome^mness of the manifold classification and was an aid to memory.

To trace out the Impact of Yoga on memory power of the selected subjects, the investigator used Wechsler Memory scale. The test includes 7 subtests to measure the memory power (given in Appendix C). It is an individual test, which took 15-20 minutes for an individual. The test was administered for each individual twice at the time of the commencement and end of the course on yoga.

Administration of the test

In order to trace out the memory power of the individual each person called, made them to sit comfortably, clear instructions were given for each subtest. The responses of the subjects were recorded in the answer sheet without the knowledge of the subjects (Plate 7).

Scoring and evaluation

Each sub-test has different sub-divisions which consists of a number of items. The maximum score possible is 143 and the minimum being 48. The total raw scores of the subjects were added to the constant value assigned for age group in which subjects fall given in the Wechsler

memory scale manual. The total of raw score and age correction was looked up in equivalent quotient. The value found was the subject's memory quotient (MQ) as corrected for age.

D. Analysis of the Data

In order to find out the 'Impact of Yoga on Adult men' in terms of changes in attitude, physical dimensions, physiological functions and memory power, statistical analysis - test of significance based on students' 't' statistic (given in Appendix D) was done.

Results and Discussion

IV RESULTS AND DISCUSSION

The results of the present study 'Impact of Yoga on Adult Men' are discussed under the following headings:

- A. Family Background of the Subjects
- B. Impact on Attitude Towards Yoga
- C. Impact of yoga on Physical Dimensions
- D. Impact of Yoga on Physiological Functions
- and E. Impact of Yoga on Memory Power

A. Family Background of the Selected Subjects (Group B)

The general informations of the selected subjects of the Group B, who underwent two months certificate course on Yoga at Tirupati are discussed in terms of the size of the family, educational level of the subjects, occupational status of the selected individual and their parents and family income.

1. Size of the family

The size of the family from which the subjects were hailed is given in this table.

TABLE I

SIZE OF THE FAMILY

Size of the family	Number of the subjects No.35	Percentage
Small	19	54
Large	16	46

Fifty four per cent of the selected individuals belonged to small family consists of 3 to 5 members which is the common pattern of the family living in this modern days. The remaining 46 per cent of the subjects hailed from large type of families, where the members are above five.

2. Educational Level of the Subjects

Table II figures out the educational level of the individuals selected for this study.

TABLE II
EDUCATIONAL LEVEL OF THE SUBJECTS

S.No.	Educational level	Number of subjects (No.35)	Percentage
1.	Higher secondary	9	26
2.	Under Graduate Course (studying)	12	34
3.	Under Graduate Course (completed)	10	29
4.	Post Graduate course (studying)	4	11

As shown in the table, all the subjects of Group B selected for this study are educated. Twenty six per cent of them have higher secondary education. Twenty nine per cent of them are graduated. Thirty four and eleven per cent of the subjects are doing under graduate and post graduate courses respectively.

3. Occupational Status of the Parents

The following table reveals the occupational status of the father and mother of the selected individuals.

TABLE III
OCCUPATIONAL STATUS OF THE PARENTS

S.No.	Type of occupation	Father		Mother	
		No.	Per cent	No.	Percent
1.	Professional	5	17	3	9
2.	Skilled	9	30	-	-
3.	Semi-skilled	8	27	-	-
4.	Unskilled	7	23	27	82
5.	Unemployed	1	3	3	9

It is a known fact that, in present days both the members (husband and wife) of the family aspire to earn in order to raise the standard of living of the family (Singh, 1977). Similarly, both the parents of 91 per cent of the participants of this study are also employed at various cadre such as professional, skilled, semi-skilled and unskilled.

4. Employment of the Participants (Group B)

Only seven out of 35 selected subjects are employed in various jobs such as Doctor (1), Clerical (3) and skilled (4). Seven of them are unemployed. All the others are doing the graduate and post graduate courses.

5. Income of the Family

The annual income of the families of the selected subjects is tabulated below:

TABLE IV
INCOME LEVEL OF THE FAMILIES

Income level	Number of families (No.35)	Percentage
Low (Upto Rs.1500)	20	57
Middle (Upto Rs.2500)	8	23
High (Above Rs.2500)	7	20

As per Housing Unit Development Corporation's Classification of the income level, 57 per cent of the families earn upto Rs.1500/. Twenty three per cent of them belonged to middle income (upto Rs.2500) and the remaining 20 per cent of the families come under high income (Above Rs.2500/-) per month category.

B. Impact on Attitude Towards Yoga

Although many factors may contribute in creating a placebo effect, one obvious factor is the attitude of the person to the treatment itself, perhaps, the beneficial effect of yoga, say an anxiety reduction, is more a function

of the positive mental set a person has towards yoga to start with (Grover et al. 1983).

The data for the attitude towards yoga was collected from two different groups (Group A and B) as explained in the procedure and the result is discussed here.

Attitudinal Changes of the Men (Group A) Towards Yoga

Adult men who underwent the basic training in Yoga and practicing it regularly for the past one and a half years comprised the Group A. Their attitude towards yoga was gathered and given in the following table.

TABLE V
ATTITUDE OF THE MEN (GROUP A) TOWARDS YOGA

(Number 100)

S.No.	Statement	Attitudes		
		Positive	Un- certain	Nega- tive
1.	Yoga benefits every one	94	4	2
2.	Yoga makes a person emotionally stable	85	12	3
3.	Yoga can cure all diseases	47	25	28
4.	Yogic principles are very difficult to follow in real life	42	13	45 *
5.	Yoga is meant only for Sadhus, Sanyasis or saints who live alone in the jungle	9	11	80 *
6.	Yoga is only for those incompetent or weak people, who cannot face difficulties in life	21	11	68 *
7.	Yoga is essential for spiritual progress	85	7	8
8.	Yoga is essential for good health	86	6	8
9.	Yoga gives peace strength and unity to the whole life	78	14	8
10.	Yoga brings success to life	57	28	15
11.	Yoga can overcome mental conflicts or problems	62	20	18
12.	Yoga can make a person more intelligent	52	29	19
13.	There are many other ways besides yoga by which a person can obtain peace and happiness	56	23	21 *
14.	Yoga gives many ways by which a person can strengthen or build character	81	10	9
15.	Even bad habits like stealing, gambling etc. can be checked by yoga	50	29	21
16.	Yoga brings discipline into life	87	7	6

*Negative statements

It is found that majority of the men who do yoga - asanas atleast an hour per day had positive attitude towards positive statements and negative attitude towards negative statements of the PGI adaptation Attitude Scale Towards Yoga.

More than 80 per cent of the men agreed that yoga is beneficial to everyone, essential for spiritual progress, good health, can strengthen or build character and brings discipline in life.

Seventy eight per cent of them opined that yoga gives peace, strength and unity to the whole life. About 47 to 62 per cent of the subjects believed that yoga cures all diseases, brings success to life, can overcome mental conflicts or problems, makes a person more intelligent, emotionally stable and eliminates the bad habits.

This result is in line with the opinion of Young (1987) that our emotions and prejudiced logic paralyze our instinctive attempts to do whatever is necessary. They are under the influence of our out-of-beat physiological rhythms, which depend upon the biological time of day. Our out-of-beat rhythm shatter our power of superior mental concentration.

Counteract those evils with the yoga meditation mov-asana, acquire with it a sixth sense, or a power of

superior mental concentration, which synchronises the right circadian rhythms in us at any time of the day, regardless of our biological clock.

It is a striking fact that in spite of the knowledge received in yoga for the past one and a half years, 56 per cent of the selected subjects of the Group A felt that there are many other ways besides yoga by which a person can obtain peace and happiness.

2. Distribution of Attitude Score Towards Yoga

As per the instructions given in the manual to use the attitude scale, 64 is the maximum score a subject can get for the attitude towards yoga. Based on the ranking, the individual's attitude was assigned the suitable scores and was totalled up. The distribution of attitude score towards yoga received by the men of Group A is figured below.

TABLE VI
DISTRIBUTION OF ATTITUDE SCORE

S.No.	Range of Attitude Score	Number of participants	No.100
			Mean \pm S.D.
1.	25-34	8	
2.	35-44	52	
3.	45-54	37	43 \pm 6.69
4.	55-64	3	

The range of attitude score and the number of participants received the score range, shown here reveal that the yogic persons have a favourable attitude towards yoga.

Three of them scored highly and eight of the subjects scored between 25 to 34.

The result of this study is in accordance with the result of Grover et al. (1983) that those who practice yoga have a more favourable attitude than the non-yogic persons.

3. Attitudinal Changes of the Men (Group B) Towards Yoga

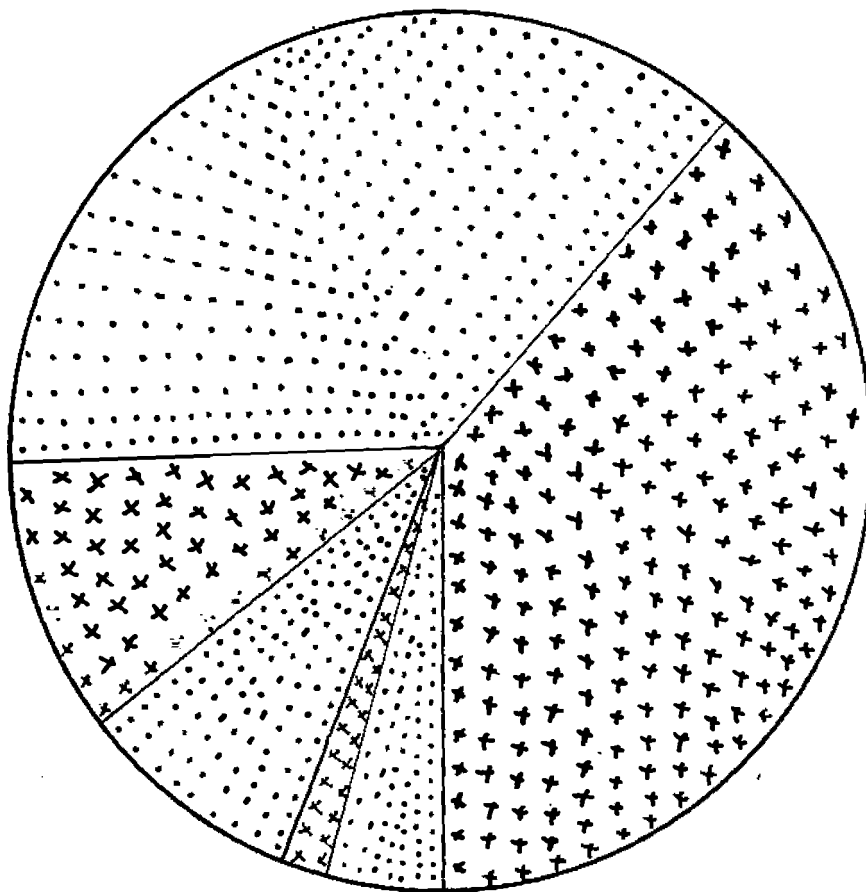
In order to trace out the impact of yoga in terms of attitudinal changes of the men (Group B), the opinion towards yoga was taken at the commencement and end of the certificate course in yoga, at Tirupati. The subjects' attitude towards positive, uncertain and negative statements of the PGI Attitude Scale Towards Yoga in percentage is presented below.

TABLE VII
ATTITUDE OF THE MEN (GROUP B) TOWARDS YOGA

S.No.	Statements	Attitude					
		Before the course			After the course		
		Posi- tive	Uncer- tain	Nega- tive	Posi- tive	Uncer- tain	Nega- tive
1.	Yoga benefits every one	94	3	3	100	-	-
2.	Yoga makes a person emotionally stable	83	14	3	100	-	-
3.	Yoga can cure all diseases	85	12	3	91	6	3
4.	Yogic principles are very difficult to follow in real life	48	14	38	11	9	80 *
5.	Yoga is meant only for Sadhus, sanyasis or saints who live alone in the jungle	14	17	69	3	14	83 *
6.	Yoga is only for those incompetent or weak people who cannot face difficulties in life	31	9	60	6	9	85 *
7.	Yoga is essential for spiritual progress	91	9	-	94	-	6
8.	Yoga is essential for good health	100	-	-	100	-	-
9.	Yoga gives peace, strength and unity to the whole life	100	-	-	100	-	-
10.	Yoga brings success to life	83	6	11	94	-	6
11.	Yoga can overcome mental conflicts or problems	94	-	6	97	-	3
12.	Yoga can make a person more intelligent	74	9	17	97	3	-
13.	There are many other ways besides yoga by which a person can obtain peace and happiness	80	14	6	34	3	63 *
14.	Yoga gives many ways by which a person can strengthen or build character	72	14	14	97	3	-
15.	Even bad habits like stealing, gambling etc. can be checked by yoga	49	14	37	100	-	-
16.	Yoga brings discipline into life	91	6	3	100	-	-

*Negative statements

ATTITUDINAL CHANGES TOWARDS YOGA








-  Before
-  After
-  Positive
-  Uncertain
-  Negative

Figure - 1

The three different attitude towards yoga given in percentage in this table clearly shows that the participants' attitude is changed due to the intensive training in Yoga. Participants' opinion reflects that the yoga alerts a man's anatomy, physiology, mental and psychic responses.

We could see the increase in the percentage of the positive attitude from the onset of the course to the end of the course. The most remarkable aspect is that only 49 per cent of the participants felt at the onset of the course that even had habits like stealing and gambling can be removed by yoga, whereas at the end of the course all the participants agreed this view. Likewise, all of them stressed during the final assessment that yoga is beneficial to every one, makes a person emotionally stable and brings discipline into life, but only 83 to 94 per cent of them agreed this view at the onset of the course.

All of them agreed the view at the commencement of the course that yoga is essential for good health and gives peace, strength and unity to the whole life. It is found that they were steadfast in their opinion at the time of the final assessment also.

At the time of the initial data collection, 72 and 74 per cent of the men respectively opined that yoga can

strengthen or build character and make a person more intelligent. At the end of the course 97 per cent of the participants expressed these attitude.

From the findings, we could see that a higher percentage (91 to 97) of the participants had the positive view of four statements (of PGI Adaptation of Yoga Attitude Scale) such as Yoga can overcome mental conflicts or problems, brings success to life, essential for spiritual progress and can cure all diseases.

Training in yoga influenced more number of participants, to have the negative attitude towards negative statement of yoga from the uncertain attitude which they had at the beginning. We could see a vast difference between the initial and final assessment for the statements such as yogic principles are very difficult to follow in real life (38 to 80 per cent), yoga is meant only for Sadhus or saints who live alone in the jungle (69 to 83 per cent), it is only for those incompetent or weak (60 to 85 per cent) and it is not the only way to obtain peace and happiness (6 to 63 per cent). (Fig.1).

These results are in the line of the opinion of Joshi (1985), that different persons may have different attitude towards yoga. On one side, we have those who feel convinced that yoga contains something very high and auspicious and stands for the very best and highest that

one can ever achieve in one's life. Such an opinion springs from an element of faith and belief.

On the otherhand, there are those who look at yoga as something to be ridiculed and to be laughed at, because of ignorance and lack of understanding. Then, there are those who are interested in yoga, but do not quite know what it properly means and what it really stands for.

4. The Test of Significance for Different Attitude

Table VIII gives the test of significance for attitude between positive to positive, uncertain to uncertain and negative to negative.

TABLE VIII

DIFFERENTIAL MEANS, STANDARD DEVIATION AND 't'VALUES
OF THE ATTITUDE

				No.35
Attitude	Mean	S.D.	't' value	Level of Significance
Positive	1.96	24.25	0.358	NS
Uncertain	0.35	24.45	4.166	0.01
Negative	8.17	18.13	0.655	NS

The results of this study depict ~~that~~ the subjects were definite about their views after attending the course on yoga. The statistical analysis of the uncertain

attitude of the subjects before and after the course on yoga is significant at 1 per cent level.

5. Test of Significance for Attitudinal changes

The 't' value of the initial and final attitude of the group B is figured in Table IX.

TABLE IX
TEST OF SIGNIFICANCE BETWEEN THE INITIAL AND
FINAL ATTITUDE

		No.35
Attitude	Mean \pm S.D.	't' value
Initial	46.43 \pm 5.557	
Final	53.14 \pm 4.486	5.048**

**Highly significant

The theoretical and practical information/training in yoga helps the individual to widen the knowledge towards yoga and realise its values.

The attitude of the selected subjects before and after the course on yoga was compared and found that it is highly significant (given in Appendix D1).

C. Impact of yoga on Physical Dimensions

Anthropometric measurements were taken to see the changes in physical development due to yoga practice. The mean of the initial and final measurements is presented below.

TABLE X

MEAN SCORES OF HEIGHT, WEIGHT AND CHEST CIRCUMFERENCE OF THE MEN

Physical Dimensions	No.35		't' value
	Initial Mean \pm S.D.	Final Mean \pm S.D.	
Height (cm)	165.28 \pm 5.848	165.28 \pm 5.848	
Weight (kg)	54.43 \pm 7.86	52.28 \pm 7.924	10.093**
Chest circumference(cm)	81.57 \pm 5.59	84.28 \pm 6.362	14.114**

**Highly significant

1. Height: Height is a physical parameter. Height of an individual mainly depends on heredity, physical exercise and nutrition. The complete growth in height will be over, before the age of 18 years in boys. But the selected subjects' age range is 20-25 years for this study. Hence, we did not see the difference in height, in these 60 days of yoga practice.

PHYSICAL DIMENSIONS BEFORE AND AFTER THE COURSE ON YOGA

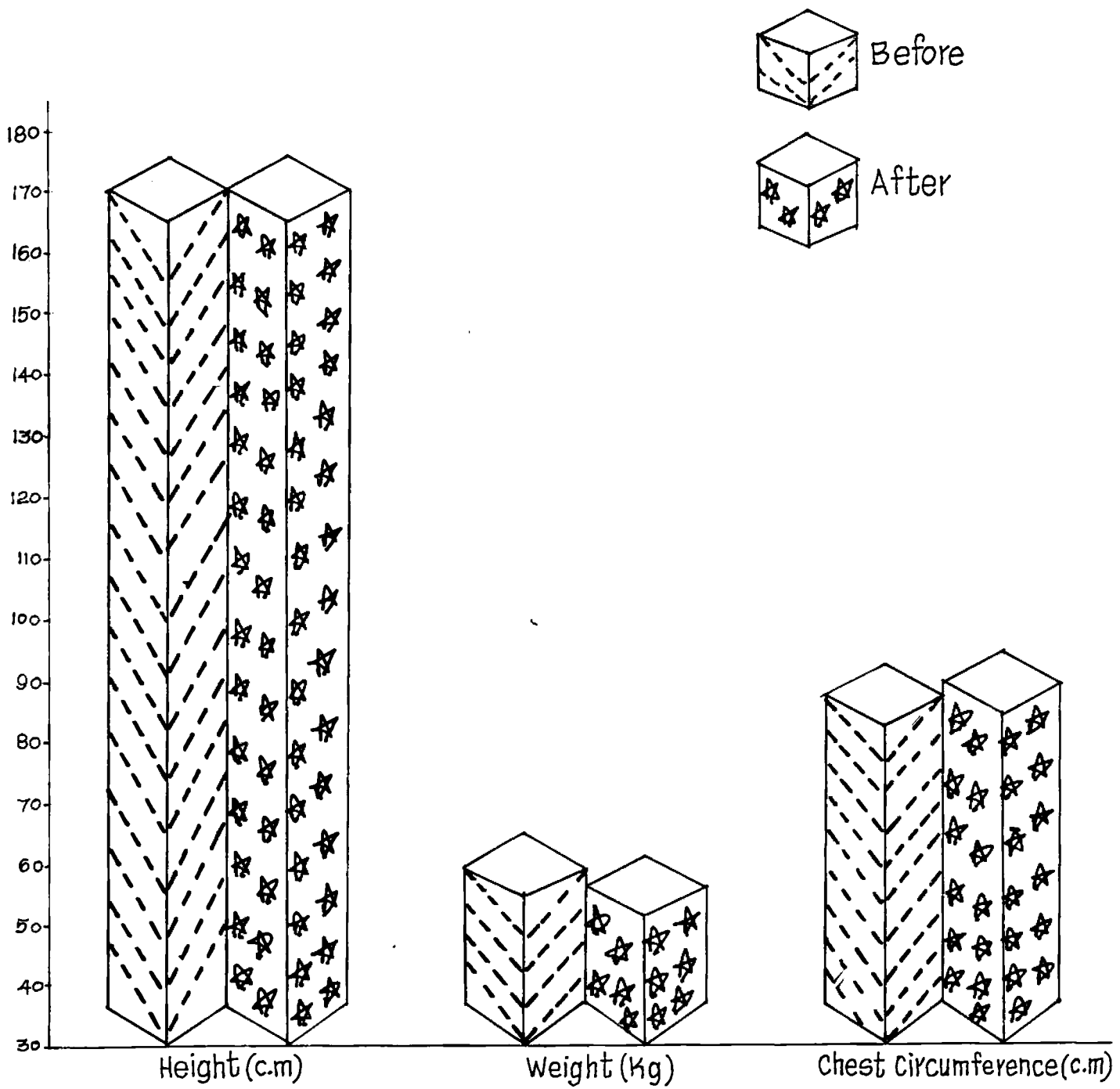


Figure. 2

Prolonged and intensive practice of yoga ■ ■■■ during childhood and adolescence period may bring changes in height. Young (1987) quotes a related case history. Thelma an adolescent girl for whom he taught yoga-mov-asana, a week later looked an inch taller, eyes sparkled and smiled readily. A month later she seemed nearly two inches taller.

2. Weight

The mean values of the weight of the selected subjects' before and after the course on yoga, clearly shows a gradual decrease from 54.43 to 52.28 kg. On an average 2.15kg of weight decrease was found among the yoga participants. It was also proved statistically.

This finding confirms with Harry's case history, who tried many different ways to reduce the weight and was deeply disappointed. Young (1987) revealed to Harry the scientific yoga secrets to reduce and stay reduced without starving himself. He did the yoga-mov-asanas (appetite controller) and developed remarkable shape as he lost weight. His chest, back and shoulders grew hard with muscle, while his waist slimmed down to that of a youth. He not only lost weight but transformed himself into a powerful, much better built and far more energetic person.

Studies conducted at the Indian Institute of Yoga, Patna and at the Yoga Institute of Washington in treating

the obese persons, it was found the rate of reduction in weight is 1-1½ lbs/week. An obese person loses about 4-6 pounds of weight per month due to intense training in yoga (Sinha, 1976).

3. Chest circumference

Proper exercises and pranayama increases the chest circumference (Yogi Raja, 1985). The figures given in Table X shows an increase in the means of the chest circumference from 81.57cm to 84.29cm.

Statistical Analysis was done for the decrease of weight and the increase of chest circumference due to yoga exercises. It was found that both are highly significant (given in Appendix D-ii and Fig.II).

D. Impact of Yoga on Physiological Functions

The changes in physiological functions such as vital capacity, rate of heart beat, pulse rate, blood pressure and RBC at the initial and final period of the experiment of this study on 'Impact of Yoga on Adult Men' are discussed here.

1. Vital capacity, Rate of Heart Beat and Pulse Rate

The test of significance for vital capacity, rate of heart beat and pulse rate between the two measurements

taken at the onset and completion of the experiment are presented below.

TABLE XI
MEAN SCORES OF VITAL CAPACITY, RATE OF HEARTBEAT
AND PULSE RATE

Physiological functions	Initial		Final		't' value
	Mean	+ S.D.	Mean	+ S.D.	
Vital capacity (ml)	2236.6	+378.78	2379.5	+380.00	14.3515**
Rate of Heartbeat (per minute)	79.86	+5.38	76.00	+ 4.104	9.226**
Pulse rate (per minute)	80.85	+5.626	80.71	+ 5.89	9.26**

**Highly significant

1. Vital capacity

According to yoga Sutra - Pranayama will increase the vital capacity. Our bodies need oxygen to burn up waste matter and to purify the blood stream. Civilised man has lost the art of breathing properly. His shallow breathing utilises only about one-tenth of his lung capacity. The lack of oxygen from which he inevitably suffers is responsible for headaches, fatigue, lack of mental alertness. The yoga breathing exercises, if performed sensibly can be a mean to a greater bodily vitality and exert a beneficial influence over the emotions and the mind (Hewitt, 1987).

The findings of this study show a marked difference between the initial 2,236.6ml and final 2,379.5ml measurements of the vital capacity, with 142.9ml increment in 60 days of yoga-asana training.

ii. Heartbeat

Not matter how deeply one exhales, a considerable amount of air still remains in the lungs. This is the air we "keep in". When more of this air is carbon-di-oxide, the energy level is low. When too much of it is good-oxygen, one feels faint because the breathing slows down. When this air consists of the right amount of good and bad air, the heart beats normally at its best pace, one feels at his strongest and possess the most energy endurance. The effective yoga-movāsana to put the best air mixture into the depth of the lungs and keep the man going at his best for hours is "Your Energy Feedback".

The mean scores reveal that there is a decrease in the rate of heartbeat after practising yoga. This finding coincides well with the result of Young's (1987) treatment to Ames, who was sick, discouraged, lost appetite and tired of fighting obstacles. He sensed a delightful "turning" in his head, felt free, contented and regained appetite after doing "Youg Energy Feed Back" exercises of yoga-movāsanas.

iii. Pulse Rate

We could see a positive change in the pulse rate also, but the difference in the mean score is very low.

It was found that there is an impact on physiological functions of the men, due to yoga, which is statistically significant.

This result accords with Swami Vishnu Devananda's (1983) statement that the laboratory tests have also confirmed yogi's ability to consciously control automatic or involuntary functions, such as temperature and blood pressure. One study of the effects of Hatha Yoga over six months revealed that lung capacity and respiration increased significantly.

2. Blood Pressure and RBC

The mean score of the blood pressure, RBC count taken at the initial and final study period is figured out in Table XII.

TABLE XII

MEAN SCORES OF BLOOD PRESSURE AND RBC COUNT

No:35

Physiological functions	Initial	Final	't' value
	Mean \pm S.D.	Mean \pm S.D.	
Blood pressure (mmHg)			
Systolic	118.50 \pm 5.315	116.78 \pm 4.827	3.624**
Diastolic	87.07 \pm 4.89	83.35 \pm 3.178	0.029NS
RBC	4.85 \pm 0.923	5.16 \pm 1.029	2.167*

**- Highly significant
*- Significant
NS- Not significant

1. Blood Pressure

From the mean values given in the above table, we can see a decrease in blood pressure, which is the expected impact on blood pressure due to yoga-asanas. The test of significance shows that the systolic pressure is highly significant and the diastolic pressure is non-significant.

This result is similar to that of Robert and Aimee who lost their fear of developing uncontrolled blood pressures by doing 'Bent over Press' asana which lowers the blood pressure when it is high or to raise when it is low. This alone, multiplied their power of command over the threatening condition (Young, 1987).

ii. RBC count

It was also found that the RBC count also increased and the difference is significant (Appendix D-iii).

E. Impact of Yoga on Memory Power

Concentration is a God's gift. It can be improved through proper exercise of the mind. Mental exercise helps in improved observation and retention in the mind, which in turn leads to improved memory quotient.

Scientifically it has been proved that Transitional meditation (T.M.) does produce a relaxation in the mind (Ghorpade, 1980).

In order to trace out the impact of Yoga on memory power, the selected subjects memory power was tested and the mean scores of initial and final assessment are given here.

TABLE XIII
MEAN MEMORY QUOTIENT OF THE PARTICIPANTS

Variable	Initial		Final		't' value
	Mean	+ S.D.	Mean	+ S.D.	
Memory quotient	110.20	+11.287	121.93	+6.907	6.526**

**Highly significant

DIFFERENCE IN MEMORY QUOTIENT DUE TO YOGA

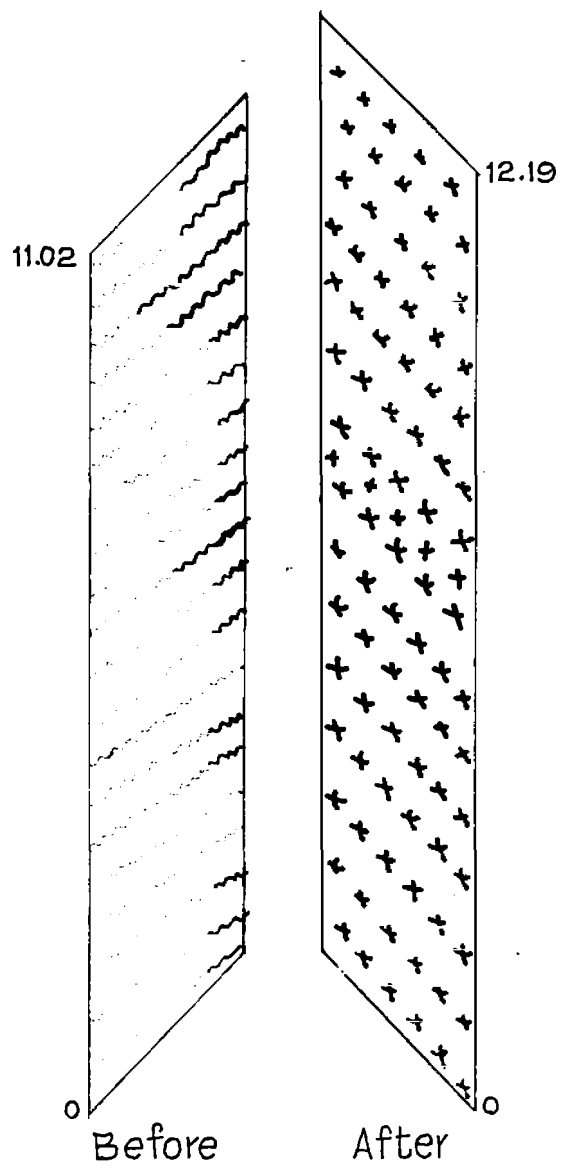


Figure. 3

The above table shows an increase in memory quotient of the men from 110.20 to 121.93. The difference between the initial and final score of the memory test, was given a statistical treatment and inferred that the increase in memory power of the adult men of this study is highly significant (Appendix D-iv, Fig.III).

This finding accords with the statement of Hewitt (1987) that Hatha yoga brings the body into harmony with the universe. The postures and breathing exercises have a calming influence on the mind and prepares it for the disciplines of Royal path. It is a preparation for the conquest of consciousness, the minds turbulence being easiest curbed and its energies concentrated when the body is strong and alert.

Summary and Conclusion

V SUMMARY AND CONCLUSION

Over the last few decades man feels the need to remain fit and maintain a good shape.

Harmonious health is impossible if the emotions are not under control. Emotional stresses are now known to be responsible for various diverse complaints. The increasing technicality of the society makes adjustment all the more difficult. One system of body discipline is the age old Indian System of Yoga (Nair, 1988). The steady, natural postures and smooth measured pranayama have a calming and controlling effect on thought and emotion. It considers the whole field of personality such as physical, physiological, emotional, behavioural, environmental and social aspects. These techniques have great preventive, curative, restorative and relaxative value.

Hence the study 'Impact of Yoga on Adult Men' was thus undertaken to find out the influence of yoga on attitude, physical dimensions, physiological functions and memory power of the adult men aged 20 to 25 (Two groups of the samples were selected). One group known as Group A consisted of 100 men doing Bachelor of Physical Education course who finished the training on yoga and practising it regularly for the past one and a half years.

An another group named as Group B comprised of 35 men, who had joined the three months course on yoga in January 1988.

The data regarding attitude towards yoga was collected from both the groups by using FGI Adaptation of yoga Attitude Scale.

In order to trace out the influence of yoga on physical dimensions, physiological functions and memory power of the men of Group B, the tools such as Anthropometry, physiological norms by the physician and the Wechsler's memory scale were used respectively.

The inter-relationship between the yoga practice and the attitude towards yoga, physical dimensions, physiological functions and memory power, was appraised.

I. Family Background of the adult men (Group B):

Fifty per cent of the subjects had higher secondary education and 34 and 11 per cent of them were doing under graduation and post graduation respectively. Twenty nine per cent of the subjects finished their graduation.

Seventeen per cent of the fathers and 9 per cent of the mothers had professional occupations. All the others were employed at various cadre such as skilled, semi-skilled and unskilled.

Regarding the employment of participants, seven of them were working and others were doing the graduate and post-graduate courses.

Fifty seven per cent of the subjects belonged to low income group. Twenty three per cent and 20 per cent of the subjects were hailed from middle and high income group families respectively.

II. Impact on Attitude Towards Yoga (Group A)

Eighty per cent of the men agreed that yoga was beneficial to everyone, essential for spiritual progress, good health, strengthen or build character and bring discipline in life.

Seventy eight per cent of them opined that yoga gives peace, strength and unity to the whole life. About 47 to 62 per cent of the subjects believed that yoga cures all diseases, brings success to life, can overcome mental conflicts or problems, makes a person more intelligent, emotionally stable and eliminates the bad habits. It is a striking fact that inspite of the knowledge received in yoga for the past one and a half years, 56 per cent of them opined that there are many other ways besides yoga by which a person can obtain peace and happiness.

The range of attitude score and the number of participants received the score range revealed that the yogic persons have a favourable attitude towards yoga-35 to 44 by 52 per cent and 45-54 by 37 per cent of the subjects. Three of them scored highly (55 to 64) and eight of subjects scored between 25 to 34.

In order to see the attitudinal changes, the opinion of the men (Group B) towards yoga was taken at the commencement and end of the certificate course in yoga, at Tirupati.

It was found that the participants' attitude is changed due to the intensive training in yoga. Participants' opinion reflects that the yoga alerts a man's anatomy, physiology, mental and psychic responses.

The most remarkable aspect is that only 49 per cent of the participants felt at the onset of the course that even bad habits like stealing and gambling can be removed by yoga, where as at the end of the course all the participants agree this view. Likewise, all of them stressed during the final assessment that yoga is beneficial to every one, makes a person emotionally stable and brings discipline into life.

All of them initially agreed the view that yoga is essential for good health and gives peace, strength and unity to the whole life. They were steadfast in their opinion at the time of final assessment also.

The percentage of the participants' attitude for the statements - yoga can strengthen or build character and make a person more intelligent, was increased from 72 to 97.

A higher percentage of the participants (91 to 97) had the positive view on yoga-can overcome mental conflicts or problems, brings success to life, essential for spiritual progress and can cure all diseases.

Training in yoga influenced more number of participants, to have the negative attitude towards negative statement of yoga from the uncertain attitude which they had at the commencement of the course. There was a vast difference between the initial and final assessment for the statements such as yogic principles are very difficult to follow in real life (38 to 80 per cent), yoga is meant only for sadhus or saints who live alone in the jungle (69 to 83 per cent), it is only for those incompetent or weak (60 to 85 per cent) and it is not the only way to obtain peace and happiness (6 to 63 per cent).

The results of this study depict that the subjects were definite about their views after attending the course on yoga. The statistical analysis of the uncertain attitude of the subjects before and after the course on yoga is significant at 1 per cent level.

In general, the attitude of the subjects before and after the course on yoga was compared and found that it is highly significant. The theoretical and practical information about yoga widens the knowledge towards yoga and realise its values.

III. Impact of yoga on physical Dimensions

There is no change in height because the selected samples were adults.

The weight of the yoga participants was decreased nearly 2.15kg within 60 days of training in yoga. It was also proved statistically.

Similarly the increase in chest circumference from 81.57cm to 84.29cm due to intense training in yoga was statistically proved.

IV. Impact of yoga on Physiological Functions

The findings of the study show a marked difference between the initial and final measurements of vital capacity from 2,236.6ml to 2,379ml due to yoga practice.

The mean scores reveal that there was a decrease in the rate of heartbeat after practising yoga. We could see a positive change in the pulse rate, blood pressure and RBC count before and after the training in yoga.

The investigator found that, there is an impact on physiological functions of men, due to yoga, which is statistically significant.

V. Impact of Yoga on memory power

The result showed an increase in memory quotient of the men from 110.20 to 121.93. The difference between the initial and final score of the memory test, as given a statistical treatment and inferred that the increase in memory power of the adult men of this study is highly significant.

Conclusion

Thus it was investigated that the knowledge/training in yoga, changed the attitude of the men. It was also found that yoga practice had an impact on physical dimensions, physiological functions and memory power of the adult men.

Recommendations

1. Imparting the values of yoga to the children/students during the sports and games period in all the schools and colleges.
2. Organising yoga centres in each district headquarters so that the urban people will be benefited. Because urban man needs to supplement his daily routine with exercise more than his rural counterpart.

3. Conducting yoga camps so as to help the people who do not have time to attend the regular course on yoga, but interested to adopt it as a 'relaxomat'.

4. Publishing articles on yoga in all the regional languages, so as to make the people understand the psychophysiological and social values of yoga-asanas, pranayama and meditation in releasing tensions and disease.

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Appendices

APPENDIX A

INTERVIEW SCHEDULE TO ELICIT INFORMATION REGARDING IMPACT
OF YOGA

I General Information

a. Information of the Individual

Name:

Sex:

Age:

Type of family:
Joint/Extended/
Nuclear
Occupation:

Education:

b. Information of the family

S.No.	Name of the person	Age	Relation to the Head	Educa- tion	Occupation	Income per month
-------	--------------------	-----	----------------------	----------------	------------	------------------------

II Physical changes

Measurements

	Before	After
--	--------	-------

a. Height

b. Weight

c. Chest circumference

III Physiological changes

	Before	After
--	--------	-------

a. Vital capacity

b. Rate of heart-beat

c. Blood Pressure

d. Pulse rate

e. R.B.C.

APPENDIX B

P.G.I. ADAPTATION OF YOGA ATTITUDE SCALE

Name:

Date:

Age:

Sex:

Education:

Instructions: Given below are a few sentences about Yoga. Of these to which ones do you agree and to what extent.

	Strongly agree/ agree	Uncertain	Disagree	Strongly disagree
1. Yoga benefits everyone				
2. Yoga makes a person emotionally stable				
3. Yoga can cure all diseases				
4. Yogic principles are very difficult to follow in real life				
5. Yoga is meant only for Sadhus, Sanyasis or Saints who live alone in the jungle				
6. Yoga is only for those incompetent or weak people who cannot face difficulties in life				
7. Yoga is essential for spiritual progress				

1. Yoga benefits everyone

2. Yoga makes a person emotionally stable

3. Yoga can cure all diseases

4. Yogic principles are very difficult to follow in real life

5. Yoga is meant only for Sadhus, Sanyasis or Saints who live alone in the jungle

6. Yoga is only for those incompetent or weak people who cannot face difficulties in life

7. Yoga is essential for spiritual progress

	Strongly agree/ agree	Uncertain	Disagree	Strongly disagree
8. Yoga is essential for good health				
9. Yoga gives peace, strength and unity to the whole life				
10. Yoga brings success to life				
11. Yoga can overcome mental conflicts or problems				
12. Yoga can make a person more intelligent				
13. There are many other ways besides yoga by which a person can obtain peace and happiness				
14. Yoga gives many ways by which a person can strengthen or build character				
15. Even bad habits like stealing, gambling etc. can be checked by yoga.				
16. Yoga brings discipline into life				

APPENDIX C

WECHSLER MEMORY SCALE

...

Calvin P. Stone
Stanford University
California

David Wechsler
Bellevue Hospital
New York

Name _____		<u>Score</u>
Age _____ Sex _____	I. Information	.....
Referred for _____	II. Orientation	.....
Date _____ Examiner _____	III. Mental Control	.....
_____	IV. Memory Passages	.....
	V. Digits Total	.....
	VI. Vis.Reprod.	.....

VII. Associate Lng	.....
Total Raw Score	.....
Age Correction	.....
Correction Score	.....
MQ (Table 3)	.....

I Personal and Current Infor.

1. Age	.....	<u>Score</u>
2. When born	.....
3. President of India	.....
4. Before him	.....
5. Governor of A.P.	.....
6. Mayor	.....

II. Orientation Score

1. Year	.....
2. Month	.....
3. Day	.....
4. Where now	.....
5. City in	.....
Total	_____

III. Mental Control (Circle omits: Cross out errors)

		Time	Errors	Score	Total
					score
1. (30")	A B C D E F G H I J K L	_____	_____	_____	_____
	M N O P Q R S T U V W X				
	Y Z				
2. (30")	20 19 18 17 16 15 14 13	_____	_____	_____	_____
	12 11 10 9 8 7 6 5				
	4 3 2 1				

Time Errors Score Total
Score

3. (45") 1 5 9 13 17
21 25 29 33 37
41 45 49 53

IV. Logical Memory

- a) Dogs/are trained/to find/ the wounded/in war time/ Police dogs/are also trained rescue/drowning people/ Instead of running/down to the water/and striking out/ they are taught/to make/a flying leap/by which they/ save/many swimming stroces/ and valuables/second of time/ The European sheep dog/makes the best/police/dog.
- b) Many/school/children in norther/France/were killed/or fatally hurt/ and others/seriously inju/ red/when a shell/wracked/ the schoolhouse/in their village/. The children were thrown/down to hill side/and across/a / a long distance/from the school house/. Only two children/escaped uninjured/.

A) Number of Memories _____ (B) Number of Memories _____

Average score = $\frac{(A + B)}{2}$ = $\frac{\quad}{2}$

V. (A)	<u>Digits Forward</u>	<u>Score</u>	(B)	<u>Digits Backward</u>	<u>Score</u>
	2-8-6-1	4		7-5-1	3
	5-3-9-4	4		Draw a line	
	7-4-2-9-6	5		through any 2-9-6	3
	8-5-1-6-4	5		series failed 3-5-6-2	4
				Circle score 9-6-1-7	4
				for maximum	
	8-4-2-7-5-1	6		number repeated	
	7-2-9-5-3-6	6		4-7-1-8-6	5
	7-4-8-2-5-9-1	7		correctly 3-9-2-6-1	5
	8-3-9-6-1-5-2	7		6-3-9-1-5-8	6
				4-8-1-6-3-7	6
	2-6-9-5-3-7-1	8		5-4-9-2-7-3-6	7
	3-7-2-9-4-1-5-8	8		2-5-1-9-4-7-3	7
	*5-9-4-2-7-3-1-6			*2-7-1-5-3-9-6-4	
	*4-2-9-3-8-6-1-7-5			*3-8-5-9-4-7-1-6	
	*5-2-7-1-8-4-9-3-6-2-			*9-1-6-4-8-3-7-5-2	
	*4-9-7-3-6-1-5-8-4-7			*5-2-7-1-8-4-9-3-6	

*Not counted in score in used.

Forward Score _____ Backward Score _____ Digits Total _____

VI. I Fold Part VII under on broken line before giving paper to subject for drawing in Part VI.

Visual Introduction

1 _____ 2 _____ S.L. _____

3 _____ Total

VII. Associate Learning

First Presentation Second Presentation Third Presentation

Come	- Go	Knife	- Sharp	Country	- France
Lead	- Pencil	Jury	- Eagle	Necktie	- Cracker
In	- Although	Country	- France	Murder	- Crime
Country	- France	Lead	- Pencil	Dig	- Guilty
Dig	- Guilt	Necktie	- Cracker	Come	- Go
Lock	- Door	Murder	- Crime	In	- Although
Jury	- Eagle	Lock	- Door	Lock	- Door
Murder	- Crime	Come	- Go	Jury	- Eagle
Knife	- Sharp	Dig	- Guilt	Lead	- Pencil
Necktie	- Cracker	In	- Although	Knife	- Sharp

First Recall Easy Hard Second Recall Easy Hard Third Recall E H

Knife	....		Lock	....		Lead	...	
Lead	....		Dig	....		Lock	...	
Jury	....		Come	....		Necktie	...	
Country	....		Jury		....	Come	...	
In		....	Knife	....		Country	...	
Murder	....		Country	....		Jury	...	
Necktie		....	In		....	Knife	...	
Lock	....		Murder	....		In	...	
Come	....		Necktie		....	Murder	...	
Dig		....	Lead	....			
						Total	.....

Easy 1) _____

Hard 1) _____

2) _____

2) _____

3) _____

3) _____

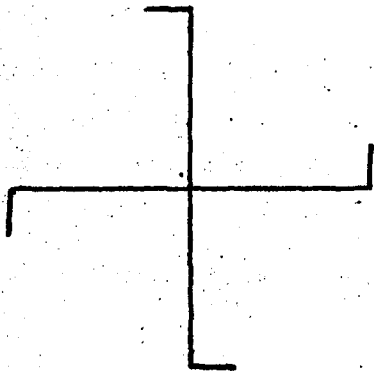
(a) Total _____

(b) Total _____

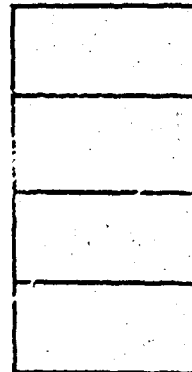
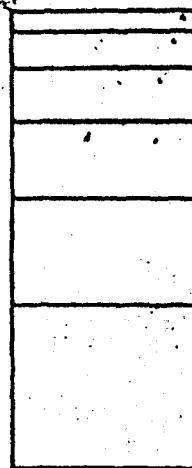
A - 2 _____

Score

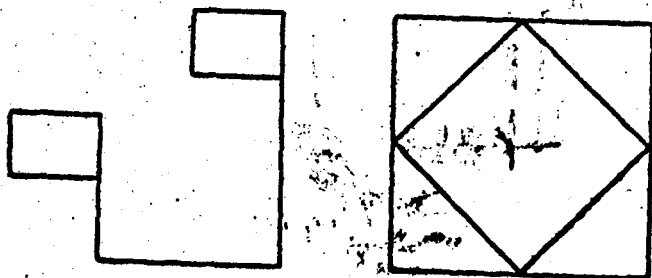
$$\frac{A}{2} + B =$$



Card 1
W-M-S II



Card 2
W-M-S II



Card 3
-M-S II

Cut this sheet on the lines to make the three cards for the

Wechsler Memory Scale
Form II

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The Psychological Corporation
New York, N. Y. 10017

II. Orientation

1. What year is this?
2. What month is this?
3. What day of the month is this?
4. What is the name of the place you are in?
5. In what city is it?

Scoring: 1 point for each item correctly answered.

Maximal score: 5 points

III. Mental control

1. Saying the alphabet (time limit "30")

Scoring: 2 points for perfect recital
 1 point if only 1 error, within 30"
 1 extra point for perfect recital
 within 10"

Maximal score: 3 points

2. Counting backward from 20 to 1 (time limit, 30")

Scoring: 2 points if no error, within 30"
 1 point if only 1 error, within 30"
 1 extra point, for no error, within 10"

Maximal score: 3 points

(Spontaneous corrections not counted as errors)

3. Counting by 4's to 53, beginning with 1
 (time limit, 45")

Scoring: 2 points, if no error, within 45"
 1 point if with only 1 error
 within 45"
 1 extra point, if no error,
 within 20".

(Spontaneous corrections not counted as errors)

Maximal score: 3 points

maximal score on the three subtests--9 points

IV. Logical Memory (Immediate recall)

Passage 1

Dogs/ are trained/ to find/ the wounded/ in war time/
Police dogs/ are also trained/ to rescue/ drowning people/
Instead of running/ down to the water/ and striking out/
they are taught/ to make/ a flying leap./ by which they
save/ many swimming strokes/ and valuable/ seconds of time/
The European sheep dog/ makes the best/police/dog.

Passage 2

Many/school/ children/ in nothern/ France/ were killed/
or fatally hurt/ and others/ seriously injured/ when a shell/
wrecked/ the school house/ in their village/ The children/
were thrown/ down a hillside/ and across/ a ravine / a long
distance/ from the schoolhouse/ Only two/ children/ escaped
uninjured.

Scoring: Final score is the mean of the number
of ideas reproduced on both passages

Maximal score: 23 points

V. Digits, Forward and Backward

Digits Forward

- | | | | |
|-------------|-----------------|------------------|------------|
| 4) 2861 | 5) 74296 | 6) 842751 | 7) 7482591 |
| 5394 | 85164 | 829536 | 8396152 |
| 8) 26958371 | 9) *(594827316) | 10) *(5271849562 | |
| 37294158 | (429386175) | (4973615847) | |

*Not counted, if used

Scoring: Score is the maximal number of digits correctly repeated on either of the two trials, through, but not beyond, 8 digits.

Maximal:Score: 8 points

Digits B_ackward

- | | | | |
|------------|----------------|-----------------|-----------|
| 3) 751 | 4) 3582 | 5) 47186 | 6) 639158 |
| 296 | 9617 | 39261 | 481637 |
| 7) 5492736 | 8) (27153964)* | 9) (916483752)* | |
| 2519473 | (38594716) | (527184936) | |

*Not counted, if used

Scoring: Score is the maximal number of digits currently repeated backwards on either of the two trials, through but not beyond, 7 digits.

Maximal score: 7 points

Maximal total score on all digits: 15 points

VI. Visual Reproduction

There are three cards of designs (cf. Fig.1). These cards are presented in the order 1, 2 and 3.

1. Swastika-Like cross

Scoring: 1 point for two long lines crossing at or near their respective centers

1 point if the tips of each line trail in clockwise direction

1 point for approximately right angles and equality of homologous lines

Maximal score: 3 points

2. Partitioned Rectangles

Scoring: 2 points if the ^eleft rectangle has 4 parts and the right has 6 parts

2 points if the subdivisions of the left rectangle are approximately equal, and those of the right are progressively smaller from left to right

1 point if the right rectangle is clearly longer than the left

Maximal score: 5 points

3. Two Designs from the Binct, Form M

Scoring left-hand figure:

1 point for two vertical uprights connected by a base line, with the left upright clearly shorter than the right.

1 point for a small rectangle at the top of each vertical line, the size proportionate to model.

1 point if small rectangles face to the left at distal ends of the vertical lines, as in model.

Maximal score: 3 points for left-hand figure.

Scoring right-hand figures:

1 point for an outer, square-like quadrilateral.

1 point for square-like quadrilateral inside the outer one, rotated 45 degrees, and with at least one corner touching the midpoint of a side of the outer figure.

1 point if four corners of the inner figure touch approximately midpoints of sides of outer quadrilateral, and the angles of both quadrilaterals are approximately right angles.

Maximal score: 3 points for right-hand figure.

VII. Associate Learning

The list and order of word-pairs are:

First Presentation	Second presentation	Third presentation
*Come-Go	Knife--Sharp	Country--France
*Lead-Pencil	Jury--Eagle	Necktie--Cracker
In-Although	Country--France	Murder--Crime
*Country--France	Lead--Pencil	Dig--Guilty
Dig--Guilty	Necktie--Cracker	Come--Go
*Lock--Door	Murder--Crime	In-Although
Jury--Eagle	Lock--Door	Lock--Door
*Murder--Crime	Come--Go	Jury--Eagle
*Knife--Sharp	Dig--Guilty	Lead--Pencil
Necktie--Cracker	In--Although	Knife--Sharp

*Called easy associations

Scoring: give 1 credit for each correct response if given within 5". To calculate the final score, proceed as follows: (1) Total all credits obtained on easy (vide Supra) associations in the three recalls and divide this sum by 2; (2) Total all credits obtained on hard associations; (3) combine the values from (1) and (2) to obtain the final score for the test.

Maximal score: for combined easy and hard associations on three recalls, 21 points.

As stated above, the specific directions for administration of Form II are identical with those prepared by Wechsler for the original form of this memory scale. The Form I manual, on page 10 contains further directions for obtaining a memory quotient which takes into account the subject's chronological age. As directed by Wechsler, the examiner summates the seven subtest scores and then refers this total score to the Wechsler Table (p.11) to obtain the correction for age. Having added this value, he next refers to Wechsler's table of MQ equivalents (Table 3, p.11) to obtain the subject's Memory Quotient.

TABLE 2
SCORE CORRECTION FOR AGE

Age	Add
20-24	33
25-29	34
30-34	36
35-39	38
40-44	40
45-49	42
50-54	44
55-59	46
60-64	48

TABLE 3

TABLE OF MQ EQUIVALENTS

Cor.Sc	Eqv.MQ:	Cor sc.	Eqv.MQ:	Cor.Sc.	Eqv.MQ
50	48	73	64	96	97
51	49	74	66	97	99
52	49	75	67	98	100
53	50	76	69	99	101
54	51	77	70		
55	52	78	72	100	103
56	52	79	73	101	105
57	53			102	106
58	54	80	74	103	108
59	55	81	76	104	110
		82	77	105	112
60	55	83	79	106	114
61	56	84	80	107	116
62	57	85	81	108	118
63	57	86	83	109	120
64	58	87	84		
65	59	88	86	110	122
66	59	89	87	111	124
67	60			112	126
68	61	90	89	113	129
69	62	91	90	114	132
		92	92	115	135
70	62	93	93	116	137
71	63	94	94	117	140
72	64	95	96	118	143

APPENDIX D
STATISTICAL ANALYSIS

...

Test of Significance

To compare the initial and final measurements taken at the onset and completion of the course on yoga to find out the 'Impact of Yoga on Adult men', the 't' test was used:

Formula: 't' value (Calculated)

$$= \frac{d \times \sqrt{n}}{\text{S.D.}}$$

Steps followed

1. The sum of the differences between the individual observations of initial and final measurements of yoga participants is calculated.
2. The mean of the above sum is calculated i.e. \bar{d}
3. The Standard Deviation for this \bar{d} is calculated
4. N is the total number of observations.
5. Thus the mean multiplied by the square root of n and then divided by the S.D. gives the observed 't' value.
6. To find out the significance the observed 't' value is compared with the table 'T' value of the corresponding

degrees of freedom, i.e. n-1 value.

7. If the observed value is higher than the table value, the difference is significant and if the observed value is less than the table value, the difference is not significant.

Attitude: Positive

$$\bar{d} = 2.13$$

$$N = 16$$

$$S.D. = 23.8$$

$$'t' = \frac{2.13 \times \sqrt{16}}{23.8}$$

$$'t' \text{ calculated:} = 0.358$$

$$'t' \text{ observed} = 1.960$$

Uncertain

$$\bar{d} = -5.5$$

$$N = 16$$

$$S.D. = 5.28$$

$$'t' = \frac{5.5 \times \sqrt{16}}{5.28}$$

$$'t' \text{ Calculated} = 4.166$$

$$'t' \text{ Observed} = 2.576$$

Negative

$$\bar{d} = 3.68$$

$$N = 16$$

$$S.D. = 22.46$$

$$'t' = \frac{3.68 \times \sqrt{16}}{22.46}$$

$$'t' \text{ calculated} = 0.655$$

$$'t' \text{ observed} = 0.960$$

Additudinal changes

$$\bar{d} = 6.4$$

$$N = 35$$

$$S = 7.486$$

$$'t' = \frac{6.4 \times \sqrt{35}}{7.486}$$

$$'t' \text{ Calculated} = 5.0578$$

$$'t' \text{ observed} = 2.576$$

D. (ii) Physical changes

Weight

$$\bar{d} = -1.828$$

$$N = 35$$

$$\text{S.D.} = 1.0716$$

$$'t' = \frac{1.828 \times \sqrt{35}}{1.0716}$$

$$|t| \text{ calculated} = 10.092$$

$$t \text{ observed} = 2.576$$

Chest circumference

$$\bar{d} = 2.4$$

$$N = 35$$

$$\text{S.D.} = 1.006$$

$$'t' = \frac{2.4 \times \sqrt{35}}{1.006}$$

$$|t| \text{ calculated} = 14.114$$

$$'t' \text{ observed} = 2.576$$

D.(iii) Physiological changesVital capacity

$$\bar{d} = 150$$

$$N = 35$$

$$\text{S.D.} = 61.834$$

$$'t' = \frac{150 \times \sqrt{35}}{61.834}$$

$$'t' \text{ Caliculated} = 14.3515$$

$$'t' \text{ observed} = 2.576$$

Rate of Heartbeat

$$\bar{d} = 3.314$$

$$N = 35$$

$$\text{S.D.} = 2.098$$

$$'t' = \frac{3.314 \times \sqrt{35}}{2.098}$$

$$'t' \text{ Caliculated} = 9.345$$

$$'t' \text{ observed} = 2.576$$

Pulse rate

$$d = -3.48$$

$$N = 35$$

$$\text{S.D.} = 2.224$$

$$|t| = \frac{3.48 \times \sqrt{35}}{2.224}$$

$$'t' \text{ Caliculated} = 9.26$$

$$'t' \text{ observed} = 2.576$$

Blood pressure

Systolic

$$\bar{d} = -3.2$$

$$N = 35$$

$$S.D. = 5.223$$

$$'t' = \frac{3.2 \times \sqrt{35}}{5.223}$$

$$'t' \text{ Calculated} = 3.624$$

$$'t' \text{ observed} = 2.576$$

Diastolic

$$\bar{d} = -0.028$$

$$N = 35$$

$$S.D. = 5.607$$

$$'t' = \frac{0.028 \times \sqrt{35}}{5.607}$$

$$'t' \text{ Calculated} = 1.029$$

$$'t' \text{ observed} = 1.960$$

R.B.C.

$$\bar{d} = 0.425$$

$$N = 35$$

$$S.D. = 1.160$$

$$'t' = \frac{0.425 \times \sqrt{35}}{1.160}$$

$$'t' \text{ Calculated} = 2.167$$

$$'t' \text{ observed} = 1.960$$

D. (iv) Memory

$$\bar{d} = 12.94$$

$$N = 35$$

$$\text{S.D.} = 11.73$$

$$'t' = \frac{12.94 \times \sqrt{35}}{11.73}$$

$$'t' \text{ Caliculated} = 6.526$$

$$'t' \text{ observed} = 2.576$$