CHAPTER – I
INTRODUCTION

These days, many teenage girls express dissatisfaction with their bodies. According to Anorexia Nervosa and Related Eating Disorders, Inc., one in 100 teenage girls between the ages of 10 and 20 have anorexia. And according to the CDC’s 2007 Youth Risk Behavior survey, more than 53 percent of female students surveyed had eaten less food to lose weight in the past 30 days, 7.5 percent of girls reported taking diet pills and 6.4 percent reported vomiting or taking laxatives to lose weight. And the obsession with weight starts early the National Eating Disorders Association (NEDA) reports that 42 percent of first- to third-grade girls want to be thinner, and 82 percent of 10-year-olds are afraid of getting fat. Many teenage girls strive to look like fashion models, but the NEDA reports that most fashion models are thinner than 98 percent of the population. This preoccupation with appearance and weight can become extreme and develop into an eating disorder. An eating disorder is a serious mental illness during which a person takes drastic measures to control his or her weight. Although the popular press paints eating disorders as affecting only girls, they can also affect boys, with the same devastating consequences.

1.1 HEALTH

In 1986, the WHO, in the Ottawa Charter for Health Promotion, said that health is "a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities". Overall health is achieved through a combination of physical, mental, emotional and social well-being which together is commonly referred to as the health triangle (WHO, 1986).
The health status 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 capita 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).

It is a well-known fact that India is only 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).

However, India is one of the major countries where communicable diseases are still not under control. The incidence of new fatal diseases such as AIDS / HIV, hepatitis-A is on the increase tuberculosis and malaria still takes a high toll. Chronic non-communicable diseases such as heart diseases, diabetes and cancer are also in the rise (Bhat and Babu 2004).

1.2 ANOREXIA NERVOSA

Anorexia nervosa is an eating disorder characterized by food restriction, odd eating habits or rituals, obsession with having a thin figure, and an irrational fear of weight gain. It is accompanied by a distorted body self-perception, and typically
involves excessive weight loss. Due to their fear of gaining weight, individuals with this disorder restrict the amount of food they consume. Outside of medical literature, the terms anorexia nervosa and anorexia are often used interchangeably; however, anorexia is simply a medical term for lack of appetite and the majority of individuals afflicted with anorexia nervosa do not lose their appetites. Anorexia nervosa is often coupled with a distorted self image which may be maintained by various cognitive biases that alter how individuals evaluate and think about their body, food, and eating. People with anorexia nervosa often view themselves as overweight or not thin enough even when they are underweight. While the majority of people with anorexia nervosa continue to feel hunger, they deny themselves all but very small quantities of food. Anorexia nervosa is diagnosed approximately nine times more often in females than in males. In 2013 it resulted in about 600 deaths globally up from 400 deaths in 1990. It is a serious health condition with a high incidence of comorbidity and similarly high mortality rate to serious psychiatric disorders. (www.encyclopedia.com)

Anorexia nervosa is an eating disorder that is characterized by attempts to lose weight, to the point of self-starvation. A person with anorexia nervosa may exhibit a number of signs and symptoms, the type and severity of which may vary in each case and may be present but not readily apparent.

Anorexia nervosa, and the associated malnutrition that results from self-imposed starvation, can cause severe complications in every major organ system in the body. Hypokalaemia, a drop in the level of potassium in the blood, is a sign of anorexia nervosa. A significant drop in potassium can cause abnormal heart rhythms, constipation, fatigue, muscle damage and paralysis.
A young person with anorexia nervosa has a distorted body image and sees him or herself differently than the rest of the world does (often at a much larger size than he or she really is) and has an intense fear of gaining weight. This person usually diets severely and loses a large amount of weight. The person often denies that there is a problem or that she or he is too thin. Females with anorexia who lose a significant amount of weight often stop menstruating. Other eating disorders include binge eating disorder (bingeing without purging), which is strongly linked to obesity. Additionally, obesity is affecting young people at alarmingly increasing rates and, along with smoking, is a leading contributor to serious health problems such as heart disease and diabetes among adults. Teens with anorexia nervosa starve themselves because they have a distorted body image and believe that they are overweight even when they aren't. They have an irrational fear of becoming fat and are obsessed with food and weight control.

1.3 ANOREXIA SYMPTOMS

1. Refusal to maintain a normal body mass index for one's age

2. Amenorrhea, a symptom that occurs after prolonged weight loss; causes menses to stop, hair becomes brittle, and skin becomes yellow and unhealthy

3. Fearful of even the slightest weight gain and takes all precautionary measures to avoid weight gain and becoming overweight

4. Obvious, rapid, dramatic weight loss to at least 15% under normal body weight
5. Lanugo: soft, fine hair growing on the face and body Obsession with calories and fat content of food

6. Preoccupation with food, recipes, or cooking; may cook elaborate dinners for others, but not eat the food themselves

7. Food restriction despite being under weight

8. Food rituals, such as cutting food into tiny pieces, refusing to eat around others, hiding or discarding food

9. Purging: May use laxatives, diet pills, ipecac syrup, or water pills; may engage in self-induced vomiting; may run to the bathroom after eating in order to vomit and quickly get rid of ingested calories

10. Excessive exercise

11. Perception of self as overweight despite being told by others they are too thin

12. Intolerance to cold and frequent complaints of being cold; body temperature may lower (hypothermia) in an effort to conserve energy.

13. Hypotension and or orthostatic hypotension

14. Bradycardia or tachycardia

15. Depression

16. Solitude: may avoid friends and family; becomes withdrawn and secretive

17. Abdominal distension

18. Halitosis (from vomiting or starvation-induced ketosis)
19. Dry hair and skin, as well as hair thinning

20. Fatigue

21. Rapid mood swings

22. Loss of a significant amount of weight

23. Continuing to diet and "feeling fat" even after reaching a goal weight, or becoming visibly thin

24. Irrational fear of gaining weight

25. Obsession with food, calories, fat content and nutrition

26. Weighing oneself once a day or more

27. Refusal to discuss a diet with others

28. Cooking for others but not eating

29. Compulsive exercising

30. Lying about eating

31. Hyperactivity

32. Depression and anxiety

1.4 CAUSES OF ANOREXIA SYNDROME

The factors that contribute to the onset of an eating disorder are complex. No single cause of eating disorders has been identified; however, known contributing risk factors include:

- Genetic vulnerability
• Psychological factors

• Socio-cultural influences

• There is some evidence that eating disorders have a genetic basis.

• The genes that are most implicated in passing on eating disorders are within biological systems that relate to food intake, appetite, metabolism, mood, and reward-pleasure responses. It has been shown that this genetic influence is not simply due to the inheritance of any one gene but results from a much more complicated interaction between many genes and quite possibly non inherited genetic factors as well.

• The biological causes of eating disorders are not well understood. This could be because the majority of studies are conducted during the acute or recovery phase of an eating disorder. At this time, there are physiological changes occurring in the person as a result of their eating disorder behaviours which can affect the findings of the studies. Studies conducted at the onset of an eating disorder could show different results.

**Psychological factors**

Research into Anorexia Nervosa and Bulimia Nervosa specifically, has identified a number of personality traits that may be present before, during, and after recovery from an eating disorder.
These include:

- perfectionism
- obsessive-compulsiveness
- neuroticism
- negative emotionality
- harm avoidance
- core low self-esteem
- traits associated with avoidant personality disorder

Specific additional personality traits may be associated with each type of eating disorder. It is also important to include that prolonged starvation induces change in cognition, behaviour, and interpersonal characteristics. It can therefore be difficult to discern the psychological causes from the psychological effects of eating disorders.

**Socio-Cultural influences**

Evidence shows that socio-cultural influences play a role in the development of eating disorders, particularly among people who internalise the Western beauty ideal of thinness. Images communicated through mass media such as television, magazines and advertising are unrealistic, airbrushed and altered to achieve a culturally perceived image of ‘perfection’ that does not actually exist.

The most predominant images in our culture today suggest that beauty is equated with thinness for females and a lean, muscular body for males. People who internalise this ‘thin ideal’ have a greater risk of developing body dissatisfaction which can lead to eating disorder behaviours.
Like most other psychiatric illnesses and health conditions, a combination of several different factors may increase the likelihood that a person will experience an eating disorder at some point in their life.

**Modifiable risk factors**

It is possible to change some socio-cultural, psychological and environmental risk factors. The modifiable risk factors for eating disorders are identified as:

- Low self-esteem
- Body dissatisfaction
- Internalisation of the thin socio-cultural ideal
- Extreme weight loss behaviours

**Self esteem**

Low self esteem has been identified by many research studies as a general risk factor for the development of eating disorders. Strong self-esteem has been described as essential for psychological well-being and for strengthening the ability to resist cultural pressures.

**Body dissatisfaction or negative body image**

Poor body image can contribute to impaired mental and physical health, lower social functionality and poor lifestyle choices. Body dissatisfaction, the experience of feelings of shame, sadness or anger associated with the body, can lead to extreme weight control behaviours and is a leading risk factor for the development of eating disorders.
Body dissatisfaction is also linked to depression and low self-esteem and has been found to be widespread in adolescent girls in Australia.

**Internalisation of the thin socio-cultural ideal**

People who internalise and adopt the Western beauty ideal of thinness as a personal standard have a higher risk of developing an eating disorder.

**Disordered eating**

Disordered eating is the single most important indicator of onset of an eating disorder. Disordered eating is a disturbed pattern of eating that can include fasting and skipping meals, eliminating food groups, restrictive dieting accompanied by binge eating and excessive exercise. Disordered eating can also include purging behaviours such as laxative abuse and self-induced vomiting. Disordered eating can result in significant mental, physical and social impairment and is associated with not only eating disorders but also health concerns such as depression, anxiety, nutritional and metabolic problems and weight gain.

**Dieting**

While moderate changes in diet and exercise have been shown to be safe, significant mental and physical consequences may occur with extreme or unhealthy dieting practices.

Dieting is associated with the development of eating disorders. It is also associated with other health concerns including depression, anxiety, nutritional and metabolic problems, and, contrary to expectation, with an increase in weight.
Dieting and adolescents at risk

Puberty is a time of great change biologically, physically and psychologically. Teenagers are often vulnerable to societal pressures and can often feel insecure and self conscious, factors that increase the risk of engaging in extreme dieting behaviour. The act of starting any diet increases the risk of eating disorders in adolescent girls. Research shows that young people who engage in unhealthy dieting practices are almost three times as likely as their healthy-dieting peers to score high on measures assessing suicide risk.

Studies in Australia and New Zealand have found:

1. Approximately half of adolescent girls have tried to lose weight and practise extreme weight loss behaviours such as fasting, self-induced vomiting and smoking
2. As many as 75% of high school girls feel fat or want to lose weight
3. Young people who diet moderately are six times more likely to develop an eating disorder; those who are severe dieters have an 18-fold risk
4. Among girls who dieted, the risk of obesity is greater than for non-dieters

1.5 COMORBIDITY

Autism spectrum disorders have a higher prevalence among people with eating disorders than in the general population. Between 50% and 75% of individuals with an eating disorder experience depression. In addition, one in every four individuals who are diagnosed with anorexia nervosa also exhibit obsessive-compulsive disorder, other
psychological issues may factor into anorexia nervosa; some fulfill the criteria for a separate Axis I diagnosis or a personality disorder which is coded Axis II and thus are considered comorbid to the diagnosed eating disorder. The causality between personality disorders and eating disorders has yet to be fully established. Some people have a previous disorder which may increase their vulnerability to developing an eating disorder and some develop them afterwards. The presence of Axis I and or Axis II psychiatric comorbidity has been shown to affect the severity and type of anorexia nervosa symptoms in both adolescents and adults. Obsessive-compulsive personality disorder is linked with more severe symptomatology and worse prognosis. Comorbid conditions include depression, obsessive compulsive personality disorder, substance abuse, alcoholism, borderline personality disorder, anxiety disorders, obsessive compulsive disorder, attention deficit hyperactivity disorder, and body dysmorphic disorder (BDD).

Zucker et al. (2007) proposed that conditions on the autism spectrum make up the cognitive endophenotype underlying anorexia nervosa and appealed for increased interdisciplinary collaboration.

1.6 DIAGNOSIS

A diagnostic assessment may be conducted by a suitably trained general practitioner, or by a psychiatrist or psychologist, who records the person's current circumstances, biographical history, current symptoms, and family history. The assessment also includes a mental state examination, which is an assessment of the person's current mood and thought content, focusing on views on weight and patterns of eating. There are multiple medical conditions, such as viral or bacterial
infections, hormonal imbalances, neurodegenerative diseases and brain tumors which may mimic psychiatric disorders including anorexia nervosa.

1.7 RELAVANCE OF YOGA AS A TREATMENT

An increasing number of men and women struggle with an unhealthy relationship with food. According to the National Institute of Mental Health, eating disorders, characterized by extreme emotions, attitudes, and behaviors surrounding weight and food, are a daily struggle for 20 million females and 10 million males in the United States.

Anorexia nervosa has the highest mortality rate of all mental illnesses. Beyond anorexia, bulimia, and binge eating disorder, millions struggle with a wide spectrum of exercise issues and disordered eating, defined by the National Eating Disorder Collaboration as a “disturbed and unhealthy eating pattern that can include restrictive dieting, compulsive eating, or skipping meals.” According to a study conducted by the National Eating Disorder Association, “four out of ten individuals have either personally experienced an eating disorder or know someone who has.”

Characterized by an extremely high relapse rate, eating disorders are associated with stigma and shame and a denial of the illness in the first place, all of which can be barriers to getting proper treatment. Additionally, our culture’s emphasis on normalizing and even celebrating thin body type, weight loss, and dieting only reinforces a dysfunctional relationship to food.

Yoga therapy is now being used in eating disorder treatment centers across the country, as yoga provides an integrative approach to mental, emotional, and physical
health. The practice of moving consciously from the inside out can have a profound impact on someone struggling with body image and body awareness as these people tend to avoid being present. Yoga has been shown to help relieve depression, anger, and anxiety and to promote self-esteem and positive body image through the cultivation of non-judgment, confidence, and self-acceptance. A regular yoga practice can help rebuild strength and bone density that is damaged and lost with anorexia.

**How Do Eating Disorders and Yoga Philosophy Connect?**

In order to allow the mind to rule choices about food, body, and weight, as one with an eating disorder does, it becomes necessary to disconnect the mind from the needs of the physical body. Often, those affected by disordered eating will completely detach from their identity or values outside of the disorder itself; weight and body image become paramount to all else. This type of behavior is seen as an act of violence towards oneself, a cycle often perpetuated by the illusion that reaching a certain weight will provide a sense of control or happiness—“Once I lose 10 pounds, I’ll be happy”—which is of course an illusion, because after 10 it becomes 12, then 15, and so on.

In stark contrast to this type of aggressive control of the body, yoga teaches us to develop an awareness of an authentic self beyond the physical body. In fact, the physical body in yoga is considered a temporary vehicle for the spirit, and becomes a lens through which to stay curious about how we act in other parts of life. For instance, holding an uncomfortable posture when the instinct is to escape allows us to notice what happens mentally when we encounter a challenging situation or begin to feel anxious off the mat. Yoga philosophy also provides us with the value of
“ahimsa,” the practice of non-violence, toward ourselves, our body, and others. The practice of meditation, another aspect of the yoga practice, allows for the development of “witness consciousness,” creating separate space between the observer (our mind), the thoughts that arise, and our reactions.

People with eating disorders and other destructive food behaviors are in a constant state of physiological stress, increasing the likelihood of a host of medical consequences including loss of bone density, heart muscle deterioration, and a heightened level of adrenaline, the body’s hormone responsible for fight or flight response when survival is threatened. Studies on mindfulness have shown that both meditation and breath-work reduce the body’s physiological stress response by decreasing sympathetic nervous system activation, and increasing activity in area of the brain responsible for confidence, emotion regulation, and mental flexibility. Interestingly, studies on yoga’s therapeutic effects in the general population show how the capacity to tolerate low levels of stress, such as learning to stay in an uncomfortable posture, is correlated to overall well-being and quality of life.

Yoga and Eating Disorder Recovery

Although yoga has shown some efficacy as a treatment for asthma, depression, and anxiety, research on the effects of yoga specifically in the treatment of eating disorders is still limited. One reason for lack of studies within this population is the high co-morbidity between eating disorders and other mental health illnesses such as anxiety, depression, and obsessive-compulsive disorder.

Jennifer Daubenmier, Ph.D., conducted research while at the University of California, Berkeley, examining how practicing yoga affects body awareness, body
responsiveness, and body satisfaction. In this study, 138 women, averaging 37 years old, were split into three groups: a yoga group, an aerobic exercisers group, and a control group. Participants were given surveys that measured body awareness, body satisfaction, and eating disorder symptoms. The yoga group reported lower scores on all measures associated with eating disorder behaviors, including greater body awareness when compared with non-yoga practitioners. The results indicate that yoga decreases eating disorder risk factors at higher rates than other forms of exercise.

A 2006 Princeton University qualitative study showed how yoga is effective in increasing self-efficacy and reducing anxiety. Eating disorder expert Robin Boudette, Ph.D., a psychologist at Princeton University, obtained data from eating disorder patients undergoing yoga therapy. The methods in this study were based on gentle, therapeutic yoga techniques used by renowned instructors such as Christina Sell in her book *Yoga from the Inside Out: Making Peace with Your Body*. According to Boudette, “Many patients become much more aware of the body for how it feels, rather than how it looks, which opens a window into a new experience of the body off the yoga mat.”

Yoga encourages practitioners to tap into inner wisdom, and has the potential to replace a dependency on external validation, such as a scale, by supporting a more internal relationship of trust and gratitude for the body. There are times, however, when yoga can be misused to support the eating disorder rather than recovery. For instance, the asana (physical) practice can become another form of overexercise and a way to continue ignoring the body. If a person is medically unstable or severely underweight, a physical yoga practice can be dangerous and even life threatening. Furthermore, 30% of people with eating disorders are believed to also have a trauma
history, and may report feeling increased anxiety levels when asked to connect to, and feel, their body.

1.8 YOGA

The word Yoga is derived from the Sanskrit root Yuj. The meaning is to bind, join, and attach and yoke, to direct and concentrate one’s attention on, to use and apply. It also means union or communion. It means the disciplining of the mind, intellect, the emotions, the will, which yoga presupposes, it means a poise of the soul which enables one to look at life in all its aspects evenly. (B.K.S. Iyengar)

Yoga is one of the six orthodox systems of Indian philosophy. It was coordinated and systematized by Patanjali in his classical work, the Yoga Sutras, which consists of 195 terse aphorisms in which it is stated that yoga is a state where all activities of the mind are channalized in one direction or the mind is free from distractions. (B.K.S. Iyengar)

1.9 THE ORIGIN OF YOGA

In the modern era, the origin of yoga is not usually given much importance. While ‘yoga’ has now become a veritable household word, knowledge of its roots escapes most people, even many of those practising it with regularity. "Historically yoga was more than a particular teaching. Yoga, a way of life, a culture and a lifestyle which encompassed not just techniques, practices or ideas, but also eating habits, bathing habits, prayer, social interaction, and work. Yoga included a vast body of 'attitudes toward being', an ingrained sense of morality and ethic and it was the bedrock of the personal – social – cosmic order which developed in that part of the
earth known as India. Therefore it is in the ancient Samskrithi (culture) of Bharata that origin of yoga is to be found.” - Smt. Meenakshi Devi Bhavanani, "Returning to the Roots; Classical Yoga"

1.10 THE ORIGIN OF YOGA IN CLASSICAL TEXTS

The origin of yoga lies in antiquity. It was first expounded in the great shastras (texts), known as the Vedas. Four in numbers, these are the earliest scriptures known to mankind, extending back thousands of years. Vedas. Together, these texts explain and regulate every aspect of life, from supreme reality to all worldly affairs. Here, and in much classical literature to follow, is where one can see evidence of the origin of yoga.

The exact birth of the Vedas is lost in the distant past. The Vedas themselves were ancient hymns, originally sung in the forests by Rishis (seers) who lived remote, ascetic lives and in this way were passed from guru to disciple for perhaps thousands of years before being put to writing. Hindu tradition itself puts the Vedas as far back as 10,000 years.

The origin of yoga can be traced back to the very oldest of these scriptures, the rig veda, which speaks about ‘yoking the mind’ to the ‘highest truth’. But within these hymns from this ancient vedic period, one even see the actual word 'yoga' used occasionally as well. As Dr. Kumar Kaul says in his book, "Yoga in the Hindu Scriptures":

"All the four Vedic Samhitas refer directly or indirectly to the yoga system and the yoga traditions. In the first three Samhitas there are direct as well as indirect references to Yoga. But the atharavaveda gives the clear conception of Yoga
describing the eight mystical circles (Chakras) and the nine gates of the human body - the golden sheath and the mystical wheel containing the thousand spokes. Therefore, it may be held that the Vedic seers and sages were aware of the nature, importance and implication of the practical aspects of Yoga." More Classical Literature like Bhagavadgita, Mahabharata, Ramayana, Upanishads, also Reveals the Origin of Yoga.

1.11 INNOVATION OF YOGA AND ITS DEVELOPMENT

Although it wasn't until recently when yoga earned massive recognition and gained a huge following, it has existed for the past thousands of years. The earliest written scriptures that would help trace the origins of yoga were found in the Indus Valley during an archaeological excavation. Hence, it could be very well that yoga started out during this early antique period. Yoga also been associated by many to Stone Age Shamanism, although there is no valid link between the two except for the fact that having a few similarities in their method and approach. However, most modern yoga methods are still deeply rooted to the Indian philosophy, which provides this practice with its religious and spiritual aspect. Ever since yoga was introduced, it has seen varied evolution. In the east, yoga remains to be a sacred practice that incorporates a lot of prayer and chanting into each session. But in the Western parts of the world, yoga has been used mainly for its physical exercises that are known to provide health and fitness benefits.

1.12 VEDIC PERIOD

This period represents the existence of the Vedas, which is a sacred scripture used by modern day practice of Hinduism. These scriptures collect various hymns that praise a divine power. If one were to examine the teachings of the Vedas, then one
would identify similarities to the teachings of yoga. All of the activities involved aims to go beyond the limitations of the mind and in the process allow the physical body to do things it is normally incapable of doing.

1.13 CLASSICAL PERIOD

This time period represents the creation of the Yoga Sutra, authored by Patanjali during the 2nd century. Patanjali’s writings will pave the way for the standardization of the Classical Yoga that now serves as the basis for the practice and philosophies of Raja Yoga. At this point, the eight limbs of yoga were established as follows: yama or social restraints, niyama or personal observance of discipline, asanas or physical postures, pranayama or proper breathing control, pratyahara or sense withdrawal, dharana or concentration, dhyana or meditation, and samadhi or Self realization.

1.14 POST-CLASSICAL PERIOD

Now that Panjatali was able to establish the eight-limbed paths toward the ultimate goal of practicing yoga, this period witnesses the gradual spread of yoga and its teachings. This was evident not only in practice, but also in the growth of literature dedicated to the proliferation of the teachings and principles of yoga. One of the major focus of the practice of yoga during this time period is the focus on the present moment. It also resulted to the formation of the five principles of yoga, which are proper relaxation, proper exercise, proper breathing, proper diet, and proper meditation.
1.15 YOGIC CONCEPT OF BODY

The subtle anatomy of the humans is divided into five energetic sheaths known as ‘pancha kosha’. Pancha, meaning five and kosha, meaning layer or sheath. This ideology describes the human being “as multi-dimensional, with the source or foundation in a spiritual dimension.” The so-called ‘spiritual dimension’ is pure consciousness which is hidden by the other four koshas, the outermost layer being the most dense, physical body. Each kosha can be thought of as energy vibrating at a different frequency. The physical body therefore vibrates at the slowest rate and the ‘inner light of consciousness’ or ‘atman’ vibrates at fastest rate or frequency. Although all five layers interpenetrate one another (Bhavanani Anandha Balayogi, 2004).

These five sheaths can be divided into three bodies:

i. Sthula Sharira / Physical Body - Annamayakosha

ii. Sukshma Shariria / Astral Body - Pranamayakosha, Manomayakosha, Vijnanamayakosha

iii. Karana Shariria / Causal Bod - Vijnanamayakosha, Anandamayakosha

Of all these, the anandamayakosha is not bound by time or space and does not die. When the practitioner resides in this sheath, they have remembered or realized their true nature, reached enlightenment and health will pervade all layers.

1.15.1 ANNAMAYA KOSHA (Food Sheath)

This describes the physical body composed from the five elements but mainly from food and water. Any malfunction in this kosha is noticed as illness or disease and changes to diet and exercise regime can offer remedies.
1.15.2 PRANAMAYA KOSHA (Pranic or Energy Sheath)

The pranic or energy sheath comprises the prana vayus, nadis and the chakras. Hence it is also called the "vital sheath" or "vital body". Prana, the vital breath which man lives by, is the bridge between the gross and subtle bodies as well as between the other koshas. Any malfunction in this sheath is noticed as afflictions of the breath, sensory issues and nervous problems, therefore, pranayamais the most effective remedy.

1.15.3 MANOMAYA KOSHA (Mental or psycho-emotional Sheath)

The third sheath is concerned with the metabolism of emotion as it is mainly concerned with feelings and imagination. If emotion is either over-indulged or suppressed, the imbalance in this sheath will have a knock-on effect upon the pranamaya kosha and the annamaya kosha. Imbalance is signified by difficulties in relationships, worry and psychological issues. Remedies include visualization, meditation and mantra chanting.

1.15.4 VIJNANAMAYA KOSHA (Intellectual Sheath)

There are two levels to this sheath, one relating more to manomaya kosha and being concerned with mental calculation and thought and the higher aspect relating more to anandamaya kosha and being concerned with the perception and will. This sheath is the seat of the ego or in Sanskrit, ‘ahamkara’ and malfunctions can include poor memory, confusion, communication issues, lack of will-power and a loss of reality. Mental exercises including mantra, meditation and spiritual study can harmonise the functioning of this sheath.
1.15.5 ANANDAMAYA KOSHA (Bliss Sheath)

The ‘bliss sheath’ is the seat of the inner essence or Atman and is where all metabolise the experience of Samadhi. The mind is said to rest in its intrinsic natural state which is pure bliss. There are no malfunctions at this level as the mind is free from ‘chitta vrittis’ or mental confusions and distractions.

The human body has several glands, many of which are ductless. The various hormones they produce kill germs in the body as they mingle with the blood. If these glands work as well as they should, all would be disease-free. Yoga gives strength to these glands to do their job properly. Each gland secretes a different fluid that affects a different function in the body (Bhavanani Anandha Balayogi, 2004).

The pituitary and pineal body glands are situated inside the back of the head, thyroid and para- thyroid are situated in the neck region, the thymus is located in the chest, and the pancreas is situated below the stomach. Different glands and organs are activated by various yogasanas in unique ways as follow

1. Pituitary – Sirasasana and Sarvangasana.
2. Para thyroid – Sarvanagasana and Halasana.
3. Thyroid – Matsyasana and Usartasana
4. Pancreas – Padha Hasta Asana, Halasana, Nouli, Uddiana, Sivalingasana and Paschimothasana
5. Adrenal – Chakrasana, Gomukhasana, Halasana, Paschimothasana.
6. Liver – Sarvagasana, Urdhva Padmasana
Hormones secreted by ductless glands are very important for a healthy life. When hormones are at a particular performance level, the body can function to its optimum. The improper functioning of these glands is usually the primary cause of most diseases. Fortunately, there are yogasana that activate each of these glands (Bhavanani Anandha Balayogi, 2004).

1.16 MODERN YOGA

Ever since those different periods, yoga has increasingly gained popularity. As of today, over 30 million people have devoted the lives to practicing yoga regularly. Most of this can be credited to the increasing awareness of various health problems and the need to find natural but effective treatment method. Another thing that makes yoga appealing to modern individuals is that it can be utilized to improve overall health and quality of life. These are all beneficial in preventing illnesses and disease formation.

1.17 SPREAD OF YOGA IN THE WEST

Yoga was introduced to the Western part of the world by famous yoga disciples when they travelled to this part of the world. It was not difficult for the Westerners to accept and practice this art, given the tremendous benefits it has to offer.

There are two main reasons why the people from the West intuitively accepted yoga as part of their routine. The physical exercise aspect of it provided essential fitness and health benefits. With several threats to someone's health, finding a natural and effective treatment method could mean tons of savings in health care.
On the other hand, the emotional and spiritual aspect of yoga has provided them means to combat everyday stress and improve quality of life. Yoga is an ancient art based on harmonizing systems of development for body, mind and spirit. It is a practical aid, not a religion.

1.18 EIGHT PETALS OF YOGA

- Yama (social disciplines)
- Niyama (individual disciplines)
- Asana (posture)
- Pranayama (regulation of breathing)
- Prathyahara (withdrawal of senses)
- Dharana (concentration)
- Dhyana (meditation)
- Samadhi (knowing directly higher self)

The Bhagavad-Gita gives explanation of the term yoga in the following words. “Yoga is neither for the person who eats too much and indulge excessively in sensual pleasures, nor for the person who sleeps too much or stays awake too long”

1.19 YOGA AS A SCIENCE AND ART

The emergence of creativity as the core of technology has added aesthetics or a new dimension in the field of science. Basically, art has been impregnated in to the science. The creative and critical faculties of mind lies hidden in the higher state of consciousness. The foundation of arts and science are now being found in deeper states of our consciousness. Hence, yoga has brought a break through in unravelling
the hidden dimensions of mind. All those seeking to develop greater critical and creative faculties now have yoga as a new tool.

1.19.1 STAGES OF YOGA (ASHTANGA YOGA)

Patanjali enumerates the means of astanga yoga for the quest of the soul namely yama, niyama, asana, pranayama, prathyahara, dharana, dhyana and samadhi.

1.19.2 YAMA (SOCIAL DISCIPLINE)

Patanjali gives the following as social disciplines

“ahimsa satya asteya brahmacarya aparigrahah yamah”

Yama are the social discipline. They are five commandments as follows;

1. Ahimsa (non-violence)
2. Satya (truth)
3. Asteya (non-stealing)
4. Brahmacharya (celibacy)
5. Aparigraha (non-covetness)

1.19.3 NIYAMA (INDIVIDUAL DISCIPLINE)

Patanjali gives the following as individual disciplines

“sauca santosa tapah svadhyaya Isvarapranidhanani niyamah”

Niyama are the individual discipline. The five niyamas are;

1. Saucha (cleanliness)
2. Santosa (contentment)
3. Tapa (austerity)
4. Swadhyaya (self study)

5. Iswarapranidhana (surrender to supreme force)

1.19.4 ASANAS

Nowadays yoga is understood as asanas or physical postures. However asanas were implied as physical postures in which one can comfortably sit and practice higher practices of yoga like pranayama, dharana and dhyana.

Patanjali defines asanas as, “sthirasukhasasanam”

It implies any meditative posture which is stable (sthira), and comfortable (sukham). Its main purpose is to calm the mind. A steady and pleasant posture produces mental balance and prevents uncertainty of mind. The word asana is derived from the Sanskrit verb 'Aas' which means existence and state of existence is Asana or Position. Here the position of Body as well as Mind is expected in Asana.

The similar description of asana is found in Hatha Yoga Pradipika which says that "One can achieve sound health, stability, lightness of body and mind with asana".

In Gheranda Samhita (Another text on Hatha Yoga), the author describes the effect of asana as "Perfecting the stability of body and mind is the result of asana".

1.19.5 PRANAYAMA

Pranayama is the step succeeding asanas in Patanjali’s astanga yoga. Pranayama is defined as follows by Patanjali,

“tasminsati svasaprasvasayoh – gativicchedah pranayamah”
According to Patanjali the asanas having been done pranayama is the cessation of the movement of inhalation and exhalation.

The word pranayama is comprised of two roots: prana plus ayama. Prana means ‘vital energy’ or ‘life force’. It is the force, which exists in all things, whether animate or inanimate. Although closely related to the air we breathe, it is subtler than air or oxygen. Therefore, pranayama should not be considered as mere Breathing exercises aimed at introducing extra oxygen into the lungs. Pranayama utilizes Breathing to influence the flow of prana in the nadis or energy channels of the pranamaya kosha or energy body.

The word Ayama is defined as ‘extension’ or ‘expansion’, thus, the word pranayama means ‘extension or expansion of the dimension of prana’. The techniques of pranayama provide the method whereby the life force can be activated and regulated in order to go beyond one’s normal boundaries or limitations and attain a higher vibratory energy.

ASPECTS OF PRANAYAMA

In the pranayama practices there are four important aspects of Breathing, they are:

- **Puraka (Inhalation)**
- **Rechaka (Exhalation)**
- **Antar Kumbhaka (Retention of breath after Inhalation)**
- **Bahir Kumbhaka (Retention of breath after Exhalation)**
The different practices of Pranayama involve various techniques, which utilise these four aspects of Breathing. There is another mode of Pranayama, which is called Kevala kumbhaka.

The practices of Pranayama work mainly with Pranamaya Kosha. The pranamaya Kosha is made up of five major pranas which are collectively known as the pancha pranas namely prana, apana, samana, udana and vyana.

1.19.6 PRATHYAHARA

Patanjali defines Prathyahara withdrawing the senses, the mind and consciousness from contact with external objects, and then drawing them inwards towards the seer, is Prathyahara.

Prathyahara means the withdrawal of senses. This requires a very strong determination and repression of the senses.

1.19.7 DHARANA

Patanjali defines dharana as Fixing the consciousness on one point or region is concentration (dharana)

Dharana is the fixed attention or one pointedness of the mind. In this state the concentration of chitta on some object is essential.

1.19.8 DHYANA

Patanjali defines dhyana a steady, continuous flow of attention directed towards the same point or region is meditation (dhyana) Dhyanator meditation which is
prolonged concentration. It is the unbroken flow of thought towards the object of concentration.

1.19.9 SAMADHI

Patanjali defines samadhi in sutra no.III-3 as follows,

“tadeva arthamatranirbhasam svarupasunyam iva samadhi”

Meaning – When the object of meditation engulfs the meditator, appearing as the subject, self awareness is lost. This is samadhi.

1.20 PATHS OF YOGA

According to the scriptures, Yoga is mainly classified in various systems of branches namely

Jnana Yoga - Union by Knowledge
Bhakthi Yoga - Union by Love and Devotion
Karma Yoga - Union by Action and Service
Raja Yoga - Union by Mental Mastery – the path of will
Hatha Yoga - Union by Bodily Mastery (Principally of breath)
Mantra Yoga - Union by Voice and Sound
Yantra Yoga - Vision and Form
Laya and Kundalini - Union by Arousal of Latent Psychic energy
Tantric Yoga - A general form for the Physiological discipline.

Also union by harnessing sexual energy.
1.21 TYPES OF YOGA

Dr. Georg Feuerstein (2006), has mentioned the following 40 major types of yoga, namely

- **Abhava – Yoga**

  The unitive discipline of non-being, meaning the higher yogic practice of immersion into the self without objective support such as mantras; a concept found in the puranas of Bhava-Yoga.

- **Agni yoga**

  The unitive discipline of fire, causing the awakening of the serpent power (Kundalini Shakti) through the joint action of mind (manas) and life force (prana).

- **Ashtanga-Yoga**

  The unitive discipline of the eight limbs, i.e. Raja-Yoga or Patanjali-Yoga.

- **Bhakti-Yoga**

  The unitive discipline of Love/devotion, as expounded, for instance, in the Bhagavad-Gita, the Bhagavata-Purana, and numerous other scriptures of Shaivism and Vaishnavism.

- **Buddhi-Yoga**

  The unitive discipline of the higher mind, first mentioned in the Bhagavad-Gita.

- **Dhyana-Yoga**

  The unitive discipline of meditation.
• **Ghastha-Yoga**

  The unitive discipline of the “pot” (ghata), meaning the body; a synonym for Hatha-Yoga mentioned in the Gheranda-Samhita.

• **Guru-Yoga**

  The unitive discipline relative to one’s teacher.

• **Hatha-Yoga**

  The unitive discipline of the force (meaning the serpent power or Kundalini-shakti), or forceful unitive discipline.

• **Jaba-Yoga**

  The unitive discipline of mantra recitation.

• **Jnana-Yoga**

  The unitive discipline of discriminating wisdom, which is the approach of the Upanishad.

• **Karma-Yoga**

  The unitive discipline of self-transcendent action, as first explicitly taught in the Bhagavad-Gita.

• **Kriya-Yoga**

  The unitive discipline of ritual; also the combined practice of asceticism (tapas), study (svadhyaya), and worship of the Lord (ishvara –pranidhana) mentioned in the Yoga-sutra of Patanjali.
• **Kundalini-Yoga**

  The unitive discipline of the serpent power (kundalini –shakti), which is fundamental to the Tantric tradition, including Hatha-Yoga.

• **Laya-Yoga**

  The unitive discipline of absorption of dissolution of the elements prior to their natural dissolution at death.

• **Maha-Yoga**

  The great unitive discipline, a concept found in the Yoga-shikha-Upanishad where it refers to the combined practice of Mantra-Yoga, laya-Yoga, Hatha-Yoga, and Raja-Yoga.

• **Mantra-Yoga**

  The unitive disciplines of mystical sounds that help protect the mind, which has been a part of the Yoga tradition ever since Vedic times.

• **Nada-Yoga**

  The unitive discipline of the inner sound, a practice closely associated with original Hatha-Yoga.

• **Patanjali-Yoga**

  The unitive discipline of Patanjali, better known as Raja-Yoga or Yoga-Darshana.
• **Purna Yoga**

  The unitive discipline of wholeness or integration, which is the name of Sri Aurobindo’s Yoga.

• **Raja-Yoga**

  The royal unitive discipline, also called Patanjali-Yoga, Ashtanga-Yoga, or Raja-Yoga.

• **Samadhi-Yoga**

  The unitive discipline of ecstasy.

• **Sanyasa-Yoga**

  The unitive discipline of renunciation, which is in contrast with Karma-Yoga in the Bhagavat-Gita.

• **Samputa-Yoga**

  The unitive discipline of sexual congress (maithuna) in Tantra-Yoga.

• **Saptanga-Yoga**

• **Shadanga-Yoga**

The unitive discipline of the six limbs (Shad-anga), as expounded in the Maitrayaniya-Upanishad: 1. Breathe control (pranayama), 2. Sensory inhibition (pratyahara), 3. Meditation (dhyana), 4. Concentration (dharana), 5. Examination (tarka) and ecstasy (Samadhi).

• **Siddha-Yoga**

The unitive discipline of adapts, a concepts found in some of the Tantras.

• **Sparsha-Yoga**

The unitive discipline of contact; a Vedantic Yoga mentioned in the Shiva-Purana, which combines mantra recitation with breath control; eg: Asparsha-Yoga.

• **Tantra-Yoga:**

The unitive discipline of the Tantras, a Kundalini-based Yoga.

• **Taraka-Yoga**

The unitive discipline of the “deliverer” (taraka), a medieval Yoga based on light phenomena.

• **Yantra-Yoga**

The unitive discipline of focusing the mind upon geometric representations (yantra) of the cosmos.
1.22 OBSTACLES OF YOGIC PRACTICE

- **Vyadi** - Sickness that disturbs the physical equilibrium
- **Sthyana** - Lack of mental disposition
- **Samsaya** - Doubt or indecision
- **Pramada** - Insensibility
- **Alasya** - Laziness
- **Avitari** - Sensuality
- **Bhranti darshana** - Illusion or invalid knowledge
- **Alabdha bumikatva** - In continuity
- **Anavasthitattva** - Instability

1.23 WOMEN AND YOGA

Women from all walks of life, and from all parts of the world, are beginning to appreciate the benefits of yoga. In modern society, women’s roles have expanded considerably. All women would like to be beautiful enough to admiring stares. Women generally tend to take greater interest in their health and beauty than men. But only a few women recognize that yoga is the perfect way to get healthy and beautiful, and is also the ideal way to lead a happy life. True beauty comes from inner health a strong heart, and inner organs that function well. This is only possible through the dedicated practice of yoga. A lean and well toned body makes a women look and feel more beautiful. Incorrect posture or slouching makes women look unnecessarily obese or awkward. Yoga has the capacity to help women feel happy and confident from the inside *(Asana Andiappan 2004)*.
1.24 BENEFITS OF YOGA

Yoga is a science that has been practiced for thousands of years. The benefits are grouped into three categories i.e. psychological benefits, physiological benefits and biochemical effects. This is based on the regular practice of traditional asana, pranayama and meditation (Swami Sivananda, 2002)

1.24.1 PHYSIOLOGICAL BENEFITS

1. Stable autonomic nervous system equilibrium
2. Pulse rate decreases
3. Respiratory rate decreases
4. Blood Pressure decreases (of special significance for hyporeactors)
5. Galvanic Skin Response (GSR) increases
6. EEG - alpha waves increase (theta, delta, and beta waves also increase during various stages of meditation)
7. EMG activity decreases
8. Cardiovascular efficiency increases
9. Respiratory efficiency increases
10. Grip strength increases
11. Eye-hand coordination improves
12. Dexterity skills improve
13. Reaction time improves
1.24.2 CLINICAL BENEFITS

1. Glucose decreases
2. Sodium decreases
3. Total cholesterol decreases
4. Triglycerides decrease
5. HDL cholesterol increases
6. LDL cholesterol decreases
7. VLDL cholesterol decreases
8. Cholinesterase increases
9. Catecholamines decrease
10. ATPase increases
11. Hematocrit increases
12. Hemoglobin increases
13. Lymphocyte count increases
14. Total white blood cell count decreases
15. Thyroxin increases
16. Vitamin C increases
17. Total serum protein increases

1.24.3 PSYCHOLOGICAL BENEFITS

1. Mood improves and subjective well-being increases
2. Anxiety and Depression decrease
3. Hostility decreases
4. Concentration improves
5. Memory improves
6. Attention improves
7. Learning efficiency improves
8. Mood improves
9. Self-actualization increase
10. Social skills increases
11. Well-being increases

1.25 VARIABLES STUDIED AND ITS RELEVANCE

The variables studied in this study have a direct significance to the treatment variable selected; such as clinical, physiological and psychological which are suitable and could be treated through yoga. Moreover the treatment of yoga is likely to create a great impact on these variables.

The variables selected for the study are;

<table>
<thead>
<tr>
<th>S.No</th>
<th>Physiological Variables</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Heart Rate</td>
</tr>
<tr>
<td>2</td>
<td>Systolic Blood Pressure</td>
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<tr>
<td>3</td>
<td>Diastolic Blood Pressure</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Clinical Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hemoglobin</td>
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<tr>
<td>2.</td>
<td>Total Cholesterol</td>
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<tr>
<td>3.</td>
<td>Calcium</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Psychological Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Depression</td>
</tr>
<tr>
<td>2.</td>
<td>Emotional Maturity</td>
</tr>
<tr>
<td>3.</td>
<td>Anxiety</td>
</tr>
</tbody>
</table>
1.25.1 PHYSIOLOGICAL VARIABLES

In physiology study how different parts or organs of an organism work together to achieve a particular function. In the body, for example the digestion of food involves the action of hormones and other chemical produced by the stomach, liver and pancreas. Muscle contraction occurs through the action of chemical messages produced by nerves that supply the muscle. If learnt how the boy functions normally, then can be understand what happens when organs function abnormally and can take care of our body (Ajmer singh, 2005)

BLOOD PRESSURE

Pressure is exerted by the blood on the walls of arteries. when the left ventricle ejects blood into the aorta, the aortic pressure rises. The maximal aortic pressure following ejection is termed the systolic pressure. As the left ventricle is relaxing and refilling, the pressure in the aorta falls. The lowest pressure in the aorta, which occurs just before the ventricle ejects blood into the aorta, is termed the diastolic pressure. Mean arterial blood pressure is defined as the average arterial pressure during a single cardiac cycle. As blood is pumped out of the left ventricle into the arteries, pressure is generated. The mean arterial pressure (MAP) is determined by the cardiac output, systematic vascular resistance and central venous pressure according to the following relationship, which is based upon the relationship between flow, pressure and resistance (Edward and Mathews, 1981).

Blood Pressure for healthy individual measures 120/80mmHg. Systolic BP 120+-10 and Diastolic BP 80+-5 is considered normal. A qualitative deviation from the norm is considered to be regarded as abnormal BP. Hypertension increase in blood
pressure above normal for given age and sex. Hypertension enforces heart to work hard as a consequence it hardens Blood vessel. It paves way for future cardiac problem. Hypotension is abnormal reduction in Blood Pressure below the lower limit of normal range. A graded relationship has been demonstrated between duration and degree of sustained hyperglycaemia and the risk of vascular disease. The micro and macrovascular complications of Type 2 Diabetes can be minimized by strict control of Blood pressure with a target of less than 140/80 mmHg (Nelson, 1986).

HEART RATE

The rhythmic expansion and contraction of the arteries corresponding each beat of heart is referred to as the pulse in the medical field. Pulse is the rate at which the human heart beats, indicating the heart beat. The pulse can be felt at any spot in the body, wherein the artery is compressed against the bone.

The most prominent spots where in one can feel the pulse without much difficulty are physiological spots, where pulse rate of heart's rhythmic tone can be ascertained, are wrists (radial artery), neck (carotid artery), inside of the elbow (brachial artery), behind the neck (popliteal artery) and ankle joint (posterior tibial artery).

Measuring the pulse can give very important information about individuals health. Any change from normal heart rate can indicate a medical condition. Fast pulse may signal an infection or dehydration. In emergency situations, the pulse rate can help determine if the patient's heart is pumping. The pulse measurement has other uses as well. During exercise or immediately after exercise, the pulse rate can give information about the fitness level and health.
The rhythm and strength of the heartbeat can also be noted, as well as whether the blood vessel feels hard or soft. Changes in the heart rate or rhythm, a weak pulse, or a hard blood vessel may be caused mainly by Cardiac conditions. The automatic nervous system which supplies para sympathetic or vagus nerves and the sympathetic or acceleratory nerves to the Sino-vial artery node play a prime role in regulating the heart rate (Larry, 1982).

1.25.2 CLINICAL VARIABLES

The liver is like a big factory that regulates blood sugar being an important chemical compound. The excess blood sugar is stored in the liver as glycogen and released when the blood sugar level lowers. Glycogen molecules are larger molecules containing thousands of glucose molecules. But glycogenolysis individual muscle cells during exercise breakdown glycogen to glucose to provide energy for contraction. Glycogen is also broken down in liver, with the free glucose being released in to the blood stream and transported to tissues throughout the body (Power and Howley, 1996).

The exercises produce biochemical changes in the cardio respiratory system and other important alterations in body composition such as high density lipoprotein, low density lipoprotein, blood cholesterol, blood glucose and triglyceride levels (Fox and Mathews, 1981).

HAEMOGLOBIN

Haemoglobin: also spelled as ‘hemoglobin’ and abbreviated 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 carbaminohemoglobin, 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 A9 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.

**TOTAL CHOLESTEROL**

High levels of cholesterol are a major risk factor for heart disease. On average, one American dies of a cardiovascular disease every 34 seconds. That is an awful lot of people. Cholesterol is often seen as the enemy and we must try hard to lower it to an acceptable level to halt the disease. There are a few different numbers in a cholesterol test including a total cholesterol number. The total cholesterol number is not as important as it was once thought to be. High cholesterol is not a good thing, but there are considerations that can mitigate a high number and make it not as bad. Total cholesterol is figured based on a measurement of HDL Cholesterol (the good kind), LDL Cholesterol (the bad guy), and triglycerides and Lipoprotein (a) in the blood.

LDL Cholesterol, triglycerides and Lipoprotein (a) are the culprits that have been linked to heart problems. These are the three things that need to be lowered when a person is determined to have high cholesterol. Often lowering fat intake and getting more exercise will help to lower as well as medications. Higher levels of HDL cholesterol have been shown to have a beneficial effect on plaque buildup in the coronary arteries. Therefore, it is often beneficial to raise the levels of HDL cholesterol while lowering the LDL cholesterol.

With this in mind, it is easy to see that sometimes controlling cholesterol is not so much a matter of lowering the total number as it is adjusting the ratio of HDL to LDL in the blood. Lowering the triglycerides is important under any circumstance.
Total cholesterol is a convenient measure used by doctors to determine when a person's cholesterol levels are too high and when the ratio of HDL to LDL cholesterol is outside the optimum range. Because LDL cholesterol is calculated, rather than measured, the total number is necessary to determine this ratio.

CALCIUM

Calcium is a chemical element which is essential for living organisms, including humans. Calcium's chemical symbol is "Ca". It is found in many foods. We need to consume a certain amount of calcium to build and maintain strong bones and healthy communication between the brain and various parts of the body.

The National Health Service (NHS)1, UK, says there is more calcium in the human body than any other mineral. Calcium continues strengthening the bones of humans until they reach the age of 20-25 years, or when they reach their peak mass. After that age, the element helps bone maintenance as well as slowing down bone density loss, which is a natural part of the aging process. People whose calcium intake is inadequate before the age of 20-25, have a considerably higher risk later on in life of developing brittle bone disease or osteoporosis, because calcium is drawn from the bones as a reserve.

Calcium regulates muscle contraction, including the heartbeat. It also plays a key role in normal blood coagulation (clotting). Nearly all of the calcium in our bodies is stored in our teeth and bones, where it supports their hardness and structure. Calcium also plays a role in the release of hormones and enzymes, as well as helping blood vessels move blood around the body. Vitamin D helps our bodies absorb and retain calcium in the bones.
1.25.3 PSYCHOLOGICAL VARIABLES

The word psychology comes 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 studies 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 programs, such as corporate fitness, exercise rehabilitation and health oriented exercise programs as well as traditional physical education and competitive athletics (Cell, 1972).

DEPRESSION

Everyone occasionally feels blue or sad, but these feelings are usually fleeting and pass within a couple of days. When a person has a depressive disorder, it interferes with daily life, normal functioning, and causes pain for both the person with the disorder and those who care about him or her. Depression is a common but serious illness, and most that experience it need treatment to get better.

Many people with a depressive illness never seek treatment. But the vast majority, even those with the most severe depression, can get better with treatment. Intensive research into the illness has resulted in the development of medications, psychotherapies, and other methods to treat people with this disabling disorder. (Altshuler LL, et al, 1998).
Depressed people may lose interest in activities that once were pleasurable, experience difficulty concentrating, remembering details, or making decisions, and may contemplate or attempt suicide. Insomnia, excessive sleeping, fatigue, loss of energy, or aches, pains or digestive problems that are resistant to treatment may be present.

Either early middle or late insomnia consistently for an extended period of time, and there is no singular, identifiable stressor causing your insomnia, then you might be suffering from an underlying depression or anxiety syndrome.

Yoga is a relaxing form of exercise that can help alleviate depression. Meditation and yoga poses can help to attack the root cause of depression - the feeling that can't handle the demands of life. It tones the nervous system, stimulates circulation, promotes concentration, and energizes mind and body.

Practice a daily yoga routine that includes 30 minutes of meditation and at least 20 minutes of poses. Yoga stretching exercises help improve blood circulation making it easier to break through the lethargy that often accompanies depression. (Holistic care foundation 2009)

**EMOTIONAL MATURITY**

Emotional Maturity is not only the effective determinant of personality pattern but also helps to control the growth of individual development. The concept mature emotional behaviour at any level is that which reflects the fruits of normal emotional development. It is a stage, which is very essential in humane life. One of the major aims of any good educational programme is to help the learner to gain emotional
maturity. Children studying in Xth class do not have much emotional maturity because of their inadequate control over the environment. A mature adult due to the development of his various powers has greater control over his environment. So, he possesses emotional maturity to a greater degree. An emotionally mature person has full control over the expression of his feelings. However, he behaves according to the accepted social values and ideals. He remains indifferent towards emotional allurements. There is no instability in the expression of emotions. During adolescence one gets excited very soon. Adolescents burst into laughter on flimsy things or loose temper soon but an emotionally mature is free from this defect. As one grows mature his emotional stability and depth of social adjustment, vocational and professional aptitude, life's ambitious etc. go on developing. A mature person is expected to understand a situation without any one's help and realize his duties and responsibilities himself. He will not act in an irresponsible manner under emotional stream and waste his time and energy over imaginary problems. But it is undoubtedly related with his success to cultivate finer qualities of self-control, politeness, sympathy, cooperation, tolerance and emotional stability. A person who is emotionally stable will have better adjustment with himself as well as with others. Emotionally mature persons will have more satisfaction in life; he will be satisfied with what he is having, of course trying to achieve more. He will have balanced attitude. He will have more positive than negative attitude towards life. To give meaning to the concept of emotional maturity as applied to children, it would be necessary to take into account maturity at various developmental levels leading up to mature adult level. Even at adult level, there should be gradation, as the science of germination probably will find that there are pronounced differences between mature adult of 25 and mature adult of 45 that are just truly developmental in nature. (Rishi Vivekananda)
ANXIETY

While doing any job when one suspects about the proportion of possibility of success is known as anxiety. Anxiety is psychological factor that differs from arousal. It encompasses some degree of activation and an unpleasant emotional state. This form anxiety is used to describe the combination of intensity of behavior and directional effect or emotion.

Anxiety plays an important role in the acquisition of motor skills as well as in athletic performance. Anxiety can either enhance or inhibit performance whether its effect is positive or negative depends on how an individual athlete perceives the situation.

People with low trait level have been known to perform better in selected motor skills than those with high or trait levels. There is also positive relationship between participants in athletic competition.

A moderate level of anxiety seems best for the acquisition and performance of motor skills levels of anxiety either too high or too low tend to inhibit learning and performance. (Lewellyn and Blucker, 1974).

1.26 OBJECTIVES OF THE STUDY

1. To explore whether the practice of hatha yoga sadhana shows any changes on selected Physiological variables among Anorexia syndrome teenage girls.

2. To examine the effect of hatha yoga sadhana on selected Psychological variables among Anorexia syndrome teenage girls.
3. To find out the impact of hatha yoga sadhana on selected Clinical variables among Anorexia syndrome teenage girls.

4. To analyze the effect of Hatha yoga sadhana on Physiological, Psychological and Clinical variables among Anorexia syndrome teenage girls.

1.27 REASON FOR THE SELECTION OF THE TOPIC

The researcher has taken this study to create awareness among the public on the effects and benefits of yoga on health. The researcher selected hatha yoga sadhana to identify the changes on physiological, psychological, and clinical variables among Anorexia syndrome teenage girls. Physiological, Psychological, and Clinical variables are needed to analyze the various changes that take place in their physical and mental level before and after the training period.

The researcher took this study due to the lack of literature and limited studies in this field and especially for Anorexia syndrome teenage girls.

1.28 REASONS FOR THE SELECTION OF THE VARIABLES

Anorexia syndrome teenage girls is increasing day by day because of current life style and food habits and lack of exercises. Anorexia syndrome teenage girls have high cholesterol deposit, abnormal hemoglobin more sweating, increased systolic and diastolic blood pressure and heart rate etc., as well as psychological like depression, anxiety and emotional maturity etc. Thus the investigator has chosen these variables for the present study. The physiological, Psychological and Clinical variables are selected as dependent variables where hatha yoga sadhana are selected as independent variables.
1.29 STATEMENT OF THE PROBLEM

The purpose of the study was to find out effect of Hatha yoga sadhana on
selected physiological, psychological and clinical variables among Anorexia
syndrome teenage girls.

1.30 HYPOTHESIS

On the basis of available literature review related to the study the investigator
has framed the following hypotheses;

It was hypothesized that there would be significant differences due to hatha
yoga sadhana practice among the experimental group than control group on selected
physiological, psychological and clinical variables of Anorexia syndrome teenage
girls.

1.31 SIGNIFICANCE OF THE STUDY

1. The findings of the study would help to explore the status of the aquatic hatha
yoga sadhana among Anorexia syndrome teenage girls.

2. This study would bring out the relative effect of pawanamuktasana series,
suryanamaskar, asanas, pranayams, meditation and relaxation among Anorexia
syndrome teenage girls.

3. This study will describe the changes in, physiological, psychological and
clinical variables due to hatha yoga sadhana among Anorexia syndrome teenage
girls.

4. This study would give an idea in maintaining the normal level of heart rate,
systolic blood pressure and diastolic blood pressure.
5. This study helps for the Anorexia syndrome teenage girls in maintaining their mental and emotional stability i.e. by reducing depression, anxiety and improving the emotional stability.

6. The findings of the study would help to adopt the suitable training programme to maintain the hemoglobin level and cholesterol level for Anorexia syndrome teenage girls.

7. The findings of the study would be helpful for the further research studies, also helpful for the academy of Anorexia syndrome teenage girls.

1.32 DELIMITATIONS

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

1. The study was confined to women who have Anorexia syndrome.

2. The age of the subjects were ranging from 15 to 18 years.

3. The total numbers of subjects were 30 Anorexia syndrome teenage girls, in which 15 for control group, 15 for experimental group I (hatha yoga sadhana) was assigned.

4. The subjects were selected from various places at Chennai.

5. The subjects were experimentally treated with hatha yoga sadhana.

6. The study was conducted on dependent variables such as systolic blood pressure, diastolic blood pressure, heart rate, total cholesterol, hemoglobin, depression, anxiety and emotional maturity and independent variables such as hatha yoga sadhana practices.
1.33 LIMITATIONS

Certain conditions like lifestyle, body structure, personal habits, family heredity, motivational factors, climatic conditions, socio-economic status, environmental conditions etc cannot be controlled.

1. Lifestyle of the subjects will not be considered.

2. The other methods of training or treatment taken by the subjects will not be taken into account.

3. The dietary and food habits of the subjects were not controlled.

4. Personal habits of the subjects were not controlled.

5. The family hereditary of the subjects were not controlled.

6. Climatic conditions were not controlled.

7. External factors like body structures, Socio-economic status, motivation and other environmental factors will not be taken into consideration.

8. Individual differences of the subjects will not be taken into consideration.

1.34 MEANING AND DEFINITION OF THE TERMS

1.34.1 YOGA

The definition, as given by Sadáshiva, is “Sa yoga yoga ityukto jìivátmá Paramátmánah.” That is, “The unification of the unit soul, the jìivátmá, with the Cosmic Soul, i.e., Paramátmá, is yoga.” -26th October 1979, DMC Gaddopur. (Subhasita samgraha part 13)
1.34.2 ANOREXIA SYNDROME

Anorexia syndrome teenage girls are the promoters of the family members in all the aspects of their life. But they face lot of health problems from burdens of responsibilities and routine work. They undergo lot of physical, mental and emotional problems leading to further health hazards. Women are more adversely affected by specific mental disorders than men.

1.34.3 HEART RATE

The number of pulse beats per unit time, usually per minute. The pulse rate is based on the number of contractions of the ventricles (the lower chambers of the heart). The pulse rate may be too fast (tachycardia) or too slow (bradycardia) (Karvonen, et.al 1957).

1.34.4 BLOOD PRESSURE

Blood pressure defined as a repeatedly elevated blood pressure exceeding 140 over 90 mmHg, a systolic pressure above 140 with a diastolic pressure above 90. Pulse rate the pulse is the number of heart beats per minute. Consistently elevated Blood Pressure is called Hypertension (Bhoj Raj, 2001).

1.34.5 SYSTOLIC BLOOD PRESSURE

The highest level which the arterial blood pressure rises during the systolic ejection of blood from the ventricle (Makarand and Madhukar Gore, 1994).

1.34.6 DIASTOLIC BLOOD PRESSURE

The lowest level to which the arterial blood pressure falls in the interval between successive heart beats (Leslie Kaminoff, 2007).
1.34.7 HAEMOGLOBIN

Haemoglobin: also spelled as ‘hemoglobin’ and abbreviated 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. (International Medical Dictionary 2010)

1.34.8 TOTAL CHOLESTEROL

High levels of cholesterol are a major risk factor for heart disease. On average, one American dies of a cardiovascular disease every 34 seconds. That is an awful lot of people. Cholesterol is often seen as the enemy and we must try hard to lower it to an acceptable level to halt the disease. (International Medical Dictionary 2010)

1.34.9 CALCIUM

A mineral found mainly in the hard part of bones, where it is stored. Calcium is added to bone by cells called osteoblasts and removed from bone by cells called osteoclasts. Calcium is essential for healthy bones and is also important for muscle contraction, heart action, and normal blood clotting. Food sources of calcium include dairy foods; some leafy green vegetables, such as broccoli and collards; canned salmon; clams; oysters; calcium-fortified foods; and soy foods, such as tofu. (medicinenet.com).

1.34.10 DEPRESSION

Everyone occasionally feels blue or sad, but these feelings are usually fleeting and pass within a couple of days. When a person has a depressive disorder, it interferes with daily life, normal functioning, and causes pain for both the person with the disorder and those who care about him or her. (Altshuler LL, et al, 1998)
1.34.11 EMOTIONAL MATURITY

Emotional Maturity is not only the effective determinant of personality pattern but also helps to control the growth of individual development. The concept mature emotional behaviour at any level is that which reflects the fruits of normal emotional development. (Rishi Vivekananda)

1.34.12 ANXIETY

According to Frost, (1971) anxiety is an uneasiness and feeling of foreboding often found when a person is about to embark in a hazardous venture and it is often accompanied by a strong desire to excel