Chapter I

INTRODUCTION

In today's age of scientific knowledge man is making rapid progress in all walks of life including the area of games and sports. The progress of games and sports may be attributed to the scientific invention for the performance of sportsmen and women, improved scientific and specific training methods also to the better understanding of the human organism. The performance in most of the sports is determined by such factors as physical fitness, techniques and tactics, though their relative contribution varies from sport to sport. In addition to these, other factors like physique, body composition and psychological traits also have an overall effect on the performance. These factors also influence the physical fitness status and technical and tactical capabilities of the sportsman.

Of all these factors the most important one is the physical fitness. A high level of efficiency in techniques and tactics are also dependent upon physical fitness. Therefore, it is necessary that during the selection of sportsmen for competition a relatively high weightage should be given to physical fitness. It has been recognized by experts and sports scientists that performance in basketball team game does not directly depend upon the mastery of skills but also on the optimum development of physical, psychological, and physiological capacities of the players. High level performance in basketball not only requires certain physical qualities like speed, endurance, explosive power,

agility, flexibility, strength etcetera but also physical structure. In addition to the techniques and tactics of a player or a team, physical and physiological characteristics help him for his better performance. The physical and physiological fitness of sportsmen differ at different levels of competitions **(Lalit Mohan Tiwari., Manoj Singh., and Bhagwat Singh., 2012).**

Today, all the sports are competitive in nature; the performance of players in different sports has taken a great leap over the last twenty years. Technology has enhanced the level of performance greatly through improved equipment and nutritional product. Back in the 1980's it was good enough to be fitter than the opponent that would secure the victory. Today, everybody is as fit, and technically, tactically advanced as their opponents. The playing fields have been leveled once again. The performance of players is influenced by many factors such as level of physical fitness, physiological and psychological abilities, technique, tactics, physique, body size, body composition and application of bio-mechanical principles **(Ortega F.B., Ruiz J.R., Castillo M.J. and Sjostrom M., 2008)**.

The relationships of sports performance with the physical, physiological and psychological abilities have been the thrust area for researchers from decades. There have been thousands of attempts by the researchers to develop a consistent physical, physiological and psychological profile of players, to be reliably used to differentiate players and to predict the sports performance. Scientists and physiologists have been of the view that body composition and

physical components of a player have a lot to do with their performance. More than the technique and tactics of a player or a team physical and physiological characteristics helps them for better performance **(Ketelaar M., Gprter J.W.V, Erschuren O., Helders P.J. and Takken T., 2009; Lena L., Susanne T., Jennifer O., Annette W. and Klaus B., 2010).**

Basketball, Football and Volleyball games are very popular at school level. Girls are highly interested to play these games. To select the most suitable and competent players, I have selected this topic.

Sports in the present day has become extremely competitive, previous records are being broken whenever there is competition. It is not mere participation or few days practice that brings an individual victory, but the continuous hardwork of training right from childhood, a strong Anthropometric variables may have influenced.

Today's sports person faces some unique challenges. The standard are higher, the competition is tougher the stakes are greater attention in these days. Coaches' physical educationists and sports scientists have always expressed a great need to know more about those Anthropometry variables. Which are helpful in improving the motor skill of the players.

Today's world is a competitive world. The rivalry to reach top and excel each other is so much. Every aspect that contributes for the excellence is carefully looked and one of such aspects is the selection of the right person for the right event in sports and games. Normally a choice of selection is given to

that player or the athletes. The players without knowing their inherent potential made wrong selection and the individual person is not able to reach the top of the ladder.

Man, by nature, is highly competitive and pursuit in performance; he has always been striving to jump higher and farther, to run faster and to demonstrate greater strength and skill. Physical fitness places emphasis on more and more activity. Physical educators have long realized that the performance of boys and girls are greatly influenced by factors such as age, height, weight and body structure. It is also acknowledged, that the persons of the same age will vary considerably in body size and shape,and individual of the same height will differ greatly in body weight that person may weigh the same but the relative proportion of the muscle fat and bone will be anything but equal.

The preparation of an athlete today for achievement is a complex dynamic matter, characterized by a high level of physical and physiological efficiency and the degree of perfection of necessary skill and knowledge and proper teaching of tactics. An athlete arrives at this state only as a result of corresponding training. Sports activity in this respect is an activity directed at steadily enhancing the preparation of an athlete and grooming him for a higher level achievement. Many other factors are also brought in to action in his preparation such as special nutrition; organization of a general region in accordance with conditions of sports activity rehabilitation after injury excetera

thus athletes training today is a multisided process of expedient use of aggregate factors so as to influence the development of an athlete **(Matveyer, 1981)**.

Prediction in human performance and sports has long been a popular topic of debate. Is there such a thing as natural players? What physical attributes are most important for high level of sports performance? Is it possible to measure players potential and predict future success (James R.M., Allen W., Jackson J.G., Disch D.P., 2011). Early researcher operated on the theory that as there were tests for assessing the innate ability of intelligence in the cognitive domain, there must also be a way to measure innate motor ability in the psychomotor domain. These early researchers concentrated from the early 1920's to the early 1940 on determining the physical components that are basic to and necessary for a successful human performance. The results of various research studies show that motor fitness components of players differ from game to game position to position, male to female players and they affect the sports performance. **Johnson W.R. and Buskirk E.R., (1974)** found in his study the successful wrestlers had better balance than the unsuccessful wrestlers. **Malhotra M.S. and Subramaniam S., (1982)** have claimed that a high level of general fitness with motor abilities like strength, aerobic endurance, speed of moment, jumping ability, agility flexibility etcetera. are the essential qualities required to be developed by the Basketballers. Optimum physical performance is a combination of all the components of motor fitness; depending on the specific demands of the sports or activities. Some

components will require more attention than other, but each should be present as an integrated part of training programme **(Tancred B., 1995).** Physical and physiological characteristics of elite players are different among sports. In selection of players for a particular sport, the focus should be on those traits and abilities which have the most significant influence on sport performance, such as physiological and anthropometric characteristics.

The system of sports training improves its effect on the general level of sports achievements. It is indicative that Olympic records of first modern Olympic game which in those times seemed to be outstanding, today are within the reach of thousands of rank and fine athletes **(Johnson and Nelson, 1991).**

It could be argued that competition itself might very well be the best form of talent identification, with competition seeing the best or most talented players rise to the top in their chosen sport. However many players do not succeed in the particular sport they have chosen, but many do achieve a degree of success, may be better suited to a different sport and never realise it **(Peltola, 1992).** With this in mind and considering that without talent development identification would be a waste of time and resources **(Jarver, 1982),** it is easy to see why talent identification is a term that is often confused with the term talent development **(Hoare, 1995).**

In years gone by, and still in western countries, an individuals participation in a particular sport might well be determined by such factors as "tradition, ideals, desire to take part in a sport according to its popularity,

parental pressure, a high school teacher's specialty, the proximity of sport facilities, etcetera. This system can lead to the more popular sports in a particular country having a plentiful supply of athletes while the lower profile sports struggle for participants. But many specialists involved in sport, hoping that individuals have chosen the sport that they are best suited to, and waiting for talented individuals to identify themselves through competition, is not good enough for modern sport. Instead, with the aid of sport scientists, many countries and individual sports within countries have developed specific methods to identify talented individuals, and help those individuals choose the sport that is best suited to their abilities **(Bompa, 1985)**.

"Physical fitness is one's richest possession, it cannot be purchased, it has to be earned through a daily routine of Physical exercise" **(Uppal, 1992).**

Physical fitness has frequently been defined as "the ability to carry out every day tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure – time pursuits and to meet unforeseen emergencies" **(Robert, 1993)**.

Researchers do not agree as to which components are involved in all the physical performance common to sports, physical fitness testing and heavy industrial occupations. The interacting functions of physiological systems contribute to the difficulty. The following qualities are basic to physical fitness should receive due attention such as Speed, Endurance, Agility, Flexibility and Power **(Richard, 1982)**.

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 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 opinion of **Eicher (1975)** is that speed is the product of two factors, stride length and stride frequency. Increasing either factor automatically increases a runner's sprinting speed. From training point of view, it appears that the stride length can be increased by increasing the leg strength. Though stride frequency is an inborn quality, it might be possible to improve slightly through training. It appears that this improvement also brings about a corresponding shortening of stride length. In stride frequency, time becomes our concern. When we reduce the time necessary to apply force at take off and eliminate wasted time in the air, then stride frequency will improve.

Speed is the performance prerequisite to the motor actions under given conditions movement task, external factors individual prerequisite in minimum of time. Speed is an important factor in all games. The modern concepts of speed embrace their abilities which make it possible for volley ball players to

execute the most suitable action for a given situation as rapidly as possible **(Richard, 1982)**.

Speed is a very important quality in track and field. A player should be extremely fast in his actions if he wants to do an opponent for which anaerobic power is very essential.

Power is the function of force and velocity and it can be defined as the rate of performing work. When expressed by the formula. Muscular power is a combination of speed and strength. It is possible for a person to be extremely strong and skilled not extremely powerful, also may be able to move with great speed against a light resistance but lacks the strength to move rapidly against heavier resistance.

It is the quality of a muscle to contract forcefully in quality possible time. Power is the rate of doing work. Power is an essential quality in many sports for it represents the effective combination of strength and speed. Increase in strength or speed will increase power. And when power increases, more work can be done in less time. Training can increase power in several ways by teaching athletes how to make effective use of their available strength. The best power training seems to involve improving strength to an optimum level, then stimulating movements specific to the sports performed with resistance as fast as possible.

The importance to successful athletic performance is the ability to generate power. A powerful athlete is able to incorporate maximum force with

speed as movement. Explosive power is also called dynamic or functional strength; jumping, hopping, skipping, bounding, medicine ball chest passes and abdominal twist tosses are the hundreds of polymeric exercises that can enhance the speed component of power.

Agility is the ability to change or alter quickly and accurately the direction by body movement during activity. Agility may be improved with increased flexibility and muscular strength.

Agility is one of the main components of physical fitness; agility is the ability of a man to co-ordinate his movements and synchronizes them according to the requirement of changing conditions. Agility is one of the performance related fitness components. Agility is correlated with balance in sport. Sports are not linear, but rather require the ability to move in multiple directions at short distances. Athletes need agility to increase their speed of movement, manage injuries, improve athletics, and provide a long-term performance enhancement effort. The objective of agility training should include the following to enhance power balance, speed and contraction; to increase intramuscular co-ordination; to increase explosive speed, power and strength at the major muscle groups; to develop quickness as a habit; and to enhance endurance or the ability to repeat high intensity work; to enhance the development of power balance, speed and coordination of skill through repetition.

It is universally accepted that the physiological functions of the body improve with use and decline with disuse. More specifically, the heart, lungs and muscles become stronger and more durable, when they are used more.

Exercise strengthens the heart muscle. Greater demands placed on the heart cause it to increase in size and get stronger through use. The person who exercises regularly has a lower pulse rate, and this rate returns to normal more quickly after exercise than does the pulse rate of sedentary person **(William, 1988)**.

It is a physiological fact that the human organism needs stimulating exercise. When the whole body is subjected to regular muscular activity, requiring a vigorous stress on the heart, lungs, and muscles, the general efficiency of physiological function improves. Research now strongly supports the theory that regular, vigorous exercise helps keep hearts healthy and may prevent cardiovascular disease. A physically fit heart beats at a lower rate and pumps oxygen (this means the ability to do more physical work) is increased substantially. People who keep fit greatly enlarge their fullness of living. They can do a day's work with ease; they can meet most emergencies; and they can extend their recreational activities. Today, more and more people are becoming interested in outdoor activities and sports. However, to give complete enjoyment, participation in these activities requires an appropriate level of physical fitness beyond that needed everyday life **(Kaz, 1990)**.

Heart rate increases linearly with increasing oxygen consumption in both trained and untrained individuals. Endurance training also tends to lower and the resting heart rate. For instance, resting heart rates in highly trained athletes may be as low as or lower than 40 to 45 beats per minute. On the other hand, in healthy but untrained subjects, resting heart rates may be as high as 90 to 100 beats per minute. Thus, the trained subject is generally characterized as having a low resting heart rate and the untrained a high resting heart rate **(Shaver, 1982)**.

Vital capacity, the total amount of air that can be forcibly expired after a complete inspiration, has been used frequently as a measure of adequacy of the respiratory system. A large vital capacity is important in intense exercise when there may be a lack of oxygen in the alveoli, but it is of little value when the exercise is less demanding. The main advantage of a large vital capacity is the ability to take in more air per unit of time with fewer, but deeper, inspirations, thus prolonging the onset of fatigue in the respiratory muscles **(Sandhu, 1982)**.

Physiological factors that influence sporting performance can be assessed by administering tests such as measurement of maximum oxygen uptake (V_{O2} max), resting pulse rate, respiratory rate and anaerobic power which correlates highly with endurance type performance in athletes, determining blood lactate concentrations by taking blood samples. As well as taking muscle biopsies in an effort to determine the type of sport an individual

is most likely to be successful in by assessing the muscle fibre distribution in a particular athlete

Psychology of sport means applying psychological theories and concepts to aspects of sports such as coaching and teaching. The sport psychologists use psychological assessment techniques and intervention strategies in an effort to help individuals to achieve their optimal performance. While sports psychology is concerned with analyzing human behaviour in various types of sport settings, it also focuses on the mental aspects of performance.

Psychology as a behavioral science has made its contribution for improving sport performance. It has helped the Coaches to coach more efficient athletes to perform more proficiently and efficiently. This psychological aspect on sport is gaining much attention among sports administrators. Bucher and Wuegt (1987), say that a rapidly growing area of interest in sports psychology concerns the use of stress management, procedures such as biofeedback and relaxation training to enhance athletic performance by reducing stress.

Preponderance of scientific evidence obtained from different investigations have revealed that apart from somatic and physiological variables, techniques and tactics, high level performance of a sportsman is dependent upon his psychological make up. Different psychic abilities play decisive roles in achieving top-level performance in track and field athletics.

Therefore superb psychological fitness and training of the "individual" are important factors, which help in achieving outstanding performance.

Psychology can help the sportsman in the activity of sports excellence. Role of psychology in selection of sports, training materials and rehabilitations would definitely help in achieving this. Tigher etal (1986), emphasize that psychology and sports converge at the same point and excellence in sports can be optimally obtained by developing appropriate strategies.

Anxiety results when an individual doubts his ability to cope with the situation that causes stress. Another important point that needs to be clarified is the difference between state anxiety and trait anxiety. Spielberger defines that the state anxiety can be considered to be more situational in nature and is often associated with arousal of the autonomic nervous system and trait anxiety can be thought of as a worldview that an individual uses when coping with situations in his or her environment **(Spielberger, 1996).**

A great deal of research has been devoted to the effect of anxiety on sports performance. Researchers have found that competitive state anxiety is higher for amateur athletes in individual sports compared with athletes in team sports. Participants in individual non-contact sports have been found to report lower levels of state anxiety than participants in individual contact sports **(Simon and Martens, 1977).**

Sports psychology within a short span of time has taken giant strides in the field of competitive games. Training of an athlete/player is incomplete

without psychological training. At present, psychological aspects have been emphasized and are becoming increasingly vital in the study of the psychological characteristics that limit the performance of the individual in a game situation at high level of competition. Studies have shown that players, who have dedicated much of their lives to their game, when the long sought goals are within their reach. Psychologically stable players will react to the situation arising during the playing situation, timely and fruitfully and positive results can be expected from the players.

1.1 AIM OF THE STUDY

The aim of the present study was to analyse the physical, physiological and psychological variables of the players. Players in different games are better in different variables. So the research scholar has taken an effort to analyse the selected physical, physiological and psychological variables in the selected games like basketball, football and volleyball.

1.2 SCOPE OF THE STUDY

Success in sport depends on trust in one's own strengths and abilities. If an athlete is well prepared for competition from a physical, technical and tactical point of view, the most important factor deciding about their degree of success is self-confidence. Self-confidence is considered to be one of the leading elements in successful athlete. Belief in one's self is at the center of sports performance. One of the most important factors determining self-confidence involves trust in our ability to execute a task. It is a part of a

broader concept of the "ego", which is deeply connected to our self-evaluation or picture of ourselves.

Height can significantly influence success in sports, depending on how the design of the sport is linked to factors that are height-biased due to physics and biology. The balance of the intricate array of links will determine the degree to which height plays a role in success among the selected games such as Basketball, Football and Volleyball.

Advantages for below average height include:

Faster reaction times (shorter neural networks)

Greater strength to weight ratio

Faster limb acceleration

Greater endurance

Greater power to weight ratio

Faster rotational capability

Greater agility

Greater balance and lower centre of gravity

Lower risk of heat exhaustion

Advantages for above average height include:

Greater absolute strength

Greater work capacity (force multiplied by distance)

Greater work per unit of time (Power)

Longer reach

Greater visibility

Lower resting metabolic rate

Lower heart rate

Less likely to become dehydrated

Greater speed and power due to mechanical advantage

In sports, such as basketball, football and volleyball, players must demonstrate the speed, strength, stamina and concentration. Correct nutrition affects the strength of the muscles and the extension of capacity. It is also necessary for the proper functioning of the nervous system and determines the rate of regeneration after physical effort.

Footwork is extremely important - whether you're a guard or post, or a midfielder, you have to have body awareness, balance, and footwork. All the sports have a high instance of ankle and knee injuries, most likely because of the nature of cutting in both sports and it can be played both indoor and outdoor. Basketball and volleyball are much more influenced by quickness than speed, and soccer is more influenced by speed than quickness. This is evident in the type of conditioning done by both sports (Basketball and volleyball -way more quick and short interval sprinting, and soccer - a lot more long distance running , in addition to sprints). Basketball and volleyball are a high scoring sport, soccer is not. Height influences your ability to play Basketball and volleyball, whereas it has almost no impact on soccer. Hence, Basketball, football and volleyball players were selected as subjects for the study to find out the differences on physical, physiological and psychological variables among district level women.

1.3 STATEMENT OF THE PROBLEM

The purpose of the study was to compare the selected physical, physiological and psychological variables among district level women Basketball, Football and Volleyball Players.

1.4 OBJECTIVES OF THE STUDY

1. To compare the selected physical variables (speed, leg explosive power and agility) among district level women Basketball, Football and Volleyball players.

2. To compare the selected physiological variables (resting pulse rate, respiratory rate and peak flow rate) among district level women Basketball, Football and Volleyball players.

3. To compare the selected psychological variables (cognitive anxiety, somatic anxiety, self-confidence and achievement motivation) among district level women Basketball, Football and Volleyball players.

1.5 HYPOTHESES

1. It was hypothesized that there would be significant difference on the selected physical variables among district level women Basketball, Football and Volleyball Players.

2. It was hypothesized that there would be significant difference on the selected physiological variables among district level women Basketball, Football and Volleyball Players.

3. It was hypothesized that there would be significant difference on the selected psychological variables among district level women Basketball, Football and Volleyball Players.

1.6 SIGNIFICANCE OF THE STUDY

The ultimate goal of research in physical education is to help coaches and physical educators train their athletes and players based on new concepts to improve their performance. The results of the study may be useful to the professional colleagues of physical education and sports in the following ways.

1. The results of the study may provide guideline, which will help the physical educators and coaches in preparing the training schedules for their players in their respective games.

2. The findings of this study will add to the quantum of knowledge in the area of sports.

3. The study may help to assess the differences on the status of physical variables among district level women Basketball, Football and Volleyball Players.

4. The study may help to assess the differences on the status of physiological variables among district level women Basketball, Football and Volleyball Players.

5. The study may help to assess the differences on the status of psychological variables among district level women Basketball, Football and Volleyball Players.

1.7 DELIMITATIONS

The following delimitations were applied to this study.

1. The study was confined only to 90 women players who had represented the Tirunelveli District.

2. The study was restricted to each 30 women subjects from Basketball, Football and Volleyball Players.

3. The subjects age ranged between 15-19 years.

4. The following criterion variables were selected for this study such as speed, leg explosive power, agility, respiratory rate, respiratory rate, peak flow rate, cognitive anxiety, somatic anxiety, self-confidence and achievement motivation.

5. The selected variables were tested with standardized test items as mentioned in the methodology.

6. Since the manual operation was made during 50m and shuttle runs, the time was recorded in one tenth of a second.

1.8 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 have influenced on the testing variables were not considered.

2. Psychological factors, food habits, rest period, life style, extracurricular activities etcetera could not be controlled.

3. The atmospheric temperature, humidity and meteorological factors during testing were also not considered.

4. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of testing.

5. The responses of the subjects to the statements in the questionnaire would depend upon various factors, such as understanding of the statements, seriousness and sincerity of the subjects etcetera.

6. The accuracy and reliability of the subjects responses to the questionnaire could not therefore be assessed.

1.9 DEFINITIONS OF THE TERMS

1.9.1 SPEED

Abilities to execute any motor movement in the shortest possible time is known as speed. (Sebastian etal 2013).

1.9.2 AGILITY

Speed is the ability to move quickly across the ground or move limbs rapidly to grab or throw **(Speed is, 2016)**.

1.9.3 LEG EXPLOSIVE POWER

Explosive power is the ability to release the maximum muscular force in on explosive manner, in the shortest possible time (Hardayal Singh, 1991).

1.9.4 RESTING PULSE RATE

Resting heart rate (RHR) refers to the number of times a heart contracts in one minute (beats per minute or BPM) while at complete rest. The normal heart rate depends on your age, gender, and health and can vary greatly for both athletes and non-athletes. (Elizabeth Quinn, 2016).

1.9.5 RESPIRATORY RATE

Respiratory rate is the number of breaths a human being takes within a certain amount of time (frequently given in breaths per minute) (Strukic P.J, 1981).

1.9.6 PEAK FLOW RATE

The maximal volume of gas that can be expelled from the lungs following a maximal inspiration is called peak flow rate (Wibom et al, 1992).

1.9.7 ANXIETY

It is a negative emotional state with feelings of nervousness, worry and apprehension associated with activation or arousal of the body **(Hoen, 1992)**.

1.9.8 COGNITIVE ANXIETY

"Cognitive anxiety is mental component of anxiety and is caused by negative self-evaluation".

Cognitive anxiety is characterized by "conscious awareness of unpleasant feelings about oneself or external stimuli, worry, disturbing visual images". In sport, cognitive anxiety is most commonly manifested by negative performance expectations and thus negative self-evaluation (Martens etal, 1990).

1.9.9 SOMATIC ANXIETY

"Somatic anxiety refers to the physiological and affective elements of the anxiety experience that develop directly from autonomic arousal. It is reflected in such responses as rapid heart rate, shortness of breath, clammy hands, butterflies in the stomach, and tense muscles" (Martens etal, 1990).

1.9.10 SELF-CONFIDENCE

Self-confidence is the belief that one that aids an individual to perform any desired behaviour successfully (Weinberg and Gould, 1995).

1.9.11 ACHIEVEMENT MOTIVATION

Achievement motivation is dominant motivational orientation in situation characterised by the attainment of success or failure. The two primary motives are either to achieve success (Mass) or to avoid failure **(Anne, 1991)**.