Chapter - I

INTRODUCTION

Today sports have become inseparable phenomenon of our social life. It is at the apex of human civilization because of its trials, competitive events and the scope of improving personality. The acquisition of new knowledge for betterment of performance of human being in relation to physical, motor and psychological qualities is in process of saturation. To strive for skill barrier is a million dollar question for the experts in sports. In the process they also explore the field of psychology and enlisted certain psychological parameters which do influence sports performance.

Physical fitness is one of the basic requirements of life. Broadly speaking, it means the ability to carry out our daily tasks without undue fatigue. In the context, of sports it is difficult to define since it can refer to psychological, physiological or anatomical state of the body. Most physical education teachers see it as a concept obtained by measuring and evaluating a person’s state of fitness by using a battery of test.

The concept of physical fitness, in general athletic terms, means the capability of the individual to meet the varied physical and physiological demands made by a sports activity, without reducing the person to an
excessively fatigued state. Such a state would be one in which he/she can no longer perform the skills of the activity accurately and successfully\(^1\).

This is where the theoretical ideas involved in the discussion on the system that provide the energy necessary for human exercise become directly related to day to day sports activities. This idea is that we should use our knowledge of the scientific basis of exercise to help us improve performance at our sport and do this in a systematic and predictable way. Unfortunately, nothing a human being does, is ever thoroughly predictable and psychological, cultural and emotive factors tend to upset the true progress of science. However, it must be possible to enhance the aims of physical training by using what we know of physiology. And the aim and objective of training are to improve performance, skill, game, ability and motor and physical fitness\(^2\).

The world of training methodology has crossed many milestones as a result of different types of researches in general and their application to the sports development in particular. In the modern scientific age, athletes are being trained by highly sophisticated means for better achievement in their concerned sports. They are being exposed to the exercise and training methods which have proved beneficial for achieving

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\(^2\) Ibid. p.134.
higher standards. Much progress has been made in the recent years in the acquisition of knowledge about training means and techniques of sports skills. In sport training specialized exercises are being prescribed for the fullest and optimum development for a particular game\(^3\).

Performance of an athlete in sports does not depend only upon the physical fitness components but several other factors also contribute to his success, such as, scientific good quality equipment, clothing, training schedule, competition frequency, psychological preparation, and balanced diet. All these factors together prepare the athlete for the competition. Apart from those all, he must develop the motor fitness. Research findings show that high level of technique perfection alone can not produce success in competitive sports. Most of the games demand a higher level of fitness of the athletes\(^4\).

Due to involvement of numerous agencies like state departments of Physical Education and Sports, military personnel, colleges and universities, multiple terminology of physical fitness, motor fitness, motor ability, general and sports specific physical fitness came into existence where many items appeared in both physical fitness and motor


abilities test batteries. In the earliest test batteries the components of motor ability or those of physical fitness were selected arbitrarily. However, during 1950 these components were selected more scientifically through factor analysis whereby the principal components are factored out or selected from a matrix of inter-correlation so as to eliminate the repetition of items measuring the same components of fitness or motor ability.

Although Motor Fitness is most often used synonymously with the physical fitness by the coaches but, it is very important for the students of physical education to understand the basic difference between physical fitness and motor fitness. Physical fitness is used to denote the five basic fitness components, i.e. muscular strength, muscular endurance, cardiovascular endurance, freedom from obesity and flexibility where as, skill related physical fitness is more comprehensive term which include all the ten fitness components including additional five motor components, i.e., power, speed, agility, balance and reaction time which are important mainly for success in sports. In other words, the researcher have already mentioned the six components of physical fitness which come under the AAHPER Youth Fitness Test and those are enlisted
below: Muscular Strength, Muscular Endurance, Speed, Agility, Explosive Strength, Cardiovascular Endurance.

In today’s techno-scientific age the world has completely changed in all aspects due to discovery and research. Thus, in the field of games and sports also there has been a great change with the help of scientific training and coaching. The athletes are being trained on scientific guidelines with highly sophisticated means, for better achievement in their concerned sports enabling the coaches to get optimum performance with minimum expenditure of energy and time. They are being exposed to the exercise training the benefit for achieving the higher standards. Transfer of technique from one place to another and the increased publicity to sports events inspire and make today’s athlete more efficient to reach newer heights⁵.

There is more understanding of the physiological need for acclimatization. There is better medical control over chances of infections, above all, there is greater attention paid to the development of the psychological attitude necessary for successful competition. But mostly the improvements are due to the athletes themselves in sprints, jumps and the throwing events. Alternatively, it is hard to resist the

conclusion that the modern athlete is actually better endowed physically, better suited to his particular task. In events such as the Shot Put, there has been advance in technique too. Clearly the research for betterment has been successful.

The improvement in particular sport is mainly based upon the specialization of that concerned sport so it is necessary to provide a very definite and scientific procedure for training technique in order to obtain the most efficient and effective performances. Measurement of body size includes such descriptive information such as height, weight, length, width and circumferences of the various body segments. It has been found that top athletes in some sports tend to have those proportions that biomechanically aid the particular performance required.

Anthrometric measurement consists of objective measurements of structure and functions of the body. The measurement of the structure includes items such as weight, total height and width, the depth and the circumferences of the chest etc. The measurements of functions include such items as pulse rate arterial and venous, blood pressure, muscles.

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strength, basal metabolic rate, estimate from cardio-vascular posture and breathing capacity.

Body composition was concerned in past with the obesity of the individual. In measuring these aspects of body compositions, the total body weight is measured. Lean body weight includes muscle bones and vital organs. The underlying assumption is that total body weight equals lean body weight. The higher the percentage of fat body weight the higher the degree of obesity.

Anthropometric measurements were maters of concern of the first phase of the scientific area of measurement, which began in 1960’s. Current interest in anthropometric measurements focuses on three areas — growth patterns and prediction of success in motor activities, as well as, assessments of obesity.

The higher the percentage of fat body weight, the higher the percentage of obesity. The physical fitness anthropometric measurement variables and body compositions are very important

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factors for achieving the high level of performance in standard competitions\textsuperscript{10}.

So, the objective assessment of the relationship that exists between selected anthropometrics measures and body compositions to performance in sprint serve the coaches and physical education teachers to select the athlete for a particular event and to construct the training schedule accordingly because no study has been done on this topic\textsuperscript{11}.

The main aspect to be emphasized in order to achieve high level of performance is the efficient function of the body. They must function well enough to support the particular activity that the individual is performing since different activities make different demands upon the organism with respect to blood circulation, respiration, metabolic neurological and temperature regulating functions, Physiological fitness is specific to activity. Human body is highly adaptable to exercise. The response of each system is discrete, hard work in the heat is necessary to improve the fitness of the temperature regulatory mechanism. Each task


\textsuperscript{11} Allen Philip and Jaes E. Harnal : \textit{Measurement & Evaluation in Physical Education} (New Yask John Willey and Sons, 1979) P.223.
has its major physiological components and fitness for the task required are effective functioning of the appropriate system.\textsuperscript{12}

The improvement in any particular game and sport is mainly due to specialization in the concerned sport and game. So it is necessary to provide in a very definite and scientific procedure for training techniques in order to obtain the most efficient and effective performances. Competition in all field of games and sports has developed to such a high degree that no coach or player can afford to neglect the application of scientific training and principles that can give him/her the advantages or at least keep him at par with his opponents.

Now-a-days physical activities have become part and parcel of human life. Many people participate in sports and games for fun and enjoyment. Enjoyment and maintaining health and fitness have increased participation in sports and games, and give rise to various forms of competitions. Competition provides the means by which one can show one's worth by competing regularly. All sports persons and team try to show their supremacy over one another in sports competitions. Each and every country develops its own innovations in techniques, tactics and

strategies for exhibiting top level performance, so as to emerge winners and champions of the world.

In competitive sports, for the selection of a particular sport, one has to consider measures of human body and the physical fitness which play a dominant role at higher level of sports competitions.

Scientists and physiologists have been of the view that anthropometry and physical components of an athlete have a lot to do with the performance, more than the techniques and tactics of a player of a team. The research findings show that a high level of technical perfection alone has nothing to do with the success in competitive sports. Most of the games demand a greater amount of speed, strength, endurance, flexibility, co-ordination and maximum fitness of the organism.  

Training of an athlete must start from young age, it means selection must be made at the school level. The potential athlete should be selected on the basis of physiological and morphological characteristics and for different sports events should be given proper extensive training by the experienced coaches over prolonged periods.

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The efficient coach provides his or her athlete with a grasp of strategy, a physiological environment conducive to model level of performance, a means of learning skill and proper course of training.

Modern scientific methods of training players or team place greater responsibility on the coaches and physical educators. They are also responsible for the selection of team taking into consideration the physical and physiological qualities essential for the game.

Psychology is a behavioral science, which has made its contribution for improving sports performance. It has helped coaches to coach more effectively and athletes to perform more proficiently. This psychological aspect of sports is gaining much attention among sports administrators. A rapidly growing area of interest in Sports Psychology concerns the use of stress management and other procedures, such as Biofeedback and relaxation technique to athletes for reducing anxiety.

The phenomenon of sports today intervals in many fields of endeavor and very often it even has a central position. Sports have thus experienced an enormous intention qualitatively as well as quantitatively with positive and negative results.

Apart from health sports with their special meaning as a prophylaxis against civilization damage and as many sided therapy, there
is a high performance sports too. The extreme sports performance principles in modern high sports prepare the man for his optimum performance without passing the limits to pathological condition.

Every increased performance demands increased input, increased engagement in its turn leads to increased stress.\textsuperscript{14}

Singh\textsuperscript{15} has suggested that most of the coaches agree that the physical characteristics, skills and training of the players are extremely important but they also indicate the good mental preparation for competition, which is necessary component of success. In western countries like Russia, G.D.R., Bulgaria, Czech and Slovakia much stress was given on the mental preparation of their international teams as well as on the psychological conditioning of their sports persons. A coach had the job of helping the athlete to find out his specific talents and factors for achieving their fullest potential. This included developing not only the physical attributes but also his attitudinal motivation and psychological spirits.

Motivation in general is a process, which indicates why people participate in sports, the way they do. The urge to run and play when


young, to excel when competing, to struggle when confined, to be aggressive when participating in some event.

When frightened and typical of man as he matures and develops and moves through life’s many dangers and competitive situations\textsuperscript{16}.

The basis of achievement motivation is achievement motive i.e. a motive to achieve. Those who engage themselves in a task on account of an achievement motive are said to work under the spirit of achievement motivation.

Achievement motive comes into picture when an individual knows that his performance will be evaluated, that the consequence of his actions will be either a success or a failure and that good performance will produce a feeling of pride in accomplishment. Hence, achievement motive may be considered as a disposition to approach success or a capacity for taking pride in accomplishment when success at one or another activity is achieved\textsuperscript{17}.

Contrary to the achievement motive there is also an aversion tendency known as “Avoidance Motive” – found in the human beings. The motive to avoid failure is considered a capacity for experiencing


shame and humiliation as a consequence of failure\textsuperscript{18}. Anxiety is one of the most common deterents to good performance. At worst the effect of anxiety gets the athletes so tied up in knots that he is frozen in fear. At best anxiety subtly impairs performance by distracting the attention.

Anxiety is a state of mind in which the individual responds with discomfort to some event that has occurred or is going to occur. The person’s worries about events, their occurrences and consequences in general are the source of anxiety. However, anxiety is either somatic or cognitive in nature. In simple words it is a type of emotional disturbance\textsuperscript{19}.

Individual differences in competitive anxiety and the ability to control that anxiety are major concerns for participants in competitive programmes. Indeed many sport psychologists doing applied work with athletes focus on anxiety management techniques and spend considerable time helping participants learn to control anxiety levels. Because of such concerns, sports psychology research on the personality construct of competitive anxiety and the implication of individual difference in competitive, anxiety for sports performance and behaviors is quite


extensive, much of the research stems from Martens (1977) Theory of competitive anxiety and his development and use of sorts competition anxiety test (SCAT).\textsuperscript{20}

Anxiety plays a permanent role in sports. It is the challenge in sports participation, which produces anxiety. How an athlete handles the anxiety determines how successful he would be. Anxiety may be positive motivating force or it may interfere with successful performance in sports events. The degree of anxiety also varies with a number of difference conditions.

Anxiety is likely to be greater in higher competitive sports than in relatively non-competitive sports, because in the competitive sports, participants are bent upon succeeding. The study of the effect of anxiety on sports performance is a major topic of interest among sports psychologists in recent years. The degree of perceived anxiety is an important variable to be considered in the performance of an individual.\textsuperscript{21}

Unfortunately, we Indians still believe in magic formulas for transforming limited trained class champions. This limitation can only be reached through the implication of new research findings. Thus to spot

out the gaps and subsequently bridge them, the scholar in the form of present study, is making modest effort in this direction to prepare the physical, anthropometric, physiological and psychological profile of athletes belonging to different track and field events. Moreover, how far they are dissimilar or similar with each other is the biggest issue. Thus, the results will open the door for the students/coaches/ physical educationist if they want to compare their physical, anthropometric, physiological and psychological parameters.

It may help the coaches of athletics, as well as physical education professionals to spot the talent in athletics and also to make a very scientific training programme for future sprinters.

**Statement of the Problem**

The purpose of the study was also to determine the physical, anthropometric physiological and psychological profile of the athletes belonging to different track and field events.

Another purpose of the study was to compare the athletes on basis of physical, anthropometric, physiological and psychological variables among sprinters, jumpers, middle distance runners, long distance runners & throwers.
**Delimitations**

1. The study was delimited to the male athletes of Track and Field of the Inter-University level.

2. The study was further delimited to Physical Fitness Components as measured by AAHPER Youth Fitness test.

3. The study was delimited to Anthropometric, Physiological and Psychological variables.

**Limitations**

1. Personal habits of subjects and their state of mind as well as emotional stresses and strains and other factors, which may have affected the result of this study and which could not be controlled, was considered the limitation of the study.

2. Certain factors like diet, daily routine habits, facilities, training, geographic conditions etc. that might have had effect on the results of the study was also treated as the limitation of the study.
Hypothesis

Based on evidence available in the literature and on the basis of personal experiences, as well as discussion with experts, the following hypothesis was formulated.

It was hypothesized that there shall not be any significant difference between means of Physical, Anthropometric, Physiological and Psychological variables of track and field athletes of different events at the university level.

Definition and Explanation of Terms

Physical Fitness

It is the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to engage in leisure pursuits and to meet emergency situations (Clarke, 1979)\textsuperscript{22}.

Physical fitness refers to the organic capacity of the individual to perform the normal task of daily living without undue tiredness or fatigue, having reserve of strength and energy available to meet satisfactorily any emergency demands suddenly placed upon him\textsuperscript{23}.


Muscular Strength

Muscular strength is defined as the force that a muscle or muscle group can exert against resistance in one maximal effort\textsuperscript{24}.

Strength is the ability to overcome resistance or to act against resistance\textsuperscript{25}.

Muscular Endurance

Ability of a muscle to work against a moderate resistance for long periods of time is termed muscular endurance\textsuperscript{26}.

Speed

Barrow and McGee define speed as, “The capacity of an individual to perform successive movements of the same pattern at the first rate”\textsuperscript{27}.

Agility

Agility is the ability to change directions quickly and control body movements\textsuperscript{28}.

The speed with which an individual may change his body positions or fatness in changing directions while moving is known as agility

**Explosive Strength**

It is the capacity of the individual to release maximum force in the shortest period of time.

**Cardiovascular Endurance**

The ability to perform muscular work at sub-maximal level by moderate-contractions for a long time is known as cardiovascular endurance.

**Anthropometrics Measurement**

Anthropometry is the science of measuring the human body and its parts. It is used as an aid to the study of human body evaluation and variations.

**Lean Body Mass**

The total body weight minus the weight of the body’s fat is called lean body mass.

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\text{Lean Body Mass} = \text{Total Body Weight} - \text{Weight of Fat}
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Body Fat

Fat is most variable tissue in the body and distributed throughout the body primarily under the skin and in the abdominal cavity\textsuperscript{32}.

Breath Holding Capacity

As defined by masses, Breath holding time is the duration of time through which one can hold his breath without inhalation or exhalation.

Percentage of Fat

Fat is the most visible tissue in the body and is distributed throughout the body primarily under skin in the abdominal cavity\textsuperscript{33}.

Resting Heart Rate

Resting heart rate may be defined as the number of heart beats in one minute when the person is under complete physical and mental rest.

Respiration rate can be defined as the number of inhalations or exhalation per minute.

Incentive Motivation

The system by which the researchers examine the motivation of young competitors by assessing what goals athletes perceived as available as a consequence of their participation in competitive sport and how

\textsuperscript{32} Phillips abd Hornak, “Measurements and Evaluation in Physical Education”, p. 11.

attractive these goals were to them (i.e., incentive values of these goals)\textsuperscript{34}.

**Excellence**

Excellence means, “opportunity for athletes to do something extremely well or to be very good at something\textsuperscript{35}.

**Power**

Opportunities for athletes to influence change and control opinions and attitudes of other people (primarily other athletes and coaches) have towards them\textsuperscript{36}.

**Sensation**

Opportunity for athletes to have existing interesting and sensory experience primarily in terms of novelty, uncertainty and complexity\textsuperscript{37}.

**Independence**

The attractiveness of opportunities to do things on ones own without the help, advice, encouragement and interference from other people\textsuperscript{38}.


\textsuperscript{36} Ibid, p. 63.

\textsuperscript{37} Ibid, p. 53.

\textsuperscript{38} Ibid, p. 76
Success

An incentive success is attached to status, prestige, recognition, social approval. The "Social" and "Self" esteem that occurs from being successful.\(^\text{39}\)

Aggression

The tendency of the players to resort to physical domination, intimidation and subjugation of one's opponents. Ascendancy over other people (i.e. power) secondary F.N.S.\(^\text{40}\).

Affiliation

The finding of attaining, maintaining and consolidating close, warm personal relationship with other people\(^\text{41}\).

Achievement motivation

It is an athlete's predisposition to approach or avoid a competition situation\(^\text{42}\).

Anxiety

Anxiety is a subjective feeling of apprehension and heightened physiological arousal\(^\text{43}\).


\(^{40}\) Ibid, p. 94.

\(^{41}\) Ibid, p. 43.

\(^{42}\) Ibid, p. 36.

State Anxiety

State anxiety is the actual feeling of state of apprehension and tension at any given moment. Person with high trait anxiety tends to have high state anxiety in stressful situation\textsuperscript{44}.

Trait Anxiety

Trait anxiety is the tendency to become anxious in stressful situation\textsuperscript{45}.

Sports competition Anxiety

Competitive anxiety is the sports specific counterpart of the motive to avoid failure of the tendency to become anxious and worried about failure to sports competition\textsuperscript{46}.

\textsuperscript{44} Dine L. Gill, \textit{Psychological Dynamics to Sports} (Human Kinetics Publishers Inc. Champaign Illionibi, 1948) P.75.
\textsuperscript{45} Ibid, 29.
\textsuperscript{46} Ibid, 61.
**Significance of the Study**

The study under investigation may contribute in the following ways.

1. The findings of this study may add to the existing knowledge of physical educationist, coaches and useful to those who involve themselves in organization of sports and training.

2. The study may help the athletes themselves to understand their potentialities in respect to physical, physiological and psychological fitness.

3. The findings of this study are likely to provide criteria for selecting potential beginner students.

4. The study may help physical education teachers, coaches and selectors in selecting fit athletes as per their requirement for demonstration.

5. Further, the study may help physical education teachers and coaches by way of informing them the specific fitness requirement, which the athletes require.
6. The findings of this study may be of great help for the teachers of physical education and coaches to design the specific training programme.

7. The outcome of this study may bring out some knowledge about the relationship of anthropometric measurement and lean body mass to the performance of sprinters.

8. This study may be of a great use to the Physical Education teachers and coaches to select appropriate potentialities for different track and field events.

9. The finding of this study may give certain guidelines based on anthropometry for selecting the proper player for a particular event or game.

10. The study may help to compare with the other players of the same level.

11. It may help the coaches and trainees to get an idea of the present performance level of the trainees.

12. It may also add the knowledge to the field of Exercise Physiology.
13. The study may be very significant for the self-assessment of the athletes.

14. It will provide the coaches to acquire a deeper insight into their own interactive process.

15. Results may also help the coaches and psychologists to provide correct guidelines to the athletes.