

# **CHAPTER – I**

## **INTRODUCTION**

Sport is an institution, which has its own traditions and values. Being an institutionalized and competitive activity, it involves vigorous physical exertion and the use of relatively complex physical skills by individuals whose participation is motivated by a combination of intrinsic satisfaction associated with the activity itself and external rewards earned through participation. The world has realized the importance of sports for modern civilization. Sports performance is indeed an aspect of complex human performance, which has several dimensions.

### **1.1 FITNESS**

Fit people make a fit nation. Fitness is that State which characterizes the degree to which a person is able to function more efficiently. Fitness is an individual matter. It implies the ability of each person to live most effectively within his potentialities (**HockeyEd.'1985**)

Fitness is that state which characterizes the degree to which a person is able to function efficiently. To lead a happy and successful life, people have to develop physical fitness, because it is necessary for the proper functioning of the body and the system. While fitness is important and functional according to the activity or the game that one undertakes, health becomes a basic necessity to every human being to live best and serve best.

### **1.2 PHYSICAL FITNESS**

Physical fitness is one the richest possessions. It cannot be purchase but it can be earned through routine physical exercises. Physical fitness as defined by the World Health Organizations is “the ability to perform muscular work satisfactorily” The purpose of physical fitness is to create a consciousness and enthusiasm amongst

the people and to stimulate their interest for physical welfare, which will in turn help them to lead a more healthy living. The physical fitness is also expected to assess factors such as speed, strength, endurance and agility which makes a person physically efficient. (**Rober V.Hockey, 1993**)

A physically fit person will have the efficient body movement or neuromuscular co-ordination as it is often called and is also bestowed with the ability to perform a given task with high degree of proficiency. The term fitness includes physical fitness, physiological fitness, and mental fitness, and cardiovascular fitness, social and spiritual fitness. Physically fit people are able to withstand fatigue for longer periods and are better equipped to tolerate physical stress.

Many researchers strongly support the view that regular exercise helps to keep a strong and healthy heart and prevents cardiovascular diseases. A physically fit heart beats at a lower rate and pumps more blood per beat at rest. As a result of regular exercise, an individual's capacity to use oxygen is increased substantially. To develop and maintain physical fitness, vigorous effort by the individual is required. Cardio-respiratory endurance, strength, muscular endurance, flexibility, power and agility are the basic compounds of physical fitness. Physical fitness is considered as one of the most valuable assets and it has received a high priority in all thoughts and actions. Modern coaches devote their time in coaching during pre season mainly for ensuring endurance, strength and flexibility. These are improved by training.

**Powell (1972)** explains that fitness is not an end, it is the beginning. A person must get fit to perform and will not necessarily get fit by performing. Fitness is not a matter of physical capacity alone. To develop and maintain a person's physical

fitness, vigorous effort by the individual is required. Body fitness and weight control greatly reduce cardiovascular diseases. This results from (a) maintenance of moderately lower blood pressure, (b) reduced blood cholesterol and (c) low density lipoprotein along with increased high-density lipoprotein. As pointed out earlier, these change all a work together to reduce the number of heart attacks and brain strokes.

Therefore it is the responsibility of every country to promote physical fitness for its citizens, because physical fitness is the basic requirement for most of the tasks to be undertaken by an individual in his/her daily life. To develop certain physical fitness and physiological fitness several methods of training are used namely circuit training, weight training, fartlek training, yoga training, aerobic training, etc. From the above, it is inferred that yoga and Aerobic exercises are very much needed to maintain a general level of physical fitness, particularly as it enhances the physical stamina and the cardio respiratory endurance.

### **1.3YOGA**

Yoga is the “Union of the individual self with the universal self”  
(Iyengar, 2001)

Yoga means the union or communication or unity with our inner being.  
‘Asana’ means a state of being in which we can remain steady, calm, quiet and comfortable with our physical body and mind.

### **1.4MEANING OF YOGA**

Yoga is a systematic practice for the realization of higher perceptions. It is the science of life and an ideal way of living, providing rhythm to the body, melody to the mind, harmony to the soul and thereby symphony to life. In short, Yoga is a way to

achieve total health, peace, bliss and wisdom. Physical, mental and spiritual aspects of yoga help to make one's life purposeful, useful and noble. Thus Yoga is an art, science and philosophy, which influence the life of man at each level. Therefore, the effect of yoga must be felt in every movement of our day- to- day lives. Yoga is an ancient Indian science which teaches man how to live in unity within himself and with those around him. It is recognized as one of the most important and valuable heritages of India. More than 2000 years ago our ancestors developed it to bind the body, mind and spirit, as a harmonious whole. It has been growing in popularity with unbelievable rapidity over the years. Today the whole world is looking towards yoga for answers to the various problems the modern man is facing (**Sharma, 1989**).

Yoga is a way of life. It is an integrated system of education for the body, mind and inner spirit. This art of right living was perfected and practiced in India thousands of years ago but, as yoga deals with universal truths, its teachings are valid today as they were in the ancient times. Yoga is a practical aid, does not belong to one religion and its techniques could be practiced by the Buddhists, Jews, Christians, Muslims, Hindus and the Atheists alike. Yoga is union with all. It brings peace to the human beings by physical practices with or without a toner on spiritualism. As we live in the age of modern science and technology, our lifestyle has become very fast. It is also becoming very hard and difficult to live a natural and normal life because of the changing scenario of the world. The very air is becoming unfit for human consumption. Our cities are growing noisier, dirtier and congested. All these do create tension. The mind is always under strain due to various social evils. When we are under stress, our digestion is not proper and we may suffer from some fairly serious

elements like Asthma and Spondylitis etc., and yoga comes to our rescue at this juncture (**Iyengar, 1993**).

### **1.5 PHYSIOLOGICAL VIEWS OF YOGASANAS**

Yoga helps to tone up the entire body to regularize blood compositions and improve blood circulations, tones up glands and visceral muscles.

Robson states that “yoga develops flexibility and vital capacity”. Regular practice of yoga helps to keep our body fit, controls cholesterol level, reduces weight, normalizes blood pressure and improves heart performances.

Further, preliminary studies in the United States and India suggest that yoga may be helpful for specific conditions, such as asthma, epilepsy, anxiety, stress and others.

Regular exercise results in an increase in the blood flow and improves oxygen carrying and waste removal capacity and further increases work load capacity (**Frank Vitale, 1973**).

Exercise increases the volume of hemoglobin and erythrocyte of the blood. Also blood vessels are seen to maintain elasticity and suppleness when stressed systematically probably by the beneficial effect of the heart.

### **1.6 BENEFITS OF YOGA**

Today, the focus is more on yoga’s practical benefits. There is a difference between yoga and stretching and normal exercise. Yoga teaches the concept of focusing awareness while performing specific postures. The benefits of yoga are numerous, including improved physical fitness, stress control, general well-being, mental clarity and greater self- understanding. The poses enhance muscle strength, coordination, flexibility and agility and can help hack feel better.

According to the National Institutes of Health, when people actively seek to reduce the stress in their lives by quieting the mind, the body often works to heal itself. In this sense, yoga can be seen not only as a way to get into shape on several levels, but also a tool for self healing.

As for athletes, yoga can be a powerful enhancement in regular training exercises. Adding yoga in a routine training programme helps to develop strength, flexibility, range of motion, concentration, and cardiovascular health and reduces stress, tension and tightness. The most significant benefit of adding yoga to a training programme is its effect on performance. Yoga allows an athlete to train harder and at a higher level because the range of motion is greater and the fear of injury is lessened.

The Suryanamaskar is a vital part in hatha yoga breath training. The physical basis of the practice links together twelve asanas in a dynamically performed series. A full round of suryanamaskar is considered to be two sets of the twelve poses with a change in the second set to moving the opposite leg first through the series. With increasing scientific research in yoga, its therapeutic and other aspects are also being explored.

### **1.7AEROBIC EXERCISE**

Aerobic exercise means the exercise where all body parts/muscles are supplied with enough oxygen with the increased heart rate. Aerobic exercises include brisk walking, jogging, swimming, cross-country running, stepping, hopping, and skipping. By doing aerobics, the whole body is used and major muscle groups including legs, trunk and arms get involved. In aerobic exercise the heart rate increases substantially, but never reaches its maximum level. The heart is always able to deliver sufficient oxygen-rich blood to muscles so that they can derive energy from fat and glycogen

aerobically. Aerobic exercises build stamina for sports and it also is the most important form of exercise for health, since it increases the efficiency of heart, circulation and muscles. Aerobic exercise is the keystone of fitness by doing aerobics it increases the capillary network in the body.

Aerobics and calisthenics are performed to the rhythmic pulse of disco music and strength together in what amounts to a modern dance form, so as to make the exercise more enjoyable and encouraging without extra effort. By doing exercise, the whole system of our body carries oxygen-rich air enters the organs and tissues of the muscles has been called “the aerobic system” and for this reason training the system for stamina is called aerobic training (**Cooper, 1969**).

A typical aerobic exercise work out consists of 8 to 10 minutes of stretching, calisthenics and low intensity exercise. This is followed by 15 to 45 minutes of either high or low impact aerobic dancing according to the target training intensity. The heart rate should be monitored at least 6 times during the exercise to ensure that the heart rate stays within the target zone. The 10 minutes cool down period usually includes more stretching and callisthenic type exercise. Improved cardio respiratory endurance is often one of the most important benefits of aerobic training programs. An aerobic exercise work out is divided into four phases: warm up, skill review, aerobic and cool down. Each phase has its own purposes, without which the work out is incomplete. Each phase of the program is necessary is aerobic dance is to provide the desired benefits.

The main objective of an aerobic exercise program is to increase the maximum amount of oxygen that the body can process within a given time. This is called “Aerobic capacity”. It is dependent upon an ability to (1) rapidly breathe a large

amount of air, (2) forcefully deliver large volumes of blood and (3) effectively deliver oxygen to all parts of the body. In short, it depends upon efficient lungs, a powerful heart, and a good vascular system. Because it reflects the conditions of these vital organs, the aerobics capacity is the best index of overall physical fitness. The aerobic dance is a good way to decrease percentage of body fat and to attain the other metabolic benefits of fitness (**Cooper, 1969**).

Aerobic exercise and fitness can be contrasted with anaerobic exercise, of which strength training and weight training are the most salient examples. The two types of exercise differ by the duration and intensity of muscular contractions involved, as well as by how energy is generated within the muscle. Initially during aerobic exercise, glycogen is broken down to produce glucose, but in its absence, fat metabolism is initiated instead. The latter is a slow process, and is accompanied by a decline in performance level. The switch to fat as fuel is a major cause of what marathon runners call "hitting the wall". Anaerobic exercise, in contrast, refers to the initial phase of exercise, or any short burst of intense exertion, in which the glycogen or sugar is consumed without oxygen, and is a far less efficient process. Operating anaerobically, an untrained 400 meter sprinter may "hit the wall" short of the full distance.

Aerobic exercise is the exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process. There are several kinds of aerobic exercise which are performed at moderate levels of intensity for extended periods of time. To obtain the best results, an aerobic exercise session involves a warming up period, followed by at least 20 minutes of moderate to intense exercise,



involving large muscle groups, and a cooling down period at the end. Aerobics is a form of physical exercise that combines rhythmic aerobic exercise with stretching and strength training routines with the goal of improving all elements of fitness (flexibility, muscular strength and cardio – vascular fitness). It is usually performed to music and may be practiced in a group setting led by an instructor, although it can be done solo and without musical accompaniment. With the goal of preventing illness and promoting physical fitness, practitioners perform various routines comprising a number of different dance-like exercises. Formal aerobics classes are divided into different levels of intensity and complexity. Aerobics classes may allow participants to select their level of participation according to their fitness level. Many gyms offer a wide variety of aerobic classes for participants. Each class is designed for a certain level of experience and taught by a certified instructor with a specialty area related to their particular class (Cooper, 1985).

### **1.8AEROBIC DANCE**

Dance is a popular activity of people of all ages and is both a physical activity and a performing art that provides participants with an opportunity for aesthetic expression through movement. People dance for a variety of reasons. Dance is used to communicate ideas and feelings and is considered a creative art. The dance is an integral part of educational experience as a form of recreation and it provides opportunities for enjoyment, self expression, and relaxation. Dance can also be used as a form of therapy providing opportunities for individuals to express their thoughts and feelings. It provides a means to cope with various stresses placed on individuals. Dance is increasingly used as a means to develop fitness. There are many forms of dance that are enjoyed by individuals including ballet, ballroom, folk, and clog,

modern, square and top. Cultural heritages is reflected in and passed on through dance activities. Within the past two decades aerobic dance provides participants with an opportunity to develop fitness and experience the fun and enjoyment of working out of music.

The aerobic dance is a common craze among most people today. It is one of the best ways to enjoy a fitness program and also a way to achieve better health. The aerobic dance is a feet tapping exercise that is accompanied with musical beats and the signals of an instructor. Aerobic dancing also induces fast breathing for a long period of time by pumping more oxygen into the bloodstream. Also known as “aerobics”, the aerobic dance can be done with hip hop or country folk music. There are different types of aerobics such as dance aerobics, step aerobics, low impact aerobics, high impact aerobics, water aerobics and aerobic kickboxing (**Cooper, 1969**).

### **1.9 PHYSICAL BENEFITS OF AEROBICS**

Aerobic exercise is a moderate intensity workout that extends over a certain period of time and uses oxygen in this process. Aerobics has become the most happening workout trend among the youth. Not only is performing aerobic exercise interesting, but also is very beneficial for health. Aerobics is a good way to decrease our percentage of body fat and to attain the other metabolic benefits of fitness. Aerobics is also a very good way to develop musculo skeletal fitness while building strength, flexibility, coordination. Aerobics is a progressive physical conditioning programme that stimulates cardio respiratory activity for a time period sufficiently long to produce beneficial changes in the body. To do any work we need energy and even while at rest some physiological functions have to be carried within our body

and for that purpose some calories of energy will be burnt. As the intensity and duration of work increases the demand for the fuel in the working muscles also increases. The organs which supply the needful should cope with the demand. It helps to strengthen lower back and works a great deal in enhancing cardiovascular development. Kickboxing is extremely useful for quick weight loss, as it helps in burning about 350-450 calories during a 50 minute workout session. At the initial level, kickboxing consists of some basic stretches and cardio warm up (**Stoll & Jennifer, 1989**).

### **1.10 PHYSIOLOGICAL CHANGES ON AEROBICS**

There is normally an increase in the number of red blood cells, but not in the concentration of haemoglobin in the blood. Some of the benefits of aerobic exercises include the productivity of less lactic acid and greater endurance. Physiologists have found that it reduces blood pressure and change blood chemistry. It also improves the efficiency of the heart. Also in the increased number and size of mitochondria, increased muscle glycogen, reduction in triglycerides, increased activity of enzymes of involved in fatty acid activation, transport and oxidation.

Regular aerobic exercises will improve cardiovascular and cardio respiratory function (heart and lungs), an increased maximal oxygen consumption ( $VO_{2max}$ ), maximal cardiac output (amount of blood pumped every minute), maximal stroke volume (amount of blood pumped with each beat) and blood volume and ability to carry oxygen. Reduced workload on the heart (myocardial oxygen consumption) for any given sub maximal exercise intensity, increased blood supply to muscles and ability to use oxygen Lower heart rate and blood pressure at any level of sub maximal exercise, threshold for lactic acid accumulation. Lower resting systolic and diastolic

blood pressure in people with high blood pressure, Increased HDL Cholesterol (the good cholesterol), Decreased blood triglycerides reduced body fat and improved weight control Improved glucose tolerance and reduced insulin resistance.

Aerobics boasts millions of followers in numerous countries throughout the world. It is well accepted that aerobics confers health and fitness benefits upon those who practice it regularly. Millions of people who eagerly enroll in aerobic classes, swim or jog regularly and participate in a multitude of other activities such as already determined and that these activities are not only fun but they contribute to their mental, physical and social development (**Stoll & Jennifer, 1989**).

### **1.11 YOGA AND AEROBIC EXERCISES**

Physical exercises are repetitive movements whereas yoga exercise involves very little movement and only postures maintained for a period of time. Physical exercises lay emphasis on strong movements of muscles whereas yoga opposes violent movements.

Yogic postures tone up the body and the mind whereas physical exercise affects mainly the body. The caloric requirement in yogic asanas varies from 0.8 to 3 calories per minute while the caloric requirement of a physical exercise varies from 3 to 20 calories per minute. The main purpose of physical exercise is to increase the circulation of the blood and the intake of oxygen. This can be done by yoga's simple movements of the spine and various joints of the body with deep breathing, but without violent movements and asanas, the various blood vessels are pulled and stretched and blood is equally distributed to every part of the body. The stretched and blood is equally distributed to every part of the body. The stretched muscles and ligaments during yoga practices are immediately relaxed muscles. Fatigue

appears after doing physical exercises. Fatigue disappears if yoga and pranayama is practiced. Tension increases and nerves are more tightened through physical exercise. Nerves and body muscles are relaxed by yoga.

Yogic exercise aims at both prevention and treatment of various diseases. Breathing exercise aims at both prevention and treatment of various diseases. Breathing exercises like pranayama including Kapalabhati is very effective for keeping the lungs healthy and prevent lung infections.

With deep breathing air circulates to every part of the lungs whereas with most other physical exercises, there is mainly an increase in the respiratory rate. However, physical exercise wastes more energy due to quick movements and more lactic acids are formed in the muscle fibers.

But energy is not wasted in yoga practices. Yoga postures and breathing exercises unlike physical exercises do not strain the cardio vascular system, and they improve one's physical fitness and endurance.

### **1.12 SURYANAMASKAR**

Suryanamaskar also known in English as Sun Salutation is a common sequence of asanas. Its origins lie in a worship of Surya, the Hindu solar deity. This sequence of movements and asanas can be practised on varying levels of awareness, ranging from that of physical exercise in various styles, to a complete sadhana which incorporates asana, pranayama, mantra and chakra meditation. It is often the beginning vinyasa within a longer yoga series. Suryanamaskar may also refer to other styles of "Salutations to the Sun". The Hatha Yoga Pradipika, the oldest known hatha yoga text does not mention "Sun Salutations" but mentions a surya-bhedana (sun-piercing) kumbhaka while the Gheranda Samhita mentions surya-bheda kumbhaka.

The oldest documented book with clear depictions of asanas is the Sritattvanidhi, though there is no mention of "Sun Salutations" in the text, it does describe the asanas "Sarpasana" (Bhujangasana), "Gajasana" (Adhomukh Swannasan), "Uttanasana" and series of asanas done in tandem, similar to Suryanamaskar. Other sources which cite early use of "Sun Salutations" are A Short History of Aryan Medical Science from 1896, which claims that in India "there are various kinds of physical exercise indoors and outdoors. But some of the Hindoos set aside a portion of their daily worship for making salutations to the Sun by prostrations. This method of adoration affords them so much muscular activity that it takes to some extent the place of physical exercise (Patel, 2004).

The natural process of sunrise in the morning and sunset in the evening has a lot of impact of human body. So the basic translation of suryanamaskar is salutations to the sun. It is a very ancient tradition which has been in existence since the Vedic age. The physical basis of the practice links together twelve asanas in a dynamically performed series. These asanas are ordered so that they alternately stretch the spine backwards and forwards. When performed in the usual way, each asana is moved into with alternate inhalation and exhalation. A full round of suryanamaskar is considered to be two sets of the twelve poses with a change in the second set to moving the opposite leg first through the series. With increasing scientific research in yoga, its therapeutic aspects are also being explored. Suryanamaskar gives more benefits with less expenditure of time. It is claimed that suryanamaskar practice improves general health and fitness. It Improves pulmonary functions, cardiovascular endurance and strengthens the abdominal muscles. Suryanamaskar is considered as the best exercise as it consists of important yogasanas and Pranayamas. The Pranayama and its

advantages are skillfully incorporated in suryanamaskar, so suryanamaskar is an appreciated exercise among all ages from kids to old age people. Suryanamaskar or Sun Salutation is the best way to burn the calories and reduce weight. It is often recommended for obesity. It is recommended by various authors and proved to be effective in children. Regular practice of suryanamaskar significantly show reduction in pulse rate, attributed to increased vagal tone and decreased sympathetic activity. Decreased sympathetic activity in turn reduces catecholamine secretion and also leads to vasodilation leading to improvement in peripheral circulation. It is also observed that regular yogic practices reduce basal metabolic rate and resting oxygen consumption. All these may be responsible for reduction in resting pulse rate. Yogic practices alter the hypothalamic discharges leading to decrease in sympathetic tone and peripheral resistance and hence the diastolic blood pressure. Regular yogic practices strengthen the respiratory muscles; increase the excursions of diaphragm and lungs as well as thoracic compliance. Also yoga practices decrease airway resistance. All these factors contribute to improvement in the various lung function tests after regular practice of suryanamaskar (**Pattabhi & Sri, 2005**).

India has a rich tradition of yogic practices. Now a days yoga, the ancient practice of postures, breathing and meditation is gaining a lot of attention from healthcare professionals. With increasing scientific research in yoga, its therapeutic aspects are also being explored. Suryanamaskar – The salutation to the God Sun, is also a part of Indian traditional yogic practices. Each cycle of suryanamaskar is a sequence of certain ‘asanas’, performed along with ‘pranayama’. The sequence of asanas is such that each asana is complimentary to the next. During suryanamaskar, muscles of the entire body experience stretch and pressure alternately and therefore it

is said to give more benefits with less expenditure of time. It is claimed that suryanamaskar practice gives benefits of both- asana and pranayama and improves general health and fitness. Hence, the present study was undertaken to study effects of suryanamaskar practice on cardio-respiratory fitness parameters in young, healthy subjects.

It is a well-known fact that suryanamaskar is an all-round exercise for all, young and old, men and women. The truth is as real and as clear as the Sun in the sky. It requires no canvassing to prove its worth. The actual practice is the only evidence to confirm the assets you get through suryanamaskar. The Sun God is one who always activates others and is full of activities too. He is the symbol of cosmic energy. The chariot of the Sun God is of seven horses. The horses represent the seven days of the week. They also stand for the seven colours of the rainbow. The seven power points in our body have different colours of their own. His work is colourful. It is endless and unlimited combination & permutation of colours. Nobody can pinpoint the exact time when the activities of the Sun God started. The span of time of His activities cannot be counted either. The end of his activities is beyond our imagination. His activities are varied. The food supplied to all the plants is the same but the rose is not the same as other flowers. All the leaves of different trees are not the same. The varieties of the trees and the leaves are uncountable. In this world there is no man alike in looks or in deeds. He is omnipresent in all and every act. When the sun rises in the sky all the creatures & worms, birds & animals start their work. Pray the Sun God to give inspiration and energy to do good deeds (**Patel, 2004**).



### **1.13 BENEFITS OF SURIYA NAMASKAR FOR CHILDREN**

Surya Namaskar calms the mind and helps improve concentration. Today, children face a cut-throat competition and should adopt Surya Namaskar in their daily schedule as it boosts endurance power and reduces the feeling of anxiety and restlessness, especially during exams. Regular practice of Surya Namaskar gives strength and vitality to the body. It is the best workout for muscles and improves flexibility in spine and in limbs for our future athletes. Children as young as 5-year-olds can start doing Surya Namaskar daily.

### **1.14 METHOD OF SURYA NAMASKAR: THE 12 POSES**

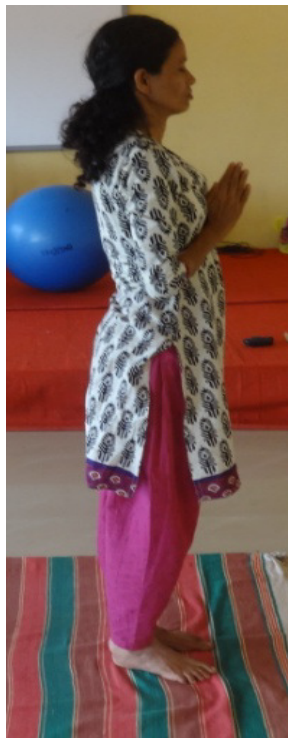
The Suryanamaskar is one of the best exercises that people can perform. The benefits accruing from these exercises are unique and excellent. This is a yoga based exercise and it is customary to perform Surya Namaskar after performing loosening yoga exercises.

The human being can be thought of consisting of 'pancha kosas' (or five sheaths) consisting of the Annamaya (or Body), Pranamaya (or Breath), Manomaya (or Mind), Vijnanamaya (or Intellect) and Anand amaya (or Bliss) sheaths. These same five kosas can be further grouped into Gross (or Sthula), the Annamaya or body sheath, Subtle (or Sukshma) consisting of the pranic, mental and intellectual sheaths and the Causal (or Karana), the Bliss sheath. Properly performed Surya Namaskar impacts and influences all five sheaths – the body, the breath, the mind, the intellect and the bliss – thus providing to the performers of these exercises the benefits for the Sthula (Gross), Sukshma (subtle) and Kaarana (Causal) bodies. Whereas conventional exercises of all forms including aerobic, weight lifting, walking, jogging and running are designed to provide benefits to the physical body and its various component

organs including joints and muscles, Surya Namaskar provides benefits of a holistic nature by working on the physical body, prana (breathing), mind, intellect and the bliss components (or kosas) of the entire human personality. In that sense, Surya Namaskar can be considered to be a personality development tool and must be included as part of one's wellness program.

The Surya Namaskar is performed usually early in the morning facing the morning rising Sun. The Namaskar is done in 12 steps, each step having its own posture (including position and form) with its own breathing pattern (inhalation or exhalation), and its own mantra.

#### **1.14.1 STEP 1 NAMASKARASAN OR PRANAAMASAN: (Prayer Pose)**



Start by (facing the direction of the sun) standing erect keeping your feet together. Place your palms joined together in front of the chest (at the heart) Angli Mudra (prayer position). Make sure your body is as straight as possible. Keep the stomach in, chest forward, neck stretched up, knee-caps tighten up. This helps to

bring your mind into a calm and relaxed zone. This posture activates the Anahatha chakra. Close your eyes and chant the Mantra Om Mitrayah Namaha breath normally.

**Awareness:** Chanting of the Mantra.

**Benefits:** This helps to bring the mind into a calm and relaxed zone. This posture activates the Anahatha chakra.

#### **1.14.2 STEP 2 ARDHA CHANDRASAN OR HASTA-UTTHANASAN:**

**(Raised Arms Pose)**



Now exhale while you stretch your hands over your head, palms facing upward. Now arch the body backwards and stretch the muscles of abdomen and chest. This posture helps to lift the energy toward the upper parts of the body propelled by inhalation. Chanting the mantra Om ravaye namah

**Awareness:** Chest

**Do's** - While exhaling bend forward in the waist - Palms facing upward. —Legs straight - Relax the neck

**Don'ts** - Do not bend the knees. - Do not keep the neck tense.

**Benefits:** Stretch the muscles of abdomen and chest. This posture helps to lift the energy toward the upper parts of the body propelled by inhalation.

### 1.14.3 STEP 3 PADAHASTASANA (Hand to Foot Pose)

Exhale and bend forward in the waist till palms touch the ground in line with the toes. Don't bend knees while performing. At first you may find it difficult to attain the ideal position but try to bend as much as possible without bending in knees.( Keep the legs straight and perpendicular to the ground) Chanting the mantra Om suryaya namah



**Awareness:** Knees and calves.

**Do's-** While exhaling bend forward in the waist - Palms touching the ground, fingers pointing forward, thumbs at 90 degree angle- Legs straight -Try to touch the forehead to the knees- Relax the neck.

**Don'ts** - Do not bend the knees. - Do not keep the neck tense.

**Benefits:** This posture massages the abdominal organs, especially the liver, kidneys, pancreas, adrenals, uterus and ovaries. The power of digestion increases and female disorders such as prolapse and menstrual irregularities are relieved. A healthy flow of

blood is sent to the spinal nerves as they are stretched and toned. The hamstring muscles at the back of the thigh and calf muscles are stretched and toned. Inversion increases blood flow to the brain. The Prana is channeled to the lower regions of the body propelled.

#### 1.14.4 STEP 4 - ASHWA SANCHALANASANA OR ANJANEYASANA: (Equestrian Posture)



On your next inhalation, extend the left leg back and drop the knee to the ground. The right knee is bent and kept between the hands and the right foot placed flat on the ground. Lift the spine and open the chest. Concentrate at the eyebrow center. Chanting the mantra om bhanavenamah

**Awareness:** Center of the eyebrows.

**Dos** - Take the left leg backwards and touch the knee to the floor, keeping the toes erect.

- The knee of the right leg will be bent

- The knee of the left leg should touch the ground - Drop the waist/ hips towards the floor

- Gaze is upwards, both arms are straight

**Don'ts** - Do not bend the neck forward. - Do not bend the elbows.

**Benefits:** Neck, chest and abdominal muscles are stretched.

### 1.14.5 STEP 5 PARKRATASANA (Mountain Posture)



From the fourth state, both the hands are brought down and palms placed on the floor. Right leg is also taken back and placed near the left one, waist and buttocks fully lifted up. Either one or both the heels are moved forward and backward. Breath is inhaled and exhaled regularly. On the exhalation bring the right leg back to join with the left leg. Simultaneously raise the buttocks and lower the head between the arms, so that the body forms a triangle with the floor. Try to place the heels flat on the ground. Focus awareness at the neck area. Chanting the mantra Om marichaye namah

**Awareness:** Waist

- Dos**
- Push the body upward so the buttocks and waist are raised into the air, leaving the body in an Inverted 'V' position
  - Take the head and chin towards the chest
  - Try to touch the heels to the floor

**Don'ts** - Do not bend the legs in the knee - Do not bend the arms

**Benefits:** True strengthens the nerves and muscles in the, arms and legs, stretches the calf muscles and Achilles' tendons and makes the spine straight and taut. It relieves varicose veins and tones spinal nerves. Maintaining the posture take a deep inhalation.

### 1.14.6 STEP 6 ASHTANGANAMASKARA (Salutation with Eight Limbs)



Exhaling gently drop both knees to the ground and slowly slide the body down at an angle as you bring the chest and chin to the ground. All eight limbs - The forehead, chest, both the palms, both the toes, knees should touch the ground and rest of the body not touching the floor. Since only eight parts rest on the ground, it is called Ashtanga' position. The buttocks are kept up. Hold the breath. Chanting the mantra Om puska namah.

**Awareness:** Stomach

- Dos**
- Bring the body towards the floor placing the 8 parts on the floor: Toes, knees, chest, palms, and forehead
  - Keep the hands close to the body, next to the shoulders
  - Keep the elbows pointed to the sky and close in to the body

- Don'ts**
- Do not touch the thighs, hips, waist or abdomen to the floor
  - Do not touch the chin to the floor
  - Do not let the elbow fall away from the body

**Benefits:** To posture develop the chest and strengthens the arms. It sends additional blood to this area helping to rejuvenate the nerves.

### 1.14.7 STEP 7 BHUJANGASANA (Cobra Posture)



On the inhalation, lower the hips while pushing the chest forward with the hands, until the spine is fully arched and the head is facing up. The knees and lower abdomen remain above the floor. Focus the awareness at the base of spine and feel the tension from the forward pull. Chanting the mantra **om hiranyagarbhaya namah**

**Awareness:** Throat / Neck

- Dos**
- Push the upper body upwards so that the arms are straight
  - Keep the fingers pointed forwards, palms on the ground, thumbs at 90 degree angle
  - Open the chest, pull the shoulders downwards
  - Drop the head and neck backwards and gaze upwards the sky
  - Keep the heels, legs close to the body, next and knees together
  - Keep the toes erect

**Don'ts** - Do not bend the elbows

- Do not let the legs or heels are apart
- Do not the shoulders towards the ears

**Benefits:** The pose gives dynamic expansion to the organs of the chest and abdomen, relieving many ailments such as asthma, constipation, indigestion, kidney and liver problems. It is very helpful in relieving tension in the back muscles and spinal nerves



#### 1.14.8 STEP 8 PARVATASANA (Mountain Pose)



Breathing out, lift the hips and the tail bone up, chest downwards in an 'inverted V' ( $\wedge$ ) posture. If possible, try and keep the heels on the ground and make a gentle effort to lift the tailbone up, going deeper into the stretch.

**Awareness:** Waist

#### 1.14.9 STEP 9 ASHWA SANCHALANASANA (Equestrian Pose)



Inhale and swing the right leg forward between the hands. The left leg remains back. Resume posture 4. Chanting the mantra om aditaya namah

**Awareness:** Centre of the eye brows

**1.14.10 STEP 10 PADAHASTASANA (Hand to Foot Pose)**

Exhale, bring the left foot forward. Join both legs and resume posture 3. Chanting the mantra om savitre namah.

**Awareness:** Knees and calves

**1.14.11 STEP 11 ARDHA CHANDRASANA OR HASTA-UTTHANASANA:**

**(Raised Arms Pose)**



Now inhale while you stretch your hands over your head, palms facing upward. Now arch the body backwards and stretch the muscles of abdomen and chest. This posture helps to lift the energy toward the upper parts of the body propelled by inhalation. Chanting the mantra Om ravaye namah

**Awareness:** Chest

**Do's** - While exhaling bend forward in the waist - Palms facing upward. —Legs straight - Relax the neck

**Don'ts** - Do not bend the knees. - Do not keep the neck tense.

**Benefits:** Stretch the muscles of abdomen and chest. This posture helps to lift the energy toward the upper parts of the body propelled by inhalation.

#### 1.14.12 STEP 12 PRANAMASANA (Salutation Posture)



Straighten the body and bring the hands in front of the chest. Resume posture 1. Chanting the mantra om bhaskaraya namah

## **1.15 GENERAL BENEFITS OF SURYA NAMASKAR**

### **1.15.1. Improves Blood Circulation of the Body**

Due to the active process of inhalation and exhalation, the lungs are constantly ventilated and the blood remains oxygenated. It's a great way of detoxing your body and helping it get rid of excess carbon dioxide and other toxic gases.

### **1.15.2. Your Mantra to Weight loss**

When done at a fast pace, it is a great cardiovascular workout that stretches the abdominal muscles while simultaneously helping you reduce excess weight around your stomach. The asanas also result in toning your arms, abs and giving great flexibility to your spine. Moreover, It helps to strengthen your entire skeletal system including your ligaments.

### **1.15.3. Promotes a Regular Menstrual Cycle**

If you're facing the problem of an irregular menstrual cycle, these asanas will help you suppress this irregularity and if practiced daily, it ensures an easy childbirth.

### **1.15.4. Benefits your Skin and Hair**

By incorporating it in your routine it will keep you youthful and healthy even in old age. It improves your blood circulation that aids in bringing back the glow on your face; preventing the onset of wrinkles, making your skin look ageless and radiant. It also prevents hair loss and the ageing of hair.

Surya Namaskar helps to improve memory and the nervous system. Moreover, its stabilizes the activity of the endocrine and thyroid glands, thereby reducing anxiety and inducing the sensation of complete calmness and tranquility.

## **1.16 PURPOSE OF THIS STUDY**

Numbers of studies have been conducted in different fields of Physical Education. Physical Education programme in schools and colleges is to develop physical fitness and to promote lifelong physical activity behavior. Many researchers conducted lot of studies in physical fitness for school children in Kerala state. They concluded that the physical fitness standards of school children are very low in Thrissur District, Kerala through the Total Physical Fitness Programme (TPFP) used as a Physical Fitness test battery. So I am interested to promote the fitness level of children of my school in Thrissur District.

Through the effect of aerobics and suryanamaskar I can give a remedial programme to the low fitness children.

### **1.17 STATEMENT OF THE PROBLEM**

The purpose of the study was to find out the effects of aerobic dance and suryanamaskar on the performance of selected low physical and physiological variables on school children in Kerala state.

### **1.18 SIGNIFICANCE OF THE STUDY**

1. This study would help to assess the physical and physiological variables on school children in Kerala state.
2. The results of the study would help to introduce the training packages for school children in Kerala state.
3. The results of the study would motivate the children of Kerala state to involve in aerobic dance and suryanamaskar practices.

### **1.19 HYPOTHESES**

On the basis of available literature and scholar own understanding of the problem, the following hypotheses were formulated:

1. It was hypothesised that there would be a significant difference in the selected physical variables due to the suryanamaskar among school children in kerala state.
2. It was hypothesised that there would be a significant difference in the selected physiological variables due to the suryanamaskar among school children in kerala state.
3. It was hypothesised that there would be a significant difference in the selected physical variables due to the aerobics dance among school children in kerala state.
4. It was hypothesised that there would be a significant difference in the selected physiological variables due to the aerobics dance among school children in kerala state.
5. It was hypothesised that the experimental groups namely suryanamaskar group and aerobic dance group would show significant improvement on selected physical variables than the control group.

6. It was hypothesised that the experimental groups namely suryanamaskar group and aerobic dance group would show significant improvement on selected physiological variables than the control group.
7. It was hypothesised that there would be significant difference between suryanamaskar group and aerobic dance group in selected physical and physiological variables.

### **1.20 DELIMITATIONS**

The study was delimited to the following factors.

1. To achieve the purpose of the study, 45 school children were selected according to the Total Physical Fitness Programme (TPFP) test result, which got low scores in Government Higher Secondary School, Cherpu, Thrissur District, Kerala state, India. The age of the school children ranged between 12 and 14 years.
2. The following physical variables were selected for this study namely body weight, strength, endurance, flexibility and cardio vascular endurance and physiological variables were selected namely systolic blood pressure, diastolic blood pressure and resting pulse rate.
3. The duration of the training period was restricted to twelve weeks and the number of sessions per week was confined to three.
4. This study was delimited to only aerobic dance and suryanamaskar practices.
5. The level of significance was fixed at 0.05 level for ANCOVA, which was considered to be appropriate.
6. The data were collected prior to and immediately after the training period.

### **1.21 LIMITATIONS**

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

1. The impact of training schedules, previous experiences, motivational factors and various physical activities were not taken into account.
2. Hereditary and environmental factor, which contribute to both physical and mental efficiency were not controlled.

3. No attempt were made to determine whether the subjects and having the some degree of motivation during the various stages of training and testing periods.
4. The fatigue factors of the players and the carry-over knowledge of the skills which might affect the performance in the tests were considered as limitations of the study.
5. Variations in performance due to diet, climatic conditions, ground conditions and other environmental factors that might affect the study, were not taken into consideration.
6. Since the human elements are involved in the test administration even slight error in measurement and timings which might affect the results were also considered as limitations of the study.

## **1.21 DEFINITION OF TERMS**

### **1.21.1 Aerobic Dance**

Move rhythmically in a series of steps along with a partner or in a group or movement and steps in time to music (**Dhananjay Shaw & Rakesh Tomar, 2000**).

### **1.21.2 Suryanamaskar**

The Suryanamaskara, is also great for Hatha yoga breath training. In Hatha yoga, the students move through the asanas with each breath. When the body contracts, they exhale, and when the body expands, they inhale (**Patel, 2004**).

### **1.21.3 Body Weight**

The force with which a quantity of matter is attracted towards earth by normal acceleration of gravity (**Singh, 1991**).

### **1.21.4 Strength**

It is defined as the capacity of a body to withstand great force (**Singh, 1991**).

### **1.21.5 Endurance**

The ability of a muscle or group of muscles to overcome resistance or to act against resistance for longer duration under conditions of fatigue or tiredness (**Singh, 1991**).

### **1.21.6 Flexibility**

Flexibility is the range of movement about a joint (**Singh, 1991**).

### **1.21.7 Cardio Vascular Endurance**

It is the body's ability to continue exertion while getting energy from the aerobic system used to supply the body with energy (**Singh, 1991**).

### **1.21.8 Blood Pressure**

Blood pressure is the pressure in blood vessels that the blood exerts against the wall of vessels. "Blood pressure is the lateral pressure exerted by the blood on the vessel walls flowing through it (**Fox, 1984**).

### **1.21.9 Systolic Blood Pressure**

Systolic blood pressure is the pressure in the heart and blood vessels during contraction phase of this cardiac cycle (Fox, 1984).

### **1.21.10 Diastolic Blood Pressure**

Diastolic blood pressure is the minimum level of arterial blood pressure in the time between successive heartbeats (**Fox, 1984**).

### **1.12.11 Resting Heart Rate**

Resting pulse rate as the distension of the arterial walls at the beginning of systolic ejection of blood which is not confined to aorta but travels down the arteries as a wave followed by a wave of recoil (**Fox, 1984**).