CHAPTER - I
INTRODUCTION
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"Yoga has complete message for humanity
Yoga has a message for the human body".

- Swami Kuvalayananda

The body is the temple of Soul and to reach a harmony of the mind, body and spirit, the body must be physically fit. The human body is built for physical activity and movement. Throughout the ages, man has had to be physically active in order to procure his daily food to succeed in the battle for survival. Every individual physical activity is essential for harmonious physical and mental development.

Exercise plays a major role in improving the quality and most likely the longevity of our lives. Most people who exercise regularly will agree that one of the main reasons for their exercise is that it makes them feel good, and help them to attain and maintain good health and physical fitness. The effect of regular physical activity significantly improves health, physical fitness and work capacity and enables people to use their leisure time more beneficially and thereby assists in adding life to years and also years to lives.
Fit people make a fit nation. Fitness is that State which characteristics 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.

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.

1.1 Yoga

The word yoga is derived from the Sanskrit root yuj. Yoga means to "Yoke", to "Bind", to "Link" to "connect" or to "Merge". Yoga joins body and mind together. The merger of soul with god and the experience of oneness with Him - is yoga. It is possible only through the control over sense organs and through continued practice and detachment. According to the great sage patanjali, "The withdrawal of sense organs from their worldly objects and their control is yoga".¹

"Yoga is a system of integrate education of the body, the mind and the inner spirit. It is a way to attain salvation and to get oneself freed from the cycle of birth and death. It's main purpose is the elimination of the forces harmful to the soul".\textsuperscript{2}

1.2 Importance of Yoga

The body becomes strong and healthy, excessive fat disappears, the face glows, the eyes are bright and the whole personality radiates, a special charm. The whole body is purified and the mind improves in ability to concentrate other importance are:

- The blood in the different blood vessels is purified through different yogasanas.

- Yogasanas helps the mind to experience tranquility. This is progressive intellectual development because of the calm mind.

1.3 Stages of Yoga

The proper function of the body depends on the several limbs. The absence or the sickness of any one limb affect the health of the whole body. The same principle applies to the study of yoga and its branches.

Any inadequacy in the study and the perfection of any the eight steps of yoga will not lead to self-realization.

The following are the eight steps as formulated by Patanjali:\(^3\).

a) Yama
b) Niyama
c) Asana
d) Pranayama
e) Pratyahara
f) Dharana
g) Dhyana
h) Samadhi.

1.4 Asana

Yogasana are simple actions for keeping the internal and external parts of the body in good health.

The third anga or limb of yoga is asana. Asanas are postures it is astute of complete equilibrium of body mind and spirit. There are literally hundreds of postures in asanas, asanas bring steadiness, agility, flexibility and so on. Thus, asana is one of the ancient yogic practices forming a base for all other practices and plays an important

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role in every kind of yoga sadhana. Asana is a special type of exercise, which is not only physical but also psychological in nature.  

1.5 Pranayama

Pranayama means a pause in the movement of breath. In Sanskrit "Prana" means "Breath" and "Ayama" means a "pause". In modern literature on yoga prana, even in the compound pranayama has been often interpreted to mean a "subtle psychic force (or) a subtle cosmic element".

Pranayama is the fourth state of astanga yoga. Pranayama means breath control. There are three important movements in pranayama: inhalation of the breath, exhalation of the breath and retention of the breath.

1.6 Breath in Pranayama

Pranayama is not deep breathing. Deep breathing tenses the facial muscles, makes the small and scalp rigid, tightens the chest and applies external force to the intake or release of breath.

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5 Kuvalayananda, Pranayama, (Kaivalyadhama Lonavala, India, 1983), p.35.
6 Swati Chandani, Rajiv Chandani, Yoga for Children, (U.B.S. Publisher's Distributes Ltd, New Delhi, 1995), p.28.
During inhalation each molecule, fiber and cell of the body is independently felt by the mind and is allowed to receive and absorb the prana. There are no sudden movements and one becomes aware of the gradual expansion of the respiratory organs and feels the breath reaching the most remote parts of the lungs.

In exhalation the release of breath is gradual and this gives the air cells sufficient time to reabsorb the residual prana to the maximum possible extent.\(^7\)

1.7 Importance of Pranayama

Pranayama is a scientific mental and physical exercise. In this exercise the diaphragm and the abdominal muscles get good exercise by controlled movements and by their alternate contraction and relaxation respectively. The heart, lungs and digestive organs like stomach, liver and the nervous and endocrine system like brain, the spinal cord, spine nerves get the massage and the rejuvenating exercise. It helps to normalize the circulation of blood.

- The body will become light
- Bodily fat will be reduced
- The belly will no longer project

\(^7\)Ibid., P.32.
• Memory will grow strong
• The face will look serene
• The voice will turn sweet
• The mind will remain calm and peaceful without any restlessness what so ever. 

1.8 Types of Pranayama

There are about 50 types of pranayama which are described in the shastras. The following are the few important pranayamas.

1. Kapalbhati 2. Agnisar
3. Bhastrika 4. Ujjayee
5. Bhramari 6. Nadishodhana
7. Sheetali 8. Sheetakari

Some of these like Bhastrika and Surya Bhedan are useful during winter, while some others like sheetali and sheetakari are specifically advantageous during summer. Others are good for all seasons.

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9 Shri G.L. Anand, Yogasanas and Sadhana, (Delhi; Pustakmahal, 2000) : P.11
1.9 Asanas and Pranayama

Practicing asanas cleanses the body. Just as a goldsmith heats gold in a fire to burn act its impurities, similarity, asanas, by increasing the circulation of fresh blood through the body, purge it of the diseases and toxins which are the consequences of an irregular life style, unhealthy habits, and poor posture. Regular practice of the strengths, twists, bends and inversions, which are the basic movements of asanas, restores strength and stamina to the body. Asanas together with pranayama or the control of breath, rectify physical, physiological and psychological disorders. They have a positive impact on the effects of stress and disease. Among the many ailments that benefit from the practice of asanas is osteoarthritis, high and low blood pressure.\(^{10}\)

Yoga can condition the muscles of the entire body. This is especially useful in athletics when muscles are developed in the particular area due to its use in a chosen sport. Yoga offers a support system that counteracts the overuse of specific muscle groups. Regular practice of yoga increases the athlete's energy level and one pointed concentration. Athletes are often subject to sore and tense lower backs, tight hamstring, rigid spine, repeated injuries, leading to

\(^{10}\)B.K.S. Iyengar, *Yoga, the path to holistic health*, (Dorling Kindersley Limited, 2001), p.10.
stress and discomfort. All of this can be addressed by the yogic practice. Yoga offers rest and regeneration as an essential part of yoga postures. Pranayama, and mental concentration techniques help. The athletes' regular training together with this can create well integrated and balanced athletic body and enhance recovery and performance.

Yoga places great importance on methodical relaxation. In sports training, off season is mainly opted for recovery, relaxation and remedial diagnosis along with fitness. During this period, the yogic training plays an important role to recover the body after the competition is over and also to maintain the fitness level. So, yogic exercises are recommended during off-season for the university athletes.¹¹

Prana is "vital energy" which includes will power and ambition, while ayama means "stretch, expansion, extension". Pranayama can be described as the "expansion and extension of energy or life force". Patanjali begins pranayama with the simple movement of breathing, and leads us deeper and deeper inter ourselves by teaching us to observe the very act of respiration. Pranayama has 3 movements,

prolonged inhalation, deep exhalation, and prolonged, stable retention all of which have to be performed with precision.\textsuperscript{12}

\subsection*{1.10 Asanas and Health}

Asanas make your body supple, bring alertness to your mind, while soothing your nerves and glands, relaxing your brain and maintaining a physical, physiological and emotional balance.\textsuperscript{13}

The breathing process is closely related to the rhythms of one physical, mental and emotional life. Knowing the principles that "when the breath is unsteady the mind is unsteady and when breath is calm, the mind is also calm." Yogis devised pranayama as part of the yogic science so as to employ the breathing process to win mastery over the mind and inhabit its modifications.\textsuperscript{14}

\subsection*{1.11 Training}

Sports' training is done for improving sports performance. The sports performance, as any other type of human performance, is not the product of one single system or aspect of human personality. On

\textsuperscript{12}Ibid., P.30.
\textsuperscript{13}Ibid., P.240
the contrary, it is the product of the total personality of the sports person. The personality of a person has several dimensions e.g. physical, physiological, social and psychic. In order to improve sports performance, the social and psychic capacities of the sports person also have to be improved in addition to the physical and physiological ones. In other words, the total personality of a sportsman has to be improved in order to enhance his performance. Sports' training, therefore, directly and indirectly aims at improving the personality of the sportsman. No wonder, therefore, sports training is an educational process.¹⁵

Scientific training methods and application of basic principles of body mechanics in sports skill have been attributed to the higher level of performance in sports skills. Performance is the combined result of coordinated exertion and integration of a variety of functions. Genetic factor probably plays an important role in an individual's performance. It appears that upto seventy percent of an individual's maximal force, power or capacity is a matter of genetic factor. The environments as well as geographic location too play an important role in performance. Moreover performance to a certain extent

depends upon the physical and motor fitness qualities in which definite improvement can be achieved through appropriate training.\textsuperscript{16}

Performance can be increased or improved to a great extent only by causing biological adaptation and this is possible only through systematic and scientific training. Specificity of exercises and overload principle should be followed in order to enhance the functioning efficiency of the various systems of the body. Numerous training procedures are in practice to improve motor fitness ability at various levels.

According to Fox\textsuperscript{17}, sports training is a programme of exercise designed to improve the skills and increase the energy capacities of an athlete for a particular event. These basic training procedures will serve better when utilized with modifications suited to individuals or a group dealt with. The training programme should look into improving the performance of the athletes and at the same time should prevent injury from taking place.


1.12 Physical Fitness Variables

The main components which influence the physical performance of an athlete are strength, speed, agility, endurance, power and coordinative abilities. Action potential depends on natural abilities and at the same time fundamentals act as the foundation for excellence.

Physical fitness is one of the most important factors that determine the performance level of an individual. Sports performance depends largely on physical fitness factors such as strength, speed, endurance, flexibility and various abilities requiring co-ordination. Sports activity is a physical activity which is not possible without these motor abilities. Fitness factors are most important for predicting athletic performance. Natural ability is the promise of potential but fundamentals are the foundation of excellence.\(^\text{18}\)

Almost all performances depend on the ability of applying greater force against a resistance. Increased strength will often contribute to better performance. Muscular strength has long been

recognized as an essential element in all physical activities and is generally considered to be a basic component of physical fitness.\textsuperscript{19}

Strength is one of the most important components of physical fitness, which affects performance in almost all games and sports in some form or the other. The primary objective in strength training is not to learn to lift as much weight as possible but to increase strength for application to the relevant sport. This is possible only when the coaches and physical education teachers use the correct and most beneficial and economical means to train their sportsmen.\textsuperscript{20}

Shoulder strength is depends largely on the energy liberation process in the muscle strength. All movements in sports are caused by muscle contractions and therefore strength is a part and parcel of all motor abilities, technical skills and tactical actions. Strength and strength training therefore assume high importance for achieving good performance in all sports.

Physical strength determines one's abilities capacities and potentialities that an individual does exhibit. There are number of

\textsuperscript{19} Bud Getchell, \textit{A Way of Life}, (New York: John Willey and Sons, 1976) P 106
\textsuperscript{20} A K Uppal and C R. Aliferet.., "Comparative Effect of Different Frequencies of Strength Training on Selected Strength Variables", \textit{SNIPES Journal}, 7 1 (1984), P 78
physical exercises and activities which develop arm strength to a great extent. The shoulder strength can be determined by the individuals performance in flexed arm hang for women.

Speed is the important quality for all the game, especially sprinters need high efficient speed. The muscle contraction must be very fast, without speed there is no game. So speed is the necessity for all the players and athletes.\textsuperscript{21}

Endurance is the result of physiological capacity of the individual to sustain movement over a period of time.

Endurance is the highly efficient quality for the long distance runners. This is the improvement of long capacity of an individual. This quality needed for long during period games and middle and long distance runners in athletics.

Endurance can be split to cardiovascular endurance and muscular endurance. Cardiovascular endurance training is to develop the efficiency of the heart and lungs so that the blood and oxygen supply to the working muscles is increased. This helps the muscles to

\textsuperscript{21} Yobu, Test Measurement and Evolution, (Madras; Grace Printers, West Mambalam, 1988) p 662
function and reduce fatigue. Muscular endurance is the capacity of the muscle to work for a prolonged time without getting fatigue.\textsuperscript{22}

Agility is the ability to change directions quickly and effectively while moving as early as possible at full speed. This quality may be essential to success in certain sports.

Agility is the prominent quality needed for all the sports and games. The ability to change the body parts from one direction to another with a graceful manner will reduce the energy expenditure. And the athlete can achieve desired goals with less difficulty.\textsuperscript{23}

Explosive power is seen in quick movement when body weight is propelled either upward or forward.

Power is the ability of the neuromuscular system to produce the greatest possible force in the shortest amount of time. Power is simply the product of muscle force multiplied by the velocity of movement. For athletic purposes, any increase in power must be the result of improvements in either strength, speed, or a combination of the two.


The advantage of explosive power training is what it “trains” the nervous system. Increase in performance can be based on neural changes that help the individual muscles achieve greater performance capacity. This is accomplished by shortening the time of motor unit recruitment, especially fast twitch fibers, and increasing the tolerance of the motor nervous to increase innervations frequencies. Explosive power results better inter muscular co-ordination as the ability of the agonistic and antagonistic muscles to co-operate to perform a movement effectively.24

Muscular strength is the force that can be generated by the musculature that is contracting.25

Athletes run fast and constantly change direction quickly. Such athletes are explodes and accelerators as well as revelators. The dynamics of these sports change abruptly: players run fast in one direction suddenly have to change direction with the least loss of speed. Acceleration and deceleration both require a great deal of leg strength. The same muscles used for acceleration (quadriceps,

hamstrings, and calves) are sued for deceleration, except they contract eccentrically\textsuperscript{26}.

Speed is one of the most important physical qualities required for successful performance in jumps, especially in the horizontal jump and in the pole vault. The amount of speed required is slightly different in the event due to differing emphasis in the take off. It is said that sprinters are born not made and it is certainly true that natural ability will always play a major role in sports events. However, the standard is high and the competition is so fierce at present that no sprinter can achieve real success without correct techniques and proper training. It has been established that running speed can be improved through training.

The relationship between strength and speed is well known. Speed performance can be improved rapidly by improving the explosive strength of the concerned muscle groups. A decrease in strength always has negative effect on speed performance. Because of the importance of explosive strength and its high trainability most of the times, speed performance is improved by improving explosive strength. Explosive strength further depends on muscle composition, muscle size and muscle co-ordination. It also depends on metabolic

\textsuperscript{26}Tudur O Bompa, Perodisation Training for Sports, p106.
process. Except muscle composition, all other factors can be improved through training.\textsuperscript{27}

1.13 Physiological Variables

Physiology is the study of the functions of the normal human body. The physiological trails depend upon the race, geographical and climatic conditions of human beings. Physiology is one of the biomedical sciences. It deals with the functions of the living organism. The goal of physiology is to gain in right in to the machinery of the human organism the roles and interaction of its parts and the resultant out put of there interactions, i.e. the over all functioning of the organism.\textsuperscript{28}

From the physiological variable, the resting pulse rate and the breath holding capacity were taken for this study. The well trained players will have lesser pulse rate at the time of rest. Training brings down the resting pulse rate. The normal pulse rate for a man is around 72 beats/minute. Good athlete will have less than 72 beats/minute.\textsuperscript{29}

\textsuperscript{27}Hardayal Singh, PP 85-87
\textsuperscript{28}Lawrence, E Morehouse and Accsustus T. Miller Physiology of Exercise (Saint Louis The C V Mosby year Book Company, 1967), p.279.
Muscular Exercise and certain emotional states cause a temporary increase in the number of red cells as a result of an outpouring of concentrated blood from spleen. This may be looked upon as an emergency measure and like that which occurs at high attitudes, is the response of the body to the tissues call for oxygen.

The major function of the red blood cells, also known as erythrocytes, is to transport haemoglobin which in turn carries oxygen from the lungs to the tissues.

In normal man, the average number of red blood cells per cubic millimeter is 5,200,000 (+ 3,00,000) and in normal women 4,700,000 (+ 300,000).

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

The bone marrow of essentially all bones produces red blood cells until a person is 5 years old, but the marrow of the long bones except for proximal portions of the humeral and tibiae becomes quite
fatty and produces no more red blood cells after about 20 years. Beyond this age, most red blood cells are produced in the marrow of this membranous bones, such as the vertebrae, sternum ribs and iliac. Even in these bones, the marrow becomes less productive as eye increases.

Tissue oxygenation is the basic regulator of Red blood cell production. Any condition, that causes the quantity of oxygen transported to the tissues to decrease ordinarily increased the rate of red blood cell production. When a person, becomes extremely anemic as a result of hemorrhage or another condition, the bone marrow immediately begins to produce large quantities of red blood cells. At very high attitudes, where the quantity of oxygen in the air is greatly decreased insufficient oxygen is transported to the tissues and red cell production is considerably increased. It is not the concentration of red blood cells in the blood that controls the rate of red cell production but the functional ability of the cells to transport oxygen to the tissues in relation to the tissue demand for oxygen.

Haemoglobin is a coloured pigment. It is present in blood and binds with red blood cells. It gives red colour to the blood. It is very important in carrying oxygen to various tissue for energy production.
Blood contains plasma and formed elements which about forty five per cent of the blood. When the blood was centrifuged the total volume of formed elements that has been packed in a tube is called packed cell volume.

Heart Rate (HR) is one of the simplest and most informative of the cardiovascular parameters. Measuring it involves simply taking the subject’s pulse, usually at the radial or carotid site. Heart rate reflects the amount of work the heart must do to meet the increased demands of the body when engaged in activity. To understand this, we must compare the heart rate at rest and during exercise.

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

The purpose of the study is to find out the effect of yogi practice on physical and physiological variables among literates and dropouts (male).

**Hypotheses**

It has been scientifically accepted that any systemic training over a continuous period of time would lead to produce changes on athletic qualities. Based on this concept, the following hypotheses were drawn.

1. There may be a significant improvement on physical and physiological variables due to the effects of yogic practice on literates and dropouts.

2. There may be a significant difference on physical and physiological variables between the literates and dropouts.
Delimitations

The following delimitations were considered for this study.

1. To achieve the purpose of the study, thirty literate and thirty-dropout male from Thanjavour District, Tamilnadu were selected as subjects. The age was ranged from 14-17 years.

2. The selected subjects were divided into two groups namely, Group I consist of thirty literate students who were studying tenth, eleventh and twelth standard and Group II consist of thirty dropouts who were completed sixth standard and below were selected randomly as subjects.

3. Group I and II were subjected to yogic training programmes over the period of twelve weeks and five sessions in a week in addition to their regular.

4. The criterion variables selected for this study were arm strength, muscular endurance, agility, explosive power, speed, endurance, systolic and diastolic pressure, and resting pulse rate.

5. The selected criterion variables for the study were assessed by the following standardized test items: arm strength, muscular endurance, agility, explosive power, speed, endurance was tested by AAPHER Youth Fitness Test. Systolic and Diastolic
blood pressure were measured by sphygmomanometer and resting heart rate was estimated by radial pulse method.

6. The data were collected prior to and immediately after the training period.

**Limitations**

The following limitations were considered while interpreting the results of the study.

1. The previous experience of the subjects in the field of sports and games, which might be influencing on the training and data collection, was not considered.

2. Psychological factors, food habits, rest period, life style etc. could not be controlled.

3. The weather conditions such as atmospheric temperature, humidity and meteorological factors during testing and training period were also not considered.

4. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of training and testing.
5. Since the manual operation was made during 50 meter run, the time was recorded in one tenth of a second.

**Significance of the study**

1. The study will assist many to avoid medicines to make they fit but to make use of one's own physique to feel healthy.

2. The findings of the study may help the individuals to compare and contrast the changes that occur in selected physical and physiological variables before and after the training programmes.

3. The study as such will create significant health awareness among people.

4. The study will promote research and growth in applying choreography in the field of Yoga training.

5. The study will serve as reference to researchers and statisticians to explore new areas in the field of physical fitness.
Definition of the terms

Arm Strength

Arm strength is the maximum force that can be generated with the arms.30

Muscular 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.31

Agility

It is the ability of the human body to change direction quickly and effectively.32

Explosive Power

It is the ability of the neuromuscular system to overcome resistance with high speed of contraction where the skeletal lever system accepts and expels at a high velocity viz., a co-ordination of

31 Ibid., P.86.
motor units, reflexes, elastic component and contractile component of the muscle.  

**Speed**

The capacity of moving a limb or part of the body's lower system or the whole body with the greatest possible velocity.  

**Endurance**

Harre (1986) defined that endurance is the ability to do sports movements, with the desired quality and speed, under conditions of fatigue.  

**Systolic blood pressure**

Systolic blood pressure is the maximum blood pressure. It occurs during the systolic of the heart. (Range 100-120mm Hg).

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**Diastolic blood pressure**

Diastolic blood pressure is the minimum blood pressure. Occurs during the diastolic of the heart. (Range 60-80mm Hg).\(^{37}\)

**Pulse rate**

The number of beats felt in exactly one minute is a pulse rate.\(^{38}\)

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\(^{37}\) *Ibid*, p.87.