

CHAPTER - I

INTRODUCTION

The Health is usually measured in terms of life expectancy at birth, infant mortality rate, fertility rate, crude birth rate and crude death rate. These indicators of health are determined by numerous factors such as per capital income, nutrition, housing, sanitation, safe drinking water, social infrastructure, health and medical care services provided by government, geographical climate, employment status, incidence of poverty and the like **(Reddy and Selvaraju 1994; Dadibhavi and Bagalkoti 1994)**.

1.1. HEALTH STATUS IN INDIA

It is a well-known fact that, India is next to China, the second largest country in terms of population in the world. But the health status of a great majority of the people is far from satisfactory as compared to China and other developed countries. However, over the last five decades or so, India has built up health infrastructure and manpower at primary, secondary and tertiary care in government, voluntary and private sectors and made considerable progress in improving the health of its population **(Ray 2003; Bhat and Babu 2004)**.

Our culture is becoming more and more health conscious and realizing that taking care of the external form, helps with the health and healing of the internal systems. Yoga has become increasingly popular among people from all walks of life. Athletes looking to keep their bodies healthy and mobile, business men and women seeking stress reduction, elderly citizens seeking relief from diseases related to the aging process and pregnant women looking for a way to connect with their body and their baby, all have begun to explore the benefits of

Yoga. Yoga has been recommended by the medical community as a manner of reducing stress, healing musculoskeletal problems.

1.2 YOGA FOR HEALTH

The term Yoga has been defined widely by various profounder. However, the most common, concept is that Yoga means the experience of oneness or unity in our inner being. The word YOGA is derived from the Sanskrit word YUJ meaning to bind, join and attach. It is defined as “Union of body, emotion and mind”. The practice of yoga integrates the body with the mind and the mind with the soul. All irrespective of race, color, caste, creed, sex and age can practice yoga. A YOGI is an accomplished male student of yoga. A YOGINI is an accomplished female student of yoga. A perfect yogic student is one who controls his body, mind, intellect and self being absorbed in the spirit within him.

Yoga is an ancient Indian science which teaches man how to live in unity within himself and with those around him. It is recognized as one of the most important and valuable heritages of India. More than 2000 years ago our ancestors developed it to bind the body, mind and spirit, as a harmonious whole. It has been growing in popularity with unbelievable rapidity over the years. Today the whole world is looking towards yoga for answers to the various problems the modern man is facing (**Sharma, 1989**).

Yoga is a science practiced in India over the thousands of years. Yoga practices mainly consist of Asana (posture- a particular position of the body which contributes to steadiness of body and mind), Pranayama (to control the breathing in a superior and extra-ordinary way to get maximum benefits.) and meditation.

1.3 CONCEPT OF YOGA

Yoga is an ancient discipline. It is recognized as one of the most important and valuable gifts of our culture. The modern era with the development of science and technology provides man more comforts for his basic necessities, but with these comforts man faces lot of problems, which cannot be solved only by the above facilities. Today, the world is looking for solutions to solve the menacing problems of unhappiness restlessness, emotional, imbalance, hyperactivity, tension, stress etc. Now, the time has come to think of a change in attitude and take a new dimension to solve the problems. There is the importance of Yoga and spiritual love. Yoga is the gift of our rishi culture, is a science and art of pure life style. Yoga offers man a conscious process to solve his problems. Yoga helps the man to evoke the hidden potentialities of man in a systematic and scientific way by which man becomes a fuller individual.

1.4 OBJECTIVES OF YOGA

Yoga improves posture, increases the intake of oxygen and enhances the functioning of the respiratory, digestive, endocrine and reproductive and excretory systems. Its effects on the emotions are equally beneficial by calming the mind, tuning us to the environment and diminishing insomnia caused by mental restlessness. Yoga is highly recommended for people in competitive, stressful working environments, for those who suffer from headaches, back and shoulder aches, allergies and asthma. Yoga also cures behavioral disorder, nervous breakdown and manic depression. The regular practice of Yoga helps us to accept whatever physical or mental conditions we might be suffering from, by increasing our immediate sense of well-being, concentration and calmness.

Much healing can be done, but it takes practice and consistency. We all have the capacity to self-destruct, particularly if things go wrong. The Yogic mentality is that life is a tremendous gift and we have to take responsibility for it. Yoga gives you the capacity to face up to life's challenges. Similarly, when you respect your body, you tend to do things that will enhance its vitality. Part of Yoga practice is deep breathing, which helps to make the body more alkaline. The acid-alkaline ratio is crucial to good health. It should be 80 percent alkaline 20 percent acids. Over acidity can be harmful for bones and tissues, leading to fatigue, dulled mentality, headaches, depression and arthritis. Refined carbohydrates, animal proteins, coffee and alcohol, as well as stress and pollution are all acid forming.

Yoga works on a Psychological level too. In a Yoga position, one should concentrate on a total awareness of our energy and how it flows. One should learn how body and mind works together. Almost all exercises can be beneficial depending on the intent and body condition. Practicing Yoga ultimately leads towards long-term health and well being.

1.5 ROLE OF YOGA IN HEALTHY LIVING

During the pronged process of evolution of universe the human body is a creation of nature. A healthy human being in a span of 24 hours produces 450 cubic tone of energy. He can speak 4800 words; he can utilize 750 muscles, relaxes 7 million nerve cells, respire 23040 times and heart beats 103689 times. Blood circulates through blood vessels to a distance of 1.68 billion kilometers. These vital processes are possible to continue in normal pattern only when there is a proper co-ordination and balance between the process of respiration, digestion, nutrition and excretion.

The major biological systems function in a typical manner only on the basis of the functioning of the above process. With this one achieves an elevated status both physically and mentally. He achieves the status of healthy living. A healthy daily routine lays the foundation of a healthy life style. A person with healthy life style, compared to others develops much better physically, mentally, socially and spiritually.

Yoga, a practice of controlling the mind and body, is an ancient art that began in India over thousands of years ago. Yoga is a systematic process of spiritual unfolding. The path of yoga teaches individuals how to integrate and heal their personal existence (**Das, 2008**). Since yoga involves breath control, meditation, and physical postures, it is supposed to increase the vitality of the human body, help with concentration, calm the mind, and improve common physical ailments (**Vaidyanathan, 2004**).

When one practices yoga, the brain remains peaceful and the senses are stilled. This generates a calm feeling of well-being. The focus is on improving strength and power. Unlike other forms of exercise, yoga can rejuvenate the body without leaving it too fatigued at the end of the session (**Lad, 2007**). Yoga teaches one to distribute the energy to the other parts of the body. Yoga is the only form of exercise that completely involves the mind and soul, which in turn results in the complete well being of the person (**Lad, 2007**).

1.6 YOGA PATHS

While yoga is a diverse system of practice comprised of many approaches to self-realization, many authorities on yoga concur that there are four major branches of yoga that over time have served as a point of origin for developing a practice of yoga. As most commonly presented, the four major

branches of yoga are *bhakti yoga*, *jnana yoga*, *karma yoga*, and *raja yoga*. Understanding the nature of each can help to incorporate yoga into the life in the most meaningful way **(Thomas Claire, 2004)**.

1. *Bhakti* literally means “devotion” in Sanskrit. Bhakti yoga is known as the yoga of devotion. Following the path of bhakti yoga requires one to surrender oneself completely to a force or power greater than oneself. That power might be a deity, saint, revered teacher, or a quality, such as love. Through the force of opening one’s heart with undivided love and devotion to this higher force, one enters the grace of self-realization. Faith, grace, and love are the hallmarks of bhakti yoga.
2. *Jnana* literally means “wisdom” or “knowledge” in Sanskrit. Jnana yoga is known as the yoga of wisdom. Of all the branches of yoga, this path requires the greatest concentration of mental activity.
3. *Karma* literally means “action” or “cause” in Sanskrit. Karma yoga is known as the yoga of action. Following the path of karma yoga involves seeking liberation through one’s actions in the world.
4. *Raja* means “royal” in Sanskrit. Raja yoga is known as the royal road to yoga, or the yoga of enlightenment. The practitioner of raja yoga follows a carefully prescribed path composed of eight practices, or limbs, known as *ashtanga* (“eight limbs”), to achieve self-realization. These limbs include many of the best-known and most frequently engaged yoga practices, including physical postures, breath control, and concentration.

Raja yoga is frequently described as the scientific path to yoga. This is because it lays out in a very clear, simple, and systematic way a series of steps that a practitioner of yoga can follow to achieve enlightenment. These steps,

which are detailed in Patanjali's *Yoga Sutras*, form a sort of ladder, each practice building sequentially on the practice that precedes it. Yoga is a way of life known to mankind from the days of ancient civilization.

The eight stages or limbs of Raja yoga called Astanga Yoga .They are

1. Yamas - Truth, non violence, control of sexual energy, non Stealing, non covetousness.
2. Niyamas - Austerities, purity, contentment, study, surrender of the ego.
3. Asanas - Steady poses.
4. Pranayama - Control of Vital energy.
5. Pratyahara - Withdrawal of senses.
6. Dharana - Concentration of the mind.
7. Dhyana - Meditation.
8. Samadhi -The Super conscious state.

Hatha Yoga is a form of Raja yoga which emphasizes only Asanas and Pranayama (**Sivananda Yoga Vendanta Centre, 1996**).

1.7 ASANAS

The third limb of yoga is asana or posture. Asanas brings steadiness, health and lightness of limbs. A steady and pleasant posture produces mental equilibrium and prevents fickleness of mind. Asanas are not merely gymnastic exercises they are postures. Asanas have been evolved over the centuries so as to exercise every muscle nerve and gland in the body which includes fine Physique and keep body free from disease.

Asanas having achieved the perfection over the guideline of Yama and Niyam, only then one must commit for the practice of Yoga Asanas. Without

this the Yoga practice is ineffective. For various Asanas body is flexed for a specific posture regularly at a given time for a given purpose. This exerts special effect on different body joints, muscles, heart, digestive system, endocrine glands, lungs & nervous system. This revives the normal functioning of respective organs and body systems. At present time Asanas in special significance has direct relation to healthy living.

1.7.1 GENERAL TYPES OF ASANAS

Asanas can be divided into meditative, relaxing, and cultural Asanas. These three types of postures are quite different in their purpose and technique.

1.7.2 MEDITATIVE ASANAS

These are cross-legged sitting postures which allow you to sit upright and relaxed for a longer time. They provide a stable seat for meditation. The aim is to train your body so you can sit a long time without moving any part of your body. This is important if you are practicing meditation or pranayama and want to come to a deep concentration.

You should choose the posture that is most comfortable for you and start practicing it for 15 minutes. You can increase the length gradually. In the raja yoga sutras the asana is defined as a steady, firm, and comfortable posture.

There are five main meditative postures:

- Padmasana or lotus
- Siddhasana or adept's pose
- Swastikasana or locked-ankles pose
- Sukhasana or easy pose
- Vajrasana for people who cannot sit cross-legged

1.7.3 ASANAS FOR RELAXATION

The Asanas for relaxation are designed in a way that there is no need to contract any muscle. It is important to practice them exactly so your body can come to a deep relaxation and is not just lying on the floor.

There are three main relaxation postures:

- Savasana or corpse pose
- Abdominal relaxation pose
- Garbhasana or child's pose

The first asana of this type, savasana, is also used for yoga nidra, the powerful system of deep relaxation, visualization and self transformation.

1.7.4 CULTURAL ASANAS

There are three important phases in the practice of cultural Asanas — each of them equally important and should be paid equal attention:

- Coming into the position
- Holding the position
- Getting out of the position

This group contains by far the largest amount of Asanas. It is said that there are 84 lakhs (8.4 million) yoga postures. Of these, 84 are more important and 12 of them constitute the structure of the Rishikesh sequence sometimes called Sivananda series or Yoga Vidya series.

The cultural Asanas can be divided in seven groups:

- Dynamic sequences - such as the sun salutation
- Inverted postures - such as the headstand or the shoulder stand
- Forward bending postures - such as the sitting forward bend Paschimottanasana.

- Backward bending postures - such as the cobra , locust , or bow poses
- Twisting postures - such as the half spinal twist
- Side ward bending postures - such as the triangle pose
- Standing postures including balancing poses - such as the tree pose.

Based on positions, the Asanas can be classified as:

- **Supine posture** –Halasana (plough pose), Chkrasana (wheel pose) and Sarvangasana (shoulder stand pose).
- **Prone posture** – Bhujangasana (Cobra pose), Dhanurasana (bow pose), Shalabhasana (locust pose) and Noukasana (boat pose).
- **Sitting posture** - Paschimottasana (forward bend pose), Matsyendrasana (spinal twist pose), vajrasana (thunderbolt pose) and Padmasana (lotus pose).
- **Standing posture** – Vrikshasana (tree pose), Veerasana (warrior pose) etc. There are various other ways to classify the Asanas; these are only a few of such Asanas (**Gore, 1991**).

1.8 PRANAYAMA

Pranayama literally means control of prana. *Prana*, in Indian philosophy, refers to all forms of energy in the universe. Life force is one part of this energy. Life force in an individual is symbolized by breathing. That is why pranayama is generally considered to mean regulated breathing. A yogi, through pranayama, can, at some stages, control other functions of his body and finally control manifestations of prana even outside his body (**Bijlani, 2004**).

Pranayama is a highly sophisticated procedure of Yoga, where by one achieves a total control over the vital force which governs the proper functioning of body's life process. Pranayama helps to tone-up the most vital

activities of the body, such as respiratory system and cardio-vascular system. In addition it strengthens the body immunity which is extremely important for maintaining the quality of life and healthy living.

1.8.1 TYPES OF PRANAYAMA

Bhagavan Patanjali has distinguished four types of Pranayama, depending upon the nature of taking pauses. In the first type, the pause is made after a thorough exhalation. When the pause is made after a deep inhaling, it would comprise of second type. In both first and second types, the students need to take special efforts to hold his breath out or in. No special efforts are needed to undertake in the third and fourth types. In the third type, the student has the liberty to stop respiring at his will and also continues it for quite some time very easily without much physical exertion. Like the third type, in the fourth type too, a student can take pauses. However one needs to exhale air for sometimes before inhalation and then takes pauses. In the literary works of the later period various names have been given to these types of Pranayama. The first type of Pranayama is known as Bahia Kumbhaka while the second type is called Abhyantara ` Kumbhaka, `Kevala Kumbhaka` refer to both third and fourth types is Pranayama.

1.9 PHYSIOLOGICAL EFFECT OF YOGA AND PRANAYAMA

The human body is a complex creation of nature. It is made up of many complex systems working together in harmony. If any of the systems faults, the entire machinery starts to suffer in order to maintain proper functioning of all systems. It is important to do proper maintenance of the body so that it remains healthy throughout life.

The best way to maintain good health and longevity of the body is to practice Asanas. Yoga is a holistic therapy which aims at achieving overall physical, mental and spiritual well being. Asanas have an equal balancing effect on all organs simultaneously without making an effort to think about different part and internal organs of the body. Yogasanas have a combined effect on all the systems simultaneously.

1.9.1 YOGA AND PRANAYAMA ON RESPIRATORY SYSTEM

A regular practice of deep Pranayama and Shavasana help to regulate inspiration and expiration, which, in turn provides adequate amount of oxygen in the body. Oxygen gets attached to blood and circulates in the entire body. A regular practice of Pranayama helps to prevent the infestation of bacterial infection in the lungs, more specifically in the apical region of lungs, specially the saprolytic bacteria prevented which subsequently cause T.B. Apart from this, the practice of finer techniques of Pranayama, helps to relieve pulmonary disorders, such as Pulmonary T.B., Bronchitis, Pneumonia etc.

During various positions of Asanas breathing is sometimes increased, lowered, controlled etc, allowing one to breathe in different capacities. Due to stretching, the capacity of lungs is enhanced. The elasticity of lungs, intercostals muscles are increased which help in improvement of the performance of the system. The breathing exercises allow more intake of oxygen which enables burning of excess calories easily. The diaphragm, muscles, cartilage are toned.

The concept of pranayama is often mistaken for deep breathing. In the later situation, movement of breath is fast and forceful. There is no time for the cells to soak in the inhaled oxygen. In pranayama, the movements are so slow that there is adequate time for every alveolus to soak in oxygen.

1. The respiratory system is geared to aerate the internal atmosphere.
2. The venous return is much better due to phases of changes in breathing. The pulmonary vascular bed relaxes to accommodate more inflow of oxygen and blood. Better diffusion of gases occurs.
3. Elasticity of the lungs and the entire respiratory track is maintained to a ripe old age.
4. The hemoglobin/oxygen saturation is enhanced during kumbhaka, as there is enough time for saturation.
5. The vital capacity, inspiratory volumes are increased. The dead space is reduced. The residual volume is decreased as more complete exhalation is performed.
6. The alveoli are exercised, which promote excellent excretion of toxins and gases.
7. The healthy movement of diaphragm massages the abdominal organs improving their blood supply and aiding the venous drainage to the thoracic cavity.

1.9.2 YOGA AND PRANAYAMA ON CARDIOVASCULAR SYSTEM

Regular practice of Yogasanas promotes purification and circulation of blood in different systems of the body. An accelerated blood flow during Yoga practice help to deplete various harmful deposits such as cholesterol in the blood vessels. Thus Yogasanas help to prevent various disorders related to

circulatory system. During Asanas, the blood vessels are stretched and the flow of blood is increased through them. The increased blood flow to various organs facilitates proper functioning.

1. Due to constant change in the chamber size, the cardiac muscle wall is properly exercised. This is without strain complete filling and emptying of the chambers is ensured.
2. The autonomic control of the heart is rested and heart rate is reduced. This helps in more efficient cardiac functioning as the metabolic demands of the entire body are also reduced.
3. Elasticity of the arch of aorta is maintained, thus preserving and improving coronary blood flow.
4. As more and more of the capillaries are opened up, microcirculation is enhanced. Hence, an enhanced supply of nutrients to cells occurs, increasing their longevity. All this happens without increase in pulse rate or blood pressure.
5. The most important effect is washing away free radicals, which can damage the heart.

1.9.3 YOGA AND PRANAYAMA ON MUSCULAR SYSTEM

A regular practice of Yogic Asanas and Yogic processes tones up muscles and offers flexibility. It normalizes the physiological activities of muscles. Moreover, at minute levels it reconstitutes any damage to muscles. Asanas accelerate the oxygen supply to blood and thus promote the normal catabolism of glycogen to release desired level of energy. This helps to regulate the lactic acid level in blood and energy based different metabolic processes continue in a normal manner.

1.9.4 YOGA AND PRANAYAMA ON ENDOCRINE SYSTEM

It has been revealed through extensive researches that various meditative Asanas, specially, padmasana, helps to regulate endocrine secretion of serotonin and dopamine. In such persons in whom there is more secretion of adrenaline and cortisone, meditative Asanas such as padmasana helps to control such secretions. This helps to control serious disorders, such as high Blood Pressure, stress and anxiety. Thus every asana regulate one or the other endocrine gland and thus offers physical and mental health and alleviate disorders.

Hyperactivity of parasympathetic nervous system results in to aggressiveness and criminal behaviors in a person. On the other side hyperactivity of sympathetic nervous system leads to inferiority complex and down with undue terror. With the result of Yogasanas the activity of both these nervous systems are well regulated and balanced which leads to progressive growth and development of the person.

1.10 POSITIVE HEALTH

It is clear that health cannot be conceptualized in terms of the physical body alone, but must also include the mental and social spheres of functioning. In accordance with this view, the World Health Organization (WHO) has defined health as “a state of complete physical, mental and social wellbeing and not merely the absence of disease” (**World Health Organization, 1946**). It is important to note that this definition structures health as a continuum. In other words, one is not simply healthy or sick. There are many degrees of health between morbidity and optimal functioning in life. This is also reflected in

the definition of health determined by recent international proceedings on physical activity, fitness and health: positive health is “associated with a capacity to enjoy life and withstand its challenges”, whereas negative health can be defined as “any departure, subjective or objective, from a state of physical or psychological wellbeing short of death” (**Bouchard et al., 1994**).

Beyond the fact that positive health is more than the mere absence of disease, the concept of “wellness” has not been precisely defined (**Bowling, 1997**). Nonetheless, **Cowen (1994)** has noted that, beyond the absence of disease, wellbeing implies the presence of positive markers of physical, social and psychological functioning. These include but are not limited to: the maintenance of social support networks, nutrition, hormone and immune function, life satisfaction, resilience to stress, psychological wellbeing and levels of physical fitness (**Bowling, 1997; Cowen, 1994; Setterlind, 1983**).

1.11 PHYSICAL WELLBEING

The assessment of physical health has been dominated by a focus on the presence or absence of disease (**Bernard & Krupat, 1994**); however, it is clear that when it comes to the measurement of positive health, that is, moving beyond a neutral state to an optimum state of functioning, the notion of disease is no longer relevant. Indicators of positive physical health therefore tend to centre on physiological and biochemical processes such as physical fitness or fluctuating levels of immunity and stress hormone levels (**Seeman, 1989**). Physical fitness for example has been used as an indicator of positive health because of its association with reduced heart disease risk, hypertension and diabetes, and because it enables individuals to comfortably carries out physical tasks and recreation activities (**Bouchard et al., 1994**).

1.11.1 AGILITY

Agility is the ability to change directions quickly and control body weight movement **(Brandon, Leigh 2009)**.

The speed with which an individual may change his body positions or fastness in changing directions while moving is known as agility **(Brandon, Leigh 2009)**.

1.11.2 FLEXIBILITY

Yoga is more than a means of developing one's flexibility, it is a powerful tool which teaches us to confront our physical limitations and gain a renewed sense of confidence in our inner strength. It is one of the wonderful gifts that come from strengthening and increasing flexibility in the body.

Flexibility refers to the absolute range of movement in a joint or series of joints, and length in muscles that cross the joints. Flexibility is variable between individuals, particularly in terms of differences in muscle length of multi-joint muscles. Flexibility in some joints can be increased to a certain degree by exercise, with stretching a common exercise component to maintain or improve flexibility.

Quality of life is enhanced by improving and maintaining a good range of motion in the joints. Overall flexibility should be developed with specific joint range of motion needs in mind as the individual joints vary from one to another. Loss of flexibility can be a predisposing factor for physical issues such as pain syndromes or balance disorders

Gender, age, and genetics are important for range of motion. Exercise including stretching often helps improve flexibility. Many factors are taken into account when establishing personal flexibility: joint structure, ligaments, tendons, muscles, skin, tissue injury, fat (or adipose) tissue, body temperature, age and gender all influence an individual's range of motion about a joint.

1.11.3 CARDIOVASCULAR ENDURANCE

Cardiorespiratory endurance is a central component of health-related fitness because the functioning of the heart and lungs is so essential to overall good health. A person can't live very long or very well without a healthy heart. Poor cardiorespiratory fitness is linked with heart disease, type 2 diabetes, colon cancer, stroke, depression, and anxiety. A moderate level of cardiorespiratory fitness can help compensate for certain health risks, including excess body fat: People who are lean but who have low cardiorespiratory fitness have been found to have higher death rates than people with higher levels of body fat who are otherwise fit. One can develop cardiorespiratory endurance through activities that involve continuous, rhythmic movements of large-muscle groups, such as the legs. Such activities include walking, jogging, cycling, and aerobic dancing (**Bbmohalik, 2012**).

Cardiovascular endurance is the ability to sustain vigorous activity that requires increased oxygen intake for extended periods of time. Cardiovascular endurance keeps the heart muscle, blood vessels, blood, and lungs in excellent condition. When take part in exercises that promote cardiovascular endurance, you heart muscle and other body muscles need more oxygen.

1.12 PSYCHOLOGICAL WELLBEING

Yoga induces a "relaxation response" associated with reduced nervous system activity and a feeling of well-being probably due to an increase in antioxidants and lower levels of the stress hormone cortisol; Yoga not only helps in prevention of lifestyle diseases, but can also be "a powerful adjunct therapy when these diseases arise,"

Yoga is a form of exercise and it's this form of activity provides great benefits psychologically. In studies done in Finland in 2000, participants were asked to partake in exercises. Based on this study, scientists discovered a connection between mood and recreational exercise. Those who participated in exercise at least two times a week had some positive effects on mood. There were fewer signs of depression and anger found among these individuals. Moreover, the ones who participated in these exercises more than twice a week were prone to be sociable, allowing one to be less stressful.

Psychological wellbeing is a broad term which encompasses but is not limited to the notions of happiness, morale, life satisfaction, social support, depression and elation (**Bowling, 1997**). Another important factor which has recently been identified as contributing to optimum functioning is the ability to relax when needed (**Gilbert & Orlick, 1996; Hassed, 2000**). This has been found to be particularly significant in situations which require high-level performance and have the potential to induce stress (**Gilbert & Orlick, 1996**). Researchers in the relaxation and stress reduction fields have found that physical relaxation can contribute to the reduction of blood pressure, heart rate and levels of stress hormones such as cortisol and adrenalin, in lowered levels of cholesterol, and in increased immune function (**Hassed, 2000**). Relaxation of

the skeletal musculature reduces activity in neuromuscular circuits including the brain itself (McGuigan, 1993). Therefore, the ability to relax voluntarily suggests that a person is able to develop some level of control over his or her own levels of autonomic arousal.

1.12.1 ANXIETY

Anxiety is a generalized mood condition that can often occur without an identifiable triggering stimulus. As such, it is distinguished from fear, which is an emotional response to a perceived threat. Additionally, fear is related to the specific behaviors of escape and avoidance, whereas anxiety is related to situations perceived as uncontrollable or unavoidable.

Physical effects of anxiety may include heart palpitations, muscle weakness and tension, fatigue, nausea, chest pain, shortness of breath, stomach aches, or headaches. The body prepares to deal with a threat: blood pressure and heart rate are increased, sweating is increased, blood flow to the major muscle groups is increased, and immune and digestive system functions are inhibited (the fight or flight response). External signs of anxiety may include pale skin, sweating, trembling, and pupillary dilation. Someone who has anxiety might also experience it as a sense of dread or panic.

Cognitive effects of anxiety may include thoughts about suspected dangers, such as fear of dying. "One may...fear that the chest pains [a physical symptom of anxiety] are a deadly heart attack or that the shooting pains in the head [another physical symptom of anxiety] are the result of a tumor or aneurysm. One feels an intense fear when think of dying, or may think of it more often than normal, or can't get it out of the mind."

1.12.2 AGGRESSION

Aggression is defined as “a sequence of behaviour, the goal response of which is the injury to the person toward whom it is directed” (**Dollard et al., 1939**). Although the term aggression refers to a wide spectrum of behaviours, in the psychological literature, it is defined as any behavior intended to harm another individual who is motivated to avoid being harmed (e.g. **Baron & Richardson, 1994; Coie & Dodge, 2000**).

Aggressive behaviours can vary from problems with emotional regulation to severe and manipulative behaviours. There are various characteristics of aggression, which can include behaviours such as starting rumours; excluding others; arguing; bullying, both verbally (name-calling) and physically (pushing); threatening; striking back in anger; use of strong-arm tactics (to get something they want); and engaging in physical fights. Notably, aggressive behaviours do not always involve physical contact with another person. Verbal aggression in elementary school years, such as starting rumors, excluding others, and arguing, can be part of a developmental trajectory leading to adolescent delinquency and Conduct Disorder.

Techniques like yoga, relaxation and interpersonal counseling also seems to be highly influential in reducing aggression (**Rana, 2007**). Yogic techniques, relaxation technique and interpersonal counseling procedures are highly efficacious in managing aggression as the failure of one technique can be taken by the other. These techniques help in alleviating aggression and bring out better concentration level, academic achievement and the best in the individual.

1.12.3 STRESS

The modern man suffers more psychological stress than the physical stress. Human is trying to live a successful life as per the expectation and norms of the society and is continually challenged with rapidly accumulating stresses. In this fast moving social set up, with high standard of living and innumerable changes the individual have no time to look back and think about what is happening to his body and mind. This accumulated stress for prolonged period leads him to the so called stress induced disorders, like heart attacks, high blood pressure, Diabetes, Asthma, Back pain and other psychological problems.

A change in attitude and life style is necessary to help the individual to come out these health hazards and to cope with the future. Traditional yoga philosophy, regards human being an individual entity. The root cause of ailment of a stress, through the various therapeutical techniques of yoga one can pluck out this cause and can provide health and harmony **(Davidson and Neal 1990)**.

Most types of insomnia are stress-related, so a gentle yoga practice that calms the nervous system and reduces stress levels will naturally relieve insomnia as well. The calming effects of a yoga help people fall asleep sooner and gives a more restful sleep. Many yoga postures increase the blood circulation to the brain, including the sleep center of the brain, which helps normalize the sleep cycle and provides natural relief for insomnia.

The most common presenting symptoms of stress are insomnia. American Journal of Managed Care experienced through their research some form of insomnia, either difficulty going to sleep, trouble staying asleep, or insomnia so severe that it disrupts daytime activities. And insomnia is often

(though not always) stress-related. Because sleep is so important to overall health, insomnia can affect your life in many ways. A sleep deficit can make you feel mentally slower and more emotional, which can exacerbate your experience of stress. Dealing with lasting insomnia can cause stress, too, which can lead to more stress-related insomnia.

Stress is the most prominent causes of mental fatigue. It consumes energy, breeds negativity and depression. Yoga believes that a healthy mind is essential for a healthy life. Regular yoga helps to clear the mind of negativity and clutter. Through breathing techniques and meditation, yoga teaches your body to breathe fully. This increases the supply of oxygen to the body which in turn helps reduce stress, increase energy flow and ensure mental clarity (**Patricia 2008**).

1.13 PHYSIOLOGICAL INDICES

Yoga has become increasingly popular in Western cultures as a means of exercise and fitness training; however, it is still depicted as trendy as evidenced by an April 2001 Time magazine cover story on "The Power of Yoga." There is a need to have yoga better recognized by the health care community as a complement to conventional medical care. Over the last 10 years, a growing number of research studies have shown that the practice of Hatha Yoga can improve strength and flexibility, and may help control such physiological variables as blood pressure, respiration and heart rate, and metabolic rate to improve overall exercise capacity (**James Raub, 2004**).

1.13.1 HEART RATE

The state of relaxation can be identified via multiple physiological parameters. For instance, it is associated with a decrease in oxygen consumption, respiratory rate and heart rate (**Patel, 1993**). Other indicators include but are not limited to: increased electrical skin resistance, reduced sweat gland activity, reduced muscle tension, blood pressure, and changes in brain activity patterns (**Lehrer & Woolfolk, 1993a**).

The simplest way to measure heart rate is by manually feeling for pulse at the wrist or neck. More accurate methods include electrocardiography, which uses a set of electrodes at the body's surface to record cardiac electrical activity on a computer screen. Heart Rate (HR) is one of the simplest and most informative of the cardiovascular parameters. Measuring it involves simply taking the subject's pulse, usually at the radial or carotid site. Heart rate reflects the amount of work the heart must do to meet the increased demands of the body when engaged in activity. To understand this, we must compare the heart rate at rest and during exercise.

Resting heart rate averages from 60 to 80 beats/ min. In middle aged, unconditioned, sedentary individuals, the resting rate can exceed 100beats/min. In highly conditioned, endurance trained athletes, resting rates is in the range of 28 to 40 beats / min have been reported. Your resting heart rate typically decreases with age. It is important to understand that, alternatively slow heart rate, coupled with a relatively large stroke volume, signifies an efficient circulatory system. During exercise the heart rates of the athletes increased at a lesser rate to a lower level. Hence it is possible for the athlete to do more and achieve high oxygen consumption before reaching the maximal heart rate.

1.13.2 BLOOD PRESSURE

Hypertension happens when the pressure in your system gets high enough leading to risks in your system. It is also commonly known as high blood pressure, which refers to the amount of pressure in your arteries. In diagnosing hypertension, several readings must be taken. If the rate of blood pressure reaches to as high as 140/90, then hypertension is present. **(Chobanian, et al. 2003).**

Scientists of yoga discovered why people who practice yoga daily had significantly lower blood pressure than those who did not. High Blood pressure is the major cause for heart disease. Yoga keeps the blood vessels open & thus lowering the blood pressure. Indian Yoga Gurus also says that long term meditation practice generally lower the blood pressure & keeps the constant mood swings **(Arumughan Riaz, 2006).**

1.14 HEMATOLOGICAL VARIABLES

Blood is considered a tissue consisting of Red blood corpuscles (Erythrocytes), White blood corpuscles (Leukocytes), platelets and liquid plasma. It is a carrier for gas, oxygen, carbon dioxide, metabolites, and products of digestion, hormones, enzymes and clotting factor. A 70 kg individual has a blood volume about six liters (85ml/kg) about one twelfth of the body weight and about three liters of plasma (45ml/kg) **(Ramakrishnan, et.al, 1980).** Blood has many diverse functions.

1. Respiration- transport of oxygen from the lungs to the tissues and Carbon dioxide from the tissue to the lungs.
2. Nutrition- transport of digested and absorbed nutrition.

3. Excretion- transport of metabolic wastes to the excretory organs.
4. Maintenance of body temperature and osmotic pressure.
5. Defense against infection.
6. Transport of metabolites and hormones from the sites of production to target organs and enzymes, chiefly the plasma specific enzymes.

1.14.1 RED BLOOD CELL

Muscular exercises and certain emotional states cause a temporary increase in the number of red cells as a result of an outpouring of concentrated blood from spleen. This may be looked upon as an emergency measure and like that which occurs at high altitudes, is the response of the body to the tissues call for oxygen. The Major function of the red blood cells, also known as erythrocytes, is to transport hemoglobin which in turn carries oxygen from the lungs to the tissues. In a normal man, the average number of red blood cells per cubic millimeter is 5,200,000 (+3, 00,000) and in normal women 4,700,000 + 300, 0000).

The total mass of red blood cells in the circulatory system is regulated within narrow limits, so that an adequate number of red cells are always available to provide sufficient tissue oxygenation and yet so that the cells do not become so concentrated that they impede blood flow.

1.14.2 WHITE BLOOD CELL

White blood corpuscles are important variety of cells in the blood. They do not contain hemoglobin, but bigger than RBC, nucleated, active amoeboid, much less in number and their life span is shorter. White blood cells help fight infections. They are also called leukocytes. There are five major types of white

blood cells such as Basophils, Eosinophils, Lymphocytes, Monocytes and Neutrophils. Red blood cells consist of protein called hemoglobin.

1.14.3 HEMOGLOBIN

Hemoglobin (Hb or Hgb,) is the iron-containing oxygen-transport metallo protein in the red blood cells of all vertebrates (with the exception of the fish family Channichthyidae) as well as the tissues of some invertebrates. Hemoglobin in the blood carries oxygen from the respiratory organs (lungs or gills) to the rest of the body (i.e. the tissues) where it releases the oxygen to burn nutrients to provide energy to power the functions of the organism in the process called metabolism. In mammals, the protein makes up about 96% of the red blood cells' dry content (by weight), and around 35% of the total content (including water). Hemoglobin has an oxygen-binding capacity of 1.34 mL O₂ per gram of hemoglobin, which increases the total blood oxygen capacity seventy-fold compared to dissolved oxygen in blood. The mammalian hemoglobin molecule can bind (carry) up to four oxygen molecules.

Hemoglobin is involved in the transport of other gases: It carries some of the body's respiratory carbon dioxide (about 10% of the total) as carbamino hemoglobin, in which CO₂ is bound to the globin protein. The molecule also carries the important regulatory molecule nitric oxide bound to a globin protein thiol group, releasing it at the same time as oxygen.

Hemoglobin is also found outside red blood cells and their progenitor lines. Other cells that contain hemoglobin include the dopaminergic neurons in the substantia nigra, macrophages, alveolar cells, and mesangial cells in the kidney. In these tissues, hemoglobin has a non-oxygen-carrying function as an antioxidant and a regulator of iron metabolism.

Hemoglobin and hemoglobin-like molecules are also found in many invertebrates, fungi, and plants. In these organisms, hemoglobin may carry oxygen, or they may act to transport and regulate other things such as carbon dioxide, nitric oxide, hydrogen sulfide and sulfide. A variant of the molecule, called leg hemoglobin, is used to scavenge oxygen away from an aerobic systems, such as the nitrogen-fixing nodules of leguminous plants, before the oxygen can poison the system. Oxygen is transported to muscles primarily by haemoglobin **(Nielsen and Weber 2007)**.

1.15 REASONS FOR THE SELECTION OF THE TOPIC

The researcher has taken interest on Degree college students, because in this modern world the lifestyle and food habits are changing day by day. Hence most of the students are affected by stress and chronic disease. To create awareness to the college students the researcher has selected this topic. The researcher selected asanas and pranayama to identify the changes on physical psychological physiological and hematological parameters among Degree college students. Physical psychological physiological and hematological parameters are needed to analyze the various changes take place in their physical physiological and mental level before and after the training period.

The researcher took this topic because there are lacks of literature and limited studies in this field and especially for Degree college students. Hence the researcher wants to find out the influence of Asanas and pranayama separately and combined practices among Degree college students.

1.16 AIM AND OBJECTIVES OF THE STUDY

The main objective of this study is, to make awareness of Asanas and pranayama significantly improves health, physical fitness and work capacity. Enable people to use their leisure time more beneficially there by assist in adding life too years and also years to live.

Physical inactivity is more dangerous for Degree college students because of current life style and food habits and lack of exercises. Degree college students have buildup of more body fat and they are very prone to metabolic disorders because they are not involving any physical activity. They are living sedentary life. To give more awareness for healthy living, for that purpose the scholar selected this topic for his research work. Number of studies has been conducted in different fields of Physical Education. But there was lacking a complete treatise on the subjects especially on the influence of Asanas and pranayama on Selected Physical, psychological, physiological and hematological parameters related to the Degree college students.

1.17 STATEMENT OF THE PROBLEM

The purpose of the study was to find out the Influence of Asanas and pranayama on selected Physical Psychological Physiological and Hematological parameters among Degree College students.

1.18 HYPOTHESIS

On the basis of conclusion drawn through review related to the study the investigator has framed the following hypotheses

1. It was hypothesized that there would be significant changes as result of Asanas practices on selected physical psychological physiological and hematological parameters when compared to the control group.
2. It was hypothesized that there would be significant improvement as a result of pranayama practices on selected physical psychological physiological and hematological parameters when compared to the control group.
3. It was hypothesized that there would be significant changes as a result of combined (Asanas and pranayama) practice on selected physical psychological physiological and hematological parameters when compared to the control group.
4. It was hypothesized that combined (Asanas and pranayama) group significantly better than Asanas group and pranayama group on selected physical psychological physiological and hematological parameters among Degree college students.

1.19 SIGNIFICANCE OF THE STUDY

1. The findings of the study would help to explore the status of the Asanas practices among Degree college students.
2. This study would bring out the effect of isolated and combined Practice of Asanas and pranayama among Degree college students.
3. This study will describe the changes in physical psychological physiological and hematological parameters due to Asanas and pranayama among degree college students.
4. This study helps for the degree college students in maintaining their mental and emotional stability i.e. by reducing anxiety and aggression.

5. This study would give an idea in maintaining the normal level of pulse rate, mean arterial blood pressure and vital capacity.
6. This study would give an idea in maintaining the normal level of systolic blood pressure and diastolic blood pressure and respiratory rate.
7. This study would give an idea in maintaining the normal level of hemoglobin, White Blood Cell and Red Blood Cell count.
8. The findings of the study would help to adopt the suitable Asanas & pranayamas programme to maintain the good health for degree college students.
9. The findings of the study would be helpful for the further research studies, also helpful for the academy of degree college students.

1.20 DELIMITATIONS

The following delimitations were taken into consideration in the interpretation of results:

1. The study was confined to men Degree College students only.
2. The age of the subjects were ranging from 19 to 25 years.
3. The total numbers of subjects were 60 degree college students, in which 15 for experimental group I (Asanas), and 15 for experimental group II (pranayama) and 15 for experimental group III (combined) and 15 for control group, were taken for the study.
4. The subjects were selected from various colleges, Andhra Pradesh.
5. The subjects were experimentally treated with Asanas, pranayama as well as combined training.
6. The study was conducted on dependent variables such as Agility, Flexibility, and Cardiovascular Endurance, Stress, Anxiety and

Aggression, Pulse Rate, Mean Arterial Blood Pressure and Vital Capacity, Hemoglobin, White Blood Cell and Red Blood Cell count.

7. The experimental period was fixed as 12 weeks and six days in a week between 6 .00 am to 7.30 am.

1.21 LIMITATIONS

The study was limited in the following aspects.

1. Subjects included in the study could not be controlled with regard to their life style, diet and habits which might influence their performance.
2. Subject's body type and the socio economic status were not considered.
3. The heredity and previous fitness experience of the subjects were not considered in this study.
4. The other extraneous factors which might influence the results of the study were not controlled.
5. The climatic conditions and temperature level could not be controlled, but the pre-test and post tests were conducted on similar weather conditions

1.22 MEANING AND DEFINITION OF THE TERMS

1.22.1 YOGA

The term yoga comes from a Sanskrit word which means yoke or union. Traditionally, yoga is a method joining the individual self with the Divine, Universal Spirit, or Cosmic Consciousness. Physical and mental exercises are designed to help achieve this goal, also called self-transcendence or enlightenment (**Stuart Ray Sarbacker, 2005**).

Yoga is a method by which one can obtain control of one's latent powers. It offers the complete means to self realization (**Sreekumar, 1968**). Yoga is a timeless pragmatic science evolved over thousands of years dealing with the physical, moral and spiritual well being of a man as a whole (**Iyenger, 1968**).

1.22.2 ASANAS

Asanas is a state of being, and by definition there could be thousands of probable states, which one can achieve. Pathanjali has defined asana 'Sthir Sukha Asanam' that is 'Asana means steady and comfortable posture' (**Jack Peter, 2006**).

1.22.3 PRANAYAMA

Pranayama means control of life force through the art of breathing (**Jayadeva yogendra, 1965**). Pranayama means breath control. In Sanskrit, prana means breath and ayama means a control. In modern literature on yoga, prana, even in the compound pranayama, has been often interpreted to mean a subtle psychi force or a subtle cosmic element (**Kuvalayananda, 1966**).

Prana means a subtle life force which provides energy to different organs (including mind) and also controls many vital life processes (e.g. circulation, respiration etcetra). Ayama signifies the voluntary effort to control and direct this prana (**Geore, 1985**).

1.22.4. AGILITY

Agility is defined as "a rapid whole-body movement with change of velocity or direction in response to a stimulus" (**Sheppard and Young, 2006A**).

1.22.5 FLEXIBILITY

Flexibility is the ability of a muscle to perform moments with large amplitude (range of motion). It is the ability of joints to move through their full range of motion along with cardiovascular endurance and muscular strength. Flexibility is the key components to maintain balanced fitness. To improve or maintain flexibility, the way is to stretch (**Uppal, 2004**).

1.22.6 CARDIO VASCULAR ENDURANCE

Cardiovascular endurance is the ability of the heart, lungs and blood vessels to deliver oxygen to working muscles and tissues, as well as the ability of those muscles and tissues to utilize that oxygen (**Uppal, 2001**). Endurance is the ability to do sports movements, with the desired quality and speed under conditions of fatigue (**Hardayal Singh, 1991**).

1.22.7 PSYCHOLOGY

The word psychology come from the Greek work psycho, means mind or soul and logs mean science. So the world psychology is the science of the mind and soul. Psychology study human nature science of the mind and soul. Psychology is the study of human nature scientifically and rather than formulate condition. Psychology plays a major role in sports and in closely associated with psychological components.

Sports psychology is defined as the scientific study of human behavior in sport. Like the other discipline with in sports and exercise science, sports psychology can be applied to varied skilled movement physical activities and exercise programmes, such as corporate fitness, exercise rehabilitation and

health oriented exercise programmes as well as traditional physical education and competitive athletics (**Diane L. Cell, 1972**).

1.22.8 ANXIETY

Weinberg and Gould (1995) definition of anxiety: 'a negative emotional state with feelings of nervousness, worry and apprehension associated with activation or arousal of the body.'

1.22.9 AGGRESSION

Aggression is defined as "a sequence of behavior, the goal response of which is the injury to the person toward whom it is directed (**Dollard et al., 1939**).

1.22.10 STRESS

Lazarus and Folkman (1984) defined stress as: 'a pattern of negative physiological states and psychological responses occurring in situations where people perceive threats to their well-being, which they may be unable to meet'.

1.22.11 PHYSIOLOGY

Physiology is the study of body functions, including physical and chemical processes of cells, tissues, organs, and systems, and their various interactions.

1.22.12 RESTING PULSE RATE

Heart rate is the number of beats felt in exactly one minute and resting heart rate is defined as the numbers of beats per minute measured while the individual is at rest (**Moses, 1995**).

The resting heart rate was measured as number of pulse beats per minute determined at radial artery in the wrist and above the radius bone.

Heart rate is defined as “the amount of work that the heart must do to meet the demands of the body” **Wilmore and Costill (1999)**.

1.22.13 BLOOD PRESSURE

Blood pressure (BP) is the force of blood against the walls of the arteries and veins created by the heart as it pumps blood to every part of the body. BP is typically expressed in millimeters of Mercury, mmHg. The blood pressure namely expressed is arterial blood pressure. It has two phases (**ACSM, 2008**).

1.22.14 SYSTOLIC BLOOD PRESSURE

Systolic blood pressure (SBP) is the maximum pressure in the arteries when the ventricles contract during a heartbeat. The term derives from systole or contraction of the heart (**ACSM, 2008**).

1.22.15 DIASTOLIC BLOOD PRESSURE

Diastolic Blood Pressure (DBP) is the minimum pressure in the arteries when the ventricles relax. The term is derived from diastole, or relaxation of the heart (**ACSM, 2008**).

1.22.16 MEANS ARTERIAL BLOOD PRESSURE

Mean arterial pressure (MAP) is the mean, or average, BP in the arterial system. Mean arterial pressure (MAP) represents the integration, or combination, of both the Systolic blood pressure (SBP) and the Diastolic blood pressure (DBP) (5th phase).

The formula for Mean arterial pressure (MAP) = Diastolic blood pressure (DBP) + $\frac{1}{3}$ (Systolic blood pressure - Diastolic blood pressure) (**ACSM's, 2008**).

1.22.17 VITAL CAPACITY

Vital capacity is the maximum amount of air that can be expired after a maximum inspiratory effort. It is the sum of Tidal volume, Inspiratory reserve volume, and expiratory reserve volume **(White, 2012)**.

Vital capacity is the maximum volume of air which can be forcefully expelled after maximum inspiration **(Sanghani, 2012)**.

1.22.18 HEMOGLOBIN

Hemoglobin (Hb) is iron-containing pigment in red blood cells that combines with and transports oxygen. Hemoglobin is a large complex protein made up of globin chains and heme found inside the red cells. Heme contains iron which is the portion of the protein that actually binds to oxygen in the lungs and releases it into the tissues **(Oxford University Press, 2008)**.

1.22.19 RED BLOOD CELL

The red blood cell, also known as erythrocytes, is to transport *hemoglobin*, which in turn carries oxygen from the lungs to the tissues. In some lower animals, hemoglobin circulates as free protein in the plasma, not enclosed in red blood cells. When it is free in the plasma of the human being, about 3 per cent of it leaks through the capillary membrane into the tissue spaces or through the glomerular membrane of the kidney into the glomerular filtrate each time the blood passes through the capillaries. Therefore, for hemoglobin to remain in the human blood stream, it must exist inside red blood cells **(Guyton, 2006)**.

1.22.20 WHITE BLOOD CELL

The leukocytes, also called *white blood cells*, are the *mobile units* of the body's protective system. They are formed partially in the bone marrow (*granulocytes* and *monocytes* and a few *lymphocytes*) and partially in the lymph tissue (*lymphocytes* and *plasma cells*). After formation, they are transported in the blood to different parts of the body where they are needed.

The real value of the white blood cells is that most of them are specifically transported to areas of serious infection and inflammation, thereby providing a rapid and potent defense against infectious agents (**Guyton, 2006**).