Chapter I

INTRODUCTION

In the modern world the involvement of physical activity become less to execute the daily routine work. It leads to less physical fitness and causes for variety of diseases. This necessitates the human being to perform exercise daily to avoid the health related problems. Exercise is the chief and best system to maintain good health. The exercise of moderate intensity can be important for health benefits. People of both sex at all age groups get benefit from regular exercise. Greater health benefits can be achieved by increasing the intensity and frequency of exercise.

People have become lazy with the advent of modern home appliances. There is no need for hard or even moderate physical work. This is a serious threat to the normal function of our body and is the cause of modern day illness like heart attack, obesity and diabetics. These diseases that were formerly found only among elderly person are now common in the young and middle aged people. The people of this age are striving hard to make their life easier. There is an increase in the mental stress and strain as never before. People are mentally unhealthy and are unequipped to cope with present day problems.

Middle age is the stage of life when physical decline has started but a person cannot be called old. Various attempts have been made to define this age, which is around the third quarter of the average life span of human beings. According to Collins Dictionary, this is usually considered to occur approximately between the age of 40 and 60. The US Census lists middle age as including both the age categories 35 to 44 and 45
to 54. In this study 80 middle aged people, between the ages of 40 to 49 were selected as subjects.

Good health means that all organs of the body are working efficiently. The important proverb is, ‘Health is wealth’, ‘if health is lost everything is lost’, and is realized more in its absence than by its presence. Youth is not a time of life it is a state of mind. The importance of health is more than education, money and other material comforts. Happiness is intimately concerned more with good physical and mental health than other outside factors. At this stage, we need to know the essential conditions to keep ourselves healthy (Dev, 1999).

The components of health-related fitness are determined by several variables including the individual's pattern and level of habitual activity, diet, and heredity. Individuals who do not exercise regularly are at greater risk of developing hypo kinetic diseases such as coronary heart disease, hypertension, hyperlipidemia, obesity, diabetes mellitus and so on. Moreover, there is highly suggestive evidence that genetic variation accounts for a substantial fraction of the individual differences in cardiorespiratory endurance and its response to exercise (Boucher & Malina, 1999). The majority of the health-related fitness components are also influenced by genetic factors and are considered to be the result of the interaction between environmental and genetic effects. For example, heritability around 30% is generally reported for blood pressure (Ward, 1990), and the sensitivity of blood pressure to environmental factors is related to the genotype (Hamet, 1995).
The exercise habits should be maintained year-round, year after to keep the benefits. This may look like an impossible task with personal effort needed for out weighting the possible reward. But, once a regular pattern of exercise is established, activities become easy and natural. In fact, many people don’t maintain their regular level of exercise (Vodka, 1995).

It is a physiological fact that the human organism needs stimulating exercise. When the whole body is subjected to regular muscular activity, requiring vigorous stress on the heart, lungs and muscles, the general efficiency of physiological functions is being improved. Research now strongly has the theory that regular and vigorous exercise helps to keep the heart healthy and may prevent cardio-vascular diseases. A physically fit heart, beats at a lower rate and pumps more oxygen, which denotes the substantial increase of ability to do more physical work. People who keep fit greatly enlarge their fullness of living.

1.1: Yoga

Yoga is an ancient science, based on the understanding of nature’s laws. It has been practiced for thousands of years. Yoga is one of the most valuable gifts of Indian culture. It is a science and art of pure life style. It increases the intake of oxygen, and enhances the functioning of the respiratory, digestive, circulatory, endocrine, reproductive and excretory systems (Anandapadmanabam, 2005).

Yoga is the uniting of individual soul to the universal soul, the union of the personal spirit to God. It is a system of spiritual and physical culture practiced from ancient times in India. It has been applied not only to the central aim of attaining
heightened consciousness but also to the development of every human facilities like physical, emotional and ethical which may conduce to that end (Iyengar, 1968).

Yoga is an ancient art, harmonizing system of development for the body, mind and spirit together. In sports it is generally seen that sports person get injured frequently due to improper flexibility, coordination as well as they do not get proper relaxation after their work out. In this regard, yoga practices are perfect for elimination of stiffness, improving coordination and preventing injuries. Even though, after injuries occurring in the body, these can easily be cured by doing yoga practice. The stretching and breathing practices of yoga help athletes to improve their performance and maintain their bodies. Practices of Dhyana (Meditation) maintain physical, mental and emotional energy, which make better concentration and endurance. Moreover, relaxation technique allows releasing body and mind from fatigue and weakness and has calming impact on mind (Jain, 2003).

There are various systems of yoga to cater the needs of the different types of people to bring about the transformation of the individual. One of the important systems of yoga is raja yoga. It is the royal yoga, because the practitioner becomes the ruler of the mind. Patanjali enumerates eight limbs or stages of yoga boost the quest of the soul. This method of yogic practice finally leads to the stage of smathi. Here, the atma finally merges with the supreme self paramatma. The third limb or stage of raja yoga is Asana.

Asana are physical postures. The common and comfortable postures of asanas are: lying (supine & prone), sitting and standing. While performing asanas, body assumes many forms resembling a variety of creatures. The names of the asanas are significant and illustrate the principle of evolution. Asanas have been evolved every muscle, nerve
and gland in the body. They secure fine physique and soothe the nerves. But the real discipline is the mind. Regular and systematic practices of asanas provide complete equilibrium of body, mind and spirit.

Among the eight limbs of yoga, the third limb ‘asana’ is closely associated with physical education. Asana is the oldest science of self-development for physical, mental and spiritual control. Asanas can be practiced by people of both sex and all age groups irrespective of profession. The physical education discipline is not an exemption to this. Asanas can be applied in physical education for enormous purpose depends upon the creativity of physical education experts.

The primary purpose of applying asanas in the field of physical education is of twofold; they are a) to develop a healthy body and b) to gain self-control and better psychological stability. Human being is a psychosomatic organism. A sound body in a sound mind is essential for players to achieve the goal. Body and mind are like two sides of a coin and one cannot be separated from the other. Asana coordinate actions of both body and mind of players.

Asana is the most effective means in accomplishing the daily practice of mental skills. Separate battery of asanas is available for activation (stimulation) and relaxation. Generally athletes are willing to develop psychological variables such as attention, motivation, achievement motivation, self confidence, level of aspiration, mental health, mental hygiene, positive thoughts etc. To achieve this, athletes have to practice activative asanas. Further, usually athletes are willing to reduce aggression, anxiety, emotion, tension, stress etc., want to decrease their high arousal level and to have relaxed state. They should practice deactive asanas at the right time.
The task is to correct and compensate the weak muscles by regular and systematic practice of compensative asanas that improves each physical systems and promote general harmonious development of the body. Understanding the most suitable compensation of asanas and their effects as well as aware of the insufficiently leaded muscle groups are the task for success.

A person can live without food for about 30 days and without water for about three to six days. But a person can survive without the breath for only five to seven minutes before death. Obviously, breathing is imperative to the sustenance of life. But the breath also has a profound effect upon the nervous system. The yogis have known for thousands of years that there is an intimate connection between the body, the mind and the breath; and that emotions are directly affected by breathing. Accordingly, the yogis developed intricate methods of controlling the breath as a method of controlling the mind and body.

Rapid and shallow breathing depletes carbon dioxide, which causes the sympathetic nervous system to become activated. This results in increased heart rate and blood pressure, which leads to sweaty palms and feet, high levels of anxiety (the flight or fight syndrome), and more. Yoga breathing is an effective method that helps restore and maintain normal carbon dioxide levels.

Yoga exercises become more comfortable and powerful when inhalation and exhalation flow freely. The subtle flowing of air into and out of the nose stimulates a relaxation response, which directly affects the brain and nervous system. Breathing through the nose also warms and filters the air further reducing its impact upon the nervous system. Normal breathing oxygenates our blood and removes the noxious by
products of metabolism and respiration. Controlled yoga breathing (pranayama) when appropriately practiced accelerates this process.

1.2: Benefits of Asanas

Substantial research has been conducted to look at the health benefits of yoga - from the yoga postures (asanas), yoga breathing (pranayama), and meditation. The information on yoga poses and benefits are grouped into three categories such as physiological, psychological, biochemical effects. Furthermore, scientists have laid these results against the benefits of regular exercise. Practicing yogasana, an individual can remain cool, calm quiet interns of physical as well as mental (Jain, 2003).

Yoga can keep the muscles strong, stretch the tension out of them and retain correct alignment. There is no other remedy that can match yogasanas in giving an exercise of the internal organs of the body (Dev, 2000). Yogic practices are supposed to improve the functions of all systems of the human organism, especially of the central nervous system. Few important benefits of asanas are: a) help to learn new skills and techniques more rapidly and easily than before, b) recover more quickly during practice and competition, c) relax more to maintain attention to the task at hand and d) eliminate the disturbing internal thoughts and feelings.

Yoga ensuring that there is an optimum supply of blood being made to various parts of the human body. It helps to flush all the toxins and to provide the much needed nourishment needed to joints. Thus, this will aid in delaying the process of aging, increase energy levels and also overall well being. Yoga can also work as a great toner for a person's muscles which can become flaccid and weak when they are not exercise often. Yoga weight loss programs are also very common around the world. Yoga is a
great way to reduce one's stress levels. Yoga helps build a calm outlook to life and also to give one a positive outlook.

Yoga increases the range of motion in joints. It may also increase lubrication in the joints. The outcome is a sense of ease and fluidity throughout our body. Yoga stretches not only our muscles but all of the soft tissues of our body. That includes ligaments, tendons, and the fascia sheath that surrounds our muscles. And no matter our level of yoga, we most likely will see benefits in a very short period of time. The greatest gains were in shoulder and trunk flexibility.

One of the most studied areas of the health benefits of yoga is its effect on heart disease. Yoga has long been known to lower blood pressure and slow the heart rate. A slower heart rate can benefit people with high blood pressure, heart disease, and stroke. On a biochemical level, studies point to a possible anti-oxidant effect of yoga. The yoga has been associated with decreased cholesterol and triglyceride levels as well as a boost to immune system function.

Yoga has tremendous health benefits for our heart. The gentler forms of yoga lower blood pressure because the asanas (yoga poses, postures, and yoga positions) keep blood flowing evenly throughout our body while we focus on our breathing. People suffering from hypertension can benefit through yoga tremendously, doing hatha yoga can lower heart rate and blood pressure. Many practitioners claim that power yoga is an excellent form of cardio conditioning, which strengthens core muscles while it keeps blood and oxygen circulating throughout your body.
Regular practice of asanas, pranayama and meditation can help such diverse ailments such as diabetes, blood pressure, digestive disorders, arthritis, arteriosclerosis, chronic fatigue, asthma, varicose veins and heart conditions. Laboratory tests have proved the yogi's increased abilities of consciously controlling autonomic or involuntary functions, such as temperature, heartbeat and blood pressure.

The relaxation and exercise components of yoga have a major role to play in the treatment and prevention of high blood pressure (hypertension). A combination of biofeedback and yogic breathing and relaxation techniques has been found to lower blood pressure and reduce the need for high blood pressure medication in people suffering from it. Physicians and scientists are discovering brand new health benefits of yoga every day.

1.3: Body Composition

Body composition is the proportion of the lean body mass and depot fat and it is one of the most important morphological features characterizing human organization. Ideal body fat levels for men are 12% to 17% and 18% to 22% for women. Body fat is essential for certain bodily functions. Body composition assessment has revealed that athletes generally have physique characteristics unique to their specific sports. For example, field events athletes have large quantities of lean tissue and a high percent body fat whereas long distance runners have the least amount of lean body and fat weight. Now a day’s body composition is considered one of the components of fitness as it plays important role in developing fitness (Singh et al., 2004).

Fat is an essential component of the human body, critical in maintaining normal physiological function and homeostasis. The majority of body fat is stored in adipose tissue in subcutaneous sites. There are some deposited around vital organs to play a
primarily protective role in the case of trauma (Malina et al., 2004). However, elevated body fat composition is undesirable, given the strong associations to various diseases including coronary heart disease and non-insulin dependent diabetes mellitus (Gidding et al., 2004; Hardly et al., 2004). Asthma (Tantisira & Weiss, 2001), some cancers and hypertension have been associated with cardiovascular disease (Higashi et al., 2003) and osteoporosis (Ravn et al., 1999).

Health practitioners universally agree that too much body fat is a serious health risk. Problems such as hypertension, elevated blood lipids (fats and cholesterol), diabetes mellitus, cardiovascular disease, respiratory dysfunction, gall bladder disease, and some joint diseases are all related to obesity. Also, some research suggests that excessive accumulation of fat at specific body sites may be an important health risk factor (Wilmore, Buskirk, DiGirolamo, & Lohman, 1986). For instance, it appears that extra fat around the abdomen and waist is associated with higher risk of diabetes, heart disease, and hyperlipidemia. Individuals who accumulate a lot of fat around the waist (apple-shaped) are worse off than those who tend to accumulate fat in the thighs and buttocks (pear-shaped).

The human body consists of several components including fat mass, lean muscle mass, skeletal bone mass and total body water. The proportions of each of these components have important implications for present and future health outcomes including cardiovascular, nutritional and psychological status as well as physical performance capability (Donnelly et al., 1996; Salbe et al., 2002; Ribeiro et al., 2003).
Lean body mass represents the weight of muscles, bones, ligaments, tendons, and internal organs. Lean body mass differs from fat-free mass. Since there is some essential fat in the marrow of bones and internal organs, the lean body mass includes a small percentage of essential fat. However, with the two-component model of body composition, these sources of essential fat are estimated and subtracted from total body weight to obtain the fat-free mass. Practical methods of assessing body composition such as skinfolds, bioelectrical impedance analysis (BIA), and hydrostatic weighing are based on the two-component (fat and fat-free mass) model of body composition.

The relationship between densitometrically-determined body fat percentage (BF%) and BMI, taking age and sex into account internal and external cross-validation of the prediction formulas showed that they gave valid estimates of body fat in males and females at all ages. In obese subjects, however, the prediction formulas slightly overestimated the BF%. The prediction error is comparable to the prediction error obtained with other methods of estimating BF%, such as skinfold thickness measurements or bioelectrical impedance. The main assumption of BMI guidelines is that body mass, adjusted for stature squared, is closely associated with body fatness and consequent morbidity and mortality (Bray, 1996; Cole, 1991).

Changes in diet and exercise patterns are the primary ways for one to lose weight. A change in diet facilitates weight loss by restricting total caloric as well as fat intake. A change in exercise patterns also facilitates weight loss by increasing caloric and fat expenditure (Keim et al., 1990). Even though individuals may attempt to lose weight, many never meet their goals. Weight loss programs often lack the two major elements needed for long-term adherence enjoyment and results.
1.4: Obesity

Obesity is a condition that arises, when the body weight exceeds the required normal weight. Accumulation of fat deposits in the body tissues results in obesity. Nature has laid down health laws for all creatures. When a person starts eating beyond a normal limit set before him, he breaks the health law and imbalance sets in. Such a condition of the body is not good for any individual. Indiscriminate eating without any wisdom to control leads to an obese individual. The fast life of modern times has caused this malady, affecting the lives of many.

Obesity increases the likelihood of various diseases, particularly heart disease, type 2 diabetes, obstructive sleep apnea, certain types of cancer, and osteoarthritis. Obesity is most commonly caused by a combination of excessive food energy intake, lack of physical activity, and genetic susceptibility, although a few cases are caused primarily by genes, endocrine disorders, medications or psychiatric illness. Evidence to support the view that some obese people eat little yet gain weight due to a slow metabolism is limited and average obese people have a greater energy expenditure than their thin counterparts due to the energy required to maintain an increased body mass.

Symptom of obesity is increase of weight; body loses its shape, due to accumulation of fats in various parts of body sometimes body balance is affected. The obese person has to spend extra energy for any movement. This increase in weight is a gradual process. The weight doesn't increase suddenly. We may overlook this, as this increase is not noticeable initially. But beyond certain limits this overweight may become reason for various diseases like hypertension, diabetes, heart problems. So we need to control the weight from the beginning.
Weight can increase because of digestive problems. Useful part of the food is absorbed in blood during the digestion. If there are some problems in this process then it may result in accumulation of fats. If the digestive problem is cured then obesity can reduce. Endocrine glands control various activities of body. A problem in the functioning of endocrine glands results in various physical problems, obesity can also be because of problems in functioning of endocrine gland system. There is strain on endocrine gland system during childbirth, menopause in case of women. So if proper care is not taken during these transformations, it may result in obesity.

1.5: Causes of Obesity

Although the mechanism of obesity development is not fully understood, it is confirmed that obesity occurs when energy intake exceeds than energy expenditure. Genetic factors influence the susceptibility of a given child to an obesity-conducive environment. However, environmental factors, lifestyle preferences, and cultural environment seem to play major roles in the rising prevalence of obesity worldwide (Hill & Peters, 1998; Goodrick, Poston & Foreyt, 1996; Eckel & Krauss, 1998; Grundy, 1998). In a small number of cases, childhood obesity is due to genes such as leptin deficiency or medical causes such as hypothyroidism and growth hormone deficiency or side effects due to drugs (Link, 2004). Most of the time, however, personal lifestyle choices and cultural environment significantly influence obesity.

Although overweight and obesity are mostly assumed to be the results of increase in caloric intake, there is not enough supporting evidence for such phenomenon. Total energy intake is difficult to measure accurately at a population level. However, a small caloric imbalance is sufficient over a long period of time to lead to obesity. While for
many years it has been claimed that the increase in pediatric obesity has happened because of an increase in high fat intake, contradictory results have been obtained by cross-sectional and longitudinal studies. On the other hand, some cross-sectional studies have found a positive relationship between fat intake and adiposity in children even after controlling for confounding factors (Maffeis, Pinelli & Schutz, 1996; Tucker, Seljaas & Hager, 1997). Although too much fat eaten is leads to obesity, there is not strong enough evidence that fat intake is the chief reason for the ascending trend of childhood obesity.

1.6: Rescue of Obesity by Yoga

Yoga is an age-old system of healing that seeks to restore imbalances in the body, mind and soul. Yoga practices help in energizing the body, which has been in an inactive mode due to obesity. Importantly, yoga helps in cleansing the body of toxins and reduces fatigue. Asanas or yoga postures help to burn up excess fat, improve metabolism, tone up muscles and help the practitioner enjoy a healthy lifestyle. Practicing yoga can be one of the most enjoyable and rewarding ways for obese people to become healthy, build confidence and self-esteem, and sometimes achieve weight loss.

Yoga can benefit to the obese people in many ways, including building strength, flexibility and balance. In addition, yoga positions are designed in a way that stimulates the glandular system, which invigorates and energizes of the body. Yoga also revitalizes the nervous system and improves cardio-respiratory health. The stress can be a factor contributing to weight gain, and we can lower our stress level by practicing yoga. Dieting and physical exercise are the mainstays of treatment for obesity. The diet quality can be
improved by reducing the consumption of energy-dense foods such as those high in fat and sugars, and by increasing the intake of dietary fiber.

1.7: Hypertension

Hypertension sometimes called arterial hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated (Chobanian et al., 2003). This requires the heart to work harder than normal to circulate blood through the blood vessels. Blood pressure is summarized by two measurements. They are systolic and diastolic blood pressure, which depend on whether the heart muscle is contracting (systole) or relaxed between beats (diastole) and equate to a maximum and minimum pressure, respectively. The middle aged people’s normal blood pressure at rest is within the range of 90-140mmHg systolic (top reading) and 60-90mmHg diastolic (bottom reading). High blood pressure is said to be present if it is persistently at or above 140/90 mmHg.

Most of the individuals, during exercise, the systolic pressure progressively increase while the diastolic remains about the same. This behavior facilitates a much greater increase in stroke volume and cardiac output at a lower mean blood pressure and enables much greater aerobic capacity and physical performance. The diastolic drop reflects a much greater fall in total peripheral resistance of the muscle arterioles in response to the exercise (a greater proportion of red versus white muscle tissue).

High blood pressure causes the heart to work harder than normal, as it has to expel blood from the left ventricle against greater resistance. Furthermore, hypertension places great strain to the systemic' arteries and arterioles. Overtime, this stress can cause
the heart to enlarge and the arteries and arterioles to become scared, hardened, and less elastic. Eventually, this can lead to atherosclerosis and diseases affecting the functioning of heart and kidney. The pathophysiology of hypertension is not well understood. In fact, it is estimated that 90% or more of those identified with hypertension are classified as having idiopathic hypertension, which is hypertension of unknown origin. Idiopathic hypertension, also referred to as essential hypertension, can result from genetic factors, high sodium intake, obesity, insulin resistance, physical inactivity, psychological stress, a combination of these factors or other factors yet to be substantiated or determined.

Hypertension is a major risk factor for stroke, myocardial infarction (heart attacks), heart failure, aneurysms of the arteries (e.g. aortic aneurysm), peripheral arterial disease and is a cause of chronic kidney disease. Even moderate elevation of arterial blood pressure is associated with a shortened life expectancy. Dietary and lifestyle changes can improve blood pressure control and decrease the risk of associated health complications, although drug treatment is often necessary in people for whom lifestyle changes are not enough or not effective.

1.8: Cause of Hypertension

Primary (essential) hypertension is mostly common in almost all contemporary societies, blood pressure rises with aging and the risk of becoming hypertensive in later life is considerable (Vasan, 2002). Hypertension results from a complex interaction of genes and environmental factors. Numerous common genetic variants with small effects on blood pressure have been identified (Ehret, 2011) as well as some rare genetic variants with large effects on blood pressure (Lifton, Gharavi & Geller, 2001) but the
genetic basis of hypertension is still poorly understood. Several environmental factors influence blood pressure.

Secondary hypertension results from an identifiable cause. Renal disease is the most common secondary cause of hypertension (O'Brien et al., 2007). Hypertension can also be caused by endocrine conditions, such as Cushing's syndrome, hyperthyroidism, hypothyroidism, acromegaly, Conn's syndrome or hyperaldosteronism, hyperparathyroidism and pheochromocytoma (He & MacGregor, 2009; Dluhy & Williams, 1998). Other causes of secondary hypertension include obesity, sleep apnea, pregnancy, coarctation of the aorta, excessive liquorice consumption and certain prescription medicines, herbal remedies and illegal drugs (He & MacGregor, 2009; Grossman & Messerli, 2012).

Lifestyle factors that lower blood pressure include reduced dietary salt intake (He, Li & Macgregor, 2013), increased consumption of fruits and low fat products, exercise (Dickinson, 2006), weight loss (Haslam & James, 2005) and reduced alcohol intake (Whelton et al., 2002). Stress appears to play a minor role (Marshall, Wolfe & McKevitt, 2012). The possible role of other factors such as caffeine consumption (Mesas, 2011) and vitamin D deficiency (Vaidya & Forman, 2010) are less clear cut. Insulin resistance, which is common in obesity and is a component of syndrome X is also thought to contribute to hypertension (Sorof & Daniels, 2002). Recent studies have also implicated events in early life (for example low birth weight, maternal smoking and lack of breast feeding) as risk factors for adult essential hypertension (Lawlor & Smith, 2005). Although the mechanisms linking these exposures to adult hypertension remain obscure (Lawlor & Smith, 2005).
1.9: Yoga and Hypertension

The main goal of treatment for hypertension is to lower blood pressure to less than 140/90 - or even lower in some groups such as people with diabetes, and people with chronic kidney diseases. Treating hypertension is important for reducing the risk of stroke, heart attack, and heart failure. High blood pressure may be treated medically, by changing lifestyle factors, or a combination of the two. Important lifestyle changes include losing weight, quitting smoking, eating a healthy diet, reducing sodium intake, exercising regularly, and limiting alcohol consumption.

Hypertension affects the internal organs like heart, lungs, liver and kidneys. Practice of asanas and pranayama helps to reduce the damage caused by hypertension. During asana practice, the movements are static; hence, it requires less blood and oxygen to assume a posture. This poses less strain, keeping the muscles relaxed. The circulation of blood is improved. When blood circulation is improved, the brain absorbs more oxygen and this helps to be alert, enhances concentration skills and improves mood swings. When stress is reduced, the body’s immune system gets a boost that also effectively enhances cognitive abilities.

In order to prevent this disease, yogic practices should be incorporated into our daily routine. Yoga helps to combats stress and saturates the mind with tranquility. However, yoga is not the only instrument to cure for hypertension, medical advice is necessary. The Yoga asanas help in bringing about a balance in the autonomous nervous system, a center that controls stress. Yoga helps in regulating the blood pressure by stabilizing the sympathetic and parasympathetic nervous system. Sedentary lifestyles are the reason for high blood pressure. Physical activity and ability to stay active helps to
reduce the risk of blood pressure. Physical activity makes the heart stronger. Exercise helps to improve the condition of the heart, by making it pump more blood efficiently. High blood pressure is caused due to high levels of stress. It is purely a mental condition. The most effective way to handle stress is to change our mental attitude towards the problems that trouble us. To initiate change in thought patterns requires mental strength. This strength can be gained through yoga.

1.10: Need of the Study

Obesity has reached epidemic levels in developed countries. Overweight and obesity are known to have significant impact on both physical and psychological health. The mechanism of obesity development is not fully understood and it is believed to be a disorder with multiple causes. The environmental factors, lifestyle preferences, and cultural environment play pivotal roles in the rising prevalence of obesity worldwide. In general, overweight and obesity are assumed to be the results of an increase in caloric and fat intake. On the other hand, there are supporting evidence that excessive sugar intake by soft drink, increased portion size, and steady decline in physical activity have been playing major roles in the rising rates of obesity all around the world. Consequently, both over-consumption of calories and reduced physical activity are involved in obesity.

Almost all researchers agree that prevention could be the key strategy for controlling the current epidemic of obesity. Prevention may include primary prevention of overweight or obesity, secondary prevention or prevention of weight regains following weight loss, and avoidance of more weight increase in obese persons unable to lose weight. Until now, most approaches have focused on changing the behaviour of individuals in diet and exercise. It seems, however, that these strategies have had little
impact on the growing increase of the obesity epidemic. There are 50% of the adults are overweight and obese in many countries, it is difficult to reduce excessive weight once it becomes established. Prevention may be achieved through a variety of interventions targeting built environment, physical activity, and diet. All in all, there is an urgent need to initiate prevention and treatment of obesity.

Pulmonary arterial hypertension is a progressive disorder characterized by abnormally high blood pressure (hypertension) in the pulmonary artery, the blood vessel that carries blood from the heart to the lungs. Hypertension occurs when most of the very small arteries throughout the lungs narrow in diameter, which increases the resistance to blood, flow through the lungs. To overcome the increased resistance, pressure increases in the pulmonary artery and in the heart chamber that pumps blood into the pulmonary artery (the right ventricle). Signs and symptoms of pulmonary arterial hypertension occur when increased pressure cannot fully overcome the elevated resistance and blood flow to the body is insufficient. Early detection and appropriate treatment may significantly improve patients lives and increase survival, therefore the primary goals of pulmonary arterial hypertension (PAH) treatment are to improve symptoms, including increasing a patient’s exercise capacity, leading to improved quality of life and a better chance of survival.

Recent research has shown that mind plays a more vital role in ensuring total health. Yoga is an effective way of dealing with mind, which in turn helps in dealing with any psychosomatic diseases/disorders like Hypertension. Yoga and meditation has helped to control blood pressure. Hypertension can regress with proper life-style management and practice of Yoga/Meditation. Adopting a proper life-style and doing Yoga - a way of
life, one can surely prevent as well as cure hypertension. Yoga is also beneficial in speedy rehabilitation of a patient.

A combination of biofeedback and yogic breathing and relaxation techniques has been found to lower blood pressure and reduce the need for high blood pressure medication in people suffering from it. Yoga exercises are considered as the best exercises to increase the body tone and strength against different diseases. Research study on the yoga exercises reveals its beneficial role on physical and health of a person. Scientific literature gives scholarly reviews on the benefits of yoga exercises in different health conditions. It was evaluated that yoga interventions shows benefits superior to exercises in all studies. All research studies found in the scientific literature for the comparison of yoga and exercise.

Past research has been found a wide range of health benefits for yoga, including reduced hypertension and obesity. But these studies have typically included mostly women. They have not focused on people with multiple health problems. Studies also suggest that practicing yoga might have other health benefits such as reducing heart rate and blood pressure.

Though yogic exercises develop most of the components of fitness, it is expected that it will have an effect on the body composition, obesity and hypertension. Some modern texts seem to indicate that yogic exercises will strengthen all organs and all physiological functions of the body. Research work on the development and maintenance of physical fitness and physiological functions of human being is an important area which requires a lot of investigation. By considering the above literature, in this study, an
attempt has been made to analyze the changes on selected body composition, obesity and hypertension due to the effect of performing selected yogasanas in middle aged people.

1.11: STATEMENT OF THE PROBLEM

The purpose of the study was to determine the effect of yoga training in middle aged people on selected body composition, obesity and hypertension.

1.12: OBJECTIVES OF THE STUDY

The primary research objectives of the study are:

1. To evaluate the influence of yoga training on selected body composition, obesity and hypertension in different age category of middle aged men.
2. To evaluate the influence of yoga training on selected body composition, obesity and hypertension in different age category of middle aged women.
3. To compare the changes on selected body composition, obesity and hypertension due to the impact of yoga training among different age category of men and women.

1.13: SIGNIFICANCE OF THE STUDY

Researchers have proved that exercises are beneficial to physically untrained people for their healthy living, by improving their physical and physiological conditions. This study would be significant in the following ways.

1. The study may throw light on the favorable effect of yoga programme on body composition, obesity and hypertension among the middle aged people.
2. The study may be beneficial to the common people to follow suitable yoga training to live a healthy life.
3. This study provides a prospect to the physical educators, exercise physiologists, coaches and athletes to scientifically understand and weigh up the changes in body composition, obesity and hypertension as a result of yoga training.

4. The researcher hopes that the results will help broaden yoga's appeal especially as a therapy for veterans with hypertension and obesity.

5. The result of the study would provide therapists with knowledge to treat patients suffering from hypertension and obesity related risk factors.

6. The verdict of the study would be a greater value for future training programme and delightful to the middle aged people.

7. This study provides basic information about yoga, summarizes scientific research on effectiveness and safety, and suggests sources for additional information.

8. This attempt would give impetus to researchers to analyze various related aspects of training.

9. The findings of this study would be an added knowledge in the field of exercise physiology.

1.14: HYPOTHESES

Based on the results of the previous studies and reviewing the related literature available in the area, the investigator framed the following hypothesis as:

1. It was hypotheses that there would be significant changes on selected body composition, obesity and hypertension due to the impact of yoga training among different age category middle aged men.
2. It was hypothesized that there would be significant changes on selected body composition, obesity and hypertension due to the impact of yoga training among different age category middle aged women.

3. It was hypothesized that there would be significant differences between different age category of middle aged men and women in altering the selected dependent variables due to the impact of yoga training.

1.15: DELIMITATIONS

The study was delimited to the following factors.

1. To achieve the purpose of this study eighty middle aged people were selected, in which 40 subjects were men and remaining 40 subjects were women. They were further categorized into four sub-groups of 20 subjects each. The first one is 40-44 age groups of men and women separately and another one 45-49 age groups of men and women separately.

2. The selected participants were the inhabitants of Nagercoil, a small town in the State of Tamil Nadu, India, and they were in the age group of 40 to 49 years.

3. The participants were restricted to perform only selected yogasanas. The duration of experimental period was restricted to twelve weeks and the frequency of training was six days in a week. This period was considered enough to get the significant changes in selected dependent variables.

4. In this study, the dependent variables selected were percent body fat, lean body mass, body mass index, systolic blood pressure and diastolic blood pressure.
5. Pre tests data was collected on selected dependent variables prior to the training and post tests data was collected after twelve week of experimental treatment from the different age categories of men and women groups on selected dependent variables.

1.16: LIMITATIONS

The following factors are the limitations of the study since the researcher could not have control over them.

1. The changes in climate condition such as temperature, atmospheric pressure, humidity during the training as well as testing periods could not be controlled and their influence on the result of the study was recognized as limitation.

2. The investigator could not control lifestyle factors that affect metabolic function.

3. The subjects’ anthropometric parameters, health habits, heredity and socio-economic conditions were not considered.

4. The investigator could not control sleep/wake up cycle of the subjects.

5. The investigator did not control the subject’s nutritional intake and fluid ingestion.

6. Physical fitness levels of the selected participants may not be the same and training administered might not have the same effect on all the participants.

1.17: MEANING AND DEFINITION OF THE TERMS

1.17.1: Yoga

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).
1.17.2: Training

“Training is usually defined as a systematic process of repetitive progressive exercises, having ultimate goal of improving athletic performance” (Bompa, 1996).

1.17.3: Obesity

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems. People are considered obese when their body mass index (BMI), a measurement obtained by dividing a person's weight in kilograms by the square of the person's height in metres, exceeds 30 kg/m$^2$ (Wikipedia).

1.17.4: Percent Body Fat

A measurement of fat in human body usually expressed as a percentage of total body weight. The normal percentage of fat of an adult male is between 15 and 17 and that of female is about 25 (Kent, 1994).

1.17.5: Lean body mass

Lean body mass is a component of body composition, calculated by subtracting body fat weight from total body weight. Total body weight is lean plus fat (Wikipedia). In equation:

\[
\text{Lean Body Mass (LBM)} = \text{Body Weight (BW)} - \text{Body Fat (BF)}
\]

1.17.6: Body Mass Index

An estimation of body composition used especially in epidemiological studies. It is an indicator of obesity on the assumption that the higher the index the greater the level of body fat (Kent, 1994).

\[
\text{BMI} = \frac{\text{Weight in Kilogram}}{\text{Height in meters}^2}
\]
1.17.7: Hypertension

Hypertension is an abnormal elevation of systolic and/or diastolic arterial pressure in which an individual's blood pressure regularly exceeds 140/90 mm Hg. Blood pressure is the force of blood pushing against the walls of arteries as it flows through them. Arteries are the blood vessels that carry oxygenated blood from the heart to the body's tissues (Wikipedia).

1.17.8: Blood Pressure

Blood pressure is known that blood flow through the vessels of the circulatory system as a result of pressure gradient. This means that blood flows from a point of high pressure to one of the low pressure (Shaver, 1981).

1.17.9: Systolic Blood Pressure

Systolic blood pressure is the highest arterial pressure measured during the cardiac cycle. It is the pressure in the artery after blood has been ejected from the ventricle during stroke (Costanzo, 1998).

1.17.10: Diastolic Blood Pressure

Diastolic blood pressure is the lowest arterial pressure measured during the cardiac cycle. It is the pressure in the artery during ventricular relaxation when no blood is being ejected from the left ventricle (Costanzo, 1998).