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CHAPTER - I

INTRODUCTION

“Sport is a universal language that can bring people together, no matter what their origin, background, religious beliefs or economic status”.

Kofi Anan
Former UN Secretary General.

Sport is all forms of physical activity which, through casual or organized participation, aim to use, maintain or improve physical fitness and provide entertainment to participants. Sport may be competitive, where a winner or winners can be identified by objective means, and may require a degree of skill, especially at higher levels. Hundreds of sports exist, including those for a single participant, through to those with hundreds of simultaneous participants, either in teams or competing as individuals.

The education imparted in our schools and colleges is mainly intellectual. Even though every school and college has a playground and offers facilities for sports like cricket and football, participation in games is not compulsory and little account is taken of it while awarding certificates
and degrees. The organic connection between mind and body must be realized and more attention must be paid to the importance of physical training of the young.

1.2 Importance of sports

According to Gandhi and Tagore, all round development of a child should depend upon the true education imparted to us. Education must be the result of overall development of the child i.e. mental, moral, social & physical. Education develops a personality which a person carries forward in his/her life. Sports are necessary for developing a strong and a healthy body through which human beings can withstand all the physical, physiological, psychological and sociological problems. Playing a game for sometime refreshes the mind of an individual. It creates a feeling of energy, and makes the player more enthusiastic. In general, education without physical activity is an incomplete one.

Sports also inculcate valuable qualities and values in young people. They learn how to cooperate with one another and to become a worthy individual in the society. They learn to play the game, practicing fair play and showing generosity towards their opponents. They also cultivate the quality of sportsmanship, by playing a game according to its rules and regulations to accept win or lose with the same temperament. They are likely to follow the ideal of sportsman spirit in life also, showing honesty and uprightness in their dealings with others and never using unfair means to attain personal ends/gains.

Regularly indulging in sports helps in keeping the immune system strong and prevents disease. It also increases the appetite of the person. Thus, sports promote good health. Sports inculcate discipline, dedication and responsibility in a person, which he is able to apply in other areas of life as well. This makes him achieve success in every sphere of life, thus, making him even more confident.
In the field of sports, physical fitness is a main component to achieve best performance. Not only in sports, but also in general life, human beings should possess minimum physical fitness for well being.

1.3 History of Kabaddi

Kabaddi is one of the most popular games in India and its unique origin can be traceable in the early Indian history. Many regions of India claim the credit for originating it and that would perhaps indicate that the game has been popular in many parts of the country for a long time ago. The present form of Kabaddi is entirely different from that of the ancient, as changes occurred in the rules and regulation of the game in different periods. At present the game turns more defensive in nature even though it demands a great deal of fitness from the players. Nowadays it is attaining wide popularity and soon the game Kabaddi may find an important place in the international sports calendar.

Kabaddi is essentially an Indian game, which commands huge popularity in India as well as in its hinterland. In India, Kabaddi is popular in different names. In the southern parts of India, the game is referred to as Chedugudu or Hu-Tu-Tu. In eastern India, it is fondly called Hadudu (for men) and Kit-Kit (for women). The game is known as Kabaddi in northern India. Breath control, raid, dodging and movement of hand and feet are the basic skills that one has to acquire, in order to play Kabaddi. The player has to acquire power and learn both offensive and defensive skills to excel in the game, which combines the characteristics of rugby and wrestling.

In the modern times, Kabaddi was given the national status of a game in India in 1918. Consequently, a standard set of rules and regulations for the game were formulated in the same year. However, the rules and regulations were brought to print in 1923. During the same year, an All India Tournament for Kabaddi was organized at Baroda, wherein the players strictly followed the rules and regulations formulated for the game. Since then, the game has come a long way. Its popularity increased and a number of tournaments were organized at national level, throughout the
country. In 1938 the game was introduced Indian Olympic Games held at Calcutta, which fetched it international recognition.

All India Kabaddi Federation (AIKF) and Amateur Kabaddi Federation of India (AKFI) were stated with a view to increase the popularity of Kabaddi as a sport in India. The All India Kabaddi Federation (AIKF) was founded in 1950. Since its establishment, the All India Kabaddi Federation has been working towards uplifting the standard of the game. To serve the purpose, it has been conducting National level Kabaddi Championships on a regular basis since 1952, in accordance with the set rules and regulations of the game. In 1955, the first men's national tournament was organized in Madras, and the first women's nationals were held in Calcutta. The Amateur Kabaddi Federation of India (AKFI) came into existence in 1973, in order to popularize the game in the neighbouring countries of India as well as to organize national level tournaments.

In 1961, the Indian University Sports Control Board (IUSCB) included the game of Kabaddi in its curriculum, as a prime sports discipline for the students. This raised the status of Kabaddi as a game in India, further. Thereafter, the game was introduced as one of the important games in the school by the School Games Federation of India (SGFI) in 1962. This decision played the vital role in urging the school going children to participate in state and national level competitions for the game, organized by the SGFI. Another development in the history of Kabaddi in India took shape in 1971, when the National Institute of Sports (NIS) included Kabaddi in the curriculum of Regular Diploma courses.

1.4 The game Kabaddi

In the case of Kabaddi, the basic skills like holding, riding, blocking, and breath holding are highly needed. It is true that these skills are basic abilities for all Kabaddi players, but the performance potential depends on specific variables. The coaches and trainees may not be able to determine them by their subjective observations of performances alone. A scientific analysis of the player's performance with respect to their skills might help in a much more positive way. This will
enable not only the right type of selection based on scientific data but also help in maximizing the
player's potentials by regrouping and synchronizing the team talents that are available. Hence, the
selection, the training, the performance and monitoring of game strategies can be updated by a study
on scientific training and performance of the players. Though the players of the team are drawn
from a particular age group, as in the case of University Teams, and their general skills measure to a
standard level which has ensured their selection in their respective University Teams, their
performance levels may vary, deciding the success or failure of their teams. In sports, successful
performance in competition depends substantially on the physical characteristics, body composition,
muscular performance, neuromuscular capability and mental ability of the players.

1.5 Importance of this study

The changing nature of the game Kabaddi, demands the right type of physical, physiological
and psychological abilities on the part of a player. The increasing trend of professionalism and the
converging demand for competitive sports have changed the complexion of the games which had
been initially intended as a recreational activity of the villagers. Today with the adventure of
modern scientific equipments for training and selection of the players, it has been now made
possible to measure the fundamental performance characteristics which contribute to a player's
success. What is recommended for the case of high school Kabaddi players are applicable to the
university Kabaddi players too.

Now a day specific training has been playing a predominant role with emergence of
different methods having sustained scientific knowledge for outstanding achievements in various
levels of competition. The sports man is able to achieve high level of performance by concentrating
on major areas like physical strength, physiological efficiencies, psychological development,
application of biomechanics and environmental adjustments.

Human beings have continually tried to run faster, jump higher, and exhibit greater strength,
endurance and skill. To be distinct among others we are naturally competitive and ambitious for
excellence in performances. As a result of practical experience, observation and scientific experimentation, old method of conditioning, though fascinating and rich in tradition, have been discarded and replaced by new methods based on insight and understanding. For centuries, this enquiry forwards better method of conditioning was slow, but in the recent years the draustic changes that have taken place that brought about some outstanding results in performance.

A conditioning program is the essence of the training experience. It is concerned as the effort made to improve through systematic manipulation of repetitions, movements with intensity and duration of exercise. Sports training assist in improving sports performances which includes physical components, technique, psychological development and adjustment to changing environmental factors. The sports man is able to achieve high level of performance by concentrating on major areas like physical, physiological and, psychological factors and by reinforcing the weaken one after identifying.

1.6 Physical Fitness

Physical Fitness is the capacity to carry out reasonably well various forms of physical activities without being unduly tired and includes qualities important to the individuals’ health and well being. Physical fitness is an ability to carry out daily tasks with vigour and alertness, without undue fatigue and with ample energy to enjoy leisure time pursuits and to meet any unforeseen emergencies.

Physical fitness is the basic requirement for most of the tasks to be under taken by an individual in his daily life. Physical fitness is one's richest possession; it cannot be purchased but only obtained through regular routines of physical exercises. A close relationship exists between physical fitness and sports performance. In case the standard of games and sports in the country is to be improved, adequate stress have to be given for enhancing the physical fitness status of sports persons. Regular participation on training schedule improves all the important physical, physiological and psychological fitness components.
Strength is a conditionable ability. It depends largely on the energy liberation process in the muscles. It is the most important motor ability in sports as it is a direct product of muscle contractions. All the movement in sports is virtually seen by muscle contraction and therefore strength is a basis for all other motor abilities, technical skill and tactics of an athlete. Strength training therefore assumes high position in sports. Muscle strength is defined as the amount of force that can be exerted by a muscle group for one movement or repetition. All individuals need a minimum level of strength. Those with low levels of strength, run a greater risk of injury, when engaged in any physical activity. Strength training is also an essential part of physical rehabilitation. Common sports injuries such as tennis elbow, rotator cuff, ligament and tendon strains etc. will respond well to muscle strength programmes. Better posture accompanied by more aesthetic appearance also benefits from strength training. In this study the major physical fitness variables of speed, speed endurance, agility, explosive power, reaction time and abdominal strength endurance are treated for the training program.

Physiological fitness is the capability of the heart, blood vessels, lungs and muscles to function at optimal efficiency, which means the level of health needed for the enthusiastic and pleasurable participation in daily task and recreation activities. Optimal physical fitness makes a possible lifestyle. In order to develop and maintain physical fitness, vigorous effort is to be done by the total body.

In recent years, with the popularity of jogging and other forms of aerobic exercise, many people associate physical fitness almost exclusively with cardiovascular fitness. Each of the specific components of fitness is critical in developing optimal physical fitness and to achieve the benefits associated with being optimally fit.

‘Fit people make a fit nation’ the term fitness includes physical fitness, physiological fitness, mental fitness, social and spiritual fitness. Physically fit people are able to do without fatigue for longer periods and are better equipped to tolerate physical stress.
Physical fitness is the ability to do the body to perform strenuous exercise too. It is the relation of one's ability to work or play with vigour and pleasure without undue fatigue and with sufficient energy for unforeseen emergencies. Physical fitness is the ability to last, to bear up and to preserve under difficult circumstances where an unfit person would give up.

In sports, successful performance in competition depends substantially on the physical and physiological fitness, body composition, muscular performance, neuromuscular capability and mental ability of the players.

1.7 Training

In the words of C Samadi, "Training is a pedagogical process which makes possible the achievement of high standard performance without any physical or mental damages, through planned systematic development of certain specific skills, physical capabilities and the adaptation of the organism". Training is defined as, ‘a systematic process of repetitive, progressive exercise (or) work, involving the learning process and acclimatization’.

Performance capacities in general readily respond to specific training programme that is strength, motor, aerobic and anaerobic tasks are trainable phenotypes. The response of these phenotypes to training is not the same at all ages. This is especially apparent in children, in whom changes associated with growth and maturation and those associated with training move in the same direction. Hence it is difficult to partition growth and maturation related changes from those associated with training. With the exception of several motor tasks, the role of genotype in the response to training has not been systematically studied in children and youth. On the other hand the role of genotype in the response to strength, aerobic and anaerobic training has been expressed in young adults of both sexes.
1.8 Circuit training

Circuit training was developed by R. E. Morgan and G. T. Anderson in 1953 at the University of Leeds in England (Sorani, 1966). The term circuit refers to a number of carefully selected exercises arranged consecutively. In the original format, 9 to 12 stations comprised the circuit. This number may vary according to the design of the program. Each participant moves from one station to the next with little (15 to 30 seconds) or no rest, performing a 15- to 45-second workout of 8 to 20 repetitions at each station (using a resistance of about 40% to 60% of one-repetition maximum). The program may be performed with exercise machines, hand-held weights, elastic resistance, calisthenics or any combination.

By adding a 30-second to 3-minute (or longer) aerobics station between each station, referred to as aerobic circuit training, the method attempts to improve cardio respiratory endurance as well (although this has not been conclusively supported in experimental research). Variations of this aerobic circuit training model include performing 2, 3, 4 or more exercise stations in series, and then performing the aerobics station.

The term "circuit training" describes the way a workout is structured rather than the type of exercise performed. It typically consists of a series of exercises or stations completed in succession with minimal rest in between. Circuit routines allow the athlete or coach to create an endless number of workouts and add variety to routine training programs.

Circuit training is an efficient and challenging form of conditioning that develops strength, endurance (both aerobic and anaerobic), flexibility and coordination all in one exercise session. It is one of the few forms of fitness training that has been shown to effectively develop both strength and cardiovascular fitness in the same exercise session.

A well designed circuit provides a balanced workout that targets all the muscle groups and builds cardiovascular endurance. Circuit routines can also be designed to correct the muscle imbalance that often occurs in sport athletes who specialize in one type of exercise day after day. It
can also provide a high intensity, skills training session or a high calorie burning workout in a short amount of time. Circuits also provide the perfect for any athlete.

This circuit training is a combination of high intensity aerobics and resistance training designed to be easy to follow, give you a great workout, and target fat loss, muscle building and heart-lung fitness. An exercise "circuit" is one completion of all prescribed exercises in the program; the idea being that when one circuit is complete, you start at the first exercise again for another circuit. Traditionally, the time between exercises in circuit training is short, often with rapid movement to the next exercise.

An exercise circuit is simply a way to arrange your workout so that different exercises for each body part or motor pattern follow each other with minimal rest. This training method allows you to train specific muscles and movements in a way of matching your goals, while requiring your cardio-vascular system to continuously provide your body with oxygen. You can train each exercise for a certain number of repetitions, or for a certain period of time. Circuits can also be set up to facilitate training groups of people, each trainee moving through the stations.

1.9 Interval training

The last few decades has seen the introduction of interval training which has considerable influence on sports conditioning. Interval training involves alternating periods of work and rest during a training session. It is a program that varies the intensity within the training session by interspersing a workout of a higher intensity with a rest period of lower intensity; then another workout is completed, once again followed by a rest period, and so on through the workout. This method of training is credited to Dr. Woldemar Gerschler of Germany who pioneered it around 1930 (Stone & Kroll, 1986). The premise of interval training is that an individual can produce a greater amount of work in a training session if the workouts are spaced between periods of rest or relief. For instance, a highly motivated athlete may be able to maintain near maximal intensity exercise for 10 minutes before becoming too exhausted to continue. Yet, if the athlete were to work
at near maximal intensity for 3 minutes interspersed with 3 minute recovery periods the pace may be maintained for an hour before experiencing the same degree of fatigue (MacDougall & Sale, 1981). Manipulating the length of the work and rest intervals in interval training will designate which energy systems are being overloaded.

In interval training work should be done with sufficient speed and duration so that the heart rate goes up to 180 beats/minute. After this there should be a recovery period and when the heart rate comes down to 120-130 beat/minute, the work should be started again. The effect of interval method is determined by the variables of interval method which include speed of work, duration of work, duration of recovery, number of repetitions and nature of recovery. By proper manipulation of the mentioned variables the interval method can be used in several ways each having a different effect of training physiologically.

Interval training developed out of training for traditional cardiovascular activities such as running. Running intervals were a way for you to practice running at a pace far above your race pace while allowing for recovery between fast-paced bouts. Interval training with resistance exercises follows the same principles, but allows you to use strength implements with minimum space. Interval training is appropriate for athletes in strength sports such as power lifting or Olympic weightlifting who desire a cardiovascular effect with equipment familiar to them.

Type of activities during the rest intervals, frequencies of training per week, the type of activity performed during the rest interval can vary from slow walking to rapid walking and jogging or the equivalent of these activities in other sports. $V_{O_2}$ max or maximal oxygen uptake is one factor that can determine an athlete’s capacity to perform sustained exercise and is linked to aerobic endurance. $V_{O_2}$ max refers to the maximum amount of oxygen that an individual can utilize during maximal or exhaustive exercise. It is measured as milliliters of oxygen used in one minute per kilogram of body weight. It is generally considered the best indicator of cardio respiratory endurance and aerobic fitness. Elite endurance athletes typically have a high $V_{O_2}$ max. And some studies indicate that it is largely due to genetics, although training has been shown to increase $V_{O_2}$
max up to 20 percent. A major goal of most endurance training programs is to increase this number. There are many different ways to train for improved aerobic endurance. The duration, frequency and intensity of each type of training vary and the training focuses on slightly different energy systems and skills and results in different physical adaptations. Cardiovascular endurance testing measures are used along with other fitness tests to measure how efficiently the heart and lungs work together to supply oxygen and energy to the body during physical activity.

When most people talk about endurance they are referring to aerobic endurance, which is often equated with cardiovascular fitness. Aerobic means ‘with oxygen’ and during aerobic exercise the body uses oxygen to help supply the energy needed for exercise. Interval training is perhaps the most versatile method for improving strength endurance and speed endurance. Athlete may eventually define work and rest intervals in terms of number of minutes or seconds. In interval training the exercises is done at relatively high intensity with intervals of incomplete recovery.

Circuit training and interval training are both methods for achieving a cardiovascular effect with weight training. In circuit training, you work through a series of exercises that each focuses on a different body part, allowing each body part to rest while your heart and lungs continue to work. Interval training requires you to choose one exercise that challenges your entire body. You perform that exercise for a set interval of time, and then work at a lower intensity or recover for another interval.

The future training process doesn't lie entirely within the hands of those directly associated with it. On the contrary it will inevitably follow the trends and developments within our society as a whole. Sports is effective in shaping the future, but it is only a part of a larger whole and is more likely to be guided by the actions of the largest until it create its own exclusive means of progress.

All over the world coaches of various disciplines in sports have conducted research to find out an appropriate way of training program for their athletes and players to improve their strength endurance which is special factor contributing towards athlete's performance. So far not many
studies have been done in India especially to evaluate the effect of circuit training and interval training.

Investigator has attempted to analyze the effect of circuit training and interval training on selected physical, physiological, and psychological variables of college men Kabaddi players in Kerala.

**1.10 Sports Psychology**

Sport psychology is a division of psychology aimed at better preparing the mind of an athlete for competition. Sports psychology has been defined as "The sub discipline of exercise science that seeks to understand the influence of behavioral processes on skilled movement" (Hatfield and Brody).

**1.10.1 General Anxiety**

Anxiety is another Psychological factor, which differs from arousal in that it encompasses some degree of activation and an unpleasant emotional state. Thus the term anxiety is used to describe the combination of intensity of behaviour and directional effect or emotion. The direction of effect, a characteristic of anxiety, is negative in that it describes subjective feelings that are unpleasant.

Anxiety means troubled state of mind, anxiety can be called nervousness. Anxiety is an unpleasant emotional state. Anxiety is an emotional reaction that is often irrational to conditions that may be unknown to others. Anxiety can be experience at various levels of intensity. Tension is another term used to describe the chronic, usually low level anxiety. Most of the people are susceptible for it, High level of anxiety as panic, which should never form to be a part of the athletic environment. That is the condition in which “The anxiety has become so great that the person loses complete control of himself and the situation”.

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Anxiety is situation specific. To some extent common feeling which tend to increase anxiety in players are fear of success and maintenance of high level of performance, fear of injuries, failure to achieve and fear surroundings, the psychological stresses and pain experiences.

There are many dimensions of fear and anxiety in athletes and non-athletes, experienced and non-experienced athletes, team game and individual sports players are reported to differ on the level of pre-competition anxiety. While highly competitive situations shoot-up anxiety, yogic practices reduce the state of anxiety.

1.10.2 Self Confidence

Self Confidence in sports relies primarily on the athlete's ability to believe he can win and that he can be successful in his efforts. Consultants at the United States Tennis Association report that self-confidence is one of the most important attributes an athlete can possess and should be fostered by both athletes and their coaches.

Athletes must develop self-confidence within their own minds. It is not something they can receive from others. While coaches can encourage players with positive feedback, if the athlete does not identify with success, it doesn't matter how much praise she receives. Athletes must take ownership of their confidence and not allow outside circumstances to interfere with their self-image, even on bad days.

While self-confidence originates within the player, athletes must surround themselves with positive role models and supporters to keep up their internal self-talk. Athletes can look for inspiration in a number of arenas and use positive strategies to maintain their upbeat attitudes. Retired athletes, spiritual advisers, coaches and training partners all can provide positive support and reinforcement.

The significance of training cannot be underplayed when it comes to building self-confidence. The most effective self-confidence is based on reality that is formed by practice and training. Extensive training to overcome weaknesses builds confidence. Trophies, ribbons and other
positive outcomes add to the level of confidence an athlete is capable of building. Continued success breeds self-confidence.

1.10.3 Achievement motivation

Motivation is a key means to achieving success. It greatly depends on the coaches' personality and attitude means of getting players interested in bettering themselves and accepting the means by which they can develop. In Kabaddi, nothing can affect performance as dramatically as a sudden loss of motivation. Without the motivation to succeed a player cannot survive the challenges Kabaddi can throw up. If the team or player is going through a bad patch then motivating your players becomes especially important. However, an overly motivated player may be nervous and take risks. During match preparation, the aim of the coach is to find the right motivational levels. This can be attained by watching the attitude of the players and providing a good pep-talk. The coach can play up or play down the importance of a game in order to reduce or increase motivation. He can also take pressure off too key-up players by accepting responsibility for the result. The experience of the coach does often tell in these situations and will play a role in the resulting performance.

Every player has a dream in Kabaddi and some players pursue their dreams and expect to achieve them through renewed hard work and dedication. Obstacles are seen as a challenge and each setback as a call for more effort to improve and overcome these problems. This type of player is intrinsically self-motivated as their desire to succeed comes from within themselves. Motivation is a key means to achieving success. It greatly depends on the coaches' personality, attitude and means of getting players interested in bettering themselves and accepting the means by which they can develop. Generally, the coach should try to understand what motivation is and the ways to turn under or extrinsically motivated players into intrinsically highly motivated successful players.
1.11 Purpose of the study

The present study has taken into consideration a court game, Kabaddi. Court games are unique in the sense they are played in a small area. It requires a high degree of short running and total body agility in order to gain good court position and compete with one's opponent on both offensive and defensive maneuvers. Competition is a fundamental feature of any sport and it is one type of human behaviour also. Emphasis is needed on the development of personality traits and factors that influences performance in competition.

Traditionally Kabaddi players were chosen based on the individual skills such as riding, holding and catching. Selection of the best players of the Kabaddi is done from subjective observation of playing performance during selection trials. In addition, their performance in past years was also discussed and then the final team was selected.

Recent researches have revealed one of the most undeniable facts that not only the performance but the physical, physiological and psychological conditions also play a prominent role in overall performance of an individual/sportsman. Thus the aforesaid arguments lead an investigator to believe that the playing ability in a game can be predicted if he can identify the variables which determine the performance could be scientifically ascertained in the case of each level of players in college level. The precise understanding and manipulation of the variables are expected to help in choosing right composition of training method as well as in the prediction of the performance level of players in a particular game context. The investigator has tried to the problem of enhancing the performance of university level Kabaddi players.

The purpose of the study was to investigate, interpret and ascertain the above factors that help to predict the performance level and effect of Kabaddi players for men in Kerala state.
1.12 Statement of the problem

The present study was designed to evaluate the effect of selected physical, physiological and psychological variables of age group 18 to 25 years College men Kabaddi players in Kerala state and is entitled

“EFFECT OF CIRCUIT TRAINING AND INTERVAL TRAINING ON SELECTED PHYSICAL, PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES OF COLLEGE MEN KABADDI PLAYERS IN KERALA STATE”

1.13 Definition and explanation of the terms

Training effect

Specificity is the principle of training that states that sports training should be relevant and appropriate to the sport for which the individual is training in order to produce a training effect.

The Specificity Principle simply states that training must go from highly general training to highly specific training. The principle of Specificity also implies that to become better at a particular exercise or skill, you must perform that exercise or skill. To be a good cyclist, you must cycle. The point to take away is that a runner should train by running and a swimmer should train by swimming.

Circuit Training

Keith Nicholis defined that "Circuit training simply involves a series of exercise which must be performed in a specific order until a specified number of circuits have been completed. Each exercise must be, done a particular number of times depending on the maximum number of the individual."
Interval Training

Interval training involves intervals if intensive exercise interspersed with intervals of relatively light exercise or exercise is done at relatively higher intensity with intervals of incomplete recovery.

Speed

Speed is the ability to perform a movement in a short period of time. The ability to move the whole body moves to one point to another as quickly as possible. Capacity of the individual in the role of making successive movement of the same kind (Mathew, 1978)

Speed endurance

Speed endurance is the ability to cover maximum distance under the conditions of fatigue in a minimum possible time.

Agility

It is the ability of the body or parts of the body to change directions rapidly and accurately (Borrow and Me Gee, 1979). Agility is the ability to change the direction of the body in an efficient and effective manner.

William defines “Agility as the ability to change the directions quickly and effectively while moving as nearly as possible at full speed”.

Agility involves a combination of balance, strength, speed and coordination. Abdominal muscles control torso movements, such as flexion, lateral flexion and rotation. Abdominal strength increases agility by helping exert greater force when coordinating torso movements and when changing positions. Abdominal endurance provides the energy need to keep moving torso, and to change directions, over extended periods of time.

Explosive Strength

"The ability to produce maximal forces in minimal time is called explosive strength".
It is the ability of neuro-muscular system to overcome resistance with a high speed of contraction, in which the skeletal muscle system accepts and expels at a high velocity, via, a coordination of motor units, reflexes, elastic component and contractile component of muscles.

**Abdominal strength endurance**

The benefits of abdominal strength and endurance are similar to strength and endurance in other skeletal muscles. Greater abdominal strength increases the amount of force that abdominal contractions can generate against resistance. Flexing abdominal repetitively or sustaining abdominal contractions for longer periods of time requires greater abdominal endurance. Abdominal endurance provides the energy need to keep moving torso, and to change directions, over extended periods of time.

**Reaction Time**

Reaction time is the delay in time between the presentation of a stimulus and the initiation of a volitional response.

**Resting heart rate**

Measurements of Resting heart rate when an organism under Physical and mental rest can be termed as resting heart rate.

**Vital capacity**

The maximum volume of air that can be exhaled from the lungs, following a maximum of inhalation (Astrand and Rodhal, 1970). Vital capacity (VC) is the maximum amount of air that a person can exhale from the lungs after first filling the lungs to their maximum extent; it equivalent to the inspiratory reserve volume (IRV) plus the tidal volume (TV).
Anxiety

Cretty defines that ‘Anxiety appears to be a general fear of foreboding a personality trait marked by a lower threshold to stressful events’.

Achievement motivation

According to Atkinson and Feather (1966), ‘The achievement motive is considered as latest disputation which is manifested in overt striving only when the individual perceives performance as instrumental to as a sense of personal accomplishment’.

Motivation is the tendency for the direction and selectivity of behaviour to be controlled by its connections to consequences and the tendency of this behaviour to persist until a goal is achieved (Alderman, 1974)

Self confidence

‘I don’t think it’s bragging to say I’m something special’.

Muhammad Ali

Self-confidence is the confidence one has in oneself, one’s knowledge, and one’s abilities. It is the confidence of the type: ‘I can do this’ ‘I have the ability to do this’. Self-confidence is the one thing that is much more important than many other abilities and traits. If you do not have self-confidence, what you do will never become fruitful at all.

Self-confidence is the knowledge that you can do something and do it well. Self-confidence comes from firsthand knowledge of the task at hand, knowing your strengths and weaknesses, applying your skills to any situation and adapting quickly as the situation unfolds. People who exude self-confidence know they have what it takes to master difficult situations, and they are not afraid of failure.
Basavanna (1975) states that, “Self confidence refers to an individual’s perceived ability to act effectively in a situation to overcome obstacles and to get things go all right”.

1.14 Objectives of the study

The objectives of the study are the following:

1. To find the effectiveness of circuit and interval training on selected physical variables of the college men Kabaddi players in Kerala state.

2. To find the effectiveness of circuit and interval training on selected physiological variables of the college men Kabaddi players in Kerala state.

3. To find the effectiveness of circuit and interval training on selected psychological variables of the college men Kabaddi players in Kerala state.

1.15 Hypotheses of the study

The study has been designed to test the following hypotheses:

H\(_1\). It is hypothesized that the circuit and interval training will have a positive correlation with the selected speed variables of the college men Kabaddi players in Kerala state

H\(_2\). It is hypothesized that the circuit and interval training will have a positive correlation with the selected strength variables of the college men Kabaddi players in Kerala state

H\(_3\). It is hypothesized that the circuit and interval training will have a positive correlation with the selected Endurance variables of the college men Kabaddi players in Kerala state

H\(_4\). It is hypothesized that the selected physiological variables will improve through circuit and interval training on the college men Kabaddi players in Kerala state

H\(_5\). It is hypothesized that the selected psychological variables will improve through circuit and interval training on the college men Kabaddi players in Kerala state
1.16 Methodology in brief

The experimental method was adopted for this study. The investigator defined the population for the study as 60 college men Kabaddi players in Kerala state. The investigator has to obtain a sample which would represent the population in all relevant aspects.

The methodology used in this research involves the choice of a specified group of subjects, selection of variables, administering of standard tests, using of the relevant tools, obtaining predetermined information in the certain chosen factors and subjecting them for a statistical analysis.

1.17 Sample for the study

The sample for the study constituted 60 college men Kabaddi players in northern and southern region of Kerala.

1.18 Delimitations

The study is delimited to the following factors:

1. The study delimited to college level men players.

2. The study is delimited to 60 Kabaddi players studying in different colleges and trained in various colleges, clubs and centers in Kerala state in India.

3. The study was further delimited to 60 Kabaddi players who have studied in various colleges in northern and southern region of Kerala.

4. The study was further delimited to the age group of 18 to 25 years of age.

5. Delimited to selected physical variables ie. maximum speed, speed endurance, agility, explosive power, reaction time and abdominal strength endurance.

6. The physiological variables selected for this study were heart rate and vital capacity.
7. The psychological variables selected for this study were general anxiety, self confidence, and achievement motivation only.

1.19 Limitations

The following uncontrollable factors associated with the study were accounted as limitations for this study.

1. The previous experience of the subjects in the field of sports and games which might be influencing on the training cannot be considered.

2. The investigator is not controlling or assessing the quality and quantity of food ingested separately for each individual.

3. The uncontrollable changes in climatic condition such as atmospheric temperature, humidity and other metrological changes during the period of experiments and at the time of testing could not be controlled and this is considered as a limitation.

4. The differences that exist among the subjects due to varied social, cultural and economic factors cannot be controlled and this is considered as another major limitation of this study.

1.20 Significance of the study

The ultimate goal of research in physical education is to help coaches and physical educators to train the athletes and players based on new concepts to, improve the performance. The present investigation has the following significant contribution to the field of physical education and sports. The findings of this study would reveal the extent to which the circuit training and interval training will help to improve the selected physical, physiological and psychological variables of Kabaddi players.